ETHEKWINI MUNICIPALITY

Durban Metro

DSW

INTEGRATED WASTE MANAGEMENT PLAN FOR ETHEKWINI MUNICIPALITY

AUGUST 2004

SKF ENGINEERS

BLUE SQUARE

MALLINICKS

HAULTEC

ETHEKWINI MUNICIPALITY

EDSW

INTEGRATED WASTE MANAGEMENT PLAN

DATE : AUGUST 2004

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ETHEKWINI MUNICIPALITY

EDSW

INTEGRATED WASTE MANAGEMENT PLAN

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FINAL DRAFT

This IWMP has been based on data and information which was relevant between July 2003 and June 2004.

Where this cannot be applicable, the cut off date selected was end of August 2004.

ETHEKWINI MUNICIPALITY

INTEGRATED WASTE MANAGEMENT PLAN

CHAPTER 1
Scope of Plan

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1 SCOPE OF PLAN

The scope of plan for the Integrated Waste Management Plan (IWMP) comprises a description of the overall objectives, goals and the planning time horizon. The geographic area covered is defined.

1.1 Goals

The main goal of integrated waste management (IWM) planning is to optimise waste management in a region by maximising efficiency and minimising financial costs and environmental impacts.

The compilation of an IWMP by a local authority enables the authority to spell out what its intentions are and how it proposes to achieve these goals. It sets milestones which it hopes to achieve and then submits its IWMP to the relevant provincial authority for approval and acceptance.

The IWMP will then be implemented to the best of the local authority's ability, subject to financial constraints imposed by budget restrictions and sustainability of services rendered. Proper monitoring of the development and implementation process will be necessary to gauge successful milestone achievements.

A regular review process is necessary to ensure that the objectives of the plan are met over a period of time.

1.2 Geographic Area

The geographic area contained within the eThekwini Municipality, as defined in the attached map, Figure 1.1 in Appendix 1.1, will comprise the region to which this IWMP is applicable.

The area is subdivided into the Central, Northern, Southern, Inner West and Outer West Regions. See Appendix 1.1.

On the eastern side the area is bounded by the Indian Ocean.

1.3 Applicable Definitions

Three words are used in relation to the IWMP and it is important that clarity is reached regarding their meanings. Within the context of this Report they are defined as follows:

1.3.1 Planning

The *planning* of the IWMP is defined as the process embarked upon for analysis, improvement and optimisation of the eThekwini DSW (EDSW) plan for integrated solid waste management.

This planning process commenced a number of years ago and has been formalised from a technical, operational and financial perspective since 1998 when a series of master plans and subsequent updates were commissioned.

In the latest master plan legal and institutional dimensions were not addressed, which is required in an IWMP, as envisaged in the National Waste Management Strategy (NWMS). These dimensions did not form part of the brief at that stage.

The planning process is therefor well advanced regarding operations, but requires further attention regarding the soft issues.

1.3.2 Development

The *development* of the IWMP is a step further than planning, and is defined as the combined effort to enhance the existing Master Plan with that dimension which would convert it to an integrated waste management plan as per the NWMS.

Development therefor means the evolution and compilation of the IWMP, recording the plan in a document, seeking approval thereof and then proceeding towards implementation of the Plan.

This development process is also currently in progress and commenced a number of years ago. It will be broadened to accommodate the further dimensions required by the IWMP.

1.3.3 Implementation

The *implementation* of the IWMP is defined as the physical execution of the stated goals and objectives which are set out in the integrated waste management plan contained within this Report, after the necessary approvals have been secured.

The continual process of waste management has resulted in past implementation of certain elements contained in the IWMP, and the future further implementation will be in accordance with this Plan, subject to limitations beyond the control of EDSW.

1.4 Overall Objectives

The overall objectives of this IWMP are to achieve integration of the solid waste management function relating to the operational, financial, legal and institutional dimensions of the business. All these must comply with various policy principles.

Certain policy principles are specified in the National Environmental Management Act (NEMA), the White Paper for Integrated Pollution and Waste Management for South Africa (IP & WM) and the National Waste Management Strategy and associated Action Plans (NWMS), and include accountability, full cost accounting, good governance, easy access to information, broad spectrum participation and the polluter pays principle.

Other principles include job creation in previously disadvantaged communities, taking serious cognisance of the waste hierarchy and minimisation of waste.

The IWMP is the route map which eThekwini will follow in the next short term planning period and the longer term planning period, subject to availability of funds and budget awards by Council.

Waste minimisation is a national objective which will be complied with and recycling and composting will be promoted.

Pollution control and environmental protection will be encouraged and supported.

Universal service provision, as required by the Constitution, is important to eThekwini Municipality and good progress has been made in this regard. Provision of an affordable and sustainable waste

management service to all sectors of the community remains a priority and on-going optimisation of the total process, with a view to realising cost effective waste management in the Region, will be pursued in a similar fashion to that which EDSW has followed over the recent past.

1.5 Planning Time Horizon

EDSW has been involved in a detailed master planning process for waste management since 1998 and have updated and expanded their Master Plan four times to date. The Master Plan initially focussed heavily on logistical, technical, operational, capital and financial aspects, and was done by utilising the software program *SKC WasteModel©*.

This planning exercise has enabled EDSW to proceed with development and implementation of their current master plan scenario which was selected on the basis of financial optimisation.

All of the above has put EDSW in the privileged position of having pre-empted the IWMP to a large degree and in fact, EDSW is already partly advanced with development and implementation of their IWMP or the Master Plan equivalent thereof.

The IWMP has a short-term planning horizon of 0 to 5 years and a longer term horizon of 5 to 12 years. The Master Plan considered a 20 year time horizon.

In summary, the master planning process has been ongoing since 1998 and has been based upon the present Rand value at the time of each Master Plan. The most recent Master Plan forms part of and is integral to the IWMP as planned and developed.

1.6 Approval

After the public participation process is complete and approval from the eThekwini Municipality has been secured for the final IWMP, it will be submitted to the KwaZulu Natal Provincial Government for consideration and approval via DEAT.

Appendix 1.1

Area Map

eThekwini Municipality

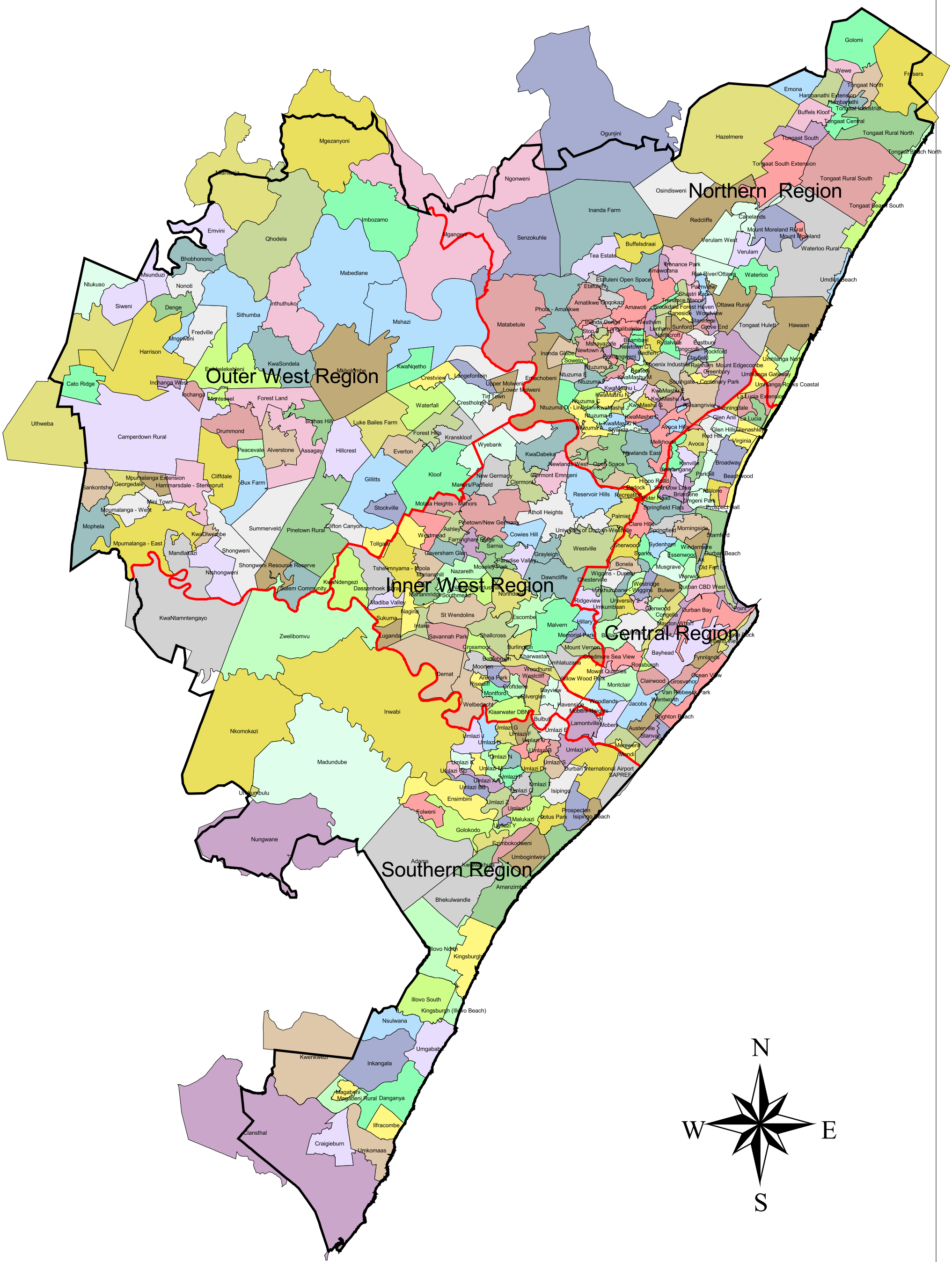

Figure 1.1

ETHEKWINI MUNICIPALITY

INTEGRATED WASTE MANAGEMENT PLAN

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2 STATUS QUO

2.1 Existing Facilities and Practices

2.1.1 Landfills

a) Site Vehicles

SITE VEHICLES				
NAME	**VEHICLE TYPE**	**REGISTRATION NUMBER**	**CURRENT HOURS (APR 2004)**	**ESTIMATED REMAINING HOURS (APR 2004)**
Bisasar Road	CAT 826G Compactor	DSW 00522	11400	8600
	CAT 826C Compactor	DSW 00324	10740	9260
	Bomag 671RB Compactor	DSW 1426	4550	15450
	CAT D7R Dozer	DSW 00494	11565	8435
	CAT 120G Grader	NDM 4401	11900 (Shared)	8100
	10t Padfoot Roller	DSW 01062	2050 (Shared)	17950
	2208 Front End Loader	NDM 4413	6900	13100
	2209 Front End Loader	NDM 4414	7350	12650
	CAT 320LME Excavator	DSW 0034	13290	6710
	Bell B20 ADT	NDM 4405	10600	9400
	Bell B20 ADT	NDM 4407	8000	12000
	Bell B20 ADT	NDM 4408	6800	13200
	Bell B20 AWT	NDM 4409	4100	15900
	Bell B20 AWT	NDM 4412	4400	15600
	Bell B20 AWT	NDM 4410	5000	15000
	Bell B17 ATT Tanker	NDM 4403	5100 (Shared)	14900
	Bell B17 ATT Tanker	NDM 4406	7400	12600
	Bomag 672 RB	DSW 1973	800	19200
	Komatsu D65 (we have 2)	DSW 1917	600	19400
	Komatsu D41	DSW 1918	500	19500
	Bell B23D Hooklift	NDM 4332	500	19500
La Mercy	CAT 826G Compactor	DSW 00521	11649	8351
	CAT D6H Dozer	DSW 00326	15196 (Rebuilt)	Nil
	CAT 120G Grader	NDM 4401	11900 (Shared)	8100
	10t Padfoot Roller	DSW 01062	2050 (Shared)	17950
	Bell B20 ADT	NDM 4431	9835	10165
	Bell B17 ATT Tanker	NDM 4403	5100 (Shared)	14900
Mariannhill	Bomag 671 RB Compactor	DSW 001088	7102	12898
	CAT D6M Dozer	DSW 00947	6316	13684
	CAT 120G Grader	NDM 4401	11900 (Shared)	8100
	10t Padfoot Roller	DSW 01062	2050 (Shared)	17950
	Hitachi FH200 Excavator	DSW 493	8214	11786
	Bell B20 ADT	NDM 4402	7836	12164
	Bell B17 ATT Tanker	NDM 4404	3250	16750
	Komatsu D65	DSW 1916	600	19400
The CAT 120 G grader and 10t roller are shared on the various operative DSW landfills. The Bell ATT Tanker (NDM 4403) is shared between Bisasar and La Mercy.				

b) Annual Waste Received

ANNUAL WASTE RECEIVED				
NAME	**WASTE TYPE**	**TRANSPORTED VOLUMES m³/ANNUM**	**TRANSPORTED/DISPOSED MASS TONS/ANNUM**	**LANDFILLED VOLUMES TON/ANNUM @ 1200 kg/m³**
Bisasar Road	Solid Waste	853288	298651	248876
	Garden Refuse	481052	72158	60131
	Building Rubble	78851	47311	39426
	Mixed Loads	30480	10668	8890
	Very Light Items	609	30	25
	Light Items	1361	68	57
	Whole Tyres	6294	1259	1049
	Munitech Contracts	110451	38658	32215
	Cover Material	277987	277987	231656
	Condemned Foods	1322	463	386
	Asphalt	933	560	467
	Mondi Pulp	36098	14439	12033
	Special Waste General	5398	1889	1575
	TOTAL	**1884125**	**764141**	**636784**
La Mercy	Solid Waste	235635	82472	68727
	Garden Refuse	30792	4619	3849
	Building Rubble	396	237	198
	Mixed Loads	15578	5452	4543
	Very Light Items	107	5.4	4.5
	Whole Tyres	99	19.8	16.5
	Cover Material	61	61	51
	Condemned Foods	5	1.8	1.5
	TOTAL	**282673**	**92869**	**77391**
Mariannhill	Solid Waste	94030	32911	27426
	Garden Refuse	113002	16950	14125
	Building Rubble	5997	3598	2998
	Mixed Loads	2662	932	777
	Very Light Items	1299	65	54
	Light Items	200	15	13
	Whole Tyres	1247	249	208
	Cover Material	43628	43628	36657
	Condemned Foods	94	33	27
	Special Waste	2416	846	705
	PSW Collection	112201	39270	32725
	TOTAL	**376877**	**138497**	**115414**

ANNUAL WASTE RECEIVED, (2002 FIGURES)				
NAME	**WASTE TYPE**	**TRANSPORTED VOLUMES m³/ANNUM**	**TRANSPORTED/DISPOSED MASS TONS/ANNUM**	**LANDFILLED VOLUMES m³/ANNUM @ 1200 kg/m³**
Shongweni	Solid Waste	118743	41560	55413
	Low Hazardous	259185	51837	69116
	TOTAL	**377928**	**93397**	**124529**

Bomag 671 compactors are used for operation on site and the assumed compaction density of the waste after disposal and compaction is 750kg/m³, due to the co-disposal of wet wastes.

ANNUAL WASTE RECEIVED, (2002 FIGURES)				
NAME	**WASTE TYPE**	**TRANSPORTED VOLUMES m³/ANNUM**	**TRANSPORTED/DISPOSED MASS TONS/ANNUM**	**LANDFILLED VOLUMES m³/ANNUM @ 1200 kg/m³**
Bulbul Drive	Solid Waste	305011	106754	142339
	Low Hazardous	313110	62622	83496
	TOTAL	**618121**	**169376**	**225835**

Hanomag C66 Compactors are used for operation on site and the assumed compaction density of the waste after disposal and compaction is 750kg/m³, due to the co-disposal of wet wastes.

Note:
Private Landfill Owners unwilling to supply updated information

c) Sites

	NAME	Bisasar	La Mercy	Mariannhill	Bulbul Drive	Shongweni	Umkomaas	Shallcross	Wyebank
	TYPE	Landfill - DSW	Landfill - DSW	Landfill - DSW	Private Landfill	Private Landfill	Garden and Building Rubble Landfill - Private	Garden & Rubble Landfill - DSW	Garden & Building Rubble Landfill - DSW
	DATE	11/02/2004	11/02/2004	13/02/2004	13/02/2004	13/02/2004	12/02/2004	13/02/2004	13/02/2004
1	**Classification:**	G:L:B+	G:M:B+	G:L:B+	H:h	H:h	None	None	None
2	**Available Air Space m³**								
3	**Permit?**	Yes	Yes	Yes	Yes	Yes	No	No	No
4	**Remaining life time?**	± 12 years	Beyond design capacity already	± 15 years	± 7 years	Unknown	Should be closed	Can be extended	Unknown
5	**Waste type handled?**	General	General	General	H:h	H:h	Garden refuse & building rubble only	Garden & building rubble only.	Garden & Building rubble only.
6	**Availability of cover material?**	On site & import	Adequate on site	On site, building rubble & import	Scarce. Mondi bark cuttings used as cell cover.	Adequate on site	Nil	Adequate on site	On site & building rubble
	Availability of closure material?	Imported on contract. Clay specified.	Adequate	Will have to import	Will be a major challenge for future.	Unknown	Nil	On site - maybe not enough.	Unknown
7	**Operational methods?**								
	Cells?	Yes	Previously yes	Yes	Not now - in future extension	Yes	No	No	No
	Push-over?	Yes	Presently push over and cover	No	Area method used	No	Yes	Yes and cover	Yes
	Compactor?	Yes	Yes	Yes	Yes	Yes.	No	Yes	Yes
	Other equipment?	FEL loaders, water bowser, Bulldozers	Bulldozers	Wash bay, weighbridge	Water bowser, Bulldozer, 2 x TLB, one pay loader	Unknown	Only FEL	No	TLB (shared)
8	**Rehabilitation?**	Yes, Grass. As landfill development progresses	South - complete. Also as Landfill development progresses	Plant Rescue Unit as cells are closed.	To commence soon	Yes, completed cell zero	Required, not done	No.	No
9	**Closure?**								
	Present state	Well executed operation	Partially closed	In progress	Not being implemented	Continuing only cell zero	No closure	Untidy	Untidy
	End use?	Parks, driving range (golf)?	Field, open space	Unknown	Closed off field, inaccessible to public.	Unknown	Park	Park	Unknown
10	**Fencing?**	Yes	Yes	Yes	Yes	Yes	None	Yes	No
11	**Access and Control?**	Yes	Yes	Yes	Yes	Yes	None	Yes	Yes
12	**Proximity to:**								
	Houses/Income group	Yes / medium and low cost (informal)	No	No / 200m buffer zone	Visible to low income housing	No	No	Yes / medium	Yes / higher income
	Business/Industry	Close proximity	No	No	No	No	No	No	No
	Other		In sugar cane field surrounds			No	Adjacent to natural water course and pipeline	No	No
13	**Pollution?**								
	Present state?	Managed	See No. 14* below. Storm water accumulation at low point and runs into natural water course	Managed	Yes	Yes	Yes	Adjacent to natural water course	No wash bay
	Control?	Yes- Leachate to sewage reticulation system	Not adequate. Leachate emission during the site visit	Yes. Leachate control & treatment	Yes, leachate storage and pumping to sewage reticulation.	Managed	No	No leachate visible	No
14	**Litter?**								
	Present state?	Managed	Yes. Extended work face due to push over operation	Managed	Yes. Landfill is unsightly.	Yes	Yes - untidy	Acceptable	None
	Control?	Yes	Not enough / limited	Yes	Yes	Limited management	No	None	None
15	**Leachate/Gas management?**	Yes - advanced system. Also odour control sprayers	No	Flaring off gas Leachate Treatment	8 gas wells, flared off.	Yes.	No	None	No
16	**General Comments**	No more scavenger access allowed.	*Low point in centre of site - waste pushed in there - a questionable operating practice.	Workshop	Aesthetics can be improved by thicker layer of Mondi bark cuttings on surface of slopes.	No access granted or sought. Observations done from outside the enclosure.	Sappi is owner of landfill.	Should be closed due to location and visibility. No complaints, however.	Enclosed, yet uncomfortable parking at workshop shared with Parks Division.
		Most township developments will take place in North - household waste	A good concrete lined stormwater control system exists.	Chipper on site.				Future? Lindsay Strachan to advise	Situated in valley.
		Industrial waste growth - more to West		Building/ developing Landfill top down.					

2.1.2 Depots and Offices

DEPOTS & OFFICES

NAME	DSW Vehicle Workshop	Alice street (Temp)	Springfield	Berea North	Tongaat	Ottawa	Phoenix	Durban North (& Greenwood Park)	Beach & Point (Baumann Rd)	Sydney Road	Southern Areas	Amanzimtoti	Kingsburgh	South Ops Entity (SOE)	Umkomaas	New Germany	Queensburgh	Wyebank	Kloof
TYPE	@ Headquarters	Depot	Depot	Depot	Depot	Depot	Depot	Depot	Depot	Depot	Regional Depot	Depot	Depot	Offices	Depot	Depot	Depot	Depot	Admin Offices
DATE	11/02/04				11/02/2004	11/02/2004	11/02/2004	11/02/2004	11/02/2003	11/02/2004	12/02/2004	12/02/2004	12/02/2004	12/02/2004	12/02/2004	13/02/2004	13/02/2004	13/02/2004	13/02/2004
1 Status Quo?	Newly acquired from City Fleet	Shared facility in Materials Dept. CEU	Full services for DSW	Full services for DSW	Depot activities moved to DSW Head Quarters	Recently Upgraded. Umhlanga and Verulam combined	Full services for DSW	Property of Roads Department who want it back again.	Building too small - in bad state - needs repair work	Full services for DSW	Full services for DSW	Full services for DSW	Shared facility with Parks Depot (Parks tractors, grass mowers & offices on site)	Solid Waste Office	Parkhome facility	Full services for DSW	Shared facility in Parks Dept.	DSW Office Block	Houses converted to offices
2 Service Provided?	Repair and maintenance of vehicles	Office, storage & street sweeping staff congregation point. Ablution/change	Office, storage & staff congregation point	Offices, storage & staff congregation point	Staff Congregation point (North)	LDV & small truck repairs done from HQ garages / Staff congregation point	Staff congregation point, ablutions & change rooms	Staff congregation point, ablutions; Garden refuse t/f	Ablutions/change rooms for street sweepers. Staff Congregation point	Staff congregation point. Change rooms & ablutions	Staff Congregation point, parking, offices, First aid, storage etc.	Staff Congregation point, parking, offices, storage & Garden refuse t/f	Staff Congregation point, parking, offices, storage etc.	Administration	Sweeper congregation and management	Offices, storage, parking & staff congregation point	Offices, storage, parking & staff congregation point	Offices, storage, parking & staff congregation point	Administration
3 Storage for?	Spares	240L and 600L trolley bins. Ethnic drums	Refuse Bags.	Refuse Bags.	Refuse Bags.	Pole bins, trolley bins, domestic bins. Refuse Bags.	Refuse Bags.	Bins. Accept Glass, paper, scrap metal & mixed waste in small quantities	Refuse Bags.	Refuse Bags.	Repair plastic disposal bins for eThekwini. Refuse Bags.	Open and Closed 27m³ containers. Refuse Bags.	Refuse Bags.	No	No	New & damaged household bins. Refuse Bags.	New & damaged household bins. Refuse Bags.	No	No
4 Parking for ?	Compactor trucks et al. Trucks under repair.	1 LDV, Water tanker, 2x10,5m³ compactors & 1 Cage tipper	3x10,5m³ Compactors 1 Cage tipper & 1 mechanical street sweeper	Collection vehicles	Trucks	LDV's, small trucks and Collection vehicles	Collection vehicles (not Ro-Ro's)	Collection vehicles	No parking available.	1 Cage tipper 1x10,5m³ Compactor	27 collection vehicles	14 compactor trucks 7 Ro-Ro's, LDV's 1 Box truck 1 Cage tipper	2x19m³ Compactors 3x10,5m³ Compactors	Staff parking only	15m³ REL & one stand by REL	20 Compactors. trucks 1 telehoist & 2 hook lifts	Compactor trucks	1 x 3t Tata Cage tipper + 2 telewaste trucks + 3 collection compactor trucks	Staff parking only
5 Street Sweepers																			
number?	nil	42 temp including 1 female	17 permanent; 8 temp including 1 female & 18 truck support staff	31 permanent	70 permanent	Umhlanga = 26 incl. temps and Verulam = 23 incl. temps	25 permanent 11 temps	18 permanent 12 temps	72 including 10 females and temps.	57 permanent 6 temps	128 permanent 67 temps	80 + truck support staff	6 permanent 5 temps	NAA	4 permanent 7 temps	98 (incl temps)	70 incl temps, supervisors and drivers	Wyebank = 40 Hammarsdale = 7	NAA
working hours?	Extended hours: 05:30 - 18:00	8h30 to 17h00	06h00 to 14h30	6h00 to 14h30	7h30 to 16h00	7h30 to 16h00	6h00 to 14h30	06h00 to 14h30	06h00 to 14h30 & 15h00 to 23h30	Collections: 06h00 - 14h30. Street sweepings: 06h00 - 14h00; 07h30 - 16h00	Street sweeping : 06h00 to 14h30 Collection : 06h00 to ± 11h30	07h00 to 15h30	07h00 to 15h30	NAA	07h00 to 15h30	07h00 to 15h30	07h00 to 15h30	07h00 to 15h30	07h00 to 15h30
6 Offices																			
number?	Five off	One off	One off	One off	Four off	Ten off	One off	Three off	Two off	Four off	10 + Board room + 3 offices at reception	Eight off	Two off	Ground floor only	One park home	Nine off	Park home type 2 offices + 2 store rooms + 1 recreational area		Converted residence 7 offices
staff?	13 Assistants; 15 Artisans; 5 Clerks & 3 Managers	1 Area cleansing officer.	1 Area cleansing officer 1 Depot clerk	1 Area cleansing officer. 1 depot clerk. 1 regional customer assistant	2	Umhlanga = 7 Verulam = 3	2 Area cleansing officers 1 depot clerk	2 Area cleansing officers 2 Depot clerks	1 Area cleansing officer 1 depot clerk	2 Area cleansing officers 1 Depot clerk 1 Regional customer assistant.	1 Acting Operations Manager 7 Area cleansing officers 3 Depot clerks 1 Receptionist / secretary	2 Superintendents 6 Supervisors 3 Depot clerks	1 Superintendent 1 Supervisor	9	1	1 senior cleansing officer. 3 area cleansing officers	1 senior cleansing officer. 1 area cleansing officer. 1 clerk		1 Co-ordinator 1 receptionist / secretary (temp)
7 Facilities																			
workshop?	Yes	No	No	No	Yes	No	No	No	No	No	Yes	Yes	Yes	No	No	No	No		No
wash bay?	Yes	No	Yes	Yes	No	Yes	Yes	No	No	No	Yes	Yes.	Yes	No	No	Yes	Yes		No
refueling?	No	No	Yes - 1 Diesel Pump	1 Diesel Pump	No -Pump belongs to Treasury	No	No	Yes - 2 Diesel Tanks (disused)	No	No	Yes - Diesel	No	Yes - 2 Diesel Pumps	No	No	Yes - 1 Diesel pump	Yes - 1 Diesel Pump 1 Petrol Pump	No	No
other?	Change rooms / Ablutions; Battery store room; Tyre store room; Spray booth; 1 Welding Bay; 1 Oil storage bay; 10 Vehicle bays; 4 inspection pits	Separate Male and Female change rooms/ablutions; Kitchen. Storage for refuse bags and street sweeping equipment.	Male & Female change rooms/ablutions shared with Berea North depot. Store room for street sweeping equipment & bags. Washbay Diesel pumps shared with Berea North Depot	Male & Female change rooms/ablutions shared with Springfield depot. Store for street sweeping equipment & bags. Washbay and Diesel pump shared with Springfield	General store room and one kitchen.	Separate Male and Female change rooms/ablutions; Kitchen; Bags etc. stored in closed containers. Open space used as washbay	Change rooms/ablutions and 1 kitchen. Store room for street sweeping equipment & bags . Store room for high pressure washer.	Storage for Bags and street sweeping equipment. Ablutions/change rooms. Store room for sundries.	Small store room for street sweeping equipment & bags.	Store room for street sweeping equipment & bags. Store room for domestic refuse (black) bags.	Storage of bins (Store roof in disrepair)	Service pit (to be built)	Two stores			Damaged bin storage. Black bags. Tyre storage. Street sweeping equipment and high pressure washer storage.	Change rooms for general workers, drivers/supervisors Black bags. Tyre storage. Street sweeping equipment. Wash bay part time/emergency use only.		Recycling station adjacent (paper, glass & aluminium can banks)
8 Fencing?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes
9 Access and Control	Yes	Yes	Yes - 24h Security	Yes - 24h Security	Yes	Yes	Yes - 24h Security	Yes - 24h Security	Yes	Yes - 24h security	Yes -24h security	Yes - 24h security	Yes	Yes - 24h security	No	Yes - 24h security	Yes - 24h Security	Yes	Yes
10 Proximity to:																			
Housing/Income Group	No	No	No	No	No	Yes / houses	Yes /houses	Yes / Mid to low	Yes / high	No	No	Yes / Medium to high	Yes / Medium to high	Yes / Medium	Yes / Medium	No	Yes / medium - low	Yes / Medium	Yes / Medium
Business/Industry	No	Yes	No	No	Yes	No	No	No	Yes	Yes.	Yes	No	No	Yes	Yes	Yes	No		No
Other	Municipal yard & buildings	Pre-school	Municipal yard & buildings	Municipal yard & buildings	No	City Fleet depot	School	Open public space	Municipal yard & buildings	No	No	No	No	Clinic	eThekwini Offices	No	Informal settlement		No
11 General Appearance																			
yard	Neat	Neat	Neat	Neat	Neat	Neat	Neat	Neat	Neat	Neat	Neat	Neat	Neat	Neat	Neat	Neat	Neat	Neat	Neat
buildings	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean
13 General Comments	Make use of specialist sub-contract repair services					Clocking in / out for staff	Roads tarred and Kerb stones	Site Completely Paved	Building small and requires urgent attention. Break ins & theft take place.	Buildings are Small and requires attention.	Require more offices	Additional offices required	. Access by boom control. Newly painted. Ambulations in sorrowful state		Small. No Store rooms. No ablution/change rooms. No communication facilities	2 Divisions: Westville; New Germany & Pinetown. Precast Palisades & panel fence	Solid waste to take Parks Division facilities and close workshop. Precast concrete wall Fence		

2.1.3 Transfer Stations

a) Garden Refuse

NAME	Chatsworth	Seadoone (School Road)	Nyati Road	Glanville Road	Travancore Drive	Tara Road	Bellair Road	Phoenix	Malacca Road	Riverside
TYPE	Garden Refuse	Garden Refuse	Garden Refuse	Garden Refuse	Garden Refuse	Garden Refuse	Garden Refuse	Garden Refuse	General Waste	Garden refuse
DATE	13/02/2004	12/2/2004	12/2/2004	12/2/2004	12/2/2004	12/2/2004	12/2/2004	11/2/2004	11/2/2004	11/2/2004
1 Status?	Operational	Operational, Recently upgrade	Operational, Small	Operational, Small	Operational, Old	Operational	Operational, New (4 - 5 years old)	Operational, Situated in Eskom servitude	Operational, Want to close and move site	Operational
2 Waste type handled?										
household	Small volumes only	No	No	Small volumes only	Small volumes only	Small volumes only	Small volumes only	Small volumes only	Small volumes only	Small volumes only
building rubble	No	Yes	Yes	No	No	No	No	No	No	No
garden	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
scrap metal	No	No	No	Yes	No	Yes	Yes	Yes	Yes	Yes
white goods	No	No	No	Yes	No	Yes	Yes	No	Yes	Yes
plastic	No	No	No	Yes	No	Yes	Yes	Yes	Yes	Yes
paper	Yes	Yes	No	Yes	No	Yes	Yes	Yes	Yes	Yes
other	No	No	No	Glass, Aluminium Cans	No	Glass	Glass bank, oil	Needs a glass bank	Yes	Aluminium Cans, Motor oil in drums
3 Operational methods?										
bin sizes/quantities?	10 x5,5 m³ skips; 1 x 27 m³ open containers	11 x 27 m³ open containers	5 x 27 m³ open containers	1 x 27m³ open container, 10 x 5,5m³ skips	10 x 5,5m³ skips 1 x 27m³ open container	18 x 5,5m³ skips 2 x 27m³ open containers.	20 x 5,5m³ skips 2 x 27m³ open container	6 x 5,5m³ skips 1 x 27m³ open container	10 x 5,5m³ skips 1 x 27m³ open container	16 x 5,5m³ skips 1 x 27m³ open container.
weighbridge?	No	No	No	No	No	No	No	No	No	No
Hopper	No	No	No	No	No	No	No	No	No	No
Closed containers?	No	No	No	No	No	No	No	No	No	No
other equipment?	No	No	No	Drum service offered	No	No	No	No	No	No
4 Wash bay?	No	No	No	No	No	No	No	No	No	No
5 General appearance										
neatness	Neat	Neat	Neat	Untidy	Untidy	Untidy	Neat	Neat	Untidy	Neat
litter	Untidy - needs sweeping	Untidy - needs sweeping	No	Untidy - needs sweeping	Untidy - needs sweeping	Untidy - needs sweeping	No	No	Untidy - needs sweeping	No
paving	Yes - Premix	Yes - Premix	Yes - Premix	Yes - Premix	Yes - Premix	Yes - Premix	Yes - Premix	Yes - Premix	None	Yes - Premix
6 Fencing?	Yes -Precast concrete panels	Yes -Precast concrete palisade - not all around	Yes - Precast concrete palisade	Yes - Dilapidated precast concrete panels	Yes - Precast cement panels	Yes - Precast concrete pallisade and wire	Yes - Precast concrete panels	Yes – Precast concrete panels	None	Yes - Precast concrete panels
7 Access and Control?	Yes 1 x Gate Day Security only.	Yes 1 x Gate Day Security only.	Yes 1 x Gate Day Security only.	Yes 1 x Gate Day Security only.	Yes 1 x Gate No Security	Yes 1 x Gate Night Security only.	Yes 1 x Gate 24h Security	Yes 1 x Gate No Security	No Open access. Night security.	Yes 1 x Gate Night Security only.
8 Proximity to:										
houses/income group	No	Yes / medium to high	No	Yes / medium	Yes / medium	Yes / medium	No	Yes / medium	No	No
business/ industry	Yes	No	No	No	Yes / Industry	Yes / shopping centre	No	No	No	Yes / industry
other	No	No	Highway	No	No	No	Hospital & school	School	Graveyard	Petrol station
9 Pollution?										
present state?	No	No	No	No	No	No	No	No	Yes	No
control?									Managed	
10 General Comments	Waste to Bisasar Landfill	Plant trees to screen on south side	Control inadequate. Could be extended?	Small and over crowded. Possibly require a larger facility.	Waste to Bisasar Landfill	Waste to Bisasar Landfill	Skips - waste is sorted and deposited in separate skips.	Closed container used as an office	Closed container used as an office	Close when new Bisasar General Refuse Transfer Station opens
		Waste to Bulbul Drive Landfill	Waste to Bulbul Drive Landfill	Waste to Bisasar Landfill			Recycling Centre	Waste to Bisasar Landfill	Adequate space available for an upgrade	Waste to Bisasar Landfill
							Waste to Bisasar Landfill		Waste to Bisasar Landfill	

b) General Waste

	NAME	Mt Edgecombe	Hammarsdale	Chatsworth	Clermont	Umkomaas	Amanzimtoti	Umlazi	Flower Road
	TYPE	General Waste	General Waste	General Waste	General Waste	General Waste	General Waste	General Waste	General Waste
	DATE	14/01/2004	13/02/2004	13/02/2004	13/02/2004	11/02/2004	12/02/2004	12/02/2004	12/02/2004
1	**Status?**	New	New	Recently upgraded	Upgrade under construction	Closed	Recently upgraded	New 4 - 5 years old	Recently upgraded
2	**Waste type handled?**								
	household (solid waste)	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
	building rubble	No	No	No	No	No	No	No	No
	garden	Yes	No	No	Yes	No	Yes	Yes	No
	scrap metal	Yes	No	No	No	No	Yes	No	No
	white goods	Yes	No	No	No	No	Yes	No	No
	plastic	Yes	No	No	No	No	No	No	No
	paper	Yes	No	No	No	No	No	No	No
	other	Cans, glass	No	No	No	No	No	No	No
3	**Operational methods?**								
	bin sizes/quantities?	2 x 27 m³ open and 18 x 5,5 m³ open skips for Garden Refuse	6 x 19 m³ closed containers	8 x 19 m³ closed containers	27m³ & 5,5m³ open containers for Garden Refuse	1 x 27 m³ open container (abandoned)	3 x 27 m³ open containers	10 x 5,5m³ bins 1 x 27m³ open container	Nil
	weighbridge?	Yes	Yes	Yes	No	No	No	Yes	Yes
	Hopper	Yes	Yes	Yes	No	No	Yes	Yes	Yes
	Closed containers?	8 x 27 m³	5 x 27m³	6 x 27m³	No	No	5 x 27m³	6 x 27m³	6 x 27m³
	other equipment?	Static Linear Compactor	Static Linear Compactor 170t/d	Static Linear Compactor 170t/d	Garden Refuse configuration	None	Refurbished compactor 150t/d	Static Linear Compactor 150t/d	Static Linear Compactor 170t/d
4	**Wash bay?**	No	No	No	No	No	Yes	No	No
5	**General appearance**								
	neatness	Neat	Neat	Neat	Under Construction	Overgrown	Neat	Neat	Neat
	litter	None	None	None	None	None	None	Sweeping required	None
	paving	Yes - Premix & Concrete	Yes - Premix and Concrete	Yes- Old Concrete Asphalt blocks	Yes- Premix & Concrete	No	Yes- Resurfacing now.	Yes- Premix and Concrete	Yes - Premix and Concrete
6	**Fencing?**	Yes- Precast concrete panels	Yes - Precast concrete panels	Yes - Precast concrete panels	Yes - Precast concrete palisades & wire	No	Yes - Precast concrete palisades	Yes - Wire	Yes - Precast cconcrete panels
7	**Access and Control?**	Yes 2 x Gates controlled entrances - 1 for garden refuse and 1 for Hooklift 24 h security	Yes 1 x Gate 24h security	Yes 2 x Gates Night security only.	Yes 2 Gates No security	No	Yes 1 x Gate 24 Hour security	Yes 1 x Gate 24 hour security	Yes 2 x Gates No security Alarm sensors used.
8	**Proximity to:**								
	houses/income group	No	No	No	No	Yes / High	Yes / Medium to High	Yes / Low	Yes / Medium to Low
	business/ industry	No	Yes / Industry	Yes	Yes / Industry	No	No	No	Yes
	other	Sugar cane field	No	Garden Refuse	No	No	No	Parks Depot	Municipal Building
9	**Pollution?**								
	present state?	None	None.	Smelly	Yes - no drainage	None	Yes - drainage problem	None	None
	control?	Grease traps and soak pit	No	No	No	No	No	No	No
10	**General Comments**	The facility is the first one in eThekwini Municipality with a refuse transfer station and a garden refuse facility for the public	Newly built. Weighbridge services at payment to non DSW users	Access/ egress road paving collapse. Attractive, well cared for.	In state of disrepair. Paving and stormwater drainage needs upgrading	Access is problematic and dangerous, although the traffic volume is low in road	Precast concrete palisades need repairs		

c) Annual General Waste Received

NAME	WASTE TYPE	TONS/ANNUM	DENSITY kg/m³	UNCOMPACTED VOLUME m³/ANNUM
Mt Edgecombe	Solid Waste	3888	350	11108
Hammarsdale	Solid Waste	3345	350	9557
Chatsworth	Solid Waste	21973	350	62780
New Germany	Solid Waste	No Record	150	No Record
Amanzimtoti	Solid Waste	19106	350	54588
Umlazi	Solid Waste	26185	350	74814
Flower Road	Solid Waste	24877	350	71077

d) Annual Garden Waste Received

NAME	WASTE TYPE	TONS/ANNUM	DENSITY kg/m³	UNCOMPACTED VOLUME m³/ANNUM
Chatsworth	Garden Refuse	4924	150	33829
Seadoone (School Road)	Garden Refuse	16573	150	110484
Nyati Road	Garden Refuse	10259	150	68391
Glanville Road	Garden Refuse	4353	150	29024
Travencore Drive	Garden Refuse	2984	150	19894
Tara Road	Garden Refuse	4639	150	30930
Bellair Road	Garden Refuse	7566	150	50439
Phoenix	Garden Refuse	3497	150	23313
Malacca Road	Garden Refuse	5210	150	34735
Riverside	Garden Refuse	6067	150	40445

2.1.4 Composting

The best known, and possibly the only formal composting business in the region, is National Plant Food, known as Gromor. They manufacture compost and organic fertilising material.

The members are R Hagen and KB Gartier, P O Box 89, Cato Ridge, Tel: 031 782 3105, Fax: 031 782 1431, e-mail at gromor@iafrica.com.

Their operations comprise composting approximately 50 000m³ of organic waste per annum, which produces 20 000m³ of compost. In addition, approximately 40 000m³ of pine bark is composted to make 18 000m³ of growing media per annum.

Selling prices vary from R80 to R185/m³ of moist bagged compost products in a wide range.

2.1.5 Recycling

a) Materials

COMPANY	MATERIAL CATEGORY	TONNAGE PER ANNUM (2003)
Collect-A-Can	Total aluminium & steel cans	784 018
	Waste paper (cardboard, office paper & newspaper)	60 647
Mondi Recycling	Waste paper (cardboard, office paper & newspaper)	4 712
Babs Waste paper	Waste paper (cardboard, office paper & newspaper)	11 200
Lothlorien Waste Paper	Waste paper (cardboard, office paper & newspaper)	18 000
ABN Waste Paper	Waste paper (cardboard, office paper & newspaper)	4 500
DSW Recycling centres	Waste paper (cardboard, office paper & newspaper)	2 400
Brook Street buy back centre	Waste paper (cardboard, office paper & newspaper)	168
Don't Waste Services	Waste paper (cardboard, office paper & newspaper)	8 080
Williams Road buy back centre	Waste paper (cardboard, office paper & newspaper)	540
Premier Waste Paper	Waste paper (cardboard, office paper & newspaper)	3 000
Gevers Waste Paper	Waste paper (cardboard, office paper & newspaper)	3 000
	Total LD (lower density plastic for all recyclers)	500
	Total scrap metal (stats received from one DSW centre)	250
Cardboard King	Waste paper (cardboard, office paper & newspaper)	3 360
Reclamation Group (Sappi agent)	Nothing received thus far	N/A
Lee Scrap Metals	Nothing received thus far	N/A
Eurotrade Metals	Nothing received thus far	N/A

TOTAL WASTE PAPER - 119 607 tonnage
TOTAL CANS - 784 018
TOTAL LD (plastic) - 500
TOTAL SCRAP METAL - 250

Notes:

i. The statistics from Mondi Recycling only represents Mondi's operations and that excludes its agents such as Babs Waste Paper, Don't Waste Services, Premier Waste, Movu Recyclers etc.

ii. Statistics from Collect-A-Can's waste paper seem to be grossly exaggerated as its main focus is cans and Collect-A-Can is a newcomer in the waste paper industry, having started only last year. Therefore it is surprising that they can surpass established companies like Babs Waste paper, Lothlorien & Mondi with their yearly tonnages. The matter has been brought to the attention of Collect-A-Can for verification.

iii. Total Scrap Metal above represents one small recycling centre that is linked to DSW. Scrap metal figures from large scrap metal dealers are not yet submitted.

b) Facilities

ID	FACILITY	ADDRESS	CONTACT PERSON	PHONE	CELL NO	CANS	PAPER	GLASS	PLASTIC	SCRAP METAL	CARDBOARD	OIL
1	KDBA Headquarters	188 Argyle Road, Durban	Mary Mkhize	031- 303 1665								
2	CBD Recycling Center	Brook Street, Durban	Ndyebo Mgingqizana	031 - 303 1665	082 809 3498	Yes	Yes	Yes	Yes		Yes	
3	North Coast Road Recycling Centre	1288 North Coast Road, Durban	Willie Mavuso		083 478 1080	Yes	Yes	Yes	Yes	Yes	Yes	
4	Westmead Recycling Centre	39 Westmead Road, Westmead	Sabelo Ngcobo	031- 700 6504		Yes	Yes	Yes	Yes	Yes	Yes	
5	Bellair Drop Off Recycling Centre (DSW)	Cnr Bellair Road & Edwin Swales Drive	Reg Gerber	031- 462 9149	082 462 4475	Yes	Yes	Yes	Yes	Yes	Yes	Yes
6	KwaMashu Recycling Centre	Lot 3 of KwaMashu - P	Willie Mavuso		083 478 1080	Yes	Yes	Yes	Yes		Yes	
7	Merebank Recycling Centre	11 Dograh Road, Merebank	Premila Kanterpersad	031 - 468 4111		Yes	Yes	Yes			Yes	
8	Queensmead Recycling Centre	Corner of Turquoise Road & Piet Retief Road., Burlington	Harry Ngidi	031 - 464 5779 (a/h)		Yes	Yes	Yes	Yes	Yes	Yes	
9	Kwadabeka Recycling Centre	3 Kwad IA Road 145	Lutrecia / Kurt Hitzeroth		083 232 8734					Yes		
10	Don't Waste Services	132 Williams Road, Congella		031 - 301 7818		Yes	Yes	Yes	Yes		Yes	
11	AT Enviromental Waste Solutions	Unit 4 & 5 , Airways Close, 7 Willcox Road, Prospecton		031 - 902 3542		Yes	Yes				Yes	
12	Reclamation Group	1 Gray Place, Pinetown		031 - 7026513			Yes			Yes	Yes	
13	Andy's Waste Paper	5 Blase Road, Shop 3, New Germany		031 - 705 4870			Yes				Yes	
14	Natal Waste Paper	15 Rana Road, Isipingo		031 - 902 8339			Yes				Yes	
15	Lothlorien Waste Paper	135 Dayal Road, Jacobs					Yes				Yes	
16	Reclamation Group	81 Teakwood Road, Clairwood		031 - 465 2080			Yes			Yes	Yes	
17	Reclamation Group	212 Sydney Road, Umbilo		031 - 303 0470			Yes			Yes	Yes	
18	Raman's Scrap Paper	22 - 24 Wills Road, Warwick Junction		031 - 307 6169			Yes				Yes	
20	Lothlorien Waste Paper	110 Umgeni Road, Durban					Yes				Yes	
21	Lothlorien Waste Paper	132 / 136 Peter Road, Springfield		031 - 577 1231			Yes				Yes	
22	Lothlorien Waste Paper	18 Ireland Street, Verulam					Yes				Yes	
23	Reclamation Group	38 - 44 Jeffels Road, Prospecton		031 - 902 1545						Yes		
24	Fine Scrap Metals	24 Hillclimb Road, Westmead		031 - 700 5007						Yes		
25	Silverglen Scrap Metals	204 Fleet Street, Westcliff, Chatsworth		031 - 403 1451						Yes		
26	Fine Scrap Metals	14 / 33 Industria Street, Jacobs		031 - 465 5055						Yes		
27	Eurotrade Metals	330 Voortrekker Road, Jacobs		031 - 461 9400						Yes		
28	Insimbi Scrap Metal	191 Jacobs Road, Jacobs								Yes		
29	Als Scrap Metal	299 Chamberlain Road, Jacobs		031 - 468 2192	082 703 6944					Yes		
30	All Metals	33 Balfour Road, Jacobs		031 - 468 5555						Yes		
31	Echo Scrap Metal	200 South Coast Road, Durban		031 - 465 8595						Yes		
32	Atlas Scrap Metal	131 Williams Road, Durban		031 - 304 5200						Yes		
33	Fine Scrap Metals	8 Harvey Road, Greyville, Durban		031 - 312 0007						Yes		
34	Durban Metal Company	1141 Umgeni Road, Durban		031 - 312 2226						Yes		
35	Lee Scrap Metals	20 Kent Road, Durban		031 - 507 2690						Yes		
36	Lee Scrap Metals	148 Abedare Road, Phoenix		031 - 500 1737						Yes		
37	Reclamation Group	126 Abedare Road, phoenix		031 - 500 4202						Yes		
38	Natal Precious Metals	7 Larsen Park, 40 Ebonyfield Avenue, Springfield		031 - 579 2150						Yes		
39	Mo's Scrap Metal	Electron Road, Durban, next to Makro								Yes		
40	Collect - a - can	13 Westmead Road, Westmead Industrial Area, Pinetown	Vincent Zwane	031 - 700 5935		Yes						
41	Babs Waste Paper	12 Brooklyn Road, Jacobs	Babs	031 - 461 5244	082 446 5173		Yes		Yes		Yes	
42	ABN Waste Paper	40 Aberdare Drive, Phoenix Industrial Area, Phoenix	Beena Popat	031 - 507 2931			Yes		Yes		Yes	
43	Fine Scrap Metal	1 Van Eck Road, Hammarsdale		031 - 736 3686						Yes		
44	Industrial Granulating Services	81 Bruning Place, Jacobs	Kevin Holland	031 - 461 3413	083 443 4159				Yes (Cable Strippings)			
45	Scrap Met	286 Sydney Road, Durban	Mr. Flanagan	031 - 461 9400						Yes		
46	Scrap Met	68 Balfour Road, Jacobs	Mr. Flanagan	031 - 461 9400						Yes		
47	Kloof Conservancy Recycling Depot	11 Emolweni Road, Kloof, Kloof Civic Centre	Ndyebo Mgingqizana	031 - 303 1665	082 809 3498	Yes	Yes	Yes	Yes		Yes	
48	Tara Road GRTS (DSW)	Tara Road, Bluff	Reg Gerber	031 - 462 9149	082 462 4475	Yes	Yes	Yes	Yes	Yes	Yes	
48	Glanville Road GRTS (DSW)	2 Glanville Road, Woodlands	Reg Gerber	031 - 462 9149	082 462 4475	Yes	Yes	Yes	Yes	Yes	Yes	
49	Riverside GRTS (DSW)	Riverside Road, Umgeni	Reg Gerber	031 - 303 1665	082 809 3498	Yes	Yes	Yes	Yes		Yes	
50	Phoenix GRTS (DSW)	Corner Hannaford & Canehaven Road, Phoenix	Ndyebo Mgingqizana	031 - 303 1665	082 809 3498		Yes					
51	Chatsworth GRTS (DSW)	301 Florence Nightingale Road, Chatsworth	Ndyebo Mgingqizana	031 - 303 1665	082 809 3498				Yes			

2.1.6 Paper Banks

ID	LOCATION	ADDRESS	NUMBER
1	Paddington Bear	15 Duyts Place, Ashley, Pinetown	1
2	New Germany Primary School	2 East Street, New Germany	4
3	Lyndhurst Primary School	2 Thole Street, New Germay	1
4	Edukids Pre-primary School	1 Harvey Road, New Germany	1
5	Pinetown Catholic Church	2 Maurice Nichols Road, Pinetown	1
6	Pinetown Girls High School	136 Old Main Road, Pinetown	2
7	Pinetown Child Welfare	33 Livingstone Road, Pinetown	1
8	St. Benedicts School	31 Mariannhill Road, Pinetown	1
9	Gelofte School	2 Caversham Road, Pinetown	5
10	Peter Pan Primary School	3 a Cobbleset Lane, Pinetown	1
11	Pitlochry Senior Primary School	49 Pitlochry Road, Westville	1
12	Westville Pre-primary School	46 Ferndale Avenue, Dawncliff, Westville	1
13	St Peters Lutheran Church	24 Koningkramer Road, Westville	2
14	Atholl Heights School	48 Methven Road, Westville	1
15	Westville Senior Primary	42 Westville Road, Westville	1
16	Westville Civic Center	10 William Lester Road, Westville	8
17	Kainon Junior Primary School	36 Perth Road, Westville	1
18	Cygnet Pre-primary School	28 Queen Elizabeth Drive, Westville	1
19	Berea West Senior Primary	7 Trent Place, Westville	2
20	Cowies Hill Scouts	795 Old Main Road, Cowies Hill, Pinetown	1
21	Cowies Hill Pre-primary School	19 Alida Place, Cowies Hill	1
22	Fairy Glen Play Centre	7 Short Place, New Germany	1
23	Altersheim Port Natal	53 Harborth Road, New Germany	1
24	New Germany Lutheran Pre Primary School	6 Callie Road, New Germany	1
25	Mrs Smith	17 Bohmer Road, New Germany	1
26	The Birches Pre-primary School	1 Oribi Crescent, Sarnia, Pinetown	2
27	Christ Church	17 Meller Road, Pinetown	1
28	Dravida Society of SA	327 New Germany Road, Reservoir Hills	1
29	Westville Country Club	1 Link Road, Westville	1
30	Westville Boys High School	26 Wandsbeck Road, Beverly Hills, Westville	1
31	Westville Girls High School	24 - 32 Westville Road, Westville	1
32	Saturn Pre-primary School	7 Saturn Road, Westville	1
33	Westville Police Station	3 Park Drive, Westville	1
34	The Tree	69 Krishna Road, Umgeni Park, Durban	0
35	Orient Islamic School	49 Centenary Road, Durban	1
36	St Anthonys Catholic SA Primary	40 Centenary Road, Durban	1
37	Glenmore Primary School	56 Feildan Drive, Umbilo	2
38	Manor Gardens School	95 Dale Road, Cato Manor, Durban	1
39	Rouken Glen Flats	381 Musgrave Road, Musgrave, Durban	1
40	Penzance Primary School	61 Penzance Road, Glenwood, Durban	2
41	Caister Lodge	264 Musgrave Road, Musgrave, Durban	1
42	Musgrave heights	132 Musgrave Road, Musgrave, Durban	1
43	St Josephs Catholic Church	218 Florida Road, Durban	1
44	Salvation Army	68 Montpelier Place, Greyville, Durban	1
45	Morningside Primary School	200 North ridge Road, Morningside, Durban	2
46	Westridge High School	189 Jan Smuts Highway, Mayville, Durban	1
47	Glenridge Pre-primary School	10 Rif Road, Mayville, Durban	1
48	Farrer House	51 East Street, Overport, Durban	1
49	David Landau Community Centre	2 Crocus Road, Asherville, Durban	1
50	Saiva Sithantha Sungum	80 Clayton Road, Asherville, Durban	1
51	Shree Ramulu Temple	60 Silver Willow Road, Puntans Hill, Durban	1
52	Sherwood Primary School	40 Sandringham Place, Bonella, Durban	2
53	Highway Hospice	59 Locksley Drive, Sherwood, Durban	2
54	Die Gereformeerde Kerk	724 Umbilo Road, Umbilo, Durban	1
55	German Lutheran Church	19 Renshaw Road, Congella, Durban	1

56	George Cambell Technical College	251 Brickhill Road, Durban	1
57	Kwazulu Natal Deaf Association	180 Mansfield Road, Durban	1
58	Durban Boys High School	255 St Thomas Road, Durban	1
59	Avonmore Shopping Centre	Ninth Avenue, Morningside, Durban	1
60	Clarence Road Primary School	40 Clarence Road, Morningside, Durban	2
61	La Guna Ridge	Cnr of Earl Haig & North Ridge Rd, Morningside	1
62	Bill Buchanan Home	50 Durrant Place, Morningside, Durban	1
63	Salvation Army	103 Montpelier Place, Morningside, Durban	1
64	The Clifton Preparatory School	102 Lambert Road, Morningside, Durban	2
65	St Philomens Childrens Home	90 Rippon Road, Sydenham, Durban	1
66	Parish of Sydenham	81 Rippon Road, Sydenham, Durban	1
67	Spearman Road Primary School	138 Spearman Road, Sydenham, Durban	1
68	Rippon Road Primary School	31 Clare Road, Clare Estate, Durban	1
69	Addington School	43 Bell Street, Point, Durban	1
70	Park View Senior Primary School	53 Bath Road, Bulwer, Durban	1
71	Somerset Country Estate	450 Queen Elizabeth Avenue, Westridge, Durban	1
72	Defy	125 Teakwood Road, Clairwood, Durban	1
73	Nazareth House	82 Ridge Road, Musgrave, Durban	1
74	High Ridge Flats	193 Ridge Road, Musgrave, Durban	1
75	Wylie House	202 Ridge Road, Musgrave, Durban	1
76	St Pauls Lutheran Church	48 Gordon Road, Windermere, Durban	1
77	St Theresas' Exhibition Centre	12 Walnut Road, Durban	1
78	St Theresas' Primary School	7 St Theresa Road, Sydenham, Durban	1
79	Happy Hours Day Care	71 Sparks Road, Musgrave, Durban	1
80	Christ Church	45 Clayton Road, Sydenham, Durban	1
81	Durban Central United Church	21 St Andrews' Street, Durban	1
82	Rhumbelow Shell Hole	42 Cunningham Road, Umbilo, Durban	1
83	Resthaven	27 Hutchinson Road, Umbilo, Durban	1
84	Wildlife Office	100 Brand Road, Glenwood, Durban	1
85	Port Natal Primary School	12 Cavell Place, Umbilo, Durban	1
86	Port Natal High School	3 Selborne Road, Umbilo, Durban	1
87	Carrington Heights Primary School	52 Mountain Rise, Carrington Heights, Durban	1
88	Umbilo Congregational Church	498 Bartle Road, Umbilo, Durban	1
89	SPCA	1 Nyati Road, Athlone Park, Amanzimtoti	1
90	St Gerards Pre-primary School	441 Marine Drive, Bluff, Durban	1
91	Bushlands Primary School	51 Grafton Street, Bluff, Durban	1
92	Brighton Beach Senior Primary	460 Marine Drive, Brighton Beach, Durban	2
93	St Francis Xavier Catholic Church	25 Sormany Road, Brighton Beach, Durban	1
94	Durban Academy	45 Island View Road, Bluff, Durban	1
95	Kenmont School	45 Island View Road, Bluff, Durban	1
96	Marlborough Park Junior Primary School	1027 Bluff Road, Bluff, Durban	1
97	Rachael de Beer Pre - primary School	49 Old Mission Road, Bluff	1
98	Nederduitsch Hervormde Kerk	137 Beacon Road, Bluff, Durban	1
99	Tara Road DSW GRTS	Tara Road, Bluff, Durban	1
100	Old Apostolic Church	8 Viden Road, Amanzimtoti	1
101	Warner Beach Junior Primary	13 Radbourne Road, Warner Beach	1
102	St Marys' Anglican Church	157 Kingsway, Warner Beach	1
103	Kuswag Hoër Skool	48-64 Bernadotte Street, Athlone Park, Amanzimtoti	1

2.1.7 Collection and Transport

a) Naming Conventions

COLLECTION AND TRANSPORTATION NAMING CONVENTION			
DSW NAME	**COMMON NAME**	**NAME USED IN STUDY**	**USAGE**
Box Truck	Box Truck	Box Truck	Street Sweeping
Cage Tipper	Cage Tipper	Cage Tipper	Street Sweeping
Hooklift 6 x 4 15t	Hooklift 6 x 4 15t Roll-on/off	Hooklift 6 x 4 15t Roll-on/off	Open 27m³ (GRS) (15 ton)
Hooklift 8 x 4 20t	Hooklift 8 x 4 20t Roll-on/off	Hooklift 8 x 4 20t Roll-on/off	Closed 27m³ (TS) (20 ton)
Industrial HC 250	20m³ REL Industrial Compactor	Industrial 20m³ REL	GRS 5.5m³ Skips Industrial 5.5m³ Skips
Rotopress	20m³ Rotopress Compactor	20m³ Rotopress	Commercial 240 litre mobile containers
Mechanical Sweeper	Mechanical Sweeper	Mechanical Sweeper	Mechanical Street Sweeping
Telehoist	Load Lugger	Telehoist	Skip Collection
M150	10,5m³ REL Compactor	10.5m³ REL Compactor	Round Collection
C200	20m³ REL Compactor	20m³ REL Compactor	Round Collection
Bakkies	LDV	LDV	General Purpose Vehicle

b) Compaction Ratios

TRANSPORTATION SYSTEMS COMPACTION RATIOS	
COLLECTION VEHICLE / STATIC COMPACTOR TYPE	**COMPACTION RATIO**
Rear End Loader (REL)	3:1
Roto-Press	4:1
Static Linear Compactor (P60)	4:1
Tractor and Trailer Systems	1:1
Open 27m³ Roll-on Containers	1:1
Telehoist Skips	1:1

c) Vehicle Fleet Particulars

EDSW - COLLECTION AND TRANSPORTATION VEHICLES					
VEHICLE TYPE	**VEHICLE USAGE**	**VEHICLES USED**	**BACK-UP VEHICLES**	**TOTAL NUMBER OF VEHICLES**	***PENDING DE-REGISTRATION***
10.5³ Paddlepackers	Round collection of domestic and commercial waste	0	0	**1**	*1*
10.5m³ REL Compactors	Round collection of domestic and commercial waste	74	8	**82**	*28*
12m³ REL Compactors	Round collection of domestic and commercial waste	18	1	**19**	*5*
19m³ REL Compactors	Collection of domestic and commercial waste	11	0	**11**	*4*
Industrial 20m³ REL Compactors	Skip clearing in light industrial areas and garden refuse transfer stations	17	7	**24**	*2*
20m³ Rotopress	Commercial 240 litre mobile containers	7	0	**7**	*0*
3.5t Cage Tippers	Street sweeping and illegal dumping	11	2	**13**	*1*
3t Cage Tippers	Street sweeping and illegal dumping	3	0	**3**	*1*
4t Cage Tipper	Street sweeping and illegal dumping	1	0	**1**	*0*
4t Tipper	Collection	27	0	**27**	*0*
4m³ Tipper	Collection	1	0	**1**	*0*
4 x 4	Maintenance	3	0	**3**	*0*
5000 litre Tanker	Pavement Washing	1	0	**1**	*0*
8t Crane Truck	Miscellaneous	1	1	**2**	*0*
Breakdown	Recovery Vehicle	1	0	**1**	*1*
Hooklift 4 x 2 15 t Roll-on/off	Open 18m³ Roll-on/off containers	2	0	**2**	*0*
Hooklift 6 x 4 15t Roll-on/off	Open 27m³ Roll-on/off containers	11	0	**11**	*3*
Hooklift 8 x 4 20t Roll-on/off	Closed 27m³ Roll-on/off containers	5	3	**8**	*0*
LDV 1t	Maintenance	52	0	**52**	*5*
LDV 0.5t	General	8	0	**8**	*0*
Mad-Vac	Street sweeping	1	0	**1**	*0*
Tenat Vacuum	Cleaning	1	0	**1**	*0*
Mechanical Sweeper	Mechanical street sweeping	6	0	**6**	*1*
Telehoist	Collection of 5.5- 11m³ skips	10	0	**10**	*2*
Tractor-Trailer Comb.	Round collection of domestic waste	1	0	**1**	*0*
Tractor	Round collection of domestic waste	4	0	**4**	*1*
Pavewash	Cleaning	1	0	**1**	*0*
Trailor between 3 and 4.5t	Skip collection	11	0	**11**	*0*
Trailer up to 1t	Transport	2	1	**3**	*0*
Telehoist Trailer	Skip collection	2	0	**2**	*0*
Payloader	Garden Refuse and Illegal Dumping	2	0	**2**	*1*
Box Tipper 16 m³	Round collection of domestic waste	0	0	**1**	*1*
Easy Pak 6m³	Round collection of domestic waste	0	0	**1**	*1*
Tip Pak 6m³	Round collection of domestic waste	0	0	**1**	*1*
Bus	General and Educational	1	0	**1**	*0*
Total Vehicles		**296**	**23**	**319**	***59***

2.1.8 Waste Services

a) Service Providers

SERVICE PROVIDERS IN ETHEKWINI MUNICIPAL AREA	
SERVICE PROVIDER	**REGION SERVICED**
Mechanical, Electrical and Cleansing Department (Amalgamated all DSW)	Northern
DSW	Central
Inner West Operational Entity: Solid Waste Management and DSW (Amalgamated all DSW)	Inner West
Outer West Operational Entity: Under DSW Management (Amalgamated all DSW)	Outer West
South Operational Entity: Refuse and Sanitation Section and Umkomaas TLC and DSW (Amalgamated all DSW)	Southern
Waste Services (Wasteman)	Various
EnviroServ	Various
Sappi	Sappi Saiccor Plant
Various local entrepreneurs	Contracts throughout the eThekwini Municipal Area

b) Service Levels

NORTHERN REGION: CLEANSING SERVICE LEVELS			
SERVICE PROVIDER	**WASTE TYPE**	**SERVICE POVIDED**	**TYPE OF SERVICE**
DSW	Domestic Service All Areas	Once weekly	2 x Council bags
	All Complexes and Commercial Properties	As required	240 litre mobile containers
	Garden Refuse	Weekly	Collection of special blue bags for garden refuse
	Garden Refuse	1 x Garden refuse transfer station, open to public	5.5m³ Skips, open 27m³ Roll-on/off containers
	Domestic Frasers	2 x 5.5m³ skips	Council bags
Private Contractors	Osindisweni Hospital Medical waste	As required	Collected by Compass Waste
	Domestic waste	On request	14m³ skip removed weekly under contract on behalf of DSW
Munitech Contracts	Domestic	Weekly	2 x Council bags
	Domestic	Weekly (one man contracts)	1 x 5.5m³ Skip / predetermined number of dwellings (1 x bag/dwelling / week)

CENTRAL REGION: CLEANSING SERVICE LEVELS			
SERVICE PROVIDER	**WASTE TYPES**	**SERVICE PROVIDED**	**TYPE OF SERVICE**
DSW	Domestic	Weekly	2 x Council bags (additional bags can be purchased)
	Street Sweeping	Daily-Weekly	Collection of litter and cleaning of street bins
	Commercial	Daily	240 litre mobile containers
	Light Industrial / Builder's rubble	As required by user	5.5m³ - 14m³ Skips
	Garden Refuse	Weekly	Collection of special blue bags for garden refuse
	Garden Refuse	7 x Garden refuse transfer stations open to public	5.5m³ Skips open 27m³ roll-on/off containers
Private Contractors (Various)	Domestic in previously disadvantaged residential areas	Weekly	2 x Council bags
EnviroServ	Industrial/Builder's Rubble	As required by user	5.5m³ - 11m³ Skips
	Commercial	Daily	240 litre mobile containers
	Low and High Hazardous	As required by user	As required by user
Waste Services	Industrial/Builder's Rubble	As required by user	4m³ - 11m³ Skips
	Commercial	Daily	240 litre mobile containers
	Low and High Hazardous	As required by user	As required by user
Entrepreneurs	Commercial/Industrial	As required by user	As required by user

INNER WEST REGION: CLEANSING SERVICE LEVELS			
SERVICE PROVIDER	**WASTE TYPE**	**SERVICE PROVIDED**	**TYPE OF SERVICE**
DSW	Domestic	Weekly	2 x Council bags (additional bags can be purchased)
	Commercial	Daily	240 litre mobile containers or black bags (purchased at same price as garden refuse bags)
	Light Industrial	As required by user	240 litre mobile containers or black bags (purchased at same price as garden refuse bags)
	Garden Refuse	Weekly	Collection of special blue bags for garden refuse
Private Contractors (Various)	Domestic in previously disadvantaged residential areas	Weekly	2 x Council bags
EnviroServ	Industrial / Builders Rubble	As required by user	4m³ - 11m³ Skips
	Low and High Hazardous	As required by user	As required by user
Waste Services	Industrial / Builders Rubble	As required by user	4m³ - 11m³ Skips
	Low and High Hazardous	As required by user	As required by user
Entrepreneurs	Commercial/Industrial	As required by user	As required by user

OUTER WEST REGION: CLEANSING SERVICE LEVELS			
SERVICE PROVIDER	**WASTE TYPE**	**SERVICE PROVIDED**	**TYPE OF SERVICE**
DSW	Domestic	Weekly	2 x Council Bags
	Commercial	As required by user	240 litre mobile containers and blue bags
	Light Industrial	As required by user	240 litre mobile containers
	Garden Refuse	Weekly	Collection of additional blue bags containing garden refuse. Bags placed with domestic waste
	Garden Refuse / Builders Rubble	1 x Garden refuse and builders rubble disposal site, open to public	Disposal on site
Private Contractors (Various)	Domestic in previously disadvantaged residential areas	Weekly	2 x Council bags
EnviroServ	Industrial / Builders Rubble	As required by user	4m³ - 11m³ Skips
	Low and High Hazardous	As required by user	As required by user

SOUTHERN REGION: CLEANSING SERVICE LEVELS			
SERVICE PROVIDER	**WASTE TYPE**	**SERVICE PROVIDED**	**TYPE OF SERVICE**
DSW	Domestic	Weekly	2 x Council bags (additional bags can be purchased)
	Commercial	Daily	240 litre mobile containers
	Light Industrial	As required by user	8m³ Skips open 27m³ roll-on/off containers
	Garden Refuse	3 x Garden refuse transfer stations, open to public	5.5m³ Skips open 27m³ roll-on/off containers
DSW	Domestic	Weekly	1 x Council bag (additional bags can be purchased)
	Commercial	Twice Weekly	2 x Council bags
	Garden Refuse	1 x Garden refuse disposal site, open to public	Disposal on site
Sappi	Sappi Commercial / Industrial	Ad Hoc	Loose in trucks
EnviroServ and Waste Services	Industrial / Builders Rubble	As required by user	5.5m³ - 11m³ Skips
	Low and High Hazardous	As required by user	As required by user
Clean & Green (Gone to Contract)	Domestic (service KwaMakutha)	Weekly	2 x Council bags
Munitech Contracts (Umlazi)	Domestic	Weekly	2 x Council bags
	Domestic	Weekly (one man contracts)	1 x 5.5m³ Skip / predetermined number of dwellings (1 x bag/dwelling/week)

2.2 Demographics, Waste Statistics and Relevant Data

2.2.1 Population

a) Base Population

POPULATION OF ETHEKWINI MUNICIAPLA AREA 2004				
REGION	**POPULATION**	**DWELLINGS**	**PERSONS / DWELLING**	**AREA km²**
Northern	918977	231125	4.0	568
Central	559994	156600	3.6	186
Inner West	645599	181812	3.6	257
Outer West	282873	80333	3.5	712
Southern	725200	168372	4.3	578
TOTAL	**3132643**	**818242**	**3.8**	**2301**

b) Distribution

NORTHERN REGION - ESTIMATED NUMBER OF DWELLING UNITS AND POPULATION BY SETTLEMENT CLUSTER, 2004						
SETTLEMENT	**DWELLING**			**POPULATION**		
CLUSTER	**TOTAL**	**FORMAL**	**INFORMAL**	**TOTAL**	**FORMAL**	**INFORMAL**
Buffelsdraai	**1077**	582	494	**2878**	1557	1321
Canelands	**330**	307	23	**1365**	1272	93
Duikerfontein	**19**	19	0	**82**	82	0
Emona-Buffels	**1437**	488	949	**3479**	1275	2204
Greylands	**2516**	1490	1025	**10612**	6286	4326
Hambanathi-Wewe	**2027**	1439	587	**8911**	7460	1451
Hawaan	**140**	30	111	**815**	173	643
Hazelmere	**1740**	519	1221	**5315**	1585	3730
Inanda	**62296**	18341	43954	**225388**	70709	154679
Inanda Farm	**692**	362	331	**2282**	1042	1240
KwaMashu	**39324**	25981	13343	**191585**	141878	49706
Melkhoute	**1191**	1135	56	**4751**	4528	223
Mount Edgecombe	**442**	421	21	**1769**	1683	86
Mount Moreland	**77**	77	0	**266**	266	0
Newlands East	**4221**	4199	21	**20871**	20764	106
Newlands West	**5825**	5790	35	**27095**	26933	162
Ntuzuma	**23700**	6483	17218	**96920**	30532	66388
Osindisweni	**677**	347	330	**2878**	1477	1401
Ottawa	**1603**	1336	267	**6012**	5011	1002
Parlock-Hippo	**1520**	1442	78	**5972**	5660	312
Phoenix	**35923**	35659	264	**167699**	166457	1242
Phoenix Industrial	**85**	85	0	**328**	328	0
Qadi TA	**14217**	3658	10559	**26699**	8763	17936
Qadi TA1	**2068**	1128	940	**6815**	3716	3099
Redcliffe	**4413**	2463	1950	**12763**	7122	5641
Sugarcane 1	**92**	92	0	**602**	602	0
Sugarcane 2	**3122**	2712	410	**9740**	8299	1441
Tongaat	**6943**	6586	357	**29948**	28381	1568
Tongaat Beach	**1582**	1010	572	**4112**	2625	1487
Umdloti	**714**	706	8	**1694**	1674	19
Umhlanga	**2731**	2639	92	**6833**	6603	230
Verulam	**8381**	6870	1511	**32497**	27320	5177
TOTALS	**231125**	**134397**	**96729**	**918977**	**592064**	**326913**

CENTRAL REGION - ESTIMATED NUMBER OF DWELLING UNITS AND POPULATION BY SETTLEMENT CLUSTER, 2004

SETTLEMENT	DWELLING			POPULATION		
CLUSTER	TOTAL	FORMAL	INFORMAL	TOTAL	FORMAL	INFORMAL
Berea North	**19390**	18935	455	**50339**	49157	1182
Berea South	**16941**	16612	330	**51536**	50533	1003
Bluff	**8866**	8579	288	**30229**	29249	980
Cato Manor	**16477**	4039	12438	**53763**	13180	40583
Chesterville	**2211**	1682	529	**11990**	9121	2868
Duikerfontein	**7348**	4574	2773	**28862**	17968	10893
Durban Bay	**3**	3	0	**1138**	1138	0
Durban CBD E	**10479**	10149	331	**28614**	27712	903
Durban CBD N	**1840**	1540	300	**7814**	6541	1273
Durban CBD W	**8062**	7880	182	**20415**	19953	462
Durban North	**12978**	12488	490	**41280**	39721	1560
Harbour	**71**	17	53	**1010**	248	761
Industrial	**1990**	1236	754	**22500**	13973	8526
Lamontville	**7698**	5283	2415	**43649**	29956	13693
Merebank	**12791**	12472	319	**57154**	55728	1427
Montlands	**6026**	5886	140	**21757**	21251	507
Old Line Suburbs	**4179**	3438	741	**14814**	12188	2626
Springfield Flats	**64**	43	21	**1646**	1096	550
Umgeni South	**14886**	12297	2589	**57746**	47703	10043
Umhlanga	**2724**	2688	37	**7932**	7825	107
Yellowwood Park	**1573**	1524	49	**5807**	5625	181
TOTALS	**156600**	**131366**	**25234**	**559994**	**459865**	**100128**

OUTER WEST REGION - ESTIMATED NUMBER OF DWELLING UNITS AND POPULATION BY SETTLEMENT CLUSTER, 2004

SETTLEMENT	DWELLING			POPULATION		
CLUSTER	TOTAL	FORMAL	INFORMAL	TOTAL	FORMAL	INFORMAL
Drummond	**272**	260	11	**988**	947	41
Fredville Comple	**3244**	512	2732	**3128**	493	2635
Hammarsdale	**316**	308	7	**1187**	1160	27
Harrison	**3683**	3272	411	**22909**	20929	1980
Inchanga	**115**	96	19	**207**	173	35
Ingqungqulu Them	**2098**	1573	525	**12010**	9138	2871
Kwa Khabazela	**3502**	1227	2275	**7528**	2638	4891
Langefontein	**0**	0	0	**0**	0	0
Mgezanyoni	**748**	134	614	**1239**	222	1017
Monteseel	**176**	171	5	**564**	548	16
Mophela	**2192**	605	1587	**4318**	1930	2388
Mpumalanga Compl	**23844**	14364	9480	**100329**	73385	26944
Ngcolosi TA	**4406**	1653	2753	**10517**	3971	6546
Nyuswa TA	**3457**	1494	1963	**10359**	5073	5287
Phepheta TA	**2235**	1662	573	**17064**	12947	4117
Qadi TA 2	**710**	619	91	**4469**	3895	574
Qadi TA1	**912**	204	708	**2190**	490	1700
Shangase TA	**1726**	693	1034	**4474**	1794	2680
Western Farmland	**2599**	1677	922	**6453**	4332	2120
Western Suburbs	**14646**	13667	979	**40068**	37368	2700
Ximba TA	**9451**	4605	4847	**32872**	16401	16471
TOTALS	**80333**	**48796**	**31537**	**282873**	**197833**	**85040**

INNER WEST REGION - ESTIMATED NUMBER OF DWELLING UNITS AND POPULATION BY SETTLEMENT CLUSTER, 2004						
SETTLEMENT	**DWELLING**			**POPULATION**		
CLUSTER	**TOTAL**	**FORMAL**	**INFORMAL**	**TOTAL**	**FORMAL**	**INFORMAL**
Chatsworth	**42147**	36159	5989	**175385**	154928	20457
Clermont	**24861**	10259	14602	**70030**	28932	41098
KwaDabeka	**9855**	4668	5186	**54368**	25755	28612
KwaNdengezi Comp	**8888**	5940	2948	**42285**	28259	14026
New Germany	**3233**	3163	71	**9664**	9517	146
Old Line Suburbs	**3089**	3072	17	**11221**	11159	62
Pinetown	**12857**	12561	297	**38335**	37266	1069
Pinetown South E	**8190**	4530	3659	**26948**	16442	10506
Pinetown South W	**28137**	14531	13606	**75820**	45995	29825
Queensburgh	**9751**	9536	215	**31153**	30443	710
Reservoir Hills	**7702**	5896	1806	**24412**	18688	5725
Shallcross	**5622**	4738	884	**24247**	20364	3884
Umgeni South	**5567**	1508	4060	**14407**	3901	10506
Western Suburbs	**1797**	1154	643	**6192**	3978	2214
Westville	**10115**	9755	359	**41130**	39866	1265
TOTALS	**181812**	**127470**	**54342**	**645599**	**475494**	**170106**

SOUTHERN REGION - ESTIMATED NUMBER OF DWELLING UNITS AND POPULATION BY SETTLEMENT CLUSTER, 2004						
SETTLEMENT	**DWELLING**			**POPULATION**		
CLUSTER	**TOTAL**	**FORMAL**	**INFORMAL**	**TOTAL**	**FORMAL**	**INFORMAL**
Adams	**2218**	1685	532	**11278**	8681	2597
Airport-SAPREF	**7036**	4443	2593	**31289**	19757	11532
Folweni	**8028**	5511	2517	**42231**	26877	15354
Illovo	**723**	482	240	**2816**	2244	572
Isimahala TA	**3364**	2241	1123	**18057**	13364	4693
KwaMakhuta Compl	**9805**	8685	1121	**51282**	45695	5586
Sobonakhona-Makh	**6953**	2206	4746	**15534**	5538	9996
Southern Suburbs	**20302**	16722	3580	**70825**	57524	13301
Toyane TA	**9493**	4384	5108	**7175**	3314	3861
Umbogintwini	**244**	141	103	**455**	263	192
Umkomaas	**5274**	3985	1289	**17406**	13222	4183
Umlazi	**82660**	47228	35432	**413077**	232218	180859
Umnini Trust TA	**10218**	5111	5107	**29262**	17014	12247
Vumangazi TA	**2055**	772	1282	**14513**	5429	9084
Western Farmland	**0**	0	0	**0**	0	0
TOTALS	**168372**	**103597**	**64775**	**725200**	**451141**	**274059**

c) Income Categories

The socio-economic distribution of the population in the eThekwini Municipality can be broken down into the following categories:

Income Group	Density	Description
High	Low, Middle	Large and middle sized erven
Middle	Middle, High	Middle and small sized erven, Cluster housing
Low	Middle, High	Small erven, Cluster housing
Informal settlements		Single units, backyard rooms, cluster housing, rows of rooms, periheral single and cluster.

The categories listed above are based on an integration of census information and previous studies conducted in the eThekwini Municipal Area. The income group as well as the dwelling type could influence waste generation figures and waste quantities. Therefore waste generation and growth is dependent on both income and the type of dwelling associated with each settlement cluster.

d) Growth Estimates

PERCENTAGES USED FOR POPULATION GROWTH		
DOMAIN	**DWELLING TYPE**	**GROWTH PERCENTAGE**
Formal	Suburb	1.07%
	Township	1.07%
Informal	Infill Single	1.16%
	Infill Backyard	1.16%
	Rows of Rooms	1.16%
	Peripheral Single	1.16%
	Peripheral Cluster	1.16%

e) Future Projections

Projections of future population growth and waste generation are influenced by many factors, such as the economy, employment, housing, emigration, disease, influx and the changes of living standards of people due to their economic situation.

The estimated growth figures indicated in d) above have taken various factors into consideration and should give an accurate estimation of future population.

2.2.2 Waste Generation

a) Unit Generation

To determine the domestic waste generated in the individual settlement clusters, the population figures are multiplied by a unit waste generation figure (kg/person/day). The unit generation figure is derived from the Waste Stream Analysis carried out in 1998 and other studies of a similar nature. Studies were carried out in the Lowveld and Escarpment District Council (1992) and Greater Pretoria Metropolitan Council (1997) areas. The unit generation is dependent on the type of domain and dwelling associated with each settlement cluster. The unit generation figures used in this Study are given in the following table.

UNIT DOMESTIC WASTE GENERATION (KG/PERSON/DAY)		
DOMAIN	**DWELLING TYPE**	**WASTE GENERATION (kg/person/day)**
Formal	Suburb	0.5-0.8
	Township	0.4
Informal	Infill Single	0.18
	Infill Backyard	0.18
	Rows of Rooms	0.18
	Peripheral Single	0.18
	Peripheral Cluster	0.18

b) Domestic Generation

NORTHERN REGION - ESTIMATED DOMESTIC WASTE GENERATION FIGURES (2004)							
SETTLEMENT CLUSTER	**POPULATION**	**TOTAL WASTE**		**FORMAL WASTE**		**INFORMAL WASTE**	
		t/day	**t/annum**	**t/day**	**t/annum**	**t/day**	**t/annum**
Buffelsdraai	2878	0.861	314	0.623	227	0.238	87
Canelands	1365	0.653	238	0.636	232	0.017	6
Duikerfontein	82	0.053	19	0.053	19	0.000	0
Emona-Buffels	3479	0.970	354	0.574	209	0.397	145
Greylands	10612	3.607	1317	2.829	1033	0.779	284
Hambanathi-Wewe	8911	3.618	1321	3.357	1225	0.261	95
Hawaan	815	0.202	74	0.086	32	0.116	42
Hazelmere	5315	1.702	621	1.031	376	0.671	245
Inanda	225388	56.126	20486	28.284	10324	27.842	10162
Inanda Farm	2282	0.640	234	0.417	152	0.223	81
KwaMashu	191585	65.698	23980	56.751	20714	8.947	3266
Melkhoute	4751	2.757	1006	2.717	992	0.040	15
Mount Edgecombe	1769	1.110	405	1.094	399	0.015	6
Mount Moreland	266	0.173	63	0.173	63	0.000	0
Newlands East	20871	12.478	4554	12.459	4547	0.019	7
Newlands West	27095	16.189	5909	16.160	5898	0.029	11
Ntuzuma	96920	24.163	8819	12.213	4458	11.950	4362
Osindisweni	2878	0.843	308	0.591	216	0.252	92
Ottawa	6012	2.435	889	2.255	823	0.180	66
Parlock-Hippo	5972	2.886	1053	2.830	1033	0.056	21
Phoenix	167699	100.098	36536	99.874	36454	0.224	82
Phoenix Industrial	328	0.164	60	0.164	60	0.000	0
Qadi TA	26699	6.733	2458	3.505	1279	3.228	1178
Qadi TA1	6815	2.044	746	1.487	543	0.558	204
Redcliffe	12763	3.864	1410	2.849	1040	1.015	371
Sugarcane 1	602	0.301	110	0.301	110	0.000	0
Sugarcane 2	9740	4.409	1609	4.149	1515	0.259	95
Tongaat	29948	18.730	6836	18.447	6733	0.282	103
Tongaat Beach	4112	1.580	577	1.313	479	0.268	98
Umdloti	1694	1.343	490	1.339	489	0.003	1
Umhlanga	6833	5.324	1943	5.282	1928	0.041	15
Verulam	32497	17.324	6323	16.392	5983	0.932	340
TOTALS	**918977**	**359.078**	**131064**	**300.234**	**109585**	**58.844**	**21478**

CENTRAL REGION - ESTIMATED DOMESTIC WASTE GENERATION FIGURES (2004)							
SETTLEMENT CLUSTER	**POPULA-TION**	**TOTAL WASTE**		**FORMAL WASTE**		**INFORMAL WASTE**	
		t/day	**t/annum**	**t/day**	**t/annum**	**t/day**	**t/annum**
Berea North	50339	39.539	14432	39.326	14354	0.213	78
Berea South	51536	40.607	14822	40.427	14756	0.181	66
Bluff	30229	23.576	8605	23.399	8541	0.176	64
Cato Manor	53763	17.849	6515	10.544	3848	7.305	2666
Chesterville	11990	4.165	1520	3.648	1332	0.516	188
Duikerfontein	28862	16.336	5962	14.375	5247	1.961	716
Durban Bay	1138	0.910	332	0.910	332	0.000	0
Durban CBD E	28614	22.332	8151	22.169	8092	0.162	59
Durban CBD N	7814	5.462	1994	5.233	1910	0.229	84
Durban CBD W	20415	16.046	5857	15.963	5826	0.083	30
Durban North	41280	30.071	10976	29.790	10874	0.281	102
Harbour	1010	0.336	123	0.199	72	0.137	50
Industrial	22500	10.617	3875	9.083	3315	1.535	560
Lamontville	43649	14.447	5273	11.982	4374	2.465	900
Merebank	57154	33.693	12298	33.437	12204	0.257	94
Montlands	21757	17.092	6238	17.000	6205	0.091	33
Old Line Suburbs	14814	10.223	3731	9.750	3559	0.473	173
Springfield Flats	1646	0.647	236	0.548	200	0.099	36
Umgeni South	57746	30.429	11107	28.622	10447	1.808	660
Umhlanga	7932	6.279	2292	6.260	2285	0.019	7
Yellowwood Park	5807	4.533	1655	4.500	1643	0.033	12
TOTALS	**559994**	**345.188**	**125993**	**327.165**	**119415**	**18.023**	**6578**

INNER WEST REGION - ESTIMATED DOMESTIC WASTE GENERATION FIGURES (2004)							
SETTLEMENT CLUSTER	**POPULA-TION**	**TOTAL WASTE**		**FORMAL WASTE**		**INFORMAL WASTE**	
		t/day	**t/annum**	**t/day**	**t/annum**	**t/day**	**t/annum**
Chatsworth	175385	96.639	35273	92.957	33929	3.682	1344
Clermont	70030	18.971	6924	11.573	4224	7.398	2700
KwaDabeka	54368	15.452	5640	10.302	3760	5.150	1880
KwaNdengezi Comp	42285	13.828	5047	11.304	4126	2.525	921
New Germany	9664	7.640	2789	7.614	2779	0.026	10
Old Line Suburbs	11221	8.938	3263	8.927	3258	0.011	4
Pinetown	38335	30.005	10952	29.813	10882	0.192	70
Pinetown South E	26948	10.934	3991	9.043	3301	1.891	690
Pinetown South W	75820	30.666	11193	25.297	9233	5.369	1960
Queensburgh	31153	24.482	8936	24.355	8889	0.128	47
Reservoir Hills	24412	12.243	4469	11.213	4093	1.030	376
Shallcross	24247	12.917	4715	12.218	4460	0.699	255
Umgeni South	14407	4.232	1545	2.341	854	1.891	690
Western Suburbs	6192	3.183	1162	2.784	1016	0.399	145
Westville	41130	32.120	11724	31.892	11641	0.228	83
TOTALS	**645599**	**322.252**	**117622**	**291.633**	**106446**	**30.619**	**11176**

OUTER WEST REGION - ESTIMATED DOMESTIC WASTE GENERATION FIGURES (2004)							
SETTLEMENT CLUSTER	POPULA-TION	TOTAL WASTE		FORMAL WASTE		INFORMAL WASTE	
		t/day	t/annum	t/day	t/annum	t/day	t/annum
Drummond	988	0.765	279	0.758	277	0.007	3
Fredville Comple	3128	0.721	263	0.247	90	0.474	173
Hammarsdale	1187	0.875	319	0.870	318	0.005	2
Harrison	22909	17.099	6241	16.743	6111	0.356	130
Inchanga	207	0.144	53	0.138	50	0.006	2
Ingqungqulu Them	12010	4.172	1523	3.655	1334	0.517	189
Kwa Khabazela	7528	1.935	706	1.055	385	0.880	321
Langefontein	0	0.000	0	0.000	0	0.000	0
Mgezanyoni	1239	0.272	99	0.089	32	0.183	67
Monteseel	564	0.441	161	0.438	160	0.003	1
Mophela	4318	1.395	509	0.965	352	0.430	157
Mpumalanga Compl	100329	34.204	12484	29.354	10714	4.850	1770
Ngcolosi TA	10517	2.767	1010	1.588	580	1.178	430
Nyuswa TA	10359	2.981	1088	2.029	741	0.952	347
Phepheta TA	17064	5.920	2161	5.179	1890	0.741	270
Qadi TA 2	4469	1.661	606	1.558	569	0.103	38
Qadi TA1	2190	0.502	183	0.196	72	0.306	112
Shangase TA	4474	1.200	438	0.718	262	0.482	176
Western Farmland	6453	2.981	1088	2.599	949	0.382	139
Western Suburbs	40068	30.380	11089	29.894	10911	0.486	177
Ximba TA	32872	11.165	4075	8.201	2993	2.965	1082
TOTALS	**282873**	**121.581**	**44377**	**106.274**	**38790**	**15.307**	**5587**

SOUTHERN REGION - ESTIMATED DOMESTIC WASTE GENERATION FIGURES (2004)							
SETTLEMENT CLUSTER	POPULA-TION	TOTAL WASTE		FORMAL WASTE		INFORMAL WASTE	
		t/day	t/annum	t/day	t/annum	t/day	t/annum
Adams	11278	5.676	2072	5.208	1901	0.468	171
Airport-SAPREF	31289	9.979	3642	7.903	2885	2.076	758
Folweni	42231	13.515	4933	10.751	3924	2.764	1009
Illovo	2816	1.898	693	1.795	655	0.103	38
Isimahala TA	18057	6.191	2260	5.346	1951	0.845	308
KwaMakhuta Compl	51282	19.284	7039	18.278	6672	1.006	367
Sobonakhona-Makh	15534	4.014	1465	2.215	808	1.799	657
Southern Suburbs	70825	42.661	15571	40.266	14697	2.394	874
Toyane TA	7175	2.021	737	1.326	484	0.695	254
Umbogintwini	455	0.245	89	0.210	77	0.035	13
Umkomaas	17406	8.687	3171	7.933	2896	0.753	275
Umlazi	413077	125.442	45786	92.887	33904	32.555	11882
Umnini Trust TA	29262	9.010	3289	6.806	2484	2.205	805
Vumangazi TA	14513	3.807	1390	2.172	793	1.635	597
Western Farmland	0	0.000	0	0.000	0	0.000	0
TOTALS	**725200**	**252.427**	**92135**	**203.097**	**74130**	**49.331**	**18006**

c) Total Generation

NORTHERN REGION - ESTIMATED TOTAL WASTE GENERATION FIGURES (2004)			
Waste Type	**Total North Region tons/annum**	**La Mercy Landfill tons/annum**	**Bisasar Rd Landfill tons/annum**
Solid Waste	82503	82472	31
DSW Collection	32542		32542
Garden Refuse	4619	4619	
Building Rubble	237	237	
Mixed Loads	6489	5452	1037
Very Light Items	6	6	
Whole Tyres	20	20	
Munitech Contracts	32438		32438
TOTAL	**158854**	**92806**	**66048**

CENTRAL REGION - ESTIMATED TOTAL WASTE GENERATION FIGURES (2004)		
Waste Type	**Bisasar Road Landfill tons/annum (excluding Inner West and Northern Regions)**	**Bisasar Road Landfill tons/annum (including Inner West and Northern Regions)**
Solid Waste	65308	76125
DSW Collection	95738	149506
Garden Refuse	72490	72490
Building Rubble	47211	47211
Mixed Loads	56136	57083
Very Light Items	30	30
Light Items	68	68
Whole Tyres	1259	1259
Munitech Contracts	6217	38658
Cover Material	261966	261966
Condemned Foods	463	463
Asphalt (Roads Department)	560	560
Mondi Pulp	4846	4846
Special Waste General	3851	3851
TOTAL	**616143**	**714116**

INNER WEST REGION - ESTIMATED TOTAL WASTE GENERATION FIGURES (2004)				
Waste Type	**Inner West Total tons/annum**	**Mariannhill Landfill tons/annum**	**Bisasar Road Landfill tons/annum**	**Shallcross Garden Refuse and Builders Rubble Site**
Solid Waste	49681	22590	27091	
DSW Collection	9506		9506	
Garden Refuse	16767	16767		Unknown
Building Rubble	3598	3598		Unknown
Mixed Loads	3067	2586	481	
Very Light Items	65	65		
Light Items	15	15		
Whole Tyres	249	249		
Cover Material	43628	43628		
Condemned Foods	1741	1741		
PSW Collection	39293	39293		
TOTAL	**167611**	**130532**	**37078**	**Unknown**

OUTER WEST REGION - ESTIMATED TOTAL WASTE GENERATION FIGURES (2004)					
Waste Type	**Outer West Region**	**Shongweni Landfill Site**	**Wyebank Garden Refuse and Bulders' Rubble Site**	**Hammarsdale Transfer Station**	**DSW Landfill Sites**
	tons/annum	**tons/annum**	**tons/annum**	**tons/annum**	**tons/annum**
Solid Waste TOTAL	**16090**	**9270***	**Limited Record**	**1831**	**4989**

Note:
** 2002 private landfill quantities escalated by 1,5% per annum for estimate purposes*

SOUTHERN REGION - ESTIMATED TOTAL WASTE GENERATION FIGURES (2004)				
Waste Type	**South Total**	**Amanzimtoti Transfer Station**	**Umlazi Transfer Station**	**Three Garden Refuse Disposal Sites**
	tons/annum	**tons/annum**	**tons/annum**	**tons/annum**
Solid Waste	45115	19106	26009	
Building Rubble	Unknown			Unknown
Garden Refuse	33248			33248
TOTAL	**78363**	**19106**	**26009**	**33248**

d) Total Landfilled Waste

TOTAL GENERAL AND LOW HAZARDOUS WASTE LANDFILLED (ESTIMATED FOR 2004)	
Waste Type	**Total tons/annum**
Solid Waste	540,868
Garden Refuse	119,689
Building Rubble	51,146
Mixed Loads	17,052
Very Light Items	101
Light Items	83
Whole Tyres	1,528
Munitech Contracts	38,658
Cover Material	321,676
Condemned Foods	498
Asphalt	560
Mondi Pulp	14,439
Special Waste General	2,735
PSW Collection	39,270
Low Hazardous	117,917*
TOTAL	**1,266,220**

Note:
** 2002 private landfill quantities escalated by 1,5% per annum for estimate purposes. Above quantities include Sappi Saicor quantities.*

WASTE ACCEPTANCE PER LANDFILL						
Waste Type	**Total tons/ Annum**	**La Mercy tons/annum**	**Bisasar Road tons/annum**	**Mariannhill tons/annum**	**Shongweni* tons/annum**	**Bulbul Drive* tons/annum**
Solid Waste	**540,868**	82472	298651	32911	42816	84018
Garden Refuse	**119,689**	4619	72158	16950		25962
Building Rubble	**51,146**	237	47311	3598		
Mixed Loads	**17,052**	5452	10668	932		
Very Light Items	**101**	6	30	65		
Light Items	**83**		68	15		
Whole Tyres	**1,528**	20	1259	249		
Munitech Contracts	**38,658**		38658			
Cover Material	**321,676**	61	277987	43628		
Condemned Foods	**498**	2	463	33		
Asphalt	**560**		560			
Mondi Pulp	**14,439**		14439			
Special Waste General	**2,735**		1889	846		
PSW Collection	**39,270**			39270		
Low Hazardous	**117,917**				53403	64514
Total	**1,266,220**	**92869**	**764141**	**138497**	**96219**	**174494**
Percentage	**100%**	**7.33%**	**60.35%**	**10.94%**	**7.60%**	**13.78%**

Note:
** 2002 private landfill quantities escalated by 1,5% per annum for estimate purposes*

e) Waste Reconciliation

A final reconciliation is carried out to compare the regional waste generation figures with the landfilled figures which are weigh bridge recorded. This will determine whether all the waste has been accounted for in the eThekwini Municipal Area. The reconciled waste generations per region in this Report are as follows:

Northern Region	158 853 tons/annum	-	15.32%
Central Region	616 143 tons/annum	-	59.41%
Inner West Region	167 611 tons/annum	-	16.16%
Outer West Region	16 090 tons/annum	-	1.55%
Southern Region	78 363 tons/annum	-	7.56%
TOTAL	**1 037 060 tons/annum**	**-**	**100%**

If this value is compared to the total solid waste landfilled, excluding hazardous waste (1,266,220 less 117,917) of 1,148,303 tons/annum, then 111,243 tons/annum of waste is not accounted for. This makes up 9.6% of the general solid waste landfilled in the eThekwini Municipal Area.

The 111,243 tons/annum of general solid waste which is un-accounted for could have been landfilled at the Bulbul Drive and Shongweni H:h landfill sites in cases where the origin could not be traced. This waste could originate from areas outside the eThekwini Municipal Area region such as Msunduzi or Richards Bay. A further portion of this un-accounted waste could also emanate from illegal dumping which is collected by DSW.

Unit waste production figures used in the estimates were rounded off from the actual figures determined in the Waste Stream Analysis 1998 which could also contribute to the discrepancy.

2.2.3 Waste Types/Characteristics

Waste is categorised as either general or hazardous waste according to the Minimum Requirements Documents (1998) of the Department of Water Affairs and Forestry. General wastes can be subdivided into the following categories:

- Paper
- Metals
- Glass
- Plastic
- Organic
- Inert Materials (eg. building rubble)

Low hazardous waste is currently handled by private contractors in the eThekwini Municipal area. Exact information of the specific waste categories generated, collected and disposed is unavailable at present. **High hazardous** waste is currently exported to Gauteng and/or Cape Town creating an associated risk exposure for EDSW.

Hazardous waste is broken up into nine classes each with their own requirements for treatment. The hazardous waste classes include the following:

- Class 1 Explosives
- Class 2 Gases
- Class 3 Flammable Liquids
- Class 4 Flammable Solids
- Class 5 Oxidising Substances
- Class 6 Toxic and Infectious Substances
- Class 7 Radioactive Substances
- Class 8 Corrosives
- Class 9 Other Miscellaneous Substances

This Report will mainly deal with **general waste** from domestic, commercial and industrial origin. General Waste, as described above, is divided into the following waste types for the eThekwini Municipal Area.

a) Waste Types

WASTE TYPE
Domestic Formal
Domestic Informal
Commercial
Light Industrial
Garden
Building Rubble
Liquid Waste
Low Hazardous (Solid)

2.2.4 Density and Compaction

a) Uncompacted Density

WASTE TYPE	DENSITY (kg/m^3)
Domestic Formal	120
Domestic Informal	200
Commercial	200
Light Industrial	200
Garden	150
Building Rubble	600

Liquid Waste	1,000
Low Hazardous (Solid)	300

b) Compaction Ratios

COLLECTION VEHICLE / STATIC COMPACTOR TYPE	COMPACTION RATIO
Rear End Loader (REL)	3:1
Rotopress	4:1
Static Linear Compactor (P60)	4:1
Tractor and Trailer Systems	1:1
Open 27m³ Roll-on Containers	1:1
Telehoist Skips	1:1

c) Landfill Compaction Density

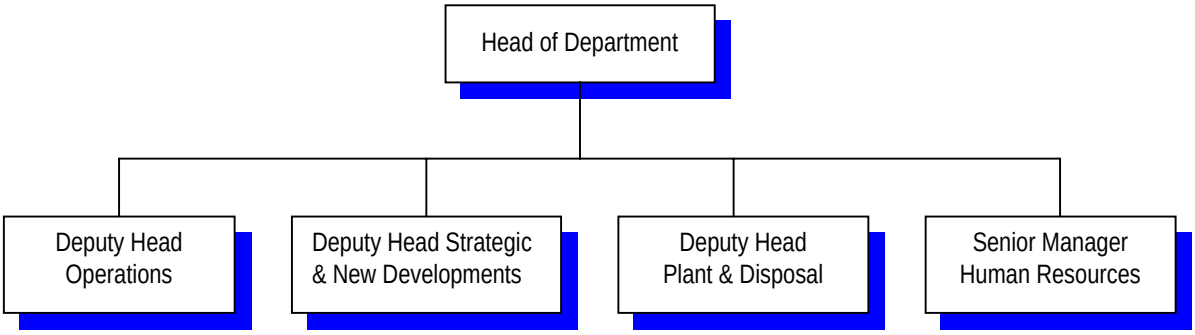
The waste which is off-loaded at the disposal site is handled by dedicated compaction and handling equipment. This equipment is used to form cells and compact the waste prior to being covered with material at the end of each day. The compaction density achieved at the landfill site is dependent on the type of equipment used and composition of the waste.

Compacted densities of up to 1 400 kg/m³ are being achieved at the Bisasar Road landfill site. This is due to good operational practices and the high percentage of soil and builder's rubble being received, as well as the extraction of gas generated in the waste body. For the purposes of the Study the compacted density will be limited to a maximum of 1 200 kg/m³.

2.3 Organisational Structure

2.3.1 Organisational Charts

eThekwini Municipality : Cleansing and Solid Waste has planned and agreed on the organisational structure which will take the recently demarcated eThekwini Municipality's Cleansing and Solid Waste Unit into the future. During the course of this exercise, staff were appointed to the agreed structure in order to commence the new financial year with a populated structure. The first two levels of staff had already been appointed/placed previously. The high-level organogram is depicted below. A short description of the roles, responsibilities and functions of each position at the second level of the organisation is provided in Section 2.3.2.



2.3.2 Defined Responsibilities

Following is a short description of the roles, responsibilities and functions of each position in the second level of the organisation.

a) Operations

- Refuse Collection
- Illegal Dumping
- Street Cleansing
- Refuse contracts (implementation, monitor, control)
- Maintenance – Bins/skips
- Law enforcement
- Complaints

b) Strategic & New Development

- Operational and capital budgets
- Compliance – Laws, IDP
- Recycling Plants
- Research & Development
- Policies
- Planning & Development
- Inter-Governmental Co-ordination
- All contracts (township, etc.)
- Administration
- Business Branch
- Human Resources

c) Plant & Disposal

- Landfill sites
- Transfer stations
- Garden refuse sites
- Large and small plant
- Mechanical workshops
- Vehicles
- Fleet management
- Transport from transfer stations and garden refuse sites to disposal facilities
- Research and development

d) Human Resources

- Recruitment
- Pay and leave
- Industrial relations
- Legislation
- Research and development

2.3.3 Staff Analysis

Cleansing and Solid Waste employs permanent staff, temporary staff and agency workers in order to fulfil their function. Excluded from the numbers are those people who form part of the entrepreneurial collection contracts where the entrepreneurs appoint their own staff.

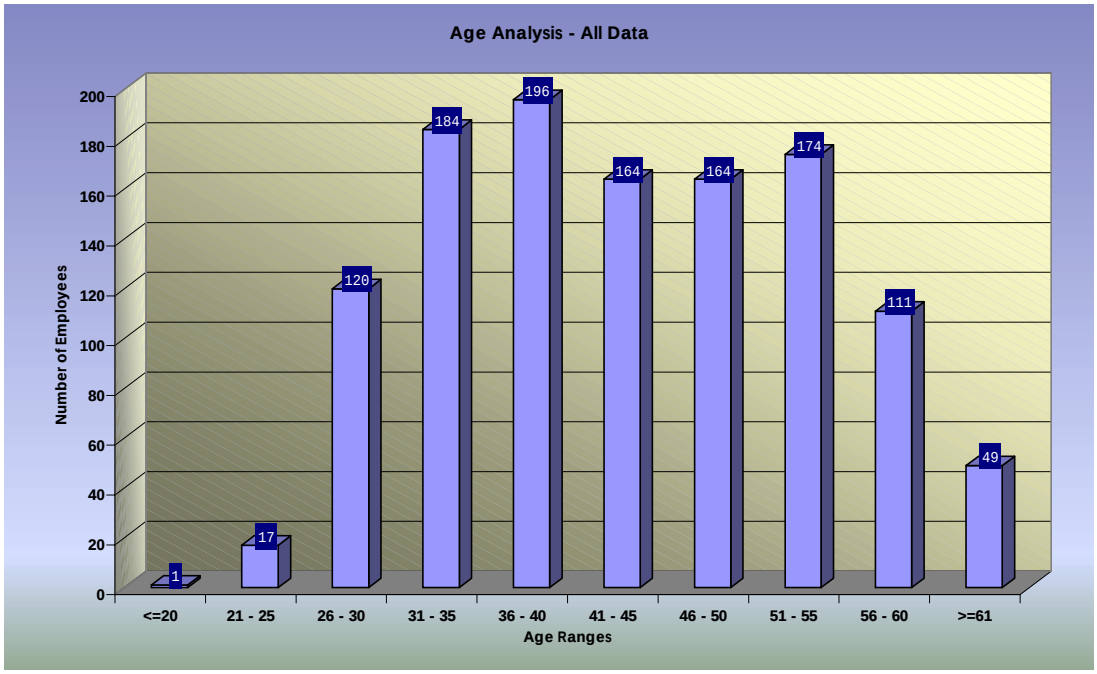
In order to do proper recruitment and financial planning, it is important to have a good understanding of the age and years of service of the staff complement. Cleansing and solid waste services are services that require physical strength and youth, especially the refuse collection section; and by having a good understanding of the age profile of staff, certain operational adjustments can be planned and made timeously.

Analysed below, are profiles of the permanent staff complement with regard to age and years of service. The calculations were based on a retirement age of 63 years.

a) Age Analysis

Cleansing and Solid Waste employ 1180 staff. As mentioned above, these numbers exclude temporary staff and agency workers.

The average age profile of the staff is 43 years. Based on previous experience in dealing with other cleansing and solid waste management services, it is confirmed that the above age profile is typical of a Municipal cleansing and solid waste management unit. It compares well with the age profile of Pikitup (Johannesburg) (Pty) Ltd and Ekurhuleni Metropolitan Municipality. From the above it is evident that 11.69 percent of the staff are 30 years and younger, 60.00 percent are between 30 and 50 years and 28.30 percent are 51 years and older. It is noteworthy that 49 staff members are 61 years and older.



It is evident from the above that cleansing and solid waste services are not for the young worker since only 18 staff members are 25 years and younger.

Analysing the number of years employed it is noted that 61 percent of the staff members are employed for 16 years or less. Comparing this to the age analysis where 72 per cent of employees are 50 years and younger, it can be deducted that cleansing and solid waste is not a job for life since at 50 years of age a worker should have had approximately 30 working years. This statistic is important for planning, training and development of the staff compliment. It is also important when considering the rules of pension funds and medical aids. Generally Local Government retirement

funds are general in nature and do not address the specific needs of the cleansing and solid waste services.

b) Summary of Staff Profile

The Former DSW

Position	Monthly Salary per person	No. of Staff	Average Age	Years Service	Total per month
A.C.O.	R9,822.53	1	38	1	R9,822.53
Accounts Clerk (Solid Waste)	R6,260.15	1	42	10	R6,260.15
Accounts Contoller	R7,566.89	1	57	16	R7,566.89
Administration Assistant (Education)	R7,896.82	1	56	11	R7,896.82
Area Cleansing Officers	R10,022.88	18	46	17	R180,411.86
Area Co-ordinators	R16,211.72	2	54	32	R32,423.44
Artisan Assistants	R4,240.64	9	40	13	R38,165.80
Chief Clerk	R6,721.33	1	46	28	R6,721.33
Cleansing Inspector	R5,970.01	1	52	32	R5,970.01
Clerk	R5,402.57	4	43	18	R21,610.28
Contract Processor	R5,772.16	2	32	9	R11,544.31
Depot Clerk	R3,918.93	10	41	15	R39,189.27
Design Engineer	R16,162.81	1	42	21	R16,162.81
Dispatchers	R6,025.27	2	41	10	R12,050.54
Disposal Engineer	R14,355.64	1	26	0	R14,355.64
Drivers (Class 1)	R5,207.17	25	50	21	R130,179.35
Driver/Conductor	R5,837.09	1	39	8	R5,837.09
Driving Instructors	R5,837.09	3	39	7	R17,511.27
Education Officers	R7,552.67	9	35	3	R67,974.05
Foreman	R11,324.36	1	37	17	R11,324.36
Garden Refuse Site Attendants	R3,750.70	8	52	25	R30,005.61
General Workers (Administration)	R3,709.67	2	49	24	R7,419.33
General Workers (Collection)	R3,728.51	144	44	17	R536,906.12
General Workers (Depots)	R3,504.36	4	46	22	R14,017.44
General Workers (Disposal)	R3,700.32	11	45	17	R40,703.55
General Workers (Str. Sweeping)	R3,729.83	278	44	17	R1,036,893.53
General Workers (Transfer)	R3,654.95	2	34	7	R7,309.90
General Workers (Vehicles)	R3,634.37	2	42	14	R7,268.74
Incinerator Operators	R5,055.79	2	36	14	R10,111.57
Maintenance Assistant	R3,868.28	1	37	9	R3,868.28
Manager: Plant And Disposal	R21,483.72	1	49	25	R21,483.72
Marketing And Sales Co-ordinator	R17,354.32	1	46	4	R17,354.32
Office Assistant	R3,940.12	1	24	1	R3,940.12
Operational Supervisor	R5,837.09	1	51	6	R5,837.09
Plant and Vehicle Officer	R12,451.21	1	47	13	R12,451.21
Plant Operators	R5,490.88	11	54	18	R60,399.70
Receptionist/Clerk	R5,108.70	1	25	4	R5,108.70
Refuse Removal Controllers	R4,968.97	60	43	13	R298,137.91
Regional Customer Assistants	R5,002.87	2	44	23	R10,005.74
Secretary/Administration Assistant	R7,389.49	1	57	11	R7,389.49
Senior Artisan Body Builders	R8,953.95	3	43	17	R26,861.85
Senior Artisan Diesel Mechanics	R9,707.35	11	42	11	R106,780.88

Position	Monthly Salary per person	No. of Staff	Average Age	Years Service	Total per month
Senior Cleansing Officer	R12,451.21	1	39	20	R12,451.21
Senior Clerk	R4,899.25	1	32	5	R4,899.25
Senior Disposal Engineer	R17,771.29	1	38	9	R17,771.29
Senior Handyman (Breakdowns)	R5,457.42	1	55	12	R5,457.42
Senior Handyman/Driver	R5,002.87	1	34	9	R5,002.87
Senior Plant Operatos	R6,058.71	2	48	18	R12,117.41
Senior Supervisor Landfill Site	R8,933.59	1	53	8	R8,933.59
Senior Waste Consultants	R11,254.59	2	43	8	R22,509.17
Superintendent	R13,369.44	1	47	29	R13,369.44
Supervisors (Landfill Site)	R6,964.91	2	41	9	R13,929.82
Team Leaders (Collection	R4,047.26	14	54	31	R56,661.60
Team Leaders (Street. Sweeping	R4,067.83	23	50	24	R93,560.13
Temporary Drivers	R5,457.97	12	37	2	R65,495.68
Temporary General Workers (C)	R3,568.38	74	33	6	R264,060.46
Transfer Station Attendant s	R5,457.42	2	58	29	R10,914.84
Waste Consultants	R8,231.29	10	34	5	R82,312.85
Waste Minimisation Assistant	R7,047.67	1	30	4	R7,047.67
Waste Minimisation Officer	R10,057.96	1	40	8	R10,057.96
Weighbridge Operators	R4,928.42	7	40	14	R34,498.93
Total		**799**			**R 3,654,284.19**

The above table provides more detail regarding employees of the “former Durban Solid Waste" (DSW). It is evident that the drivers (class 1) have an average age of 50 years, which is seven years higher than the average age of the total staff complement. The average age of the drivers will improve substantially when the temporary drivers become permanent employees. Plant operators have an average age of 54 years, which is very high. The team leaders for street sweeping and collection have an average age of 50 and 54 which is also at the high end. What makes interesting reading is the fact that the average age of 44 years of the street sweeping staff is the same as that of the collection staff. One would have expected that the street sweeping staff would be older than the collection staff.

The average salary of R 3 730.00 per person for collection and street sweeping staff is the same. It can be noted that average salaries for these two categories of staff is much higher than what is on offer in the private sector. The average salary of temporary staff is slightly lower at R 3 568.00.

Outer West

Position	Monthly Salary per person	No. of Staff	Average Age	Years Service	Total per month
Cleansing Officer	R12,747.43	1	32	9	R12,747.43
Drivers - Refuse	R4,704.79	5	46	14	R23,523.93
General Assistants (Refuse Dump)	R4,747.66	2	43	9	R9,495.32
General Assistant (Refuse Station)	R3,905.03	1	63	14	R3,905.03
General Assistants (Refuse V10)	R3,590.02	6	50	22	R21,540.13
General Assistants (Refuse V11)	R3,541.39	8	44	16	R28,331.12
General Workers (Street Sweeper)	R3,451.42	20	37	9	R69,028.31
General Workers	R3,541.39	3	37	6	R10,624.17
Heavy Plant Operator	R4,897.59	1	53	8	R4,897.59
Operator (Payloader)	R4,897.59	1	48	30	R4,897.59
Total		**48**			**R 188,990.62**

The average age of street sweepers and general workers in this area is 37 years, which is substantially lower than the average age of 43 years. The average salary of general workers in this area is the lowest at R3 451.00 per person, but is still substantially above that offered in the private sector.

North

Position	Monthly Salary per person	No. of Staff	Average Age	Years Service	Total per month
Assist Directors	R13,615.36	4	53	19	R54,461.45
Depot Clerks	R5,114.23	2	50	13	R10,228.45
Education Officer	R9,622.75	1	48	3	R9,622.75
General Workers	R3,536.41	100	45	14	R353,640.61
H/D Drivers	R5,026.03	12	45	17	R60,312.40
Managers North	R14,289.60	2	53	17	R28,579.20
Secretary	R5,197.12	1	39	14	R5,197.12
Supervisors	R6,507.46	4	56	26	R26,029.84
Superintendents	R8,512.48	2	55	26	R17,024.95
Temporary H/D Drivers	R4,418.44	2	54	5	R8,836.88
Total		**130**			**R 573,933.65**

The average age of 45 years for general workers in this area is the same as for those at "the former Durban" and the average salary for this level of worker is slightly lower at R3 536 than for "the former Durban".

South

Position	Monthly Salary per person	No. of Staff	Average Age	Years Service	Total per month
Clerk/Receptionist	R4,391.88	1	23		R 4,391.88
Container Park Attend	R3,781.84	4	45		R 15,127.36
Driver Supervisor	R5,244.50	2	44		R 10,489.00
Extra Heavy Plant Operators	R6,073.50	13	42		R 78,955.44
General Worker	R3,726.59	134	42		R 499,362.86
Heavy Plant Operator	R5,424.80	2	39		R 10,849.60
Manager: Solid Waste	R14,434.73	1	46		R 14,434.73
Senior Artisan Assist	R4,159.13	4	42		R 16,636.52
Senior Assistant	R8,304.54	1	46		R 8,304.54
Superintendent: Collection	R10,378.14	4	45		R 41,512.56
Supervisor: Collection	R6,825.49	9	39		R 61,429.41
Team Leader	R4,159.13	19	49		R 79,023.42
Total		**194**	**42**		**R 840,517.32**

The average age of 42 years for general workers in this area is slightly lower than that for "the former Durban" and the average salary for this level of worker is on par with that of "the former Durban".

Umkomaas

Position	Monthly Salary per person	No. of Staff	Average Age	Years Service	Total per month
General Worker	R3,575.02	8	47		R 28,600.16
Refuse Removal Controller	R5,882.85	1	51		R 5,882.85
Total		**9**	**47**		**R 34,483.01**

The average age of 47 years for general workers in this area is higher than that for "the former Durban" and the average salary for this level of worker is slightly lower at R 3,575 than that of "the former Durban" and "South".

c) General

The amalgamation of various grades of local authorities to form the eThekwini Municipality, resulted in differences in the salaries of the staff.

The average salaries for the five areas are as follows:

Area	Value
Former Durban	R 4,574
Former Outer West	R 3,937
Former North	R 4,414
Former South	R 4,333
Former Umkomaas	R 3,831

The above indicate that a parity problem exists with regard to staff remuneration which needs to be addressed.

All temporary staff, being temporary staff for longer than two and a half years, are employed on a full-time basis, and these staff members will enjoy similar benefits to that of the existing staff. All temporary staff, being temporary staff for less than two and a half years, as well as agency workers, will be required to apply for a position, and if approved, will also become full-time staff.

The aforementioned has been budgeted for in the 2004/2005 budget and will become part of the committed expenses going forward. The current annual cost (excluding annual escalation) of these staff issues, amount to R25 million.

2.3.4 Co-operation between Authorities

eThekwini Municipality, and more specifically EDSW, being one of the leading municipal cleansing and solid waste management teams, have experienced a very active and co-operative relationship with the various levels of government. It is active in all spheres of government from local to national level.

2.4 Present Economics and Financing

2.4.1 The Economics and Financing Situation

EDSW offers both an economic and a social service. The economic service is rendered in competition with the private sector and income generated is determined by means of a promulgated tariff for such services.

The social service includes services such as household collection, garden site services, transfer facilities, street sweeping, beach cleaning, litter picking and the removal of illegal dumping.

2.4.2 Current Cost

Table 2.4a below shows the income and expenditure of the EDSW for the financial years 1994/1995 to 2002/2003 and the budget figures for 2003/2004. The effect of the amalgamation of the recently demarcated eThekwini Municipality is noticeable in the escalation of the income and expenses in the 2002/2003 financial year.

Table 2.4b depicts the Percentage Growth Year-on-Year in income and expenditure in relation to the major line items for the period 1994/1995 to 2003/2004. It is noticeable that expenditure increases at low levels in one year is followed by a substantial increase for the next year. Capital charges increased substantially since 1998/1999 mainly due to capital expenditure on the upgrading of facilities and the replacement of the ageing fleet.

Table 2.4c depicts each major line item as a Percentage of Total Expenditure. Expenditure percentages were stable over the years for salaries, general expenditure and repairs. However, since the amalgamation, salary expenditure increased from 28 to 37 per cent of the total expenditure.

Capital charges increased over the years from a low 2.24 per cent in 1996/1997 to a budgeted 5.02 per cent for the current financial year.

Income generated from economic services is used to reduce the deficit generated by the service. The deficit of the service is funded from the rates account. The household collection service is not charged through a separate tariff like certain other municipalities do. eThekwini Municipality includes the cost of the household collection in the rates charge.

Economic services are charged through the consolidated bill in line with section 102 (1)(a) of the Local Government: Municipal Systems Act, No. 32 of 2000 (as amended), which allows for this as well as does Section 68 of Ordinance 18 of 1976.

The property rates and taxes charged by eThekwini Municipality make provision for indigent customers and since the waste removal is charged through rates on the consolidated bill, no separate indigent policy exists for solid waste charges.

Attached Table 2.4d, is the Schedule of Tariffs for EDSW. Commercial services, landfilling as well as additional household services are charged in terms of the approved Schedule of Tariffs.

Table 2.4a: Income and Expenditure

INCOME STATEMENT - CLEANSING AND SOLID WASTE - 1994 - 2003										
Description	**1994/1995**	**1995/1996**	**1996/1997**	**1997/1998**	**1998/1999**	**1999/2000**	**2000/2001**	**2001/2002**	**2002/2003**	**2003/2004 BUDGET**
SALARIES, ALLOW.ETC.	27,744,981	33,780,334	38,376,710	48,208,711	50,899,614	56,812,862	65,132,282	71,089,564	120,085,154	141,464,620
GENERAL EXPENSES	61,873,190	72,846,895	97,382,385	128,313,342	126,167,701	150,345,253	130,732,478	142,902,003	145,611,363	177,320,520
REPAIRS	8,184,968	9,389,321	9,596,319	12,330,714	12,317,858	14,312,261	14,154,070	15,270,866	19,365,746	19,307,360
CAPITAL CHARGES	6 709 302	8 232 594	7 618 010	8 225 327	10 197 153	14 972 375	16 003 115	20 335 334	31 699 313	43 780 570
TOTAL RECOVERY	(21 688 330)	(22 015 134)	(22 505 155)	(33 167 610)	(25 856 153)	(29 199 060)	(28 238 658)	(35 091 405)	(47 763 886)	(55 761 750)
TOTAL CHARGE-OUTS	(22 646 687)	(30 781 308)	(32 748 596)	(45 898 736)	(48 063 237)	(60 406 692)	(41 292 267)	(34 146 385)	-	-
TOTAL EXPENDITURE	**60 177 423**	**71 452 702**	**97 719 672**	**118 011 748**	**125 662 935**	**146 837 000**	**156 491 018**	**180 359 978**	**268 997 690**	**326 111 320**
TOTAL INCOME	**(21 380 062)**	**(27 072 608)**	**(31 121 251)**	**(76 176 978)**	**(74 584 487)**	**(72 782 888)**	**(75 096 678)**	**(74 210 123)**	**(84 578 704)**	**(106 651 560)**
NET DEFICIT	**38 797 361**	**44 380 094**	**66 598 422**	**41 834 770**	**51 078 448**	**74 054 112**	**81 394 341**	**106 149 855**	**184 418 986**	**219 459 760**

Table 2.4b: Income and Expenditure % Growth Year-on-year

INCOME STATEMENT - CLEANSING AND SOLID WASTE - 1994 - 2003 (Percentage Growth Year-on-Year)										
Description	**1994/1995**	**1995/1996**	**1996/1997**	**1997/1998**	**1998/1999**	**1999/2000**	**2000/2001**	**2001/2002**	**2002/2003**	**2003/2004 BUDGET**
SALARIES, ALLOW.ETC.		21.75%	13.61%	25.62%	5.58%	11.62%	14.64%	9.15%	68.92%	17.80%
GENERAL EXPENSES		17.74%	33.68%	31.76%	(1.67%)	19.16%	(13.05%)	9.31%	1.90%	21.78%
REPAIRS		14.71%	2.20%	28.49%	(0.10%)	16.19%	(1.11%)	7.89%	26.81%	(0.30%)
CAPITAL CHARGES		22.70%	(7.47%)	7.97%	23.97%	46.83%	6.88%	27.07%	55.88%	38.11%
TOTAL RECOVERY		1.51%	2.23%	47.38%	(22.04%)	12.93%	(3.29%)	24.27%	36.11%	16.74%
TOTAL CHARGE-OUTS		35.92%	6.39%	40.15%	4.72%	25.68%	(31.64%)	(17.31%)		
TOTAL EXPENDITURE		**18.74%**	**36.76%**	**20.77%**	**6.48%**	**16.85%**	**6.57%**	**15.25%**	**49.14%**	**21.23%**
TOTAL INCOME		**26.63%**	**14.95%**	**144.77%**	**(2.09%)**	**(2.42%)**	**3.18%**	**(1.18%)**	**13.97%**	**26.10%**
NET DEFICIT		**14.39%**	**50.06%**	**(37.18%)**	**22.10%**	**44.98%**	**9.91%**	**30.41%**	**73.73%**	**19.00%**

Table 2.4c: Income and Expenditure %

INCOME STATEMENT - CLEANSING AND SOLID WASTE - 1994 - 2003 (Percentage of Total Ependiture)										
Description	**1994/1995**	**1995/1996**	**1996/1997**	**1997/1998**	**1998/1999**	**1999/2000**	**2000/2001**	**2001/2002**	**2002/2003**	**2003/2004 BUDGET**
SALARIES, ALLOW.ETC.	26.55%	27.19%	25.09%	24.46%	25.50%	24.03%	28.82%	28.48%	37.91%	37.04%
GENERAL EXPENSES	59.20%	58.63%	63.66%	65.11%	63.22%	63.59%	57.84%	57.25%	45.97%	46.43%
REPAIRS	7.83%	7.56%	6.27%	6.26%	6.17%	6.05%	6.26%	6.12%	6.11%	5.06%
CAPITAL CHARGES	6.42%	6.63%	4.98%	4.17%	5.11%	6.33%	7.08%	8.15%	10.01%	11.46%
	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
TOTAL RECOVERY	(20.75%)	(17.72%)	(14.71%)	(16.83%)	(12.96%)	(12.35%)	(12.49%)	(14.06%)	(15.08%)	(14.60%)
TOTAL CHARGE-OUTS	**(21.67%)**	**(24.77%)**	**(21.41%)**	**(23.29%)**	**(24.08%)**	**(25.55%)**	**(18.27%)**	**(13.68%)**	**0.00%**	**0.00%**
TOTAL EXPENDITURE										
TOTAL INCOME	**(35.53%)**	**(37.89%)**	**(31.85%)**	**(64.55%)**	**(59.35%)**	**(49.57%)**	**(47.99%)**	**(41.15%)**	**(31.44%)**	**(32.70%)**
NET DEFICIT	64.47%	62.11%	68.15%	35.45%	40.65%	50.43%	52.01%	58.85%	68.56%	67.30%

Table 2.4d: Income and Expenditure per Service

Tariff Bylaw Code	Description	2002/2003 Excluding Vat	2003/2004 Excluding Vat	Proposed % Change	Comments / Notes
101	A. Hire of 240 litre WHEELED CONTAINERS provided in terms of Section 3 - per container per month or part thereof	R11.00	R11.00	0.00%	In order to bridge the tariff gap in other entities within eThekwini Municipality, and to remain competitive.
	B. Hire of 360 litre WHEELED CONTAINERS provided in terms of Section 3 - per container per month or part thereof	R15.00	R15.00	0.00%	
	C. Hire of 600 litre WHEELED CONTAINERS provided in terms of Section 3 - per container per month or part thereof	R22.00	R22.00	0.00%	
	D. Hire of 1100 litre WHEELED CONTAINERS provided in terms of Section 3 - per container per month or part thereof	R44.00	R44.00	0.00%	
	E. Hire of other sized WHEELED CONTAINERS provided in terms of Section 3 - per container per month or part thereof	Full Cost	Full Cost		
102	Removal of DOMESTIC REFUSE from rateable premises in accordance with Section 5 (1)	No Charge	No Charge		
103	Removal of DOMESTIC REFUSE on request (Monday - Friday) when not in accordance with Section 5 (1) - per cubic metre or part thereof per month	R43.00	R45.00	4.65%	Increase in line with Code 202 where service is identical but aimed at the commercial sector.
104	Removal of DOMESTIC REFUSE on request (Weekend and Public Holidays) when not in accordance with Section 5 (1) - per cubic metre or part thereof per month	R60.00	R66.00	10.00%	
105	**A.** Replacement of 240 litre WHEELED CONTAINER (inclusive of transport) when lost, misplaced or damaged by customer.	R300.00	R300.00	0.00%	Current price sufficiently covers the cost of bin.
	B. Replacement of WHEELED CONTAINER other than 240litre (inclusive of transport) when lost, misplaced or damaged by customer.	Full Cost	Full Cost		eg. (360 Litre, 600 Litre, 660 Litre and 1100 Litre Wheeled Containers)
	C. Sale of 240litre WHEELED CONTAINER for business purpose only (exclusive of transport)	R250.00	R250.00	0.00%	
106	Supply of PLASTIC BIN LINERS for 240 litre Wheeled Containers - per 10 bin liners	R10.00	R11.50	15.00%	Based on increase in cost of Bin Liners
107	BLACK PLASTIC BAGS ON A ROLL / PACK (each of 26 bags), for domestic refuse only - When Purchased for cash from a Municipal Office - per roll/pack	R20.00	R20.00	0.00%	To encourage the use of DSW black bags when refuse volumes increase within the domestic sector. When Purchased for cash from a Municipal Office
108	**A.** Removal of GARDEN REFUSE on days determined in accordance with Section 5, by means of plastic bags provided by the Council - per pack of 12 bags	R26.00	R26.00	0.00%	To encourage additional demand, discourage illegal dumping and reduce volumes at garden site. To reduce the tariff gaps in the new areas.
	B. Removal of GARDEN REFUSE on days determined in accordance with Section 5, by means of plastic bags purchased from designated retail outlets - per pack of 12 bags.	R29.82	R29.82	0.00%	To encourage retail outlets to stock and make the blue bag accessible to the customer. Rounded off with current VAT is an easy to deal with sum for the retail outlet (R34 inclusive)

Tariff Bylaw Code	Description	2002/2003 Excluding Vat	2003/2004 Excluding Vat	Proposed % Change	Comments / Notes
109	Delivery Charge on Extra Garden Refuse/Black Plastic bag packs on request - per delivery	R20.00	R27.00	35.00%	Clients are further encouraged to purchase extra packs from designated retail outlets and /or municipal offices (Item 107/108)
201	**A.** Hire of STEEL CONTAINERS (Skips) - per steel container per month or part thereof:				
	i 5,5 m³ container	R195.00	R213.00	9.23%	A moderate increase is introduced, in order to remain with market related pricing.
	ii 8 m³ container (And 5.5 m³ Lidded Skips)	R225.00	R246.00	9.33%	
	iii 11 m³ container - no stock	R300.00	R327.00	9.00%	
	iv 14 m³ container	R330.00	R360.00	9.09%	
	v 18 m³ container	R420.00	R459.00	9.29%	
	vi 27 m³ container	R660.00	R720.00	9.09%	
	B. Hire of STEEL CONTAINERS (Skips) - per steel container per week or part thereof:				
	i 5,5 m³ container	R65.00	R71.00	9.23%	
	ii 8 m³ container	R75.00	R82.00	9.33%	
	iii 11 m³ container	R100.00	R109.00	9.00%	
	iv 14 m³ container	R110.00	R120.00	9.09%	
	v 18 m³ container	R140.00	R153.00	9.29%	
	vi 27 m³ container	R220.00	R240.00	9.09%	
202	**A.** Removal of COMPACTABLE TRADE / INDUSTRIAL REFUSE on days determined by the Head of Department : Cleansing and Solid Waste or nominee in terms of Section 5 (1) - per cubic metre or part thereof per month.	R43.00	R45.00	4.65%	A minimum increase is introduced, in order to remain with market related pricing, and reduce the tariff gaps in the new areas.
	B. Extra over A) above where wheeled container/s not provided in terms of Section 3 - per cubic metre or part thereof per month.	R8.50	R9.00	5.88%	Increase kept low to encourage the commercial sector to use wheeled containers instead of bags.
	C. Extra over A) above where WHEELED CONTAINERS are provided , and no collection service required, in terms of Section 5 (1) - per cubic metre or part thereof per month.		R22.50	NEW	To cater for instances where Wheeled containers are hired but no collection service required, based on a minimum charge of two lifts per month.
203	**A.** Removal of COMPACTABLE TRADE / INDUSTRIAL REFUSE on request on days when not in accordance with Section 5 (1) - per cubic metre or part thereof per month	R60.00	R66.00	10.00%	Special, Weekend Service and Public Holidays
	B. Extra over A) above where wheeled container/s not provided in terms of Section 3 - per cubic metre or part thereof per month	R8.50	R9.50	11.76%	Increased to encourage the commercial sector to use 240L bins.

Tariff Bylaw Code	Description	2002/2003 Excluding Vat	2003/2004 Excluding Vat	Proposed % Change	Comments / Notes
204	Removal and / or Disposal of Refuse where not covered for under any other tariff item / code	Full Cost	Full Cost		Special Events / Non-Standard Services whether for collection, disposal, sundry services or a mix.
205	**A.** Transport of steel container or compaction unit by means of a telehoist type vehicle - per steel container / compaction unit per trip per 5 km zone or part thereof from a disposal facility.	R132.00	R132.00	0.00%	In order to bridge the tariff gap in other entities within Thekwini Municipality, and to remain competitive.
	B. Service Fee, when customer cancels and truck is returned empty per 5 km zone or part thereof from a disposal facility.	R132.00	R132.00	0.00%	To eliminate cancellations and to recover cost of running the vehicle empty.
	C. Service fee, for storage of steel container or compaction unit at DSW Depot - per container per month or part thereof		R120.00	NEW	New tariff to accommodate customer when space at their site is limited.
206	**A.** Disposal of UNCOMPACTED SOLID WASTE per cubic metre or part thereof when removed in terms of Code 205.	R17.00	R21.00	23.53%	Increase in line with the increase in disposal costs required to meet the stringent demands of the Dept.of Water & Forestry & the high capital charges linked to the high capital expenditure incurred on landfill sites. This applies to all disposal tariffs.
	B. Disposal of UNCOMPACTED GARDEN REFUSE per cubic metre or part thereof when removed in terms of Code 205.	R5.50	R6.50	18.18%	As above but reduced to encourage domestic users & new businesses.
207	Disposal of COMPACTED SOLID WASTE per cubic metre or part thereof when removed in terms of Code 205.	R51.00	R63.00	23.53%	as per Code 206
	Codes 205, 206 and 207 tariffs are subject to a 33.3% surcharge for work carried out during weekends and public holidays where requested by the customer				To recover the cost of overtime
301	**A.** Removal of DEAD DOGS, CATS and other SMALL ANIMALS - per carcass	R56.00	R65.00	16.07%	To recover costs incurred due to the specialisation and utilisation of general workers, vehicles equipment and time.
	B. Removal of LARGE DEAD ANIMALS - per carcass	Full Cost	Full Cost	--	
302	**A.** Removal and disposal of derelict small vehicles - per vehicle	R300.00	R360.00	20.00%	eg. Motor Cars, Station wagon, Minibus, LDV
	B. Removal and disposal of derelict large vehicles - per vehicle	Full Cost	Full Cost		eg. Omnibus, Lorry

Addition:

- **Where a service is to be rendered for which no tariff is fully appropriate (ie where the container size or the waste density differs materially from the standards), the charge will be based on the determined disposal fee plus R132 per 5km zone from the disposal site utilised, or Full Cost (whichever is the greater).**
- **Where a container is overloaded a surcharge of 15c per kilogram will be applied.**
- **Products and/or services will be subject to availability at time of request .**

2.4.3 Cost of Existing Process

The purpose of determining unit costs for the various cleansing and solid waste services is to facilitate the planning and budgeting for the future provision of services to unserviced areas and new areas; as well as to benchmark the cost of the services with competitors and other municipalities. Unit costs would be useful for the strategic planning exercises.

EDSW prepares their budgets in terms of services and not in terms of activities, which makes it difficult to prepare unit costs. An Activity Based Cost exercise needs to be undertaken to calculate the cost per activity accurately.

Key indicators for the various waste management activities are important for forward planning in terms of determining personnel and equipment requirements. They are also useful in setting baseline indicators for performance monitoring.

The cost less income of existing processes/services has been reviewed. Refuse Removal had the highest net cost at R94 074 655 followed by Street Sweeping and Disposal Sites with a total net cost of R57 882 998 and R21 728 477, respectively.

A summary of the analyses is attached in Table 2.5.a However, the exact cost of existing processes for operation of facilities still requires further work which falls outside the scope of this assignment.

Table 2.5a: Income and Expenditure per Service

	Totals	Area Management (ARM)	Business Branch (BBN)	Refuse Removal (DDA)	Disposal Sites (DSP)	Garden Refuse Sites (GRS)	Management (MGE)	Plant & Transport (PLT)	Refuse Removal (REF)	Street Swepig (STS)	Trading - Metro (TRM)	TRS	Transfer Stations (TSS)	XTR
	YTD	YTD	YTD	YTD	YTD	YTD	YTD	YTD	YTD	YTD	YTD	YTD	YTD	YTD
DESCRIPTION	BUDGET	BUDGET	BUDGET	BUDGET	BUDGET	BUDGET	BUDGET	BUDGET	BUDGET	BUDGET	BUDGET	BUDGET	BUDGET	BUDGET
SALARIES, WAGES & ALLOWANCES														
Total	120 085 155	7 754 718	4 169 810	-	6 913 850	259 290	1 527 737	10 162 724	40 886 712	44 563 190	-	-	386 038	3 461 086
GENERAL EXPENSES														
Total	145 611 364	2 103 828	1 485 541	-	7 907 789	534 990	14 626 141	11 125 817	85 238 925	13 234 582	-	-	2 611 374	6 742 377
REPAIRS & MAINTENANCE														
Total	19 365 748	210 121	6 636	-	4 681 761	2 000	40 117	13 970 479	333 119	1 500	-	-	114 516	5 499
CAPITAL CHARGES														
Total	31 699 312	183 824	-	-	14 287 583	235 876	1 206 030	12 749 786	1 991 151	83 726	-	-	961 336	
CONTRIBUTIONS														
RECOVERIES														
Total	(47 763 885)	-	-	-	-	-	(33 184)	(47 730 701)	-	-				
CHARGE OUTS														
Total	-	-	-											
INCOME														
Total	(84 578 705)	-	-	-	(12 062 506)	-	-	-	(34 375 252)	-	(4 665 545)	(33 140 551)	-	(334 851)
GRAND TOTAL	184 418 989	10 252 491	5 661 987	-	21 728 477	1 032 156	17 366 841	278 105	94 074 655	57 882 998	(4 665 545)	(33 140 551)	4 073 264	9 874 111

2.4.4 Capital Expenditure

The required medium to long term capital expenditure detailed in the table below are the aggregate values in 2004 Rand values and escalated by 5% to indicate the influence of inflation.

Year	Capital Expenditure (2004 Rand Value)	Escalated Values (5% Escalation / year)
2004/2005	37,889,800	39,784,290
2005/2006	52,977,040	58,407,187
2006/2007	80,274,800	92,928,115
2007/2008	76,452,190	102,011,605
2008/2009	79,928,762	67,952,600
2009/2010	50,707,276	65,367,051
2010/2011	46,455,143	71,867,316
2011/2012	49,765,200	73,525,866
2012/2013	35,245,240	54,676,935
2013/2014	39,610,000	64,520,516
2014/2015	31,368,840	53,651,362
2015/2016	149,977,740	269,338,473
2016/2017	36,068,600	68,012,725
2017/2018	16,869,000	33,399,466
2018/2019	41,705,880	86,703,529
Total	**825,295,511**	**1,202,147,036**

The capital expenditure requirements as stated in the table above are driven by the need to satisfy the following:

- levels of service improvement, in particular the provision of sustainable waste transfer and disposal facilities.
- waste growth as a result of population and economic growth; and
- renewal and replacement of assets and investment to improve operating efficiencies.

The eThekwini Cleansing and Solid Waste Service depends largely on the availability and allocation of funds within the eThekwini Municipality for capital projects, based on a process of prioritisation of projects across all services and support functions. In terms of the Integrated Development Plan the Waste Service will be allocated the amounts indicated below, which are less than the amounts required as indicated in the above table.

	2002/2003 Comparative Total Rands	2003/2004 Total Allocation Rands	2004/2005 Total Allocation Rands	2005/2006 Total Allocation Rands
Solid Waste	35,500,000	36,000,000	31,618,800	34,253,280

The lower allocation of capital budget than required will compromise service delivery of which the real impact will only be felt in years to come. The required capital expenditure as indicated above is calculated on the optimum scenario and any deviation will increase operating cost and future capital expenditure.

2.5 Policy and Legislation

2.5.1 Introduction

The aim of this section of the Report is to provide an overview of the law relevant to waste and waste management and to identify how it influences eThekwini Municipality in developing their IWMP.

2.5.2 Waste and the Environment

This sub-section sets out the laws regulating waste specifically as an environmental issue.

a) The Constitution (Act 108 of 1996)

The Constitution is the supreme source of law in South Africa. The Bill of Rights, set out in Chapter 2 of the Constitution, contains an environmental right conferring a substantive entitlement in regard to the environment. In terms section 24 of the Constitution, everyone has the right –

"(a) to an environment that is not harmful to their health or well-being; and

(b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that –

(i) prevent pollution and ecological degradation;

(ii) promote conservation; and

(iii) secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development".

The Bill of Rights binds all organs of state. The effect of this is that, firstly, eThekwini must ensure that it does not carry out its functions as an organ of state in the local government sphere in a way which creates an environment which is harmful to peoples' health or well-being. Secondly, to the extent that environmental matters fall within the legislative and executive competence of local government, eThekwini is under a positive obligation to put in place reasonable legislative and other measures (which would include an IWMP) which promote the protection of the environment.

The Constitution also contains certain administrative and procedural rights which assist in protecting the substantive rights (such as the environmental rights) – in other words, they are rights which provide tools for the practical enforcement of the substantive rights. The administrative and procedural rights include the right of access to information (section 32), the right to just administrative action (section 33) and the right to approach a court in regard to an alleged infringement of or threat to a right in the Bill of Rights (section 38). These rights need to be recognised and provided for by local government in all its governance systems.

It is also important to note, in relation to local government, that in terms of section 152(1)(d) of the Constitution, one of the objects of local government is "to promote a safe and healthy environment".

b) National Environmental Management Act (Act 107 of 1998) ("NEMA")

The objective of NEMA is to provide for co-operative governance of environmental matters. NEMA establishes principles for decision-making on matters which affect the environment, bodies for the promotion of co-operative governance and procedures for co-ordinating environmental functions which are exercised by organs of state.

Although NEMA does not contain provisions directly impacting on waste and waste management, the following sections of NEMA are important for anyone who is involved in activities which affect the environment:

- section 28 ("duty of care and remediation of environmental damage")[i]

  This section says that anyone who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent the pollution or degradation or to minimise and rectify the pollution or degradation. This duty applies to, amongst other people, the owner or occupier of the land or premises and a person who is in control of the land or premises.[ii]

  The section also sets out some of the measures which can be taken. They include investigating, assessing and evaluating the impact on the environment; informing and educating employees about the environmental risks of their work; stopping or changing or controlling activities which cause pollution or degradation; containing or preventing the movement of pollutants; eliminating the source of the pollution or degradation; and remedying the effects of the pollution or degradation.

  The section allows competent authorities to give directions to take certain steps. When the required steps are not taken, the competent authority may itself take the steps and recover the costs. The costs may be recovered from a range of people, including the person who was responsible for the pollution, the owner of the land at the time that the pollution took place and the person who buys the land in question.[iii]

- section 29 ("protection of employees refusing to do environmentally hazardous work")

  This section protects employees who refuse to do work because they believe, in good faith and reasonably, that the work would result in an imminent and serious threat to the environment.

- section 31 ("access to environmental information and protection of whistleblowers")

  This section sets out persons' and the state's right to information relating to the environment and threats to the environment.

- section 32 ("legal standing to enforce environmental laws")

  "legal standing" means that you have the right to go to court and ask the court to assist in settling a dispute. If there has been a breach or a threatened breach of a provision of NEMA or of any other provision which appears in an Act dealing with the protection of the environment, section 32 gives you legal standing if:

  – it is in your interests;

  – it is in the interests of someone else who, for practical reasons, cannot go to court himself or herself;

  – it is in the interests of a group or class of people whose interests are affected;

  – it is in the public interest; or

  – it is in the interest of protecting the environment.[iv]

  In addition, the section says if someone goes to court and loses, the court does not need to order the payment of legal costs by that person if the court thinks that the person acted reasonably out of a concern for the public interest or for the protection of the environment.[v]

c) Environment Conservation Act (Act 73 of 1989)

The disposal of waste is regulated by the Environment Conservation Act.[vi] The Environment Conservation Act regulates waste disposal in two ways.

First, the Environment Conservation Act allows the Minister of Environmental Affairs and Tourism to identify activities which in his opinion may have a substantial detrimental effect on the environment[vii] and says that if you undertake one of those activities, you must have a written authorization from the Minister.[viii] The operation of a waste disposal site is one of the activities which the Minister of Environmental Affairs and Tourism has identified as potentially having a substantial detrimental effect on the environment.[ix] The Minister can issue the written authorization subject to conditions.[x] In order to apply for written authorization, you may need to submit a scoping report and environmental impact assessment report.[xi] Written authorizations from the Minister of Environmental Affairs and Tourism are not required for waste disposal sites which were already operating before 2 March 1998.[xii] All sites established after 2 March 1998 will need a written authorization.

Second, the Environment Conservation Act says that you may not establish or operate a waste disposal site unless you have a permit issued by the Minister of Environmental Affairs and Tourism. Also note that the issuing of the permit is subject to the concurrence of the Minister of Water Affairs and Forestry. The permit will include a condition contained in a Record of Decision issued by the Minister of Water Affairs and Forestry regarding any measures that he or she considers necessary in order to protect a water resource.[xiii] This kind of permit is generally referred to as a "section 20 permit". The Minister can issue the permit subject to conditions.[xiv] Section 20 of the Environment Conservation Act came into force in August 1990.[xv] It is important to note that the permitting requirement applies to both new and existing landfill sites.

If you are required by the Environment Conservation Act to have a section 20 permit or a written authorization (or both), it is a criminal offence not to have them. It is also a criminal offence if you do not comply with any of the conditions attached to the section 20 permit or the written authorization.[xvi]

The requirement that waste disposal sites have to get a section 20 permit has two aims. The first is to register and permit all proposed and operating landfill sites and all landfill sites which close after August 1990. The second is to give the Department of Environmental Affairs and Tourism a means of control and a set of conditions to ensure that landfill sites are designed, prepared, operated, closed and monitored according to certain minimum requirements.

The Environment Conservation Act itself does not say anything about the practical, physical requirements which apply to the operation of a disposal site. In other words, reading the Environment Conservation Act will tell you that you need a section 20 permit, but it will not tell you the detailed and practical requirements of operating a disposal site within the law. That kind of information appears in a series of publications issued by the Department of Water Affairs and Forestry, entitled the Waste Management Series. There are three documents in the series:

- Minimum Requirements for the Handling, Classification and Disposal of Hazardous Waste
- Minimum Requirements for Waste Disposal by Landfill
- Minimum Requirements for the Monitoring of Water Quality at Waste Management Facilities

Although the Waste Management Series documents are not, strictly speaking, "law", it is essential to be familiar with them and to comply with the relevant minimum requirements contained in them. This is so for two reasons. First, the Department of Water Affairs and Forestry can identify particular requirements set out in the documents which are relevant to a particular waste disposal site and make those requirements conditions of the site's section 20 permit. The section 20 permit is a dynamic legal document and can be amended and revised throughout the life of the disposal site to take account of changing circumstances. New conditions can therefore be added to a section 20 permit and conditions which have become irrelevant can be removed. As mentioned above, it is a criminal offence if you do not comply with the conditions of a section 20 permit. Second, even if requirements which are set out in the documents and which are relevant to a particular site have not been made conditions of that site's section 20 permit, it is very likely that the site will have to comply

with the requirements in order to retain the section 20 permit. The Minister of Water Affairs and Forestry can cancel a section 20 permit.[xvii] Therefore, although in this situation failing to comply with the relevant requirements is not a criminal offence, it may have the practical result of leading to cancellation of the section 20 permit.

The next two subsections describe the main features of two of the documents in the Department of Water Affairs and Forestry's Waste Management Series:

- Minimum Requirements for the Disposal of Waste by Landfill
- Minimum Requirements for the Handling, Classification and Disposal of Hazardous Waste

(Note that there is a third document in the minimum requirements series which deals with water quality monitoring. This document will be dealt with in the section dealing with water pollution.)

d) Minimum Requirements for Waste Disposal by Landfill

It is essential for the holder of a section 20 permit (or the person appointed as the Responsible Person at the site) to have read and fully understood the *Minimum Requirements for Waste Disposal by Landfill* document. Note that it is the responsibility of the holder of the section 20 permit (in other words eThekwini Municipality) to ensure that the applicable minimum requirements are met.

The document contains a mix of, firstly, broad, general information and requirements relevant to waste disposal sites and, secondly, detailed requirements involving chemical analysis and the application of prescribed formulae. The contents of the document are not repeated.

e) Minimum Requirements for the Handling, Classification and Disposal of Hazardous Waste

The *Minimum Requirements for the Handling, Classification and Disposal of Hazardous Waste* document looks at the principles of good waste management. It also sets out a system for the classification of waste and sets out minimum requirements for the treatment and disposal of hazardous waste in particular. The document sets out the following broad outline for the classification and treatment of hazardous waste:

- first, the waste is classified into one of the South African Bureau of Standards classes;
- it is then treated in accordance with the requirements of that class;
- the waste or its residue is then given a hazard rating;
- the waste or its residue is then disposed of according to the appropriate method set out in the document.

Again, it is essential for the permit holder to be familiar with this document. The contents of the document are not repeated in this Report.

Another way in which the Environment Conservation Act directly impacts on waste is in its regulation of litter.

Section 19 provides that no person may litter. The authority in control of, or responsible for, the maintenance of any place to which the public has access, must provide containers for litter. Local government must, therefore, provide containers that are adequate and suitable for discarding litter at places under its control or maintenance.

Section 19A provides for the removal of litter. It obliges any person or authority in control of, or responsible for, the maintenance of a place to which the public has access, to remove litter that has been discarded, dumped or left behind at that place. Local government will thus be responsible for removal of litter from a place under its control or maintenance, including any pavement adjacent to

that place, or land situated between the place and the street, road or site used by the public to get access to such place.

Section 24A empowers a competent authority to make regulations regarding the control of the dumping of litter, including the removal of litter, placing of containers for the dumping of litter and any other matter necessary to control and prevent littering.

f) National Water Act (Act 36 of 1998) and Water Use

The National Water Act affects waste management in two important ways. First, it enacts a regulatory framework which applies to the use of water – in other words, the various licenses and permits which are required by users of water. Second, it contains provisions dealing with water pollution, which may be of practical importance to waste disposal sites. This sub-section of the Report deals first with water use issues and then with water pollution issues.

As indicated, the use of water is regulated by the National Water Act:[xviii] if you use water, you are subject to the fairly complicated regulatory framework contained in the National Water Act. Depending on how you use water and what you use it for, you may be required to obtain various licenses and authorisations and to register your use of water. A brief description of the regulatory framework is set out below:

- Licences:[xix] if you use water, you will need a licence from the Department of Water Affairs and Forestry, unless –
  - your water use is listed in Schedule 1 to the National Water Act (Schedule 1 contains a list of water uses which are exempted from the licence requirement), or
  - there is a general authorisation given in the National Water Act for your use of water, or
  - the Minister of Water Affairs and Forestry has exempted you from having to get a licence.
- Authorisations:[xx] the National Water Act says that there are certain "controlled activities" which you may only undertake if you have been authorised to do so.
- Registration:[xxi] the Minister of Water Affairs and Forestry may make regulations requiring particular water uses to be registered with a responsible authority.
- "Water use" is defined in the National Water Act as including –
  - "disposing of waste in a manner which may detrimentally impact on a water resource"xxii and
  - "disposing in any manner of water which contains waste from, or which has been heated in, any industrial or power generation process".[xxiii]

  There is a possibility that the waste disposal which takes place at waste disposal sites detrimentally impacts on water resources, particularly at sites where co-disposal takes place and there is therefore a chance that leachate enters groundwater. Also, there is a possibility of water being disposed of which contains waste from industrial processes at sites where co-disposal takes place.

As mentioned above, a person may use water without having to get a licence if that person's use of water is listed in Schedule 1 of the National Water Act or if a general authorisation has been given for that person's use of water under section 39 of the National Water Act. However, neither Schedule 1 nor the general authorisations under section 39 apply to waste disposal sites. This is explained in more detail below.

Schedule 1 sets out a list of water uses which do not need licences. An example of a water use which does not need a licence is domestic water use. Another example, more relevant to waste

disposal sites, is that you may "discharge waste or water containing waste … into a canal, sea outfall or other conduit controlled by another person authorised to undertake the purification, treatment or disposal of waste or water containing waste, subject to the approval of the person controlling the canal, sea outfall or other conduit" without a licence.[xxiv]

If some of a particular waste disposal site's liquid waste is disposed of in that way, then that site does not need a licence or any authorisation for that particular part of its activities. This is provided that, firstly, the person treating or disposing of the liquid is authorised to do so and, secondly, that the person in control of the canal or other conduit approves the use of the canal or conduit for that purpose.

It is clear, however, that even if Schedule 1 is relevant, there are some uses of water which take place at waste disposal sites, especially where co-disposal takes place, which are not covered by Schedule 1.

Section 39 of the Act allows the state to authorise certain uses of water generally or in relation to a specific water resource or within a specified area.[xxv] If you use water in a way which has been authorised under section 39, then you do not need a licence, even though your use of water is not listed in Schedule 1. At present, none of the uses of water authorised under section 39 is relevant to waste disposal sites.[xxvi]

The Minister of Water Affairs and Forestry may declare certain activities which are likely to impact detrimentally on a water resource to be "controlled activities".[xxvii] If you carry out an activity which the Minister has declared to be a "controlled activity", you need to get authorisation.[xxviii] At present, however, the Minister has not declared any activities to be "controlled activities". There is therefore no need at the moment for a waste disposal site to get authorisation to carry out a "controlled activity", but this may be necessary in the future.

Regulations have been published under the National Water Act which say that anyone who uses water in one of the ways described in section 21 of the National Water Act must register that use with the Department of Water Affairs and Forestry.[xxix] As mentioned above, "disposing of waste in a manner which may detrimentally impact on a water resource" is one of the uses of water listed in section 21. This may well apply to waste disposal sites, particularly where leachate is generated. To register your water use, you need to get a form from the Department of Water Affairs and Forestry. Contravention of these regulations is an offence which carries a fine or a prison sentence.

In summary, therefore, at present waste disposal sites need to register their water use and to get a licence for their water use. In future, other sections of the National Water Act requiring licensing or authorisation may become relevant (for example those dealing with "controlled activities").

g) Water Pollution

The National Water Act[xxx] contains provisions dealing with pollution of a water resource. The National Water Act defines "water resource" as including "a watercourse, surface water, estuary or aquifier".

The National Water Act requires persons to take all reasonable measures to prevent pollution of water resources. This duty is placed on people who own land or are in control of or occupy land on which an activity is taking place which causes or is likely to cause pollution of a water resource.[xxxi]

The National Water Act also describes the types of measures you can take to halt or prevent pollution. They include measures to –

- comply with any prescribed waste standard or management practice
- stop, change or control whatever is causing the pollution
- stop or eliminate the source of the pollution
- contain or prevent the movement of pollutants

- remedy the effects of the pollution.[xxxii]

If you do not take adequate steps to prevent pollution of water resources, then you can be ordered to do so.[xxxiii] If you do not comply with that order, then the state can in your place take whatever steps it thinks necessary to prevent the pollution. The state can then recover the costs from you.[xxxiv]

It is also important to note in relation to water pollution that the permit for operating a waste disposal site which is required under section 20 of the Environment Conservation Act (which is discussed in more detail in paragraph 2.5.2c of this Report) may be relevant to water pollution in two ways. Firstly, there may be particular conditions of a waste disposal site's section 20 permit which relate to water pollution. Secondly, some of the requirements which are set out in the Waste Management Series published by the Department of Water Affairs and Forestry relate to water pollution. For example, the *Minimum Requirements for the Disposal of Waste by Landfill* document states that it is compulsory to have –

- a physical separation between waste and the surface and groundwater systems
- an effective surface water diversion drainage system (to contain polluted water and divert clean water away from the waste disposal area.[xxxv]

It is therefore important to understand how those regulatory documents relate specifically to water pollution.

Note also that the Waste Management Series – in particular *Minimum Requirements for Waste Disposal by Landfill* and *Minimum Requirements for Water Monitoring at Waste Management Facilities* - published by the Department of Water Affairs and Forestry contains certain requirements regarding the monitoring of water pollution at and around waste disposal sites.

The *Minimum Requirements for Waste Disposal by Landfill* document contains a chapter (chapter 13) on water quality monitoring. The chapter sets out the following requirements, which apply before a waste disposal site opens, during the operational life of the site and after closure of the site:

- a surface water monitoring system
- a ground water monitoring system comprising boreholes
- a leachate monitoring system
- a sampling system
- reporting requirements.

The *Minimum* Requirements for Water Monitoring at Waste Management Facilities document contains technical sections on the following:

- Policy and strategy for groundwater quality management in South Africa (section 2)
- South African aquifiers (section 3)
- The steps to be followed in designing a water monitoring system (section 4)
- Risk assessment (section 5)
- Facilities for monitoring (section 6). This section sets out, for example, the minimum water monitoring requirements at different types of waste disposal sites.

h) Water Act (Act 54 of 1956)

The old Water Act[xxxvi] (most of which has been repealed by the National Water Act) contains requirements which are still in force relating to the treatment of effluent and water which has been used for industrial purposes.[xxxvii]

Regulations published under the old Water Act set out the quality standards which are generally applicable for waste water and effluent (for example relating to pH balance, minimum percentage of dissolved oxygen saturation, and so on).[xxxviii] If a waste disposal site does produce effluent which leaves the site or is discharged into the ground, these standards will have to be complied with.

i) Atmospheric Pollution Prevention Act

The national legislation which regulates air pollution is the Atmospheric Pollution Prevention Act.[xxxix] The Atmospheric Pollution Prevention Act falls under the Department of Environmental Affairs and Tourism. The department official in charge of implementing many of the important provisions of the Atmospheric Pollution Prevention Act is the Chief Air Pollution Control Officer. The Atmospheric Pollution Prevention Act deals with four different kinds of air pollution:

- noxious or offensive gases
- smoke
- dust
- fumes from cars and other vehicles

Two of these, namely smoke and vehicle fumes, will generally not be of particular relevance to waste disposal sites because the sites themselves generally do not generate significant volumes of smoke and vehicle fumes. However, the other two kinds of air pollution, which are of more relevance, are discussed in some detail below.

Noxious and offensive gases are regulated in the following ways: The Atmospheric Pollution Prevention Act says that if you carry on a "scheduled process" at premises which fall within a "controlled area", you must obtain a registration certificate which authorises you to carry on the scheduled process.[xl] If you carry on a scheduled process without a registration certificate, you are committing an offence.[xli] The Act also says that if you are putting up a building or plant at which you plan to carry on a scheduled process, you need a provisional registration certificate. In addition, if you are altering or extending a building or plant which is already being used to carry on a controlled process, you need a provisional registration certificate.[xlii]

A scheduled process is an activity or process listed in Schedule 2 of the Atmospheric Pollution Prevention Act. Schedule 2 contains a list of over seventy specific processes which create noxious or offensive gas. The processes are described in specific and technical terms. For example, one of the processes listed is "arsenic processes", which are described as "processes in which any volatile compound of arsenic is evolved". The Atmospheric Pollution Prevention Act therefore regulates certain specific activities, rather than the production of noxious or offensive gases in general. In order to find out whether you need a registration certificate, you do not need to ask whether you carry on a process which produces noxious or offensive gas. Instead, the question to ask is whether you carry on one of the specific processes listed in Schedule 2 to the Atmospheric Pollution Prevention Act.

A controlled area is an area which the Minister of Environmental Affairs and Forestry has declared in the Government Gazette as a controlled area.[xliii] The whole of South Africa has been declared a controlled area.[xliv] This means that if you carry on a scheduled process anywhere in South Africa, you must have a registration certificate.

If any of the processes listed in Schedule 2 to the Atmospheric Pollution Prevention Act is being carried out at a waste disposal site, then that site needs a registration certificate.

j) Dust

The Atmospheric Pollution Prevention Act regulates dust in "dust control areas". A dust control area is an area which the Minister of Environmental Affairs and Tourism has declared to be a dust control area.[xlv] Every disposal site will need to establish whether or not it falls within a dust control area.

Dust is defined in the Atmospheric Pollution Prevention Act as "any solid matter in a fine or disintegrated form which is capable of being dispersed or suspended in the atmosphere".[xlvi] Dust therefore may well include substances like sand, which can be blown into the air.

The Atmospheric Pollution Prevention Act takes the approach that dust is only a problem if it causes a nuisance or potentially causes a nuisance to people living close to the site that is near the dust source. You do not need any permit or authorisation or certificate if your operation or plant creates dust. However, if the dust causes or potentially causes a nuisance to your neighbours, the Atmospheric Pollution Prevention Act regulates what you do in one of the three ways described below.

First, if you carry on an industrial process and the Chief Air Pollution Control Officer thinks that the dust from the industrial process causes or may cause a nuisance to people living in the area, you have to adopt the "best practicable means" to prevent the dust or to prevent the nuisance.[xlvii] The Chief Air Pollution Control Officer can prescribe the measures to be followed.[xlviii]

Second, if you have deposited a pile of matter exceeding twenty thousand cubic metres in volume and the Chief Air Pollution Control Officer thinks that dust from the pile causes or may cause a nuisance to people living in the area, you have to adopt the "best practicable means" to prevent the dust or to prevent the nuisance.[xlix] Again, the Chief Air Pollution Control Officer can prescribe the measures to be followed.[l]

Third, if you do <u>not</u> fall under either of the two situations described above and the Chief Air Pollution Control Officer thinks that dust which originates from land which you own causes a nuisance to people living in the area, he or she can send you a notice requiring you to take steps to stop or limit the nuisance.[li]

It is quite possible that large quantities of dust originate from the stockpiles of sand at waste disposal sites, particularly if the weather conditions are dry and windy. As mentioned above, however, there is no permit or authorisation or certificate which a site needs to get in relation to dust. The Atmospheric Pollution Prevention Act becomes relevant when dust causes a nuisance to neighbours or when there is a risk that dust will cause a nuisance to neighbours, in which case the Chief Air Pollution Control Officer may require a site to take preventative steps. The Chief Air Pollution Control Officer will advise the site if the site is required to take preventative steps.

k) Health Act (Act 63 of 1977)

The focus of the Health Act is the promotion of the health of people and the provision of mechanisms to ensure that this objective is achieved – its impact on the environment is therefore tangential to its focus on health. Three sections in the Act are important in regard to waste management, namely sections 20, 34 and 38.

Section 20 of the Act places an obligation on local authorities to take lawful and reasonably practical measures to maintain their areas in a hygienic and clean condition and to prevent the occurrence of:

- any nuisance;
- any unhygienic conditions;
- any offensive condition; or
- any other condition which will or could be harmful or dangerous to the health of any person within its district or the district of any other local authority.

Sections 34 and 38 of the Act authorise the National Minister of Health to make regulations which may impact directly on waste management.[1]

The powers in terms of section 34[2] include the approval, regulation, restriction or prohibition of the use of any place for public gatherings, and to the standards which shall be conformed to in respect of the provision of water and washing and sanitary conveniences, and the serving of goods and disposal of waste at, and the provision of sewerage and drainage systems for, such place and such other measures as may be necessary in order to prevent the development at such place of conditions dangerous or detrimental to health[2].

The powers in terms of section 38 include the regulation, control, restriction or prohibition of, or providing for, any or all of the following matters, or any other matter deemed necessary, in respect of rubbish, night soil, sewerage or other waste originating from residential, industrial or commercial premises or any other premises –

- night soil removal, rubbish removal, sewerage, sewage purification works, the treatment, purification or disposal of such substances;
- the siting of these works and registration of works;
- taking samples, quality requirements and keeping of records;
- measurers to prevent the pollution of water or of any soil surfaces by any waste;
- the requirements in respect of the quality to which treated or purified waste, any product reclaimed from waste, or any other by-products of waste must comply before disposal or utilisation; and
- inspection of activities.

The Minister of Health may, in consultation with the Ministers of Environment Affairs and Tourism and Water Affairs and Forestry, pass regulations that are potentially covered by other Acts. For example, regulations may be made in terms of this Act pertaining to sewage works, which may also be covered by section 12 of the Water Act.

l) Hazardous Substances Act (Act 15 of 1973)

The Hazardous Substances Act provides for regulations to be passed by the Minister of Health in order to control the dumping and disposal of hazardous waste. In this regard, where local government is involved in the disposal of empty containers used for Category B Group I substances, it must refer to Regulation GG5467 of 25 March 1977.

2.5.3 Waste and Service Delivery

This sub-section considers the laws regulating specifically from a service delivery perspective.

a) Service Delivery

This section of the Report focuses on waste as a service delivery issue, rather than an environmental or health issue. eThekwini, as an organ of state in the local government sphere, has extensive obligations in respect of the delivery of municipal services. The legislation governing municipal service delivery obligations must be taken into account in compiling eThekwini's IWMP.

[1] Regulations passed in terms of section 38 must be done (in consultant with the Ministers of Water Affairs and Forestry and Environmental Affairs and Tourism)
[2] Section 34(j)

b) Powers & Functions

The starting-point is section 156 of the Constitution, which regulates the powers and functions of municipalities. In terms of section 156(1), a municipality has executive authority in respect of, and the right to administer, the local government matters listed in Part B of Schedules 4 and 5 of the Constitution (as well as any other matter assigned to local government by national or provincial legislation). "Refuse removal, refuse dumps and solid waste disposal" are listed in Part B of Schedule 5 as functional areas of local government competence.

c) Municipal Service

The Local Government: Municipal Systems Act (Act 32 of 2000) ("the MSA") contains both broad and specific provisions relating to municipal service delivery. A "municipal service" is defined in the MSA as –

> *"a service that a municipality in terms of its powers and functions provides or may provide to or for the benefit of the local community irrespective of whether –*
>
> *(a) such a service is provided, or to be provided, by the municipality through an internal mechanism contemplated in section 76 or by engaging an external mechanism contemplated in section 76; and*
>
> *(b) fees, charges or tariffs are levied in respect of such a service or not."*

This Report is premised on the assumption that refuse removal, refuse dumps and solid waste disposal are all municipal services.

d) Regulation of Municipal Services

Chapter 8 of the MSA regulates municipal services. Section 75 places certain general duties on municipalities in relation to municipal services. In terms of section 75(1), a municipality must give effect to the provisions of the Constitution and must –

- give priority to the basic needs of the local community;
- promote the development of the local community; and
- ensure that all members of the local community have access to at least the minimum level of basic municipal services.
- In terms of section 75(2), municipal services must -
  - be equitable and accessible;
  - be provided in a way which promotes the prudent, economic, efficient and effective use of available resources and the improvement of standards of quality over time;
  - be financially sustainable;
  - be environmentally sustainable; and
  - be regularly reviewed with a view to upgrading, extension and improvement

e) Regulation of Tariff Policy

Section 74 regulates tariff policy in respect of municipal services. A municipality is obliged to adopt and implement a tariff policy on levying fees for municipal services. A municipality's tariff policy must reflect at least the following principles:

- people who use municipal services must be treated equitably in the application of tariffs;

- in general terms, what individual users pay for services should be in proportion to their use of the services;
- poor households must have access to at least basic services. Different ways of providing for this are suggested, for example lifeline tariffs and subsidisation;
- tariffs must reflect the costs reasonably associated with providing the service – for example capital, operating, maintenance, administration and replacement costs and interest charges;
- tariffs must be set at levels which allow the service to be financially sustainable;
- in appropriate circumstances, surcharges on tariffs may be allowed;
- special tariffs may be set for categories of commercial and industrial users in order to promote local economic development;
- the economical, efficient and effective use of resources must be promoted, as well as the recycling of waste and other appropriate environmental objectives;
- any subsidisation of tariffs should be fully disclosed;
- tariff policies may differentiate between different categories of users, debtors, service providers, service standards, geographical areas, and so forth, provided that the differentiation does not amount to unfair discrimination.

In regard to tariff policy, note also that in terms of section 24(l) of the Environment Conservation Act, the Minister of Environmental Affairs and Tourism is empowered to make regulations in relation to the imposition of compulsory charging, deposits or related financial measures on waste types or specified items in waste types with the concurrence of the Minister of Finance.

f) Fiscal Powers & Functions

Section 74 of the MSA should be read with section 229 of the Constitution, which regulates municipal fiscal powers and functions. In terms of section 229, a municipality may (subject to subsections (2), (3) and (4)) impose *"rates on property and surcharges for fees for services provided by or on behalf of the municipality"*. This power may not be exercised in a way that materially and unreasonably prejudices national economic policies, economic activities across municipal boundaries, or the national mobility of goods, services, capital or labour.

g) Provision of Municipal Services

Part 2 of Chapter 8 of the MSA regulates the provision of municipal services. The different mechanisms which a municipality can use to provide a municipal service, ranging from a department within the municipality's administration, through municipal entities, to other institutions including a private sector company, are listed. Section 78 prescribes the process which municipalities must follow when they decide how – in other words through which mechanism – to provide a municipal service in their areas. There are particular provisions which a municipality must comply with when it provides a municipal service through a service delivery agreement with what the MSA terms "external mechanisms". These provisions must be taken into account particularly in assessing instruments for implementing IWMPs, for example service delivery partnerships (including public private partnerships).

h) By-Laws

eThekwini Municipality has prepared a set of by-laws governing environmental systems, refuse removal, solid waste disposal and refuse dumps and solid waste disposal sites which collectively address many of the regulatory and enforcement issues which arise in relation to waste.

2.5.4 Tariff Setting and Recovery

No tarrifs are set for household collection, street sweeping, litter picking and the removal of illegal dumping which is in line with section 229 of the Constitution. Tariffs are charged for business, commercial, bulk services and for disposal. These tariffs are set by EDSW and approved by treasury for further approval by the relevant bodies.

Tariff determination is not undertaken in terms of the provisions of the Local Government: Municipal Systems (as amended) Act No. 32 of 2003 (MSA). It is impossible to apply the provisions of the MSA if EDSW is not ring fenced and no Activity Based Costing exercise has been undertaken. These two elements are essential in order to calculate appropriate tariffs. All other tariffs of the merged entities are now (since July 2004) converged into one Schedule of Tariffs.

2.5.5 General Governance Provisions

This sub-section sets out the laws specifically relating to the development of an IWMP.

There are a number of general governance issues which, although not directly relevant to the environmental or service delivery aspects of waste management, should nevertheless be borne in mind in preparing an IWMP. Some of these are set out below.

a) Co-operative Government

As indicted above, the legislation affecting waste and waste management is fragmented and overlaps in some respects. In addition, functional competence for matters affecting waste management has been assigned to different spheres of government (with, for example, the environment being a concurrent national and provincial function, while solid waste is a local government function).

The Constitution contains a chapter (Chapter 3) which places an obligation on all spheres of government and organs of state to comply with the principles of co-operative government. They must, for example –

- provide effective, transparent, accountable and coherent government for the Republic as a whole;
- respect the institutions, powers and functions of government in other spheres;
- not assume a function unless conferred on them;
- exercise their powers and perform its functions in a manner that does not encroach on the geographical, functional or institutional integrity of government in other spheres; and
- co-operate with other levels of government in mutual trust and good faith by, *inter alia*, informing other spheres of government, and consulting with these spheres, on matters of common interest, and co-ordinate their actions accordingly.

These provisions must be reflected by local government in the implementation of its waste management planning. The co-operative governance obligation will have implications for the participation by local government in existing and future initiatives established by other government departments in relation to waste.

b) Public Participation

The MSA contains extensive provisions pertaining to public participation.[3] In particular, the community has the right to contribute to decision-making processes by its municipality. A municipal council must establish appropriate mechanisms, processes and procedures to enable residents,

[3] *Inter alia*, section 5 and Chapter 4

communities and stakeholders in the municipality to participate in the local affairs. For this purpose it must provide for –

- the receipt, processing and consideration of petitions and complaints lodged by residents, communities and stakeholders in the municipality;
- the receipt, processing and consideration of written objections and representations with regard to any matter to which it is required to invite public comment;
- public meetings of residents, on a ward or any other basis;
- public hearings by the council and its committees when appropriate; and
- surveys among residents when appropriate and the processing and publication of the results.[4]

Municipalities must also, within the financial and administrative capacity of the municipality, build the capacity of residents and communities to participate.[5]

These provisions mean that public participation will be a core element of the IWMP as it is implemented.

c) *Executive Authority*

The executive authority which local government has in respect of the functions set out in the Constitution is addressed in the MSA.[6] The MSA states that a municipality exercises its executive authority, by amongst other things –

- developing policy, plans, strategies and programmes, including setting targets for delivery;
- promoting and undertaking development;
- administering and regulating its internal affairs and the local government affairs of the local communities;
- implementing applicable national and provincial legislation and its by-laws;
- providing municipal services to the local community;
- preparing, approving and implementing its budget;
- imposing and recovering rates, taxes levies, duties and fees, including setting and implementing tariffs, rates and tax policies;
- monitoring the impact of effectiveness of any services, policies, programmes or plans;
- promoting a safe and healthy environment; and
- doing anything else within its executive competence.

The list reiterates the role of the environmental right and should be considered as a key input for the development of IWMPs.

d) *Integrated Development Planning*

The Act states that municipal planning must be developmentally orientated to ensure that municipalities –

[4] Section 17
[5] Section 17
[6] Section 11

- pursue the objectives of local government set out in section 152 of the Constitution;
- give effect to their developmental duties as required by section 153 of the Constitution; and
- together with other organs of state contribute to the progressive realisation of the fundamental rights contained in sections 24, 25, 26, 27 and 29 of the Constitution."[7]

All municipalities were obliged to adopt a full and integrated development plan (IDP) that represents a five year plan by March 2002. The IDPs must include co-ordination of plans, the policy framework and general basis on which annual budgets are based and must be compatible with national and provincial plans.[8]

The purposes of the IDPs are –

- municipalities must establish plans for managing development in the short, medium and long term; and
- the plans must integrate all the important aspects of development, including social, economic, environmental, ethical, infrastructural and spatial. (Integration means that sectoral plans should not be constructed in isolation of a broader vision. For example, the environment must be factored into waste management planning).

In other words, these plans are intended to reflect how local government will give practical effect to its developmental responsibility. The development of effective plans therefore requires municipalities to be strategic and holistic in the approach to the management of waste.

The IDPs have several implications for the development of IWMPs, including the following:

- the IWMP cannot be drafted without reflecting the broader context, i.e. it must take local government's development responsibility into account, and should inform the content of the IDPs where they have not been adopted;
- the purposes of the IDPs will also have to be reflected in the IWMPs. For example, apart from the underlying philosophy of the National Waste Management Strategy, the Act requires that planning is strategic and holistic and must be underpinned by a vision which will progressively lead to environmentally sustainable development;

Whilst the Act does not specify how waste in particular must be integrated within the IDP, it does provide general direction of what the key elements of the IDPs must be. The IWMPs must therefore ensure that they address the requirements/elements of the IDP. The core elements are:

- the municipality's vision for long term development with emphasis on the municipality's most critical development and internal transformation needs;
- an assessment of the existing level of development (including where communities do not have access to services);
- development priorities and objectives;
- an alignment of development strategies with provincial and national sectoral plans that are binding on municipalities in terms of legislation;
- spatial development frameworks;
- operational strategies;
- applicable disaster management plans;

[7] Section 23
[8] Section 25

- financial plans; and
- key performance indicators and performance targets.

In addition to the core list, the contents of other sections of the Act summarised in this section also inform the approach to issues in the IDP, and consequently IWMP.

e) Performance Management

Local government is obliged to establish a performance management system that is commensurate with its resources and is in line with the priorities, objectives, targets and indicators contained in its IDP.[9] Performance management systems must include an appropriate performance indicator, performance targets, the evaluation of performance and regular internal reporting.[10]

The community must be involved in the development, implementation and review of the municipality's performance.

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[i] The language of section 28 is very similar to that of section 19 of the National Water Act, 36 of 1998.
[ii] sections 28(1) and (2)
[iii] sections 28(4), (7) and (8)
[iv] section 32(1)
[v] section 32(2)
[vi] Act 73 of 1989
[vii] section 21(1)
[viii] section 22(1)
[ix] GN R1182 in Govt Gazette No 18261 of 5 September 1997
[x] section 22(3)
[xi] section 22(1) read with GN R1183 in Govt Gazette No 18261 of 5 September 1997, as amended by GN R1645 in Govt Gazette No 19599 of 11 December 1998
[xii] GN R1183 in Govt Gazette No 18261 of 5 September 1997, as amended by GN R1355 in Govt Gazette No 18362 of 17 October 1997
[xiii] section 20(1)
[xiv] section 20(1)(a)
[xv] ie when the Minister of Environment Affairs officially defined "waste". See GN R1986 in Govt Gazette No 12703 of 24 August 1990
[xvi] section29(4)
[xvii] section 20(1)(b)
[xviii] Act 36 of 1998
[xix] section 22(1)
[xx] sections 37 and 38
[xxi] section 26(1)(c)
[xxii] section 21(g)
[xxiii] section 21(h)
[xxiv] section 22(1)(a)(i) read with Schedule 1 item (f)
[xxv] section 39(1)
[xxvi] GN R1191 in Govt Gazette No 20526 of 8 October 1999 contains certain section 39 authorisations. Two – General Authorisation 3 and General Authorisation 4 – are of particular interest.
[xxvii] section 38
[xxviii] section 37(2)
[xxix] GN R1352 in Govt Gazette No 20606 of 12 November 1999
[xxx] Act 36 of 1998
[xxxi] section 19(1)
[xxxii] section 19(2)
[xxxiii] section 19(3)
[xxxiv] sections 19(4) and (5)
[xxxv] see section 2.3.2
[xxxvi] Act 54 of 1956

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[9] Section 38
[10] Section 41

[xxxvii] section 21
[xxxviii] GN R991 in Govt Gazette No 9225 of 18 May 1984, as amended by GN 1930 in Govt Gazette No 9400 of 31 August 1984 and GN 1864 in Govt Gazette No 17567 of 15 November 1996. Apparently the regulations are currently under review.
[xxxix] Act 45 of 1965, as amended
[xl] section 9
[xli] section 9(2)
[xlii] section 9
[xliii] section 8
[xliv] GN R1776 in Govt Gazette No 2179 of 4 October 1968
[xlv] section 27
[xlvi] section 1
[xlvii] section 28(1)(a)
[xlviii] section 28(2)
[xlix] section 28(1)(b)
[l] section 28(2)
[li] section

Appendix 2.1

Photographs

DSW Vehicle Workshop (Headquarters)

Bisasar Landfill

Riverside Garden Refuse Transfer Station

Malacca Road Garden Refuse Transfer Station

La Mercy Landfill

Tongaat Depot

Ottawa Depot

Phoenix Garden Refuse Transfer Station

Phoenix Depot

Durban North / Greenwood Park Depot

Beach and Point Depot

Sydney Road Depot

Bellair Road Garden Refuse Transfer Station

Flower Road Refuse Transfer Station

Southern Areas Regional Depot
Collingwood Rd

Tara Road Garden Refuse Transfer Station

Travancore Drive Garden Refuse Transfer Station

Glanville Road Garden Refuse Transfer Station

Umlazi Refuse Transfer Station

Nyati Road Garden Refuse Transfer Station

Amanzimtoti Depot

Amanzimtoti Refuse Transfer Station

Seadoone (School Road) Garden Refuse Transfer Station

Kingsburgh Depot

Kingsburgh Solid Waste Offices

Umkomaas Depot

Umkomaas Garden Refuse Transfer Station (Now Closed)

Umkomaas Garden Refuse Landfill (Private)

New Germany Depot

New Germany Refuse Transfer Station

Queensburgh Depot

Shallcross Garden Refuse Landfill

Chatsworth Garden Refuse Transfer Station

Chatsworth Refuse Transfer Station

Bulbul Drive Landfill Site (Privately Owned and Operated)

Mariannhill Landfill

Kloof Admin Offices

Recycling Centre next to Offices

Wyebank Garden Refuse Landfill and Depot

Hammarsdale Refuse Transfer Station

Mount Edgecombe Refuse Transfer Station

ETHEKWINI MUNICIPALITY

INTEGRATED WASTE MANAGEMENT PLAN

CHAPTER 3
Strategic Objectives and Planning

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3 STRATEGIC OBJECTIVES AND PLANNING

3.1 Existing Waste Management Strategies, Systems and Practices

3.1.1 IP & WM Policy Objectives

The Government's national policy on Integrated Pollution and Waste Management (IP & WM) sets out the vision, principles, strategic goals and objectives to be used in South Africa.

a) Definition of IP & WM

Integrated Pollution and Waste Management is a holistic and integrated process of management, **aimed at pollution prevention and minimisation at source**, and managing the impact of pollution and waste on the receiving environment.

The White Paper represents a paradigm shift from starting to deal with waste **after** it is generated, towards

- pollution prevention
- waste minimisation at source, if possible, and
- involvement of all sectors of society in pollution and waste management
- cross-media integration
- horizontal and vertical institutional integration of government departments etc.

b) Vision for the Policy

The vision of the Government is to develop, implement and maintain an integrated pollution and waste management system which contributes to sustainable development and a measurable improvement in the quality of life, by harnessing the energy and commitment of all South Africans for the effective prevention, minimisation and control of pollution and waste.

c) Policy Principles

Three principles, specific to pollution and hazardous waste management were adopted.

The effects on human health and the environment must be taken into account when transborder movement occurs.

A duty of care principle applies and waste generators are always accountable for management and disposal of such waste.

Regulatory instruments must have universal applicability to all sectors of waste generators.

d) Strategic Goals of the Policy

Seven strategic goals of the Policy were identified for achieving integrated pollution and waste management.

The essence of these goals is reproduced here. Further amplification is possible by perusal of the *"White Paper on Integrated Pollution and Waste Management for South Africa - May 2000"* as published by DEAT.

Goal 1: Effective Institutional Framework and Legislation seeks *"to create, develop, implement, maintain and continuously improve an effective, adequately resourced and harmonised institutional framework and integrated legislative system and to build institutional capacity"*.

Goal 2: Pollution Prevention, Waste Minimisation, Impact Management and Remediation seeks *"to promote holistic and integrated pollution and waste management through pollution prevention, minimisation at source, impact management and remediation"*.

Goal 3: Holistic and Integrated Planning seeks *"to develop mechanisms to ensure that integrated pollution and waste management considerations are effectively integrated into the development of government policies, strategies and programmes, all spatial and economic development planning processes and all economic activities"*.

Goal 4: Participation and Partnerships in IP & WM Governance seeks *"to establish mechanisms and processes to ensure effective public participation in integrated pollution and waste management governance"*.

Goal 5: Empowerment and Education in IP & WM seeks *"to promote the education and empowerment of South Africa's people to increase their awareness of and concern for pollution and waste issues, and assist in developing the knowledge, skills, values and commitment necessary to achieve integrated pollution and waste management"*.

Goal 6: Information Management seeks *"to develop and maintain databases and information management systems to provide accessible information to interested and affected parties that will support effective integrated pollution and waste management"*.

Goal 7: International Co-operation seeks *"to develop mechanisms to deal effectively and in the national interest with international issues affecting pollution and waste"*.

3.1.2 NWMS and Action Plans

The National Waste Management Strategy (NWMS) and Action Plan for Integrated Waste Management Planning (IWMP) version C was published on the 15th October 1999.

The NWMS strives to ensure that the Integrated Pollution and Waste Management policy translates into practice. Acceptable waste service levels must be extended to all citizens of the country with regard to collection, transport, treatment and disposal. A short summary of the salient points in the NWMS have been reproduced below for easy reference.

a) Objectives

The primary objectives of Integrated Waste Management are optimisation in order to maximise efficiency, minimisation of environmental impacts and financial costs and improvement of the quality of life of all South Africans.

b) Integrated Waste Management Planning

IWMP places great emphasis on waste prevention and minimisation. Optimum utilisation of available resources must be achieved and existing systems must be maintained, alternatives need to be investigated and the most appropriate systems must then be selected.

Planning was previously fragmented and needs to be co-ordinated with land-use planning and integrated with the Land Development Objectives (LDO's).

The IWMP process can be subdivided into three main sections:

i. Status Quo

The base line situation needs to be reviewed and recorded.

ii. Systems Analysis

The systems analysis must address:

- Projections of future needs and requirements
- Setting objectives
- Identifying systems components
- Evaluating alternative methods and approaches

The above could be compared on a quantitative basis as the first level of comparison. However, after institutional, legal and environmental aspects have been taken into account, the choice of scenario could be overruled by the soft issues.

iii. Master Plan

Development and implementation of the IWMP is the final objective. This plan should be sustainable and flexible should priorities change over time. It will form the route map to achieve the goals and objectives of the local authority's general waste management and provincial authority's hazardous waste management over the long term.

c) General Waste Management Plans

Integrated general waste management plans are the responsibility of local government. First generation and final waste management plans are required.

Municipal general waste management plans should address:

- Status quo or base line situation
- Future projections and waste management needs must be compared to the existing
- Situation analysis
- Needs assessment report
- Development of an integrated general waste management strategy for the municipality

A First Generation Waste Management Plan is defined as a planning procedure which *"comprises a description of the baseline situation and an analysis of the problems and needs; and sets priorities and targets for the implementation of the waste management plan."*

A Final Waste Management Plan *"involves a thorough description of:*

- *The waste management status quo, including data on the waste stream, comprising generation, collection, transportation, treatment and disposal of all waste produced within an area of jurisdiction.*
- *Setting targets for waste management and procedures for compliance*
- *Developing five year action plans and a twelve year macro development plan"*

d) Minimisation and Recycling

One of the long-term objectives of the NWMS is to reduce the waste stream and to utilise the resource base inherent in waste production.

The DEAT may develop and implement a National Waste Minimisation Programme (together with the private sector). It will also co-ordinate recycling initiatives.

The scope, programming and sustainability of a waste minimisation process on a large scale will need to be evaluated in depth before policy is written in this regard. Unimplementable policy is counter-productive.

The cost savings and techniques associated with waste minimisation have to be demonstrated. (The potential of innovative waste minimisation policy instruments must first be tested in a simulation process, if possible.)

As waste minimisation is given the highest priority in terms of the waste hierarchy, it is important that minimisation considerations are provided for in almost every other aspect of the NWMS.

Recycling is an important aspect of waste minimisation and utilises a valuable resource base which has been neglected up to now. Source separation is proposed in the NWMS and this will entail a massive education campaign over the time span of at least one generation for general waste. Source separation for hazardous and industrial wastes by industry and commerce may be easier to implement. Other countries have had varying degrees of success. Children don't necessarily grow up to be adult recyclers. This has been confirmed in a number of Western European countries and the USA where the commitment and enthusiasm for waste minimisation has diminished with time. Therefor education will have to be continuous and ongoing.

e) Waste Information System

Waste minimisation should form an important element of the waste management planning that is undertaken by provinces, local authorities and other responsible parties. For the waste minimisation initiatives to be effective it is important that information is available on the volume, composition, source and destination of the waste. The data supplied by the Waste Information System (WIS) will therefore be supplemented with more detailed data relating to the

composition and source of the waste, as well as with technical descriptions of production processes and raw materials.

f) Treatment and Disposal

An objective of the NWMS is to suitably position or situate medical and hazardous waste treatment facilities to serve waste producers on a regional basis. Provincial government must support DEAT with the planning and siting of such hazardous waste treatment plants. Suitable disposal sites could be identified by stakeholders in collaboration with DEAT.

The feasibility of establishing regional hazardous waste disposal treatment plants such as incinerators or other will need to be investigated.

The establishment of organic hazardous and hazardous waste sites at strategic locations will be necessary. An adequate number of permitted hazardous waste disposal sites need to be planned and developed to meet the requirements of commerce and industry.

A programme must be developed for phasing out co-disposal of hazardous waste with general waste over the long term.

g) Provincial Responsibilities

One of the primary functions of provincial government is strategic planning to ensure that waste management considerations are integrated with development planning and decision-making.

Provincial government is responsible for data processing and quality assurance of the Waste Information System (WIS). Local government is responsible for data collection but will be assisted by provincial government.

Formation of public-private partnerships for the planning and development of hazardous waste management facilities may be investigated. The Province may elect to participate in such ventures, which in turn could lead to the implementation of public-public partnerships.

Framework planning and planning for hazardous waste must be done on a provincial level for the following waste types:

- industrial hazardous
- agricultural and forestry pesticides
- medical
- mining
- power station
- radio-active medical

Provincial government must establish a detailed inventory of all potentially polluting sites in the province. Hazardous waste management plans must be drawn up or compiled.

All industries must have access to and use of hazardous waste disposal facilities.

h) Obligations of Local Government

Municipalities and Metropolitan Authorities are responsible for providing waste management services and managing waste disposal facilities. Specific functions to be carried out by regional local authorities and local municipalities include:

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

eThekwini DSW has a duty to play an active role in promoting waste minimisation at all levels of society within the eThekwini Municipality. They have focussed their strategy and implementation program to achieve this objective. The NWMS is clear on these issues and compliance with the policy on pollution prevention, waste minimisation, impact management and remediation is a duty which all responsible metropolitan, regional and local authorities should take up with alacrity, subject to the constraints mentioned in d) above.

i) Implementation

Implementation of the NWMS will be guided by the principles of economic efficiency and financial viability.

(Setting up a policy of non-sustainable waste minimisation could impact negatively on the implementation process. Lack of funding is a further inhibitor.)

j) Strategy

The term “strategy” is defined by the NWMS as follows:

> *"Strategy means a broad course of action designed to make the best use of resources and opportunities and offering the best prospect of achieving the defined objective whilst dealing with the risks involved in the course of action."*

Provincial and local government will develop their own legislation and implementation strategies to meet their specific needs.

Waste minimisation strategies must be integrated within an overall sustainable development framework. In terms of the NWMS time frame, waste collection services must be established in South Africa from 1999 onwards and must be fully realised by 2006, priority being given to the poorly serviced areas.

A carefully developed implementation plan for both hazardous and general waste collection and transport must be implemented over the medium (2003 - 2006) to the long (2007 - 2010) term.

National surveys by DEAT must establish the quantum and category of hazardous waste in RSA. Planning for a management system for medical waste treatment and transport should have been in place by 2002. These objectives are behind schedule at this stage and time frames have not been met.

3.1.3 DSW Strategic Planning Workshop 1998 and Beyond

The last strategic planning workshops held by DSW were in October and November 1997. They were attended by 13 senior staff members (and a secretary) who were part of the then DSW management hierarchy.

Only three of the original participants namely, John Parkin, Danny Ramlahl and Trevor Palmer were involved in the interviews held in March 2004 to develop IWMP strategic objectives.

The outcome of this workshop resulted in the following strategic plan:

a) Vision

"To become the leader in the solid waste industry in Africa".

b) Mission

"To contribute to a clean and healthy environment and vibrant economy for the Durban Metropolitan Area, through responsible solid waste management practices, recognising solid waste as a useful resource wherever possible.

To succeed in our mission, we will:

- Operate DSW as a strategic business unit with customer service and cost consciousness being paramount.
- Encourage creativity and initiative from employees, through the provision of training and development to equip them to face the challenges of the future in the South African waste industry.
- Identify and address the needs of business and the community, through the provision of a superior service and the fostering of a partnership relationship with all customers.
- Promote and facilitate a cleanliness and waste minimisation ethic amongst stakeholders.
- Become one of the leaders in the field of research and development.
- Promote affirmative action in employment and in staff progression with the objective being to reflect the correct demographics.
- Support empowerment initiatives within previously disadvantaged communities."

c) Strategies

Sixteen strategies were formulated and some of them included:

- enforcement of by-laws
- implementation of appropriate waste management practices
- promotion of community empowerment
- implementation and maintenance of cost effective operational methods
- extension of services to previously disadvantaged communities
- promotion of empowerment
- etc.

It does appear that, in a broad sense, the strategies were implemented positively.

d) Objectives

The various branches had to achieve set objectives and have been working towards these goals over the past years.

Objectives achieved include the following:

- production of an integrated plan for waste transportation and disposal
- various sales, marketing, administration and research and development objectives were formulated and achieved
- a dynamic education and waste minimisation program was implemented
- expansion of service levels to the rural areas.
- etc.

Some of the goals which had mixed and even no success include:

- closure of La Mercy Landfill in 2000
- securing a hazardous waste site to serve the region's long term needs
- feasibility of a MRF

e) Waste Industry Analysis

A waste industry analysis was done. Many of the issues mentioned still have relevance at this point in time, more than six years hence.

Among these issues count

- hazardous waste management challenges
- urbanisation
- shortage of funds in Council
- development costs vs. capital shortages

- the restrictive roles of approval authorities (such as DEAT, DWAF etc.)

f) SWOT Analysis

The SWOT analysis is obviously dated by now. A few salient points are made regarding the situation in 1998:

- *Strengths* included the available airspace, financial liquidity and service reliability.
- *Weaknesses* included no in-house hazardous waste expertise, lack of capital funding, age of vehicle fleet and no metro by-laws.
- *Opportunities* could arise from industrial waste market, waste to energy, expanded waste collection and less waste to landfills.
- *Threats* constituted budgetary restraints, political interference and private waste management monopolies.

3.1.4 General Strategic Objectives

The following general strategic objectives, were considered in developing this IWMP for eThekwini Municipality:

- Refinement of the organisational structure which was established for the management of the different activities.
- Populate the organisational structure as soon as possible.
- Development of a Waste Information System in accordance with the requirements of the NWMS. (The specific requirements of national and provincial authorities, regarding a WIS to which local authorities should comply, are unavailable at this stage).
- Expand and grow the IWM awareness campaign in the communities; and among staff by training courses.
- Co-operate with neighbouring local authorities with the objective of regionalisation of waste management.
- Sell management inputs and develop capacity in interested African countries who seek assistance and guidance.
- Investigate and implement public-private partnerships in order to develop and operate hazardous waste facilities in KwaZulu Natal.
- Assertive by-law enforcement must be implemented with an appropriate fine and a related collection structure in place.
- The financial impact/effect on municipal waste management of a zero waste to landfill target by 2020AD needs to be evaluated.
- Development and growth of carbon credit revenues.
- Support for and active participation in renewable energy initiatives.
- Endeavour to implement the concept of a business unit to its full extent.
- Develop a long-term waste minimisation and disposal plan (including financial impact of plan) and secure Council commitment.

- Develop relationships with South African peers in order to contribute meaningfully to the IWM debate.
- Secure key staff by making their jobs more interesting and relevant.
- Expand the commercial section of the business.
- Bring recently included areas to the same level of operation and commitment as to that which citizens have come to expect from EDSW.
- Take a position on cross boundary movement of waste.
- Encourage the further development of the EDSW brand.
- Endeavour to get more control over organisational inputs and outputs.

3.2 NWMS Objectives

The National Waste Management Strategy objectives and action plans for the short and the longer term for each stage of the waste management hierarchy are set out as follows:

3.2.1 Waste Prevention, Minimisation and Recycling

Short-term objectives include the introduction and enforcement of appropriate regulatory instruments; and the development and implementation of appropriate economic instruments and other financial incentives.

Measures should further be adopted to facilitate, co-ordinate and expand existing waste minimisation and recycling initiatives.

The long term NWMS objective is to ensure that all sectors of society adopt practices that ensure waste prevention, minimisation and recycling.

3.2.2 Collection and Transport

The main short-term objective is that local governments implement appropriate, sustainable and environmentally acceptable collection and transport services, with a focus on unserviced areas.

Appropriate, sustainable and affordable collection services must be rendered to all citizens of the country in the long term. Disadvantaged communities must be empowered to participate in appropriate and affordable waste collection systems in rural areas.

3.2.3 Waste Treatment

Short term objectives of the NWMS for waste treatment facilities are controlled by a regulatory framework based on a waste classification system; hazardous waste must be handled, collected and moved safely; and hazardous waste treatment facilities need to be provided in conjunction with the private sector.

Air emission standards must be reviewed, revised and enforced.

Health care waste treatment systems must be developed and guidelines for safe management of such waste must be compiled.

The long-term objective is the enforcement of current and new regulations and legislation, guidelines and standards for the total waste stream, from cradle to grave.

3.2.4 Waste Disposal

Short term objectives for disposal are:

- registration of all disposal facilities
- facility plans must comply with DWAF permit conditions
- the DWAF Minimum Requirements must be adhered to

Furthermore, all provinces must be adequately serviced by hazardous disposal or treatment facilities within reasonable proximity of generators.

The long-term objective is to ensure that all unavoidable wastes are safely collected, transported and disposed of at facilities developed and operated in accordance with DWAF Minimum Requirements or other appropriate standards.

3.2.5 Waste Information System

The development of waste information systems is not on schedule in terms of the NWMS, mainly as a result of lack of capacity and will within DEAT.

This is a key element of the NWMS and metropolitan municipalities should take a pro-active position on this issue as they have a high vested interest in this matter.

3.3 Consultative Interviews

3.3.1 Purpose and Goal

A series of consultative interviews were held over two days with senior management in EDSW during March 2004.

The Client elected to follow this route in stead of holding a strategic planning workshop where a wider participation could take place. The main reason for this was that management structures were not fully populated, as final appointments were in progress at the time of the interviews.

There is consensus amongst senior management that an updated strategic planning workshop is due. The last one was held in October/November of 1997, no less than six years ago. Since then the demarcation of eThekwini Metropolitan Municipality was promulgated. New areas were incorporated to form a much larger area than what was previously known as the Durban Metropolitan Council.

The disciplines that were interviewed were Management, Education and Waste Minimisation, Finances and Landfilling/Disposal. A decision was taken that the Legal discipline would be dealt with in a telephonic discussion between Mr. John Paley and the legal consultant.

The purpose of the interviews was to determine the strategic planning objectives of each discipline, as seen by the leader(s) thereof. An agenda was forwarded to each leader as a basis for discussion, and this was followed generally during the interviews.

The result of these discussions enabled the Consultant Team to compile a set of strategic objectives for the IWMP which were subsequently perused and commented upon by all participants in the interviews.

At a second strategic planning session held at eThekwini DSW's offices in June 2004, comments were discussed and the strategic planning and objectives for the IWMP were agreed. The various disciplines were represented at this session held on 2004-06-09 and their feedback has been incorporated in this Chapter.

3.3.2 Management

This interview was held on 2004-03-22 and was attended by R Rampersad, J Parkin, G Chantler, J Louw and R Khan. The discussions ranged widely across the selected subjects and have been broadly grouped under the following headings:

a) Business Development

i. Peripheral Local Municipalities

Although eThekwini has as its main objective to resolve its own challenges, they will be open to opportunities that present themselves with regard to peripheral local municipalities. eThekwini has a wealth of knowledge and experience of solid waste management embodied within EDSW and it would not be in the spirit of co-operative governance if they do not offer their services to other spheres of government. This is an area of opportunity for EDSW and needs to be explored selectively.

Many municipalities have approached EDSW and discussions are taking place with Buffalo Local Municipality, Kokstad, Dolphin Coast, Stanger, Ugugu and others.

Although the present focus is internal, future scope for growth beyond own borders will be exploited.

Dolphin Coast need to identify a new landfill soon, and EDSW's Buffelsdraai Landfill could service this area and this option could be pursued as a potential public-public partnership.

ii. Organic Growth

Business should expand as residential, business and industrial spatial growth takes place and these changes need to be anticipated timeously as they will impact on the ability to deliver services. The domestic waste collection service is also expected to change with the implementation of the government's and eThekwini's housing program – informal areas

could change to formal areas which need different resources and service levels. EDSW needs to keep track of these developments in order to maintain a competitive edge.

The goal for expanded service levels in rural and previously disadvantaged or under-serviced areas is being achieved in accordance with program targets. The original five-year milestones are expected to be achieved within the next two to three years.

In the short term (one to five years) the expectation is that there will be no backlogs and that an equitable service will be provided to all inhabitants within the municipal borders.

iii. Support for Africa

Approaches have been made to EDSW from Mauritius, Mozambique, Ghana, Nigeria and Iran. EDSW takes the position that a management expertise function can be provided, at re-imbursement, especially in the early stages of developing a metropolitan waste management system in countries such as these.

Full support for SADEC agreements and the NEPAD initiative will be given.

Reliability and responsiveness in service delivery evokes this kind of new customer interest and this could benefit existing EDSW customers in the long term. Relationships on an international level would also impact positively in the longer term on improved ingenuity within EDSW.

A city such as Maputo does not have an adequate waste transport system and could use good second hand trucks from EDSW. This has the added benefit that these vehicles are placed beyond the reach of potential competition within Durban and that an interested market is developed for second-hand waste vehicles. This will contribute to fleet renewal for EDSW in order to improve service delivery.

iv. Increased Revenues

The anomaly that results from increased and successful recycling and waste reduction, (in that these activities could reduce the waste stream, staff needs, vehicles, etc, whereas a major objective is to increase revenue), needs careful consideration.

The effect and impact upon EDSW's own "profit sustainability" could be destructive. This is a major reason why EDSW must work towards becoming the primary facilitator of recycling in the area. This could result in partnerships with private sector entrepreneurs who would benefit from the EDSW brand name, available skills and market access.

De-listing of waste types by ensuring pre-treatment could also result in augmented revenue from an increase in generated disposables.

v. Transboundary Movement of Waste

The Basel Convention of 1989 regulates the transboundary movement of hazardous waste and has been acceded to by South Africa. No domestic legislation has been passed in this regard.

The Bamako Convention on the ban of import into Africa and the control of transboundary movement and management of hazardous waste within Africa was adopted by the OAU, as they felt that the Basel Convention was not strict enough. The Bamako Convention totally prohibits the import of hazardous waste into Africa. The RSA has neither signed nor acceded to this convention and no domestic legislation has been promulgated. This may well represent an opportunity for the bold and intrepid.

vi. Hazardous and Medical Waste

Management feels positive about the potential business opportunity of entering the hazardous waste market. Participation in the long-term is unavoidable.

The hazardous waste issue remains a provincial responsibility, but treatment plants would be situated in a local authority region of jurisdiction and a collective effort is prudent.

Negative aspects are that EDSW does not have expert knowledge of hazardous waste disposal and lacks capacity in this regard.

The private sector will find it increasingly difficult to secure and develop hazardous waste disposal sites and joint efforts with EDSW could alleviate this problem. At present there is no H:H site in KwaZulu Natal - a glaring deficiency which must be redressed as a matter of urgency.

Incineration is an acceptable practice for hazardous and medical waste, but does not appear to be viable for domestic waste in large volumes at this stage. However, it is the intention of EDSW to stay abreast of new technologies and to participate actively in encouragement of pilot projects which seem viable and practical. Close interaction with provincial and national government is essential in this regard.

Suitable by-laws could be promulgated to address aspects not covered adequately at this stage. EDSW will have to be actively involved in the development of by-laws. Permitting of private sector operators is of importance.

vii. Restructuring

The outsourcing (in general terms) of the disposal function was investigated in 2003. The report concluded that EDSW does have capacity to render the service but the long-term financial commitment is lacking due to uncertainty regarding access to funding. The outsourcing of the disposal function only, does not appear to be a viable option, from a strategic perspective. EDSW would not do this out of free choice and are essentially opposed to the notion, for the time being. Practicalities include the difficulty of moving Municipal staff out of the Municipal pension scheme, for instance.

The outsourcing of disposal is thus not a strategic objective for EDSW in its present format.

Outsourcing of services will be limited to poverty alleviation programmes, service delivery in inaccessible areas where community participation is a practical solution, and services to low density rural settlements by small business entrepreneurs.

Public-Private Partnerships will be pursued where it is in the interest of the EDSW and eThekwini as a whole. Some of the new ventures indicated above, such as public-private partnerships, will be investigated with the main focus on reducing risk to EDSW.

Public-Public Partnerships could be considered, for instance, where a peripheral local authority such as Dolphin Coast may be interested in making use of Buffelsdraai Landfill.

b) Waste Minimisation

The term "waste minimisation" is used in the broader sense where recycling, separation at source, reduction and minimisation are all included.

Raising awareness for waste is the building block for achieving all of the latter and this will be addressed in greater detail later in this chapter under Education and Waste Minimisation.

The successful end result of waste minimisation would cause both a staff and an equipment reduction, with a change in emphasis in the waste management process and operation. In reality, population, urban and business growth could neutralise this effect to a large extent.

The only viable option to counter these impacts is to control the markets for recycling and waste reduction. Partnerships with the private sector must be part of this process.

Management's view on recycling and waste reduction is to support the initiatives because these are national objectives.

Separation at source is supported, albeit not for domestic waste, as this is not viable at this stage. This route could be followed, but with the focus on commerce and industry.

In an effort to reduce the total waste to landfills, incremental targets for recycling and waste minimisation need to be set on a realistic time scale and a suitable infrastructure must be created to receive recycled waste.

Incentives for industry and commerce to reduce waste at source could include tying a service to a rates charge. A strategy for incentives and/or disincentives must be developed and could include awards, peer and public recognition, penalties, etc. Such strategies need to be supported by proper legislative and institutional backup.

Raising awareness for waste includes the introduction of core values to both customers and staff.

It should be noted that the recycling markets will drive the waste minimisation process to a large extent.

c) Waste Information System (WIS)

The WIS is an essential element of the NWMS and EDSW realises the need for this and would implement a system as soon as guidance is given by DEAT in this regard. The absence of legislative and institutional support renders it difficult for EDSW to have control over the waste generated within its area of jurisdiction.

d) Zero Waste to Landfill by 2020

The Polokwane Declaration regarding zero waste to landfill by 2020 is an optimistic scenario which has dramatic financial implications for all local authorities throughout the country. As with many policy decisions this declaration was also approved without taking full account of the cost implications.

Careful consideration of these financial effects could have a significant impact on the position which EDSW must take in this regard.

SKC Engineers will model a theoretical scenario with a decreased percentage of waste to landfill to establish the impact of waste minimisation at source.

The six big cities in RSA should form a group to drive this issue proactively with National Government in order to get a realistic and achievable goal for reducing waste to landfill in a sustainable manner.

It is believed that zero waste to landfill is neither sustainable nor achievable by 2020.

e) Legal Aspects

Legal aspects are not discussed in detail here and are addressed in paragraphs 3.3.6 and 3.5.

By-law enforcement remains problematic while self-policing is required.

Monitoring, surveillance and enforcement must be regulated properly by the by-laws before this can be done properly.

The requirements of international law, as it impacts upon solid waste management in eThekwini, need to be addressed.

f) Human Resources Strategy

i. Organisational Design and Placement

The organisational design is complete and the population of the structure is in progress at the date of writing this Report.

EDSW is blessed with a highly and diversely skilled management team with strong leadership at the top. They will be responsible for executing strategy.

The biggest problem facing management is the placement of the middle management since there are more applicants than positions.

The medium-term strategy is to settle the new structure and to clarify roles and responsibilities within the eThekwini organisation and structures.

ii. Parity

Due to the amalgamation the following parity issues need to be dealt with:

- Temporary staff that qualify in terms of agreed conditions will become permanent employees in the new structure at normal municipal employment rates and benefits.
- Staff employed in different areas at the same level are not remunerated equally and this needs to be addressed.
- Employees employed through agency arrangements and that qualify in terms of agreed conditions, could become permanent employees in the new structure at normal municipal employment rates and benefits. At this point in time no agreement has been reached as yet.
- The high cost of parity is an aspect which needs careful consideration.

iii. Staff Development

The development of its employees is an important focus of EDSW and training within the new organisational set-up will address the core values of EDSW and will endeavour to get staff customer-wise.

Further educational developments that will have to be addressed are:

- Workplace training.
- Lobbying and motivation for waste training to be recognised in terms of the Municipal Bursary Scheme.
- Effective utilisation of the in-house skills training offered and facilitated by the Municipality.

iv. General

As mentioned above, EDSW is blessed with a quality management team and have highly skilled staff at the second and third tier. It will be difficult to keep these staff members motivated within the normal municipal work place. Therefore EDSW is considering a strategy of offering their services to other municipalities and to Provincial Government. This will enable staff to keep growing in their current positions without any additional cost to eThekwini.

g) Financial Strategy

i. Financial Policy and Procedures

EDSW is a sub-cluster within the Municipality and all its financial policies and procedures are subject to that of the Municipality.

Substantial amounts of capital, including related operational cost, will have to be spent on EDSW activities and services. EDSW will seek a long-term commitment from the Municipality regarding financial support.

ii. Hazardous Waste Opportunity

EDSW identified, as mentioned above, a hazardous waste venture as a strategy to be explored. A high-level business plan will have to be developed to ascertain the viability and sustainability of such a project. The possibility of financial assistance by the provincial authority could be explored.

iii. Entrepreneurial Project

Munitech is currently managing the entrepreneurial project which ensures collection and transport of waste from inaccessible rural areas to central points of transfer (skips etc). Transfer to landfills is done from these points by EDSW. A decision has been taken that EDSW would replace Munitech with regard to the management of the project. This will commence when the current contract with Munitech expires.

iv. Expansion of Service

The expansion of the waste disposal service to unserviced and under-serviced areas is currently on track and will be completed within the five year plan as envisaged.

v. Funding of Operational Budget

The operational budget is mainly funded through two sources of income; namely:

- Income generated from commercial services rendered including disposal services.
- Any shortfall on the operational budget is then funded through a transfer from the general rates account.

The commercial income is generated in terms of a schedule of tariffs that is calculated on an annual basis and approved by the Council of eThekwini and then promulgated with all other tariffs of the Municipality.

eThekwini's income in terms of solid waste is well secured since all waste related billing is placed on a consolidated bill that is forwarded on a monthly basis to customers.

The position is covered by Section 68 of Ordinance 18 of 1976 which established a system of consolidated billing for Durban. This system has been extended to all areas under the jurisdiction of eThekwini Municipality by the section 12 Notice. Section 68(h) of the aforementioned Ordinance states that the Municipality may *"in accordance with Section 255 of Ordinance 25 of 1974 cut off the supply of electricity or water or both if any amount reflected in the said amount (i.e. the consolidated bill) is not paid as if the said amount related to the supply so cut off"*.

The system of consolidated billing is, to the best of our knowledge, unique to eThekwini Municipality and is expressly protected by section 102 (1)(a) of the Local Government: Municipal Systems Act no. 32 of 2000. We quote:

> *"102. (1) A municipality may –*
>
> *(a) consolidate any separate account of persons liable for payments to the municipality; …"*

The ring fencing of income is seen as a strategic initiative to further the strategic business unit concept already developed.

vi. Budgeting Process

Budget escalations are within the guidelines provided by National Treasury. Budgets are prepared taking a three-year view in order to simplify planning and to reduce unexpected budgetary demands. The EDSW budget is prepared at sub-cluster level, integrated into the Procurement and Infrastructure cluster budget, which is then fed into the Municipal budget.

No institutional or strategic directional change in the way budgets are prepared is foreseen for the near future.

vii. Growth Opportunities

EDSW has identified the commercial sector as a growth market and is pursuing a strategy to grow market share. Growth in market share and income in this section of the business will not benefit EDSW's direct financial position, but will reduce the transfer from the general rates account. However, growth in this sector will definitely promote the image of EDSW.

viii. Carbon Credit Project

EDSW is currently in the process of development and implementation of the first carbon credit project in South Africa on the extraction of methane gas and converting it into usable energy, namely electricity. The income generated from the project will not be ring fenced as solid waste income. However, a certain amount will be donated to an existing trust fund for the furtherance of solid waste education. The remainder of the income so generated will be applied to reduce the transfer from the general rates account.

The carbon credit project was viewed with scepticism initially, and although difficult to understand and to implement, it is now proving to be successful. The sale of excess carbon credits needs further investigation to ascertain what benefit could be achieved by this.

ix. Funding of Capital Projects

Future capital needs will be funded from the eThekwini capital budget, through ventures, DEAT and other government grants.

EDSW will seek firm commitment to future capital expansion programs from the Municipality. If the Municipality is unable to commit to the future plans of EDSW, the whole or parts of the operational plan could be in jeopardy.

x. Risks

The following risk management issues were identified:

- Loss of revenue by the Municipality may stifle the EDSW operational budget.
- That EDSW's capital needs are not seen as a priority by the Municipality.
- Income generated from commercial services is generated in competition with the private sector. As indicated above, commercial services are charged in terms of an approved Council Schedule of Tariffs which leaves no room for negotiating price or increasing profit.
- The imminent separation of electricity from municipalities through the Electricity Distribution Implementation process may reduce the effectiveness of income collection.

- The loss of skilled staff.

A Risk Analysis is done as recorded in Appendix 6.1 of Chapter 6.

h) Institutional Arrangements

The service is a dualistic type of service with a social and commercial element. The commercial element of the service is rendered in competition with the private sector.

- By-laws need to be revised and loopholes need to be closed.
- A new development is the introduction of permits/licences. This needs to be supported by an effective education campaign and enforcement structure.
- Joint initiatives with other spheres of government and the private sector need to be investigated.
- Public-Private Partnership initiatives will be investigated for the handling, treatment and disposal of hazardous waste.

3.3.3 Education and Waste Minimisation

This interview was held on 2004-03-22 and was attended by M Mkize, R Abbu, J Parkin, J Louw, R Khan and G Chantler. Initially the group was informed of the activities of the Education and Waste Minimisation Division, or DSW Education, of the Cleansing and Solid Waste Unit in eThekwini DSW. The strategic objectives were discussed afterwards.

a) Introduction

The main objective of the Education and Waste Minimisation program is to capacitate all sectors of the eThekwini Municipality's community in order for them to make informed and responsible decisions regarding the way in which they manage the waste that they generate. DSW Education provides training, guidance and information throughout the local authority region through twelve education offices. The success of the section is measured by the reduction in litter, illegal dumping, the mass of waste going to landfill and by the number of jobs created involving waste as a resource.

Education and the promotion of waste minimisation takes place through:

- development of educational material
- presentations to all community sectors
- information sharing
- seminars are planned with a view to have businesses participating
- waste minimisation clubs
- recycling drop-off centres which are contracted out to small business/ entrepreneurs. These centres are mainly situated at garden refuse sites.
- community buy back centres which are funded either by National Government or external donors. Twelve have already been established, and another four are expected to be

opened by August 2004, subject to available funding from DEAT and the Flemish Government.

- landfill education programs
- educational institutions programs
- door to door education in developing communities
- participation in environmental programs

Training has been carried out for groups from Buffalo City, Pietermaritzburg, Botswana, Mauritius, India, Swaziland and other local councils for landfill supervisors, education officers and litter assistants. These courses run over two weeks and trainees spend time with knowledgeable staff in EDSW during their workday. Lectures are given and appraisals take place after a period has elapsed. *"Waste Management Guidelines"* and *"Recycling Guidelines"* have been drawn up for use by other municipalities.

SETA accreditation is being sought for these training programmes.

The Education and Waste Minimisation Division sits on the National Recycling Forum and co-ordinates the KZN Waste Minimisation Reuse and Recycling Forum.

b) Strategic Objectives

The following strategic objectives are being pursued:

- a wider presence and coverage of the whole area of jurisdiction
- Community Development Workers (CDW's) are not in permanent employ and this must be changed to have the existing 14 CDW's increased to 21 and engaged on a permanent basis.
- proper by-law enforcement is essential for control of littering, nuisances and illegal dumping and recycling activities.
- spot fines are inadequate for discouragement of illegal dumping and increased penalty fines will need to be collected via summonses issued by the Metro Police
- budgets should provide for training and seed capital for recycling projects (the limited funding has a constrictive effect on the project initiatives)
- recycling projects are very cash flow sensitive
- time lags between application for and award of funding threatens project success
- registration of training programs with SETA

c) Methodology

The existing methodology for training and waste minimisation programs are working well and will be maintained.

The waste management education is targeted at schools, communities and formal and informal businesses. Preparatory and primary schools participate well, but high school interest

is not responsive. Paper recycling at schools is successful and they are paid 30c/kg on average. More than 1200 schools have been reached over the past ten years.

Workshops are held and landfill site visits are arranged. Certificates are awarded for successes and the *"adopt-a-spot"* programs encourage clean-ups and maintenance of key areas within the community by individuals, groups and businesses.

CDW's reside in their areas of operation and attempt to raise awareness of waste within the community with basic education on waste. They participate in all community structures. This "volunteer work" is done on a temporary contract basis at a minimum wage funded by EDSW. Environmental days are utilised to highlight the negative impacts of waste on the environment and to show how these impacts can be reduced. *"Clean Community Committees"* are established in areas to address waste issues.

An objective is to put a system in place where achievement and success can be measured and results can be quantified. This division would like to earn income by selling their successful ideas and programs to other local authorities.

d) Financial Aspects

One of the challenges for the education and waste minimisation initiative is securing sufficient funding timeously to finance projects which could contribute to achieving even greater success.

DSW Education has its running costs funded by Council. Sponsors are sought actively, and currently include DEAT, Shell, World Bank etc. Internet searches are done regularly to seek out new sponsors.

The financial control of all expenditure and sponsor disbursements are done through the Association of Clean Communities Trust which has been set up for this purpose. The latest amendments to the Local Government: Municipal Systems Act (Act no 32 of 2000, as amended) need to be reviewed to determine whether this trust structure needs to be revised to comply with the law.

e) Other Aspects

Other aspects of note brought to the attention of the meeting included:

- By-laws prohibit the burn and bury method which is still widely practised in outlying rural areas. The prohibition should only be applicable if a proper collection service is provided in that area.
- Recycling is enjoying prominence, but there is still a question about whether the full cycle is complete. Re-use of disposed material, e.g. scrap metal artwork vs. recycled material, e.g. making plastic garden furniture from recycled material, does not ensure that these materials do not end up in a waste disposal site ever. Disposal is only postponed until some future date.
- Recycling activities should be controlled by EDSW in terms of trading policies and collection practice within the eThekwini Municipal boundaries.

3.3.4 Landfilling / Disposal

This interview was held on 2004-03-23 and was attended by J Parkin, L Strachan, G Chantler, J Louw and R Khan. Although the main subject was landfilling, discussions also ranged wider and these perspectives were duly noted, being relevant and useful.

The selected subjects were broadly grouped as follows:

a) Spatial Planning

The growth of eThekwini is rapid and land development objectives and spatial planning should be co-ordinated properly. EDSW is affected directly and should be informed of the situation timeously to allow for proper strategic planning.

Waste management works to 20 year horizons, but residential, commercial and industrial expansion, is usually private sector driven and are initiated on shorter term market needs. It is possible that present spatial planning is driven by a form of crisis management. The co-ordination between the 37 former boroughs has been virtually non-existent up to date.

The relocation of the regional airport could seed industrial development in the north.

Residential development is taking place to the west and in the northern Umhlanga node whilst industrial and harbour developments seem to concentrate in the south basin and where the existing airport is situated.

New landfill developments cannot be implemented until a final decision is reached regarding the location for a light aircraft airport.

b) The Hazardous Waste Market

There is general consensus that EDSW should get involved in the hazardous waste market from a business prudence perspective.

A potential income source could be developed and a social responsibility will be met in jointly seeking new disposal sites with the private sector.

The lack of a H:H disposal site in KwaZulu Natal must be seen as an opportunity and planning for this option should commence soon.

The two private H:h landfills do not have comfortable margins of airspace available. Bulbul Drive Landfill is nearing the end of its useful life and Shongweni may have only 15 - 20 years airspace remaining, at present disposal rates.

Private landfill owners are under pressure from both the public and from authorities. A Public-Private Partnership seems to be a good option for ownership and operation of hazardous waste treatment facilities. The general consensus is that the timing for such an initiative is ripe.

The public should be made aware that wastes can be made benign by a treatment process; and then such wastes could be landfilled safely. This is a strategic objective and EDSW is

pursuing the route for de-listing certain wastes. A structured plan is not on the table at this stage, but the intent has already been established.

Close co-operation with the provincial authorities is critical; and to date there has been an appreciation of the mutual interest in these matters between EDSW and the Province.

c) *New Landfills and Transfer Stations*

Landfill and transfer station positions for the medium term have been fixed through previous investigations and are well situated for the future.

The Buffelsdraai landfill development and opening is imminent and timeous for the urban explosion at the North/Umhlanga node. It augers well for the situation of Stanger, where the Sappi Landfill has closed and Stanger requires a new landfill facility. The Ilembe Regional Council is in discussion with EDSW about this situation.

The existing access road to Buffelsdraai is not up to standard and will be unable to cope with the heavy-duty traffic once the landfill has opened. However, this is in the process of being upgraded.

Transfer stations will be developed at Bisasar and Tongaat in the medium term. Stanger may consider a transfer station to channel waste through to Buffelsdraai. Dolphin Coast may want to utilize this disposal facility in future.

Local authorities on the edge of the EDSW region have all been kept informed of developments and yet their interest in mutual use of facilities has been minimal. EDSW realises that these authorities need support, but at this stage no concerted efforts are being made in this regard.

Waste generation in the Region is being monitored to enable prioritisation of new transfer station development.

Funding for capital and operational expenditure remains a perennial challenge. The effort spent on obtaining carbon credits on landfill operations would be recognised in a positive manner if Council takes the position that budget applications are enhanced by additional fund awards at least equal to the carbon credit values credited to the city coffers.

Rehabilitation and closure of private landfills, where owners could go into liquidation, could impact negatively on the availability of Council funds at an inopportune time. It is proposed that a waste levy for rehabilitation be paid into a trust fund created for this purpose and that the involved parties contribute to such a fund.

d) *Collection and Transport*

Collection and transport are the most costly elements of the waste management process and generally comprise approximately 60% of the total cost at EDSW.

Transport alternatives could be considered, such as lease options, sharing of specialist equipment and waste by rail. However, each of these has advantages and disadvantages; and the ultimate goal should always be to pursue the long term least cost option.

The obvious strategic objective is to keep these functions within EDSW, but to ensure that the most suitable vehicles and equipment are utilised.

e) New Technologies

New technologies in waste management and related activities are being developed world-wide. The USA and Europe are leaders in this regard, and Africa lags behind to a large extent. USA and European technologies are not always applicable in Africa, mainly due to the difference in waste stream content.

In South Africa, appropriate technology, based on the best local solution, is applied. Responsible waste managers have a duty to stay abreast of these new technologies and should select the most appropriate ones for their own applications.

Research and development should be encouraged and EDSW aims to remain independent and technologically aware by participating and contributing to feasible new technologies. This specialist knowledge acquired could be put to use within the Region and could be sold to or be shared with other local authorities.

Protection of intellectual property must be safeguarded.

f) Gas Energy Utilisation

EDSW moved into the field of gas energy utilisation in 2002 and this has now become a reality with the initiative at Bisasar Road. (The first report on this technology was submitted in 1996).

A renewable energy policy has been accepted, in line with national policy. The position taken is that cost efficiency could be sacrificed in the interests of national policy in this regard.

EDSW has gone through a learning curve with gas energy utilization, which is unique among South African cities. Assistance and guidance could be offered to other cities should they so wish.

The objective is to utilise and control the generation of landfill gas, which will result in making the solid waste management process in the city more environmentally friendly and, to a lesser degree, more cost efficient. Positive impacts are expected upon air space utilisation, transport, power supply by the electricity department and, subject to odour control, landfill positioning closer to city centres.

Presently the City draws 1700 Megawatts of electricity and landfills could generate 10 Megawatts through gas utilisation. This is just more than half a percent, which is small, yet justifiable in terms of a renewable energy policy. Ten tonnes of power station coal is saved for every 10 Megawatts generated from landfill gas.

The market for clean development mechanisms, where carbon credits are earned, will be targeted by EDSW with a view to selling credits in a developing market. The financial reward is gratifying, although the affected State Departments (DWAF and DME) still have to formulate their position and requirements.

3.3.5 Financial

This interview was held on 2004-03-24 and was attended by D Ramlahl, T Palmer, G Chantler, J Parkin, R Khan and J Louw.

a) General Financial Issues

EDSW implemented the full cost accounting method complying with the requirements for all the other departments within the Municipality.

The budget process followed is that of an operational budget and a separate capital budget and these are prepared in terms of a three year budget cycle.

Capital expenditure for EDSW is first funded from the central Municipal cash surplusses and/or overdraft facility and when loans for such projects are implemented, cash is placed back into the system and any overdraft raised is cleared.

The capital budget is funded from internal and external loans as well as by means of government grants. Internal loans are charged at higher rates than external borrowing rates.

The major cost items in the budget are staff and transportation costs which are fairly constant cost items in the expenditure budget.

The Municipality is in the process of implementing Generally Accepted Municipal Accounting Practice (GAMAP) and EDSW is also subject to it. GAMAP will be implemented to its full extent from the 1st of July 2004. eThekwini is one of the leading Municipalities in this regard.

EDSW is not ring fenced in terms of assets, liabilities, income, expenditure, rights and obligations. This has been identified as a business risk. The real cost and return generated by the commercial section of the business is not known at this stage. Expenditure is not calculated per activity per unit. No income is received by EDSW in a separate ring fenced account for chargeable services. All monies are received in a central or general deposit account.

b) Income and Credit Policy

Tariffs, as discussed elsewhere, are only applicable on commercial collection services, disposal charges and additional services. Incorporated in the general rates account is an amount for basic services. A basic waste collection service is seen as a once per week collection service and equity in terms of waste management services is achieved by means of this arrangement. Additional services are charged by means of a tariff on the Schedule of Tariffs. The costs relating to street sweeping and litter picking activities are also paid from the general rates account.

Indigents are classified in terms of a certain threshold on property valuation.

Commercial waste management charges as well as general rates are charged through the consolidated bill and the Municipal credit policy is applicable throughout.

It was suggested that the new by-law make provision for the reporting of all public and sports gatherings in order for EDSW to implement proper measures to manage waste generated during such occasions as well as to charge the relevant client (waste generator).

c) *Fleet Arrangements*

EDSW is responsible for the control and maintenance of its own vehicle fleet. They prepare their own procurement documentation within the guidelines provided by the Municipality when ordering new fleet vehicles. The procurement section of the Municipality prepares the final order. Uncertainty prevails regarding the responsibility for control and maintenance of non-specialised fleet.

The average age of the fleet is in the region of 10 years with the maximum age of units being 14 years. When necessary, vehicles are hired in at an as-and-when required basis. The hiring of vehicles is not the norm, it is rather the exception.

Intensively utilised vehicles, such as compactors, are refurbished halfway through their expected working life in order to extend the useful life expectancy of these vehicles.

Second-hand compactor vehicles are stripped for spares and do not go onto the local second-hand market. This is a measure which prevents the local waste industry from buying these vehicles at cost and then using these same vehicles in competition with the Municipality. EDSW is actively seeking alternative arrangements, such as exporting these vehicles to neighbouring countries, thus putting such equipment beyond the reach of competing business.

d) *Waste Management Information System*

A waste management information system needs to be developed. Financial management information is in the same format as the Municipal reporting systems and does not always address waste management information requirements to the full extent required. EDSW has it's own contracts program and weighbridge program which is used to prepare the accounts. This information is then uploaded to consolidate billing for posting. The reader should not confuse this with the Waste Information System (WIS) that is being developed on a national level.

e) *Management of Entrepreneurial Contracts*

EDSW has been tasked to take over the management of the entrepreneurial contracts from Munitech when their contract term expires. This will be a difficult and taxing task.

f) *SWOT Analysis*

A provisional SWOT Analysis was done first and general agreement was reached on the content thereof during the second strategic planning session held in June 2004.

SWOT Analysis

Strengths (internal to organisation)	Weakness (internal to organisation)
▪ Strong EDSW Brand ▪ Strong leadership at top two tiers ▪ Skilled second and third tier management - management expertise ▪ Intrapreneurial skill (internal entrepreneur) of top management ▪ Equitable service plan in developed and in process of being executed ▪ Sufficient airspace capacity available for disposal of general waste ▪ Staff training and development at a high standard ▪ Control over fleet workshop –own mechanical workshop is managed. ▪ Benefit of consolidated billing – the provision of electricity is used as a credit management tool. ▪ Deficit funded from general rates account ▪ Possible new income streams from renewable energy projects ▪ Community development and education programmes well developed ▪ Community involvement in area cleaning – adopt-a-spot ▪ Political support for the service rendered ▪ Landfill training programme of a high standard ▪ Well managed entrepreneurial community collection projects	▪ Lack of waste management information system ▪ Capital shortages – limited financial commitment to execute operational plans ▪ Fleet age is at the high end ▪ Staff age is at the high end especially the collection teams ▪ High relative costs of staff and parity implementation ▪ EDSW is not ring fenced fully in order to be managed as a proper business unit ▪ Not structured as a fully-fledged business unit with service delivery and service level agreements ▪ Shortcomings in by-laws (spot fines too low and not enforced properly; no permits/licences for the private sector operators) ▪ Limited hazardous waste expertise ▪ Limited control over organisational inputs and outputs ▪ Community development workers not permanent employees ▪ Time delay for funding projects due to competing priorities ▪ Limited understanding of the negative impact on health and environmental matters when not providing a proper service ▪ No waste information system (This will be developed by national government
Opportunities (external to organisation)	**Threats (external to organisation)**
▪ Apply a portion of the carbon credit funds to fund education and waste minimisation projects ▪ Registration of training programmes with relevant SETA ▪ Market second-hand vehicles outside borders of South Africa in order for them not to be reused by the private sector in competition with EDSW ▪ Regionalisation of waste management ▪ Hazardous waste management through PPP's ▪ Provide waste management services to SADEC and other countries ▪ Provide assistance to other South African municipalities, provincial and central government ▪ Become part of the municipal bursary scheme ▪ Drive further carbon credit transactions ▪ Develop other capital and operational funding opportunities	▪ Private sector competition ▪ Lack of experience at authorities like DEAT, DWAF and Province ▪ Lack of hazardous waste guidelines – cross boundary movements ▪ Financial sustainability of the Municipality ▪ EDSW not high enough on operational and capital budget allocation priority ▪ Environmental activists - implementation of zero waste to landfill ▪ Lack of understanding of waste management business at senior and political level ▪ Lack of understanding by national and provincial government of carbon credits program.

3.3.6 Legal

No interview was held and Mr J Paley and Ms K Reynolds agreed to have a telephonic discussion regarding matters pertaining to legal strategic objectives. The telephonic discussion was held on 14 May 2004 between Mr Paley and Ms Reynolds.

The function of the legal office is to support the strategic objectives of the other disciplines. For example, the efficient collection of refuse tariffs is an important component of EDSW's operations. The technique of consolidated billing employed by EDSW promotes the collection of tariffs. The legal office has the task of ensuring that, from a legal perspective, consolidated billing is permissible. It is to some extent inappropriate to talk of the legal office having its own strategic objectives in relation to waste; and this position is supported by EDSW.

Ms Reynolds then identified and discussed with Mr Paley, from the range of objectives raised by the other disciplines, those objectives which appear to require legal support. This is further discussed in paragraph 3.5 of this Chapter.

3.4 Evaluation and Prioritisation of Needs

3.4.1 Expanded Service Delivery

Expanded service delivery within the Region and specifically to the rural areas which were incorporated during the demarcation process, is progressing satisfactorily and the five year milestones are expected to be achieved within the next two to three years, according to management. Backlogs will be redressed as per program.

Much of the focus is on:

- entrepreneur development through public private partnerships for servicing inaccessible areas.
- community empowerment, training and capacity building through use of Community Development Workers and spearheaded by DSW Education.
- creating a litter free environment in the rural areas of the Region.

Hazardous waste initiatives which will be implemented to access the market and to form Public-Private Partnerships in development of disposal facilities could also be categorised under expanded future service delivery.

The upgrading of the transport fleet over recent years, consuming a substantial portion of the awarded capital budgets, has also improved service delivery.

The present focus is internal, but there is future scope for growth in service delivery beyond the present Region's borders, to neighbouring local authorities.

Expanded service delivery needs may be prioritised from high to low as follows:

- complete expanded service delivery to rural areas
- empower communities by training and information distribution
- maintain a lower average age for the transport fleet
- pursue the hazardous waste market and develop an H:H site
- look beyond own borders for further opportunities

3.4.2 Waste Separation at Source

There is general consensus that waste separation at source is not practical in the present day South African city with regard to domestic waste. Separation at source is a prerequisite for viable recycling.

Waste separation at source could be implemented in commercial and industrial applications and either financial rewards or penalty collection tariffs could be applied to create either incentives or disincentives.

A softer option, which could achieve limited success in this regard, is by granting peer and public recognition for active participation in the program and to bestow awards publicly.

A fully effective source separation program, together with an organic waste composting initiative, could result in a waste stream reduction of 60 to 70% of the total waste stream, but the cost would be exorbitant, i.e. more than current and future avoided costs. (According to Dohrman and Naidoo of the MIIU, avoided costs are cost savings. Current avoided costs are typically transport and landfill costs; whereas future avoided costs result in smaller landfills or longer landfill lifespans, or a smaller transport vehicle fleet etc.)

Waste separation at source needs may be prioritised in decreasing order as follows:

- encourage waste separation at source with commercial and industrial waste generators
- implement an incentive/disincentive program which will operate effectively
- create an award/recognition program

3.4.3 Waste Minimisation

The 1998 DSW Strategic Planning Workshop included in the "Mission" statement that a waste minimisation ethic would be promoted amongst stakeholders.

A division was created within DSW, called the Education and Waste Minimisation division or DSW Education, and it has achieved remarkable success in the Region. See paragraph 3.3.3. This division needs more financial support and the Community Development Workers, or CDW's, need to be employed on a permanent basis; and their number should be increased.

In order that an ingrained culture of waste minimisation be established in the community, it is essential that school programs are favourable towards such a bias. The syllabus should address this at the earliest stage of a learner's school career as it has been established that older children are not as responsive to this subject as the younger ones are.

Public awareness of waste related affairs is growing, but a real danger exists that the public will focus on recycling only, and not on waste minimisation. Waste minimisation starts right there at home with the individual.

Waste minimisation is contrary to the objective of a waste service provider, in that whereas the growth of business is a primary goal, waste minimisation results in reduced staff, equipment and turnover. However, growth in business, population and unit waste generation could neutralise this

anomaly. Management, however, positively supports waste minimisation because it is one of government's objectives as declared in the NWMS.

The establishment of a materials recycling facility was investigated by DSW in 1999 and at that stage the feasibility was unfavourable. This could change dramatically upon closure of key disposal sites and if new landfills are situated further from generation areas. High transfer and transport costs could add new impetus to the development of such a facility or facilities.

Waste minimisation needs may be prioritised in decreasing order as follows:

- raise public awareness with regard to waste minimisation
- permanent employment of CDW's encourage and foster community and school awareness programs and/or syllabus content
- re-visit the feasibility of a materials recycling facility in the near future
- evaluate the impact of selective incineration to support airspace conservation in the long term

3.4.4 Recycling

Recycling is also supported by EDSW Management because it is government policy and recycling is embodied in the NWMS.

School programs must be supported to raise awareness on recycling (newspaper collection projects for fund raising) and for fostering core values in this regard.

The cost of recycling must be determined with care. Although recycling may be applicable and viable in the USA and Europe, it does not necessarily follow that the same applies in the RSA, and in eThekwini, more specifically.

Some materials are easier to recycle, e.g. paper, aluminium cans, rigid plastics, etc. and it could be highly profitable to recycle these materials. The waste streams of highly developed first world countries such as the USA and countries of Europe, differ substantially from the waste streams of third world and semi-third world countries such as South Africa. Further aspects which differ from the first world countries are that South Africa's population is much smaller, less affluent and developed, and generate much smaller total quantities of recyclable materials. The long distances over which such materials need to be transported to markets also adds expense. All these factors have a negative impact on the feasibility of recycling in general.

When the cost of recycling is more than the total avoided cost, i.e. current plus future avoided cost, then recycling or waste reduction is not viable as a profitable business solution.

Dohrman and Naidoo of the MIIU postulate that about 25% of the typical RSA waste stream could be recycled at below the current avoided cost. A 50% reduction in the waste stream could be achieved if the total avoided cost (current plus future) is the benchmark.

Recycling needs for EDSW could be prioritised in decreasing order as follows:

- awareness must be created on as broad a front as possible
- partnerships in recycling must be formed with the private sector

- the recycling and waste reduction markets must be secure and prices must be stable before serious efforts are made in this regard

3.4.5 Zero Waste to Landfill by 2020

The *"DSW Strategic Planning for 1995 and Beyond"* included the objective to reduce waste to landfill and the development of opportunities from this objective was envisaged.

The Polokwane Declaration of 2001 set the objective of zero waste to landfill by 2020. The basis for this decision was founded upon the mistaken premise that European and USA data for waste streams are similar to that of the RSA. This information was used as a benchmark for the South African situation, and incorrectly so. Local waste contains a much lower percentage of recyclable materials than first world waste generated in the USA and Europe.

Messrs Dohrman and Naidoo, in their paper "Waste Reduction Economics 101", which was presented at a workshop on 28/29 July 2003, hold the view that even if a local authority is 100% effective in capturing all recyclable materials, a waste reduction of only 30 to 40% could be achieved. At best, 60 to 70% would be achieved, with the remainder, 30 to 40% still going to landfill.

In order to achieve waste reduction beyond the 40% level, serious composting and recycling would be required. At Polokwane incineration/waste to energy was promoted to deal with the balance of waste remaining and to ensure "zero" waste to landfill as per the USA and European models.

Incineration is considered an absolute non-starter in the RSA for large quantities of general waste. Even with incineration, the ash comprising 10 to 15% of the waste will still need to go to landfills.

The latter option is neither sustainable nor applicable as this country has good landfill resources compared to the USA and especially compared to the European countries. The cited resources include "good" landfill soils, low rainfall, dry climate, more than sufficient landspace in close proximity to cities and towns, etc.

Zero waste to landfill is not an attainable goal and certainly is not applicable to South Africa. Any new legislation must adopt and be based upon attainable and sustainable goals.

Zero waste to landfill needs for EDSW could be prioritised in decreasing order as follows:

- implement incremental targets for waste reduction and recycling that are both attainable and sustainable
- promote and create a receiving environment for the output/products which emanate from recycling
- lobby and promote a unified position among peer cities to government regarding the non-achievability of zero waste to landfill.

3.4.6 Raising Awareness

Raising awareness of the community with regard to waste related matters is important for the overall strategy of waste minimisation and recycling. A number of initiatives are already in place.

a) Newsletter

A newsletter is circulated by the eThekwini Municipality, together with the rates accounts. Space for communications regarding waste management news items is reserved and this serves as a primary information source to all residents of the Region.

b) Community Development Initiatives

As reported elsewhere in this chapter, DSW Education is fully committed to involving all sectors of the community, inclusive of schools, business and commerce, in raising awareness. See paragraph 3.3.3.

Community Development Workers have been deployed in the rural areas and the low income areas such as Umlazi, Inanda and KwaMashu, where they interact with families, schools and businesses and where they promote sound waste management practices.

c) Education and Training

DSW Education initiates education and training programmes within the community and also train other interested local authorities.

Manuals have been compiled and are for sale and thus contribute to funding for this division's activities. See paragraph 3.3.3 a).

d) Clubs

The establishment of waste minimisation clubs is one of the requirements of the NWMS and various such clubs have been formed in the Region.

The purpose is to spread the message for sound waste practices and to encourage and initiate waste minimisation projects and practices.

DSW Education has been formed and their running costs are Council funded. Their projects are funded through the trust fund. It has the objective of minimising littering and keeping public areas, such as tourist and other highly visible areas clean and unsullied.

Raising awareness needs for the EDSW could be prioritised as follows:

- financial and human resources support for community development initiatives and education and training
- financial support for media communications
- regular information/news article contributions to the eThekwini newsletter.

3.4.7 Optimisation of Solid Waste Management

The operation of solid waste management was benchmarked in 1998 and has been undergoing a regular process of systems analysis and optimisation since then by making use of a dedicated software program called *SKC WasteModel*©.

Master plans were developed and have been adjusted as demarcation and expansion of the EDSW client base changed over the last 5 years. Best use of approved budget funding was made after appropriate long term analysis of a variety of scenarios on a regular basis.

This approach has enabled EDSW to do cost efficient short and long term planning with the limited resources at their disposal. EDSW hopes to achieve a cost saving of more than 20% over the medium to long term between the original benchmark operations and the projected optimised operations.

Technical choices are based on detailed financial costing and has enabled EDSW to evaluate a variety of options before budget approvals are sought for implementation strategies.

3.5 Legal Framework

As indicated in paragraph 3.3.6, in the telephonic legal interview, those issues arising out of the strategic objectives raised by other disciplines, which interface with legal issues, were identified.

First, one of the strategic objectives raised by EDSW is the need to promote waste prevention, waste minimisation and recycling. (This is, of course, one of the strong drivers of national government's waste policy.) The Legal Department advised that local government's competence in relation to waste prevention and minimisation is essentially limited to the area of nuisance prevention. To the extent that waste prevention and minimisation are environmental issues, they fall within the concurrent responsibility of national and provincial government. Legislative measures to promote these objectives will therefore have to come from national or provincial government. In relation to the use of fiscal measures to promote recycling, the Legal Department advised that legislation promulgated in terms of section 229 of the Constitution (which regulates municipal fiscal powers and functions) would be necessary. The point was made that, once the Local Government: Municipal Property Rates Bill (which as at 14 May 2004 has been passed, but not yet promulgated as an Act) has been enacted, this legislation may open up opportunities for local government to promote recycling (by way of a hypothetical example, by giving rates rebates to property owners who have effective recycling measures in place).

Second, EDSW has as another strategic objective the sale of its expertise in waste management to other jurisdictions (for example, Mauritius and Mozambique). International agreements must be concluded in accordance with section 231 of the Constitution (which states, amongst other things, that the negotiation and signature of international agreements is the responsibility of the national executive). Where EDSW is exercising a power or function of, for example, another municipality in relation to waste, the provisions of section 238 of the Constitution will apply. In terms of section 238(2), the power or function will be exercised on an agency or delegation basis.

In relation to EDSW's proposed involvement in the hazardous waste industry, Mr Paley advised that in his view, hazardous waste falls within the ambit of nuisance and therefore within the sphere of local government competence. eThekwini's current by-laws do already contain provisions relating to hazardous waste.

In relation to the enforcement of by-laws and the drive to increase spot fines for offences such as illegal dumping, the current system caters for this. The prosecutor of an illegal dumping offence, for example, can at any time make representations to the Chief Magistrate in relation to the proposed admission of guilt fine. The Magistrate will of course not automatically implement the recommendations of the prosecutor – it may be that eThekwini needs to lobby the courts in relation to the strategic importance of strong deterrent measures.

3.6 Institutional Arrangements

3.6.1 Ring Fencing

The EDSW in its current institutional format is not ring fenced comprehensively. It is suggested that it be financially and operationally ring fenced (not separated, since a MSA process is not contemplated) from the other business of the Municipality. This will assist with the future planning of the entity since a proper understanding of its financial and operational position will be gained. The accuracy of information will improve significantly through a ring fencing exercise and information will be of more use for well informed management decisions. EDSW also needs to ring fence its internal services/departments and an Activity Based Costing exercise will assist in proper tariff setting.

3.6.2 Business Unit

The Municipality manages EDSW as a business unit within the Municipal structure. Business units differ in degree of autonomy and authority and EDSW (especially the commercial section of the business) should be provided with more responsibility in order to properly compete with the private sector. It is not managed as a fully fledged business unit according to the proper definition of a business unit, and it is also not managed as a department. The current institutional format is something inbetween and it is suggested that it moves towards a fully fledged strategic business unit with its own income and expenditure statement and balance sheet as well as service delivery and service level agreements. EDSW's performance can be better managed and the needs of the service can be better identified when operating as a strategic business unit. The aforementioned financial and operational ring fencing is essential to create a strategic business unit.

The creation of a strategic business unit does not change the ownership of the entity. All by-laws, rights and obligations should remain unchanged (if they are appropriate for the current format of the business); they will only be linked more closely to the core business of EDSW.

The different services offered by EDSW should also be managed as business units within EDSW in order to develop transparency in the service.

3.6.3 Public-Public Partnerships

The opportunity for development of Public-Private and Public-Public Partnerships exists and the waste management business lends itself particularly well for innovative partnerships. The latter partnerships may be possible with neighbouring Local Municipalities, other Local and Metropolitan Municipalities, Provincial Government Departments, National Government Departments and SADEC countries. The possible Public-Private Partnerships will all differ in terms of their nature and service and each one will need to be considered on its own individual merit. The following services may be rendered to the aforementioned parties:

- Neighbouring and other Local Municipalities may be assisted with waste related training needs, Integrated Waste Management Plan development, systems analysis, waste management information systems, disposal strategies and the entering of disposal (general and hazardous) arrangements, treatment of hazardous waste and transport agreements.

- Combined efforts with other municipal departments with regard to environmental management education in order to stretch municipal budgets.
- It is the considered view of EDSW to enter into a partnership arrangement with Metropolitan Municipalities in order to form a partnership through the Six Cities Network to review the Zero Waste to Landfill arrangement that currently exists as well as driving other important waste related issues.
- Since EDSW has the best waste management expertise in the KwaZulu Natal Province it may be in the interest of the Province to make use of their expertise to assist it to develop the Provincial Integrated Waste Management Plan and the handling of hazardous waste within its area of jurisdiction.
- EDSW is of the view that they must raise their visibility with regard to National Government waste related issues by forming partnerships with National Government Departments.
- EDSW receive many requests from SADEC and other countries like Mauritius to assist it with its waste management functions. The opportunities range from management support (Public-Public Partnership) joint venture tenders with the private sector (Public-Private Partnership).

3.6.4 Public-Private Partnerships

A recent Section 78 (1) investigation into the restructuring of the disposal function revealed that EDSW has the necessary skill, expertise and resources but lacks the capital and operational cost commitment to implement essential projects. The externalisation of EDSW as a whole or in sections, as the case may be, cannot be explored fully before the eThekwini Municipality has had the opportunity to fully apply its mind to the capital and operational budget needs as well as the strategic and institutional options of the business. The eThekwini Municipality should also apply its mind to the method of externalisation as the fragmentation of control over the service should not be encouraged. The service, as for Public-Public Partnerships, lends itself to innovative Public-Private Partnerships, but control over the core of the business should not be fragmented. The service as a whole should be externalised should the Municipality not have the financial resources to support the financial plan presented.

The implementation of Public-Private Partnerships should not be prevented or delayed at the operational level. Various partnerships have been or are in the process of being entered into for the benefit of the service and community at large. These partnerships range from community entrepreneurs that assist with the collection of household waste, community partnerships regarding adopt-a-spot, environment management training in conjunction with the private sector, waste recycling and minimisation initiatives, hazardous waste collection, stabilisation (decontamination) and safe disposal, carbon paper transactions and other capital funding opportunities. These waste management Public-Private Partnerships should take place with EDSW as the facilitating partner.

3.6.5 Fleet

EDSW is one of the few solid waste and cleansing services that has control over its vehicle fleet and workshop arrangements albeit obtained recently. This is of major benefit for the effective delivery of services and this arrangement should be maintained. Participation in the funding arrangements regarding fleet requirements will be necessary.

3.7 Financial Impacts/Strategies

The comments under this section are introductory and will be developed further in Chapter 6 of this Report. The financial impacts of strategies will take place at two levels, namely, operational and capital.

The assumptions and impact of each scenario will be described in detail after the systems analysis has been undertaken.

3.7.1 Refinement of Organisational Structure

The refinement of the organisational structure will have virtually no impact on the operational budget in the short to medium-term. Certain savings may be possible over the long-term.

3.7.2 Population of Organisational Structure

The population of the organisational structure will have no impact on the operational budget other than those issues regarding parity, as already mentioned. The current budget provides for the increase in salary cost associated with parity, and will form part of all operational budgets.

3.7.3 Waste Information System

The development of the Waste Information System is a national government function which is not on schedule and has an impact on certain strategic decisions. Should it be delayed further it may have a negative impact on the operational and capital cost of the organisation.

3.7.4 Expand and Grow the IWM Awareness Campaign

Expansion and growth of awareness may lead to an initial increase in operational cost but if correctly managed and properly implemented the long-term benefits will outweigh the initial cost by far. The benefits of this can normally be seen in the reduction of illegally dumped waste which is very costly to remove. It normally pays to spend money on education in order to reduce the cost associated with the collection of illegally dumped refuse. EDSW is convinced that such investment will bear fruit in the medium- to long-term. History has proven that an investment in education and awareness only bears fruit in the long-term if the message is reinforced regularly.

3.7.5 Investigate and Co-operate with Neighbouring Local Municipalities

The initial operational cost will be limited but the financial and other gains resulting from increased work turnover and staff satisfaction can be substantial over the long-term. The satisfaction that staff will get from this will be a major benefit, which could improve staff retention at senior management level.

3.7.6 Management Expertise for Others

The sale of management expertise to other South African municipalities and interested African countries has merit.

As in the previous paragraph, the initial cost will be limited but the financial and other gains could be substantial over the long-term.

3.7.7 Public-Private Partnerships for Developing Hazardous Waste Facilities

In order to comment meaningfully, the extent of participation needs to be developed; but it may have an effect on the operational and capital budget. This decision must be taken with a clear commercial mindset (to make money) and the approach must be that risks that can be best managed by the private sector should be transferred to the private sector.

ETHEKWINI MUNICIPALITY

INTEGRATED WASTE MANAGEMENT PLAN

CHAPTER 4
Systems Assessment and Analysis

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4 SYSTEMS ASSESSMENT AND ANALYSIS

4.1 Assess Baseline

4.1.1 Introduction and Background

SKC Engineers, together with Haultec, have been involved with the solid waste master planning and management in the eThekweni Municipality since 1998. Previous reports that addressed solid waste management in the eThekwini Municipal Area (EMA) since 1998 up to 2002 are listed below.

Report Title	Reference Number	Date
• *Status Quo Report of Solid Waste Management*	SKC Doc No. 1783/D0090	November 1998
• *Waste Stream Analysis of Solid Waste Disposal*	Doc No. 1815/A0001	November 1998
• *Systems Analysis for Solid Waste Disposal Management*	SKC Doc No. 1819/D0090	February 1999
• *Master Plan for Solid Waste Management*	SKC Doc No. 1822/D0090	May 1999
• *Master Plan for Solid Waste Management - Revision 1*	SKC Doc No. 1879/D0090	January 2000
• *Status Quo Report of Solid Waste Management for Demarcation Extensions*	SKC Doc No. 1943/D0106	December 2000
• *Systems Analysis of Solid Waste Management for Demarcation Extensions*	SKC Doc No. 1949/D0106	February 2001
• *Master Plan 2001 for Solid Waste Management for Demarcation Extensions*	SKC Doc No. 1950/D0106	March 2001
• *Status Quo 2002 of Solid Waste Management for eThekweni Municipal Area*	SKC Doc No 2077//D0132	July 2002
• *Systems Analysis 2002 of Solid Waste Management for eThekwini Municipal Area*	SKC Doc No 2084/D0132	August 2002
• *Master Plan 2002 of Solid Waste Management for eThekwini Municipal Area*	SKC Doc No. 2085/D0132	September 2002

Studies conducted previously and the findings reported in the above Documents form the basis upon which this Systems Assessment and Analysis and the development of the Master/Action Plan is founded.

The following operational elements are addressed in the baseline assessment:

- Operational aspects;
- Existing infrastructure and resources;
- Collection and transportation vehicles and fleets;
- Site operation equipment;
- Disposal sites, transfer stations and vehicle depots;
- Proposed future potential regional landfills; and
- Residential density of waste generation areas.

Information procured subsequent to the publication of the original Master Plan Document in May 1999 has been incorporated into this Report.

4.1.2 Landfill Sites, Garden Refuse Facilities & Transfer Stations

This systems assessment and analysis was carried out on the following waste management facilities, both existing and proposed:

Operational General Waste Landfill Sites

1. La Mercy Landfill Site
2. Bisasar Road Landfill Site
3. Mariannhill Landfill Site

Hazardous Waste Landfill Sites (privately owned and operated)

1. Shongweni (H:h) Landfill Site
2. Bulbul Drive (H:h) Landfill Site

Garden Refuse and Builders Rubble Landfill Sites

1. Shallcross Landfill Site
2. Wyebank Landfill Site
3. Umkomaas Garden Refuse Site

General Waste Transfer Stations

1. Chatsworth Transfer Station
2. Umlazi Transfer Station
3. Flower Road Transfer Station
4. Mount Edgecombe Transfer Station
5. Hammarsdale Transfer Station
6. Amanzimtoti Transfer Station
7. Clermont Transfer Station (being upgraded/rebuilt)
8. Umkomaas Transfer Station (closed)

Garden Refuse Transfer Stations

1. Phoenix Transfer Station
2. Malacca Road Transfer Station
3. Riverside Road Transfer Station
4. Bellair Road Transfer Station and Recycling Centre
5. Chatsworth Transfer Station
6. Tara Road Transfer Station
7. Glanville Road Transfer Station
8. Travencore Drive Transfer Station
9. Nyati Road Transfer Station
10. Seadoone (School Road) Transfer Station

Vehicle Depots and Offices

1. EDSW Vehicle Workshop (Freighter Workshop/Springfield)
2. Alice Street Depot (temporary)

3. Tongaat Depot
4. Ottawa Depot
5. Phoenix Depot
6. Durban North and Greenwood Park Depot
7. Springfield and Berea North Depot
8. Beach and Point Depot (Baumann Road)
9. Sydney Road Depot
10. Southern Areas Regional Depot (Collingwood Rd)
11. New Germany Depot
12. Wyebank Depot
13. Kloof Admin Offices
14. Queensburgh Depot
15. Amanzimtoti Depot
16. Kingsburgh Depot
17. Southern Region Offices (Kingsburgh)
18. Umkomaas Depot

Proposed Regional Landfill Sites

1. Buffelsdraai Landfill Site
2. New Shongweni Landfill Site
3. Feralloys Landfill Site
4. Lovu Landfill Site
5. Umbumbulu Window (possible development option only)

Proposed Transfer Stations

1. Electron Road Transfer Station
2. Tongaat Transfer Station

Information on all the existing facilities can be found in the Status Quo, Chapter 2 of this Report.

4.2 Gap Analysis and Needs Assessment

4.2.1 Introduction

The objective of this section is to identify gaps and needs, which are to be addressed in the IWMP. These gaps could emerge from existing systems and service levels or may arise from implementation of new or additional systems or services provided.

Needs include the following:

- Implementation of general waste collection services in new or un-serviced areas,
- Waste minimisation/recycling initiatives,
- Proper and timeous planning and erection of solid waste facilities,
- Optimisation of waste management services,
- Development and implementation of a Waste Information System
- Lack of capacity building, and
- Regular replenishment of fleet

Gaps and needs identified in the Status Quo investigation and in the Strategic Planning and Objectives exercise are further discussed under each respective discipline.

4.2.2 Technical and Operational Issues

Certain informal settlements within the eThekwini Municipality have inadequate or no waste disposal services at the current stage. This is mainly due to the remoteness of these settlements and/or the small quantity of waste generated in these settlements.

Illegal dumping quantities and areas where this occurs are not fully accounted for. Illegal dumping results in unnecessary additional cost in the total solid waste service. It could also have adverse effects on public health and the environment. If this was properly accounted for and problem spots could be identified, then these areas could be investigated to determine whether the waste collection service is inadequate or if blatant disregard of by-laws is taking place.

Limited information is available on industrial and hazardous waste. A proper Waste Information System could be of great value to EDSW, in order to establish the quantities of such wastes generated within their area of jurisdiction. This would promote waste minimisation, reuse/recycling and safe disposal procedures.

eThekwini Municipality should start to plan and implement a Waste Information System. This will enable EDSW to determine the full extent of waste generation, transport and disposal within the eThekwini Municipal Area, and will allow more efficient planning and management.

4.2.3 Waste Minimisation/Recycling and Composting

Information is available on paper (cardboard, office paper & newspaper recycling), although it is not entirely clear where salvaged paper originates from.

Virtually no other information, except for aluminium and steel can recycling, done by Collect-a-Can, is readily available.

Estimates of waste compositions were determined by Haultec, as documented in the Report *Waste Stream Analysis of Solid Waste Disposal Management* (Haultec Document no. 1815/A0001), November 1998. This data could be used to determine the potential for recycling. It may be advisable to update this waste stream analysis, as it is more than 5 years old.

A composting option was addressed in Scenario 8 of the original Systems Analysis in 1999. The scenario indicated that a composting facility located near Bisasar Road Landfill would be prudent. The proposed new Refuse Transfer Station in Electron Road could incorporate such a facility in future. The potential for composting needs to be investigated.

No source separation of waste is currently undertaken by the residential sector. Waste minimisation and re-use should be promoted amongst all sectors of the eThekwini Municipality.

Current recycling initiatives mainly come from the private sector. The Municipality should get more involved with the private sector in order to establish a sustainable recycling culture in the EMA.

4.2.4 Institutional, Organisational and Financial Issues

EDSW is not a ring fenced entity and this makes financial decision-making inadequate. The Municipality should consider ring fencing the unit financially and operationally.

Tariffs are not calculated in terms of the requirements of the Local Government: Municipal Systems, Act No. 32 of 2000 (MSA), in all respects. Household waste collections are charged through the rates account and no separate costing is undertaken to determine the true cost of a service as contemplated in the MSA.

Management is only in control of the operational aspects of the business and need to be placed in total control in order to be responsible and accountable.

No service level agreements and/or service delivery agreements are in place within an incentive and penalty regime. This results in inadequate monitoring of services rendered.

The solid waste management information is deficient and limited; and cannot inform management decision-making. Much reliance is placed on the knowledge and experience of management for day-to-day management decisions.

The fleet management system could be improved. Fleet cost is one of the major cost drivers in solid waste management and a strong handle on day-to-day operations and long term planning issues is necessary.

Solid waste issues and challenges are not always high enough on the agenda of decision makers. This can be overcome through improved education and communication.

4.2.5 By-laws and Legislation

eThekwini Municipality has prepared a set of by-laws (acts) governing environmental systems, refuse removal, solid waste disposal and solid waste disposal sites which collectively address many of the regulatory and enforcement issues which arise from waste management.

However, new legislation could have an influence on future waste management and planning and therefor the Municipality should keep up to date with these regulatory developments.

4.3 Solid Waste Functions

4.3.1 Collection and Transport

The various types of collection vehicles are listed and discussed in Chapter 2 of this Report, the Status Quo. However, modelling allows for the simultaneous analysis of an unlimited number of possible waste transport types, such as purpose-made refuse compactor trucks, but it requires the operating costs (both variable and fixed) as input to be available for each selected transport type. Vehicle cost profiles have been compiled for each of the following transport modes used in the analysis:

- 20m³ Industrial REL;
- 20m³ REL Compactor;
- 10.5m³ REL Compactor;
- 20m³ Rotopress;
- 20m³ Tractor/trailer;
- Hooklift 8x4 20t;
- Hooklift 6x4 15 t;
- Mechanical sweeper;
- Telehoist, and
- Box/Cage Trucks.

4.3.2 Disposal

Similar to collection and transport costs, operating costs are required for the waste disposal sites in order to calculate the operational costs of alternative disposal site options.

These costs will include the cost of development and operation of the various landfill sites as well as maintenance and rehabilitation thereof. It also includes the cost of all operational vehicles utilised on the landfills.

4.3.3 Training and Information Programs

Training and information programs can be seen as a solid waste function required to capacitate all sectors of the eThekwini Municipality's community in order for them to make informed and responsible decisions regarding the way in which they manage the wastes that they generate. DSW Education currently provides training, guidance and information throughout the local authority region.

4.4 Future Needs

4.4.1 Growth

Growth in future needs for solid waste management services is inevitable, based purely on population and waste generation growth. However, population growth rates have been substantially lower year on year, mainly due to the effects of HIV/Aids. However, even if negative population growth rates emanate, it does not necessarily mean that waste generation will decline. Waste generation increases with community development and increased affluence, and also due to economic growth in business and industry.

4.4.2 Strategic Process Outputs

The need to expand existing service delivery in fields such as hazardous waste has been expressed and discussed in the foregoing strategic objectives and planning. Other aspects discussed in the Strategic Objectives included expansion of the solid waste service into new areas and areas not currently serviced.

4.4.3 Growth Parameters & Projections

a) Population

Current population figures were obtained or derived from existing Urban Strategy information as well as from the most recent Census figures and are portrayed in Section 2.2.1. The estimated 2004 figures are utilised as the baseline information for evaluation of scenarios.

b) Waste Generation

Waste generation figures are derived by multiplying the estimated population with a waste generation figure for a specific area or income group. These figures have been determined and are listed in Section 2.2.2. The estimated waste generation figures listed are utilised as the baseline information for evaluation of scenarios.

Growth factors of between 1.07% and 1.16% growth per annum in population, depending upon the dwelling type and the associated income group, as well as a 1.5% growth in waste generation, are used for determination of future needs in the scenarios analysed in this Report.

4.4.4 Landfills

a) Airspace

The initial model commenced with the volume of airspace (compacted m^3) available at the beginning of year one (1998), after which it calculated the balance available, based on a calculated volume transported to and disposed at that site. The database within *SKC WasteModel©* was updated to reflect year one as the year 2004 when the Systems Analysis was done.

The following data is required for each individual waste generation area, including each waste type (maximum sixteen types of waste per area):

- Daily uncompacted waste volume generated (kg/day);
- Uncompacted density (kg/m^3);
- Number of service points per cell; and
- Effective growth rate (% p/a).

The initial data was updated to reflect year 1 as year 2004 as opposed to the original model with year 1 reflecting 1998 data.

More accurate figures for available airspace can be obtained by having the landfills surveyed and by comparing the actual survey with the proposed closure plan profile.

b) Availability of cover and closure material

Availability of cover and closure material for each site depends on the site-specific factors. Cover and closure material, where possible, are excavated in new cell developments on site. However, cover material is imported in some cases, and in other cases suitable materials which are disposed at the landfills are used as cover material. In most cases final closure/capping material needs to be imported for closure and rehabilitation of landfills.

c) Equipment

Equipment utilised on the three DSW owned and operated landfill sites are listed in Chapter 2 of this Report. The waste handling equipment at the disposal sites comprise CAT compactors, Bomag compactors, Bell compactors, bulldozers and a variety of other construction equipment such as backactors, front-end loaders, water tankers, articulated dump trucks, grader and roller.

Additional and/or new equipment is acquired as budgets allow, as the need arises and as the landfills progress. Operational costs of all these vehicles are included in the costs when the various scenarios are analysed.

4.4.5 Transfer Stations

Various existing and proposed transfer stations have been listed earlier in this Report. The use of transfer stations is mainly necessitated by landfills being developed beyond the economical transportation range of collection vehicles covering the areas of waste generation.

4.4.6 Collection and Transport Systems

DSW currently have a collection and transportation vehicle fleet of 325 vehicles, comprising a range of vehicles suited to collect and transport waste from the areas of generation to the nearest disposal or transfer facility.

4.5 Systems Analysis

4.5.1 Introduction

Scenario simulations form the essence of the systems analysis process; and the projected transport requirements in terms of distance and time are calculated through the following steps:

- Calculate the total uncompacted waste volume generated in each year (by waste type per area);
- Calculate the total waste mass generated in each year (by waste type);
- Calculate the number of trucks, based on the waste generation characteristics and the vehicle characteristics, required by each area, per collection point, in each year;
- Determine the best (closest) site for disposal in each year;
- Calculate the transport distance component in each year; and
- Calculate the transport time component for each area in each year.

These calculations are repeated for each year over the 15-year design period.

As mentioned before, SKC Engineers have developed various waste management scenarios over the past six years for EDSW. Therefor, there was no need to develop a multitude of new scenarios to optimise the current systems, as these processes have already been followed.

The systems analysis is based on a comparative study of the present status quo scenario with other scenarios. Three scenarios were selected and analysed in order to establish a first generation IWMP.

SKCWasteModel© is a strategic planning and management tool, which is used to simulate future waste generation, vehicle requirements and costs and disposal site utilisation. Absolute accuracy of current or future results cannot be guaranteed. The model uses a comparative process and assumptions should be consistent throughout the analysis.

4.5.2 IWMP Scenarios Analysed in the eThekwini Municipal Area

The following alternatives were analysed for the EMA:

- Scenario 1: Status Quo 2004 (balancing and validating new base data);

- Scenario 2: Master Plan 2004 (Incorporating the 2002 Master Plan with updated base data);

- Scenario 3: The effect of a voluntary estimated 15% recycling initiative on the solid waste management service;

Two additional scenarios were initially considered, but due to the nature thereof and the high capital cost effects, these are not compared to the scenarios above. However, the two alternatives were:

- Scenario 4: The effect of a 20-30% recycling initiative (sorting and recycling of mixed waste) on the solid waste management service;

- Scenario 5: Alternative first world waste treatment technologies.

Both Scenarios 4 and 5, have virtually no impact on the cost of collection and transporting of waste to disposal facilities, which account for between 60 to 70% of the solid waste management cost in most cases. Specialised facilities would have to be erected to implement either one of these two scenarios, which would have major cost implications. Additional staff would be required for implementation, which also adds to the costs. The main benefit derived from both of these two scenarios would be the amount of airspace saved on the existing landfills.

4.5.3 Scenario Analysis

Each scenario is described using a graphical representation of the area under consideration, showing the waste disposal sites and transfer stations relevant to that scenario, and a bar chart defining the years in which each transfer station is in operation and in which each waste disposal site is open to accept waste. Further to the graphical representation of the scenario, a short description of the scenario is given. A table is provided defining the modes of transport applicable to each scenario.

The tables and charts refer to disposal sites and transfer stations by name. These names are assigned to the sites / transfer stations during the analysis of the scenario, and are retained if used in further scenarios.

The outputs from the modeling and analysis of each scenario are:

- the type of vehicle used to collect and transport each waste type,
- the number of each vehicle type needed to transport each waste type in each year,
- the average cost of the total waste transport and disposal process to each service point (ratepayer) in each year, and
- the total cost of waste services in each year for the 15-year analysis period, as applicable.

Each of these outputs are presented in tabular and chart form. The mass and compacted volume transported to and stored at the disposal sites are provided for the recommended scenario only.

The fourth result, i.e. the total cost of waste service in each year for the full analysis period, is the result that is used in the recommendation of a specific scenario as the solution. These costs are presented as estimated costs in charts for each scenario and as relative costs on charts in Chapter 5.

In the evaluation in Chapter 5, costs are plotted relative to the scenario that best represents the current process, namely "*Status Quo Scenario*". Scenario 1 of this Report is the scenario closest in definition to the current process, and will therefore be taken as the benchmark or the status quo scenario in 2004. It will be called the "Status Quo Scenario 2004".

The "relative cost" charts for a 15-year analysis period are as follows:

- Relative cost of collection and transportation
- Relative cost of transfer stations
- Relative cost of disposal and/or treatment
- Relative cost of total waste service

These relative cost charts have been used to compare the various scenarios to one another and to make the necessary recommendations.

Population figures for the eThekwini Municipal Area have been obtained from the Urban Strategy Department as well as from Census information. The Urban Strategy 2002 GIS population figures updated to 2004 figures, are used in this Report as the basis for the population and domestic service point figures, and are based on the assumption of a "medium" HIV/AIDS scenario.

The Status Quo Scenario 2004 was developed with the new waste generation properties incorporated into *SKC WasteModel©* .

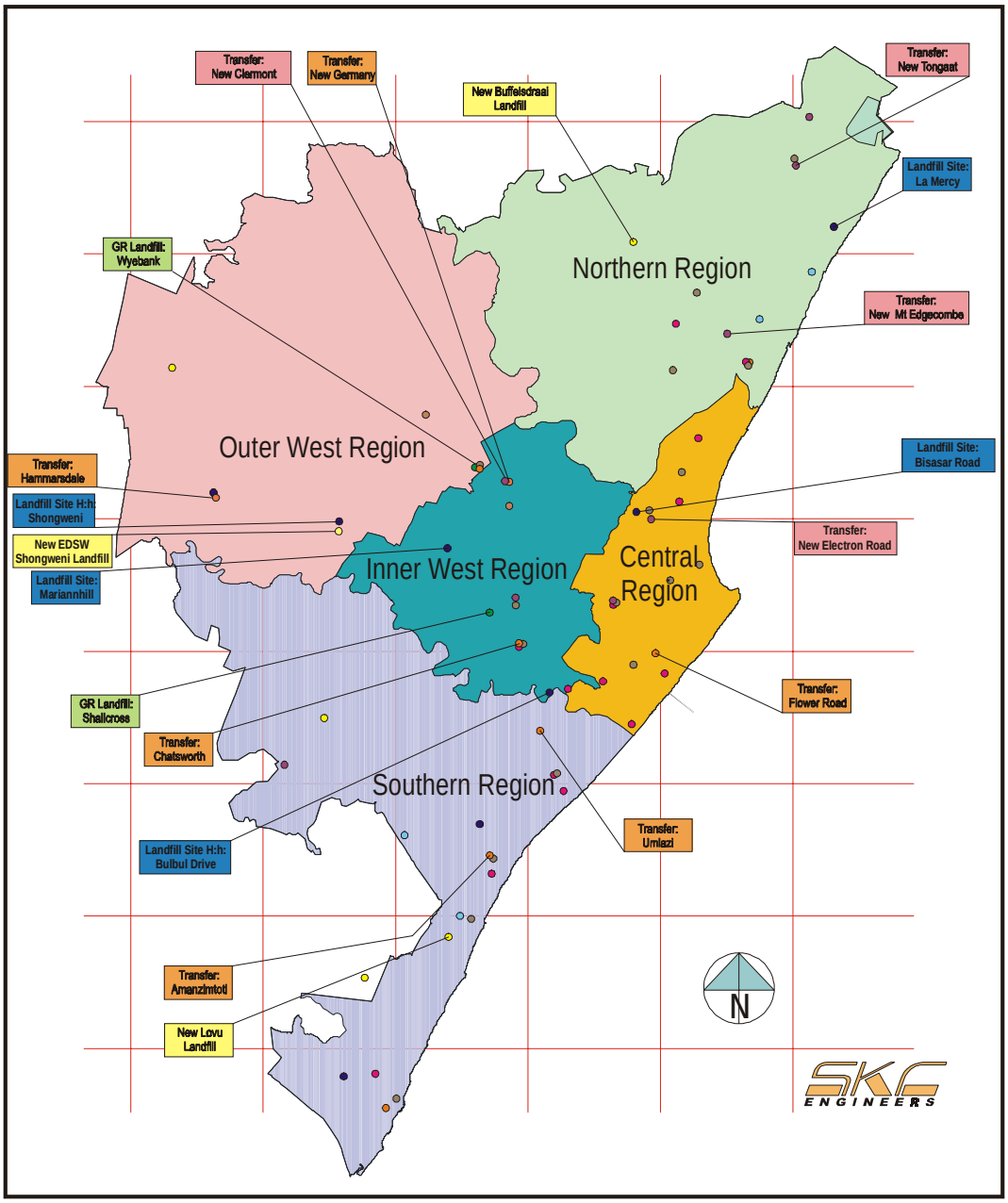
The Table below indicates waste type definitions used in the simulations:

Type	Short Name	Long Name
1	DMH(dtd)	Domestic Medium-High Income Door-to-Door
2	DF	Domestic Flats
3	DL(dtd)	Domestic Low Income Door-to-Door
4	DI(Skips)	Domestic Low Income Skips
5	Com(240l)	Commercial 240l
6	Ind(Skips)	Industrial 5.5m³ skips by telehoist
7	Ind(REL)	Industrial 5.5m³ skips by REL
8	GRS(Skips)	Garden Refuse Transfer Station 5.5m³ Skips
9	GRS(27m³)	Garden Refuse Transfer Station 27m³ open container
10	Inanda(C)	Inanda Contracts
11	Umlazi(C)	Umlazi Contracts
12	KwaNtz(C)	KwaMashu Ntuzuma Contracts
13	Chesterv(C)	Chesterville Contracts
14	NewNorth	New Northern Areas
15	NewSW	New South Western Areas
16	NewSouth	New Southern Areas

Table 4.1 – Waste Type Definitions for Master Plan 2004

Waste types 1 to 13 are utilised in Scenario 1, which is the Status Quo 2004 scenario. The last three waste types will be applied later in other scenarios which follow.

4.5.4 Scenario 1: Status Quo 2004 (balancing and validating new base data, EMA);



No	Site/Transfer Station	Availability of Site / RTS (Years) 2 4 6 8 10 12 14
1.	La Mercy Landfill	
2.	Bisasar Road Landfill	
3.	Mariannhill Landfill	
4.	Shongweni H:h Landfill	
5.	Bulbul Drive H:h Landfill	
6.	Chatsworth RTS	
7.	Flower Road RTS	
8.	Amanzimtoti RTS	
9.	New Germany RTS	
10.	Umlazi RTS	
11.	Hammarsdale RTS	

No	Site/Transfer Station	Availability of Site / RTS (Years) 2 4 6 8 10 12 14
12.	New Lovu Landfill	
13.	New Buffelsdraai Landfill	
14.	New EDSW Shongweni Landfill	
15.	New Tongaat RTS	
16.	New Mt Edgecombe RTS	
17.	New Electron Road RTS	
18.	New Clermont RTS	

Figure 4.1 – Location of Sites and Site Availability Scenario 1: Status Quo 2004

a) Scenario Definition

The results of Status Quo 2004 Scenario 1 will be used as a basis for the comparison of the results of other scenarios. Waste parameters and data in *SKCWasteModel*© were altered to reflect 2004 figures.

The remote demarcated areas have not yet been fully incorporated into the waste service due to the lack of required funding by the EMA and other factors influencing the provision of services in the remote areas. This scenario reflects the impact of the updated waste volumes. The new baseline of 2004 as year 1 is applicable in *SKCWasteModel*©.

The location of sites and site availability for the Status Quo 2004 Scenario 1 are shown in Figure 4.1. The availability and operational periods of facilities may be described as follows:

- La Mercy Landfill is closed in year two (June 2006). The model diverts this waste to the new Buffelsdraai Landfill, once it is operational, and re-calculates the collection, transportation and disposal costs.
- Buffelsdraai Landfill is expected to open in January 2006. It will accept waste from the northern regions and from the proposed new Electron Road transfer station after 2006.
- Waste from the Mt Edgecombe transfer station (opened in 2003) will be directed to the Buffelsdraai Landfill once it is operational.
- Lovu Landfill site is opened in year five (July 2008) to receive waste from the Umlazi and Amanzimtoti transfer stations as well as from the surrounding area.
- Bulbul Drive H:h Landfill will only accept waste from the system to fulfil its co-disposal ratios for H:h rating. It is estimated that the landfill will be closed in year six.
- The new Tongaat transfer station will open in year six (July 2009). Waste from the Tongaat transfer station will be directed to Buffelsdraai Landfill.
- The New EDSW Shongweni Landfill is expected to open in year seven (July 2010). Waste from the Hammarsdale transfer station will be redirected to the EDSW Shongweni Landfill once operational. Feralloys Landfill is an alternative to the New EDSW Shongweni Landfill should the development of the latter not transpire.
- The privately owned Shongweni H:h Landfill still requires a certain amount of waste from the system to fulfil its co-disposal ratios for H:h rating. Any excess waste will be redirected to the New EDSW Shongweni Landfill once operational.
- The New Germany transfer station is now closed and is currently being upgraded. Once the upgrade is completed it will be known as the Clermont Garden Refuse Transfer Station and will receive garden refuse only. Only when Mariannhill Landfill nears closure will Clermont be upgraded to transfer domestic waste.
- It is predicted that the Bisasar Road Landfill site will close at the end of year 13. Waste will be diverted through the Electron Road transfer station, (opening in January 2010) to the Buffelsdraai Landfill, except where an alternative landfill site is in close proximity to the area of waste collection.

Three new landfill sites and two new domestic refuse transfer stations, namely EDSW Shongweni, Buffelsdraai and Lovu Landfills together with Tongaat and Electron Road transfer stations are introduced for development in this scenario.

The modes of collection vehicles used for each waste type are as follows:

Type	Short Name	Long Name	Collection Vehicle Used
1	DMH(dtd)	Domestic Medium-High Income Door-to-Door	10.5m³ REL Compactor
2	DF	Domestic Flats	20m³ Rotopress
3	DL(dtd)	Domestic Low Income Door-to-Door	20m³ Tractor/Trailer
4	DI(Skips)	Domestic Low Income Skips	20m³ Industrial REL
5	Com(240l)	Commercial 240l	20m³ Rotopress
6	Ind(Skips)	Industrial 5.5m³ skips by telehoist	Telehoist
7	Ind(REL)	Industrial 5.5m³ skips by REL	20m³ Industrial REL
8	GRS(Skips)	Garden Refuse Transfer Station 5.5m³ Skips	20m³ Industrial REL
9	GRS(27m³)	Garden Refuse Transfer Station 27m³ open container	Hook LR15
10	Inanda(C)	Inanda Contracts	Inanda Contracts
11	Umlazi(C)	Umlazi Contracts	Umlazi Contracts
12	KwaNtz(C)	KwaMashu Ntuzuma Contracts	KwaNtuz Contracts
13	Chesterv(C)	Chesterville Contracts	Chesterville Contracts

Table 4.2 – Modes of Transport for Status Quo 2004 - Scenario 1

b) *Analysis of Results*

The analysis of this scenario generates estimates of solid waste mass and compacted volume transported to and disposed of at the various disposal sites.

The opening of the new landfill sites in the eThekwini Municipal Area demonstrates a consistent growth of disposal cost throughout the planning period. Transfer costs indicate rapid growth from year three when large amounts of waste are being transferred to the more remote Buffelsdraai Landfill. Further increased transfer costs are due to the opening of new transfer stations in year six.

The estimated total cost of waste services in the EMA for the Status Quo 2004 Scenario 1 are reflected in the Chart below.

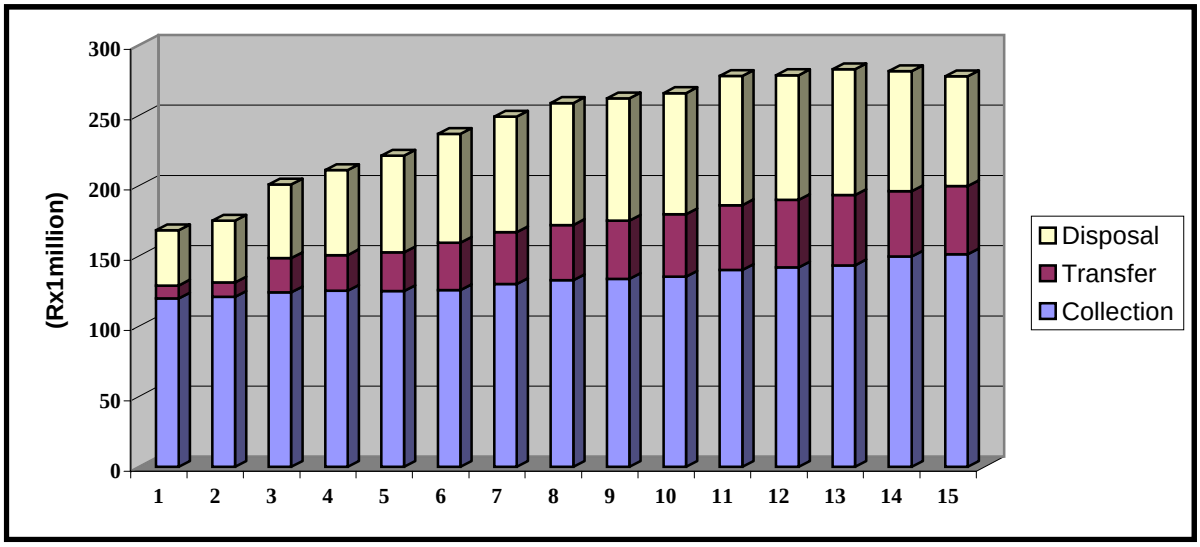


Chart 4.1 – Estimated Total Waste Service Cost per Year for the Status Quo 2004 - Scenario 1

The additional cost of construction of the new facilities and additional transfer costs will impact negatively on the cost of services. The total cost of the waste service over the 15-year analysis period, in current Rand value, is R 3 647 million.

In year one of the analysis period, collection forms 71.1% of the cost of the total waste service and disposal 23.4% with the remaining 5.5% being transfer costs. In year 15, this changes to 54.4% for collection, 28.1% for disposal and 17.4% for transfer respectively.

The Table below indicates the total cost of waste services for Scenario 1 for a period of five, ten and fifteen years.

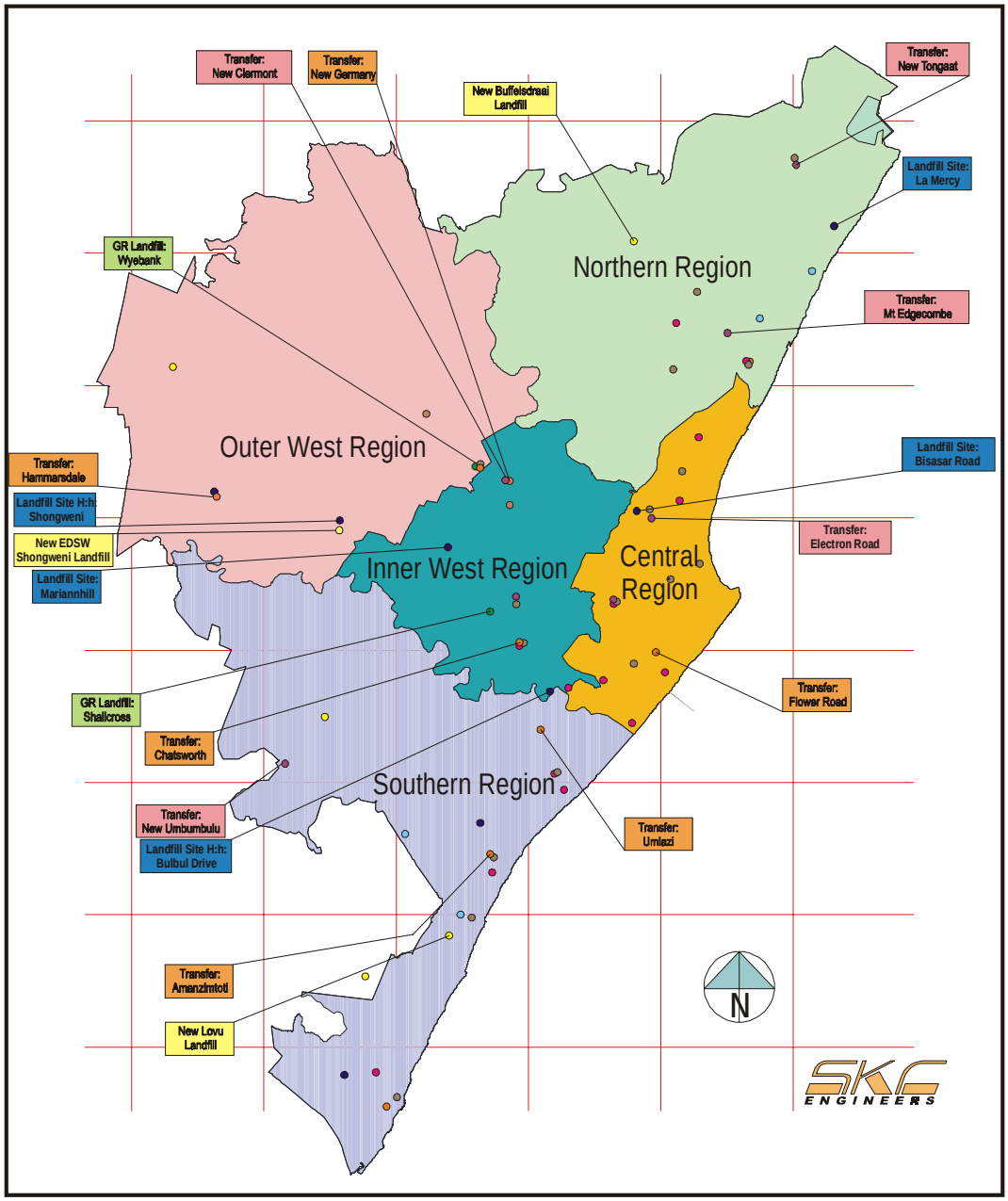
Accumulative Total Cost for:	5 Years	10 Years	15 Years
Scenario 1	976,377,000	2,248,636,000	3,646,935,000

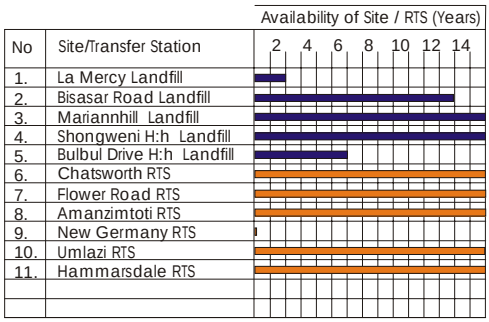
Table 4.3 – Accumulative Total Cost for waste services for Status Quo 2004 - Scenario 1

c) Synopsis of Results

A steady growth in costs for waste services in the eThekwini Municipal Area can be observed. This is mainly due to the population growth rate as well as the growth rate in waste generation over the period analysed. Opening and closing of waste facilities also have a substantial impact upon the Status Quo 2004 costs.

4.5.5 Scenario 2 : Masterplan 2004 (Incorporating the 2002 Master Plan with updated base data);





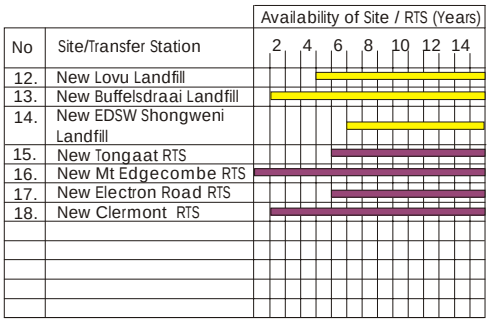


Figure 4.2 – Location of Sites and Site Availability Scenario 2: Master Plan 2004

a) Scenario Definition

The population in the recently incorporated demarcation areas of the eThekwini Municipal Area is scattered and sparse, with the exception of two areas where there are small densely populated settlements. Provision of a formal waste service in certain of these areas is almost impossible, mainly due to poor access as well as the remote location of these settlements, and will not be economically viable. However, EDSW is determined to incorporate these areas, and they will eventually be provided with a similar level of service as other areas in the eThekwini Municipal Area. This scenario will however only focus on the concentrated settlements where the higher population densities occur. Even though denser populations occur in certain areas, it does not necessarily imply that a door to door service will be a practical or economical option. Therefor, different levels of service were investigated before a final recommendation could be made on the level of service. Specific service levels were assigned to each of these settlements and evaluated in this scenario.

In the Northern Region, the area around Wewe and Hambanathi settlements has been identified as having a sufficient population concentration to justify a waste collection service. However, the number of people living in the area and the size of this specific area does not justify a door to door service. Therefore, it is proposed that 27m³ containers be provided where local inhabitants may dispose of their waste. Containers will be collected and emptied once a week using a Roll on-off vehicle. However to operate an economically viable service it would mean that certain residents would have to walk as far as 400 meters to dispose of their waste. This may result in their not utilising the service provided, but rather disposing of their waste on the property. In order to circumvent this, it is proposed that a local collection system be put in place whereby an entrepreneur appointed by EDSW could collect waste from the service point and take it to the nearest container. It is proposed that the container be emptied once a week initially at the La Mercy Landfill and later at the Buffelsdraai Landfill when it opens in year two. The total unit cost remains relatively high at approximately R332 ton and a total cost per service point of R27.23 per month.

In the Southern Region, two areas around Umbumbulu and Folweni have been identified with a sufficiently high concentration of dwellings to warrant a basic level of service. It is proposed that a new small transfer station be provided near Umbumbulu to receive waste from the area. Due to the concentration of the population in the area, people would have to walk up to 500 meters to the transfer station to dispose of their waste. It is proposed that the waste in the Umbumbulu area be collected in a similar manner to that of the Northern Region. An entrepreneur employed by EDSW could execute this task. Waste generated in the Folweni area can go directly to the Amanzimtoti transfer station by means of a 10.5m³ REL shared with the other collection services in the Southern Region. As with the Northern Region, the total unit cost is high at approximately R305/ton and a cost per service point of R31.34 per month.

The location and availability of sites analysed in this scenario are given in Figure 4.2. The availability and operational periods of the facilities analysed may be described as follows:

- La Mercy Landfill is closed in year two (June 2006). The model diverts this waste to the new Buffelsdraai Landfill, once operational, and re-calculates the collection, transportation and disposal costs.
- Buffelsdraai Landfill is expected to open in January 2006. It will accept waste from the Northern Region and from the proposed new Electron Road transfer station.
- Waste from the Mt Edgecombe transfer station (opened in 2003) will be directed to the Buffelsdraai Landfill once it is operational.
- Lovu Landfill site is opened in year five (July 2008) to receive waste from the Umlazi and Amanzimtoti transfer stations as well as from the surrounding area.

- Bulbul Drive H:h Landfill will only accept waste from the system to fulfil its co-disposal ratios for H:h rating. It is estimated that the landfill will be closed in year six.
- The new Tongaat transfer station will open in year six (July 2009). Waste from the Tongaat transfer station will be directed to Buffelsdraai Landfill.
- The New EDSW Shongweni Landfill is expected to open in year seven (July 2010). Waste from the Hammarsdale transfer station will be redirected to the EDSW Shongweni Landfill once operational.
- The privately owned Shongweni H:h Landfill still requires a certain amount of waste from the system to fulfil its co-disposal ratios for H:h rating. Any excess waste will be redirected to the New EDSW Shongweni Landfill once operational. Feralloys Landfill is an alternative to the New EDSW Shongweni Landfill should the development of the latter not transpire.
- The New Germany transfer station is now closed and is currently being upgraded. Once the upgrade is completed it will be known as the Clermont Garden Refuse Transfer Station and will receive garden refuse only. When Mariannhill Landfill nears closure Clermont will be upgraded to handle domestic waste.
- It is predicted that the Bisasar Road Landfill will close at the end of year 13. Waste will be diverted through the Electron Road transfer station, opening in January 2010 to the Buffelsdraai Landfill, except where an alternative landfill site is in close proximity of the area of waste collection.
- As mentioned above it is proposed that the new Umbumbulu transfer station be provided to receive waste from the Umbumbulu and Folweni areas in the Southern Region. This transfer station will open in year six.

b) *Analysis of Results*

The cost of servicing the recently incorporated (concentrated) areas, as set out above in the scenario definition, will cost in the region of R 8.64 million in the first year. Initial capital outlay is included in this amount.

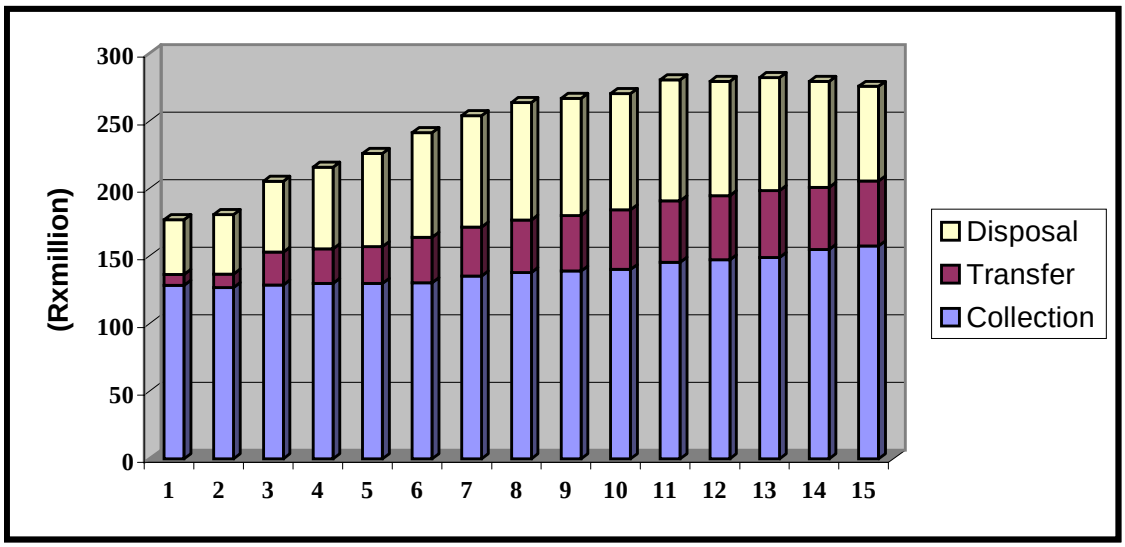


Chart 4.2 – Estimated Total Waste Service Cost per year for Scenario 2.

The estimated total cost of waste services in the EMA for Scenario 2 for the 15-year projection is given in Chart 4.2.

The total cost of the waste service over the 15-year analysis period, in 2004 Rand value, is R 3 697 million. This equates to an additional 2.3% in the total waste service cost compared to Scenario 1.

The Table below indicates the total cost of waste services for Scenario 2 for a period of five, ten and fifteen years.

Accumulative Total Cost for:	5 Years	10 Years	15 Years
Scenario 2	1,004,715,000	2,300,764,000	3,697,497,000

Table 4.4 – Accumulative Total Cost for waste services for Scenario 2

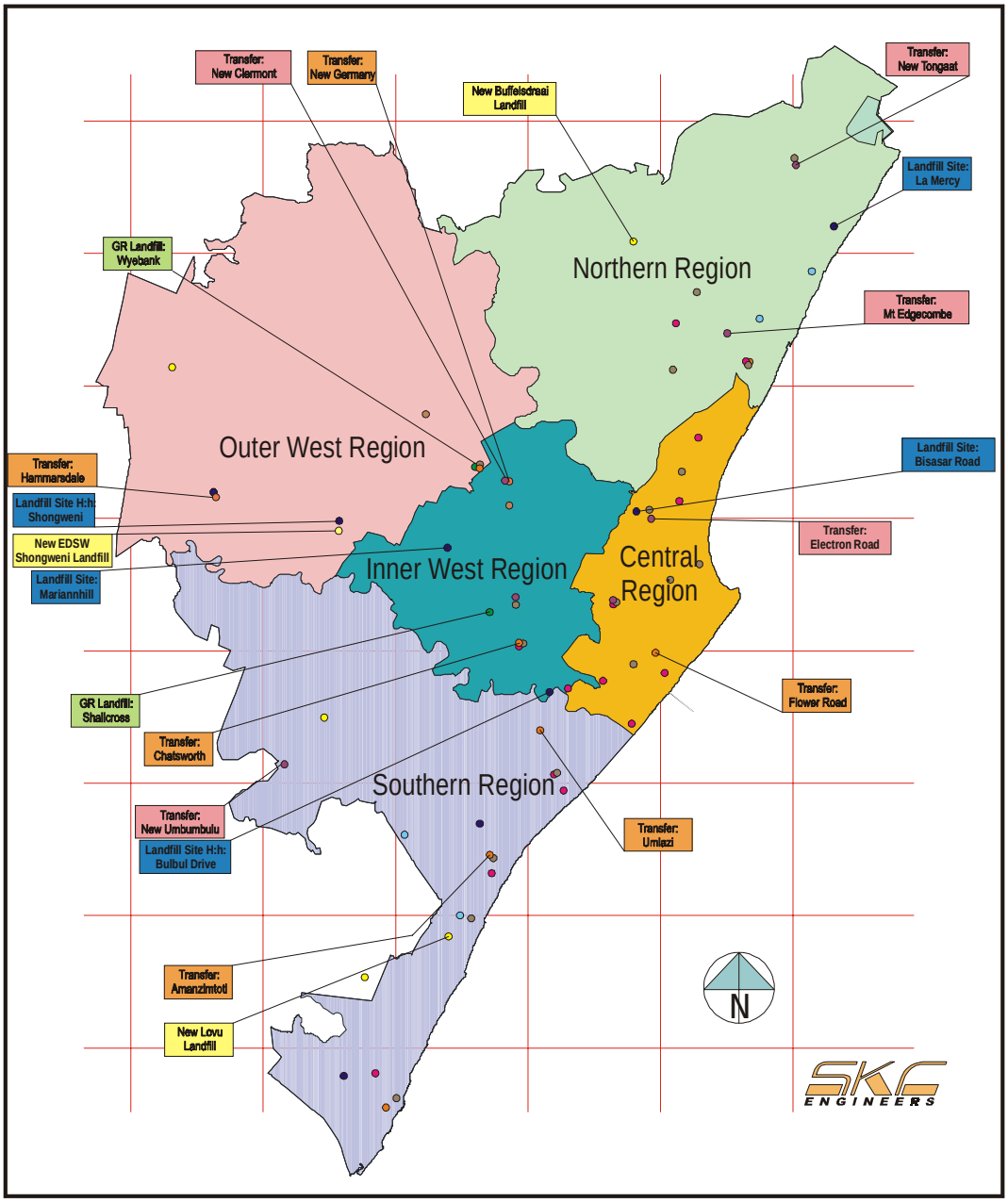
c) *Synopsis of Results*

The closure of the La Mercy Landfill in year two and the opening of the new Buffelsdraai Landfill impacts on the cost of solid waste management services. Transfer costs increase from year three when a large amount of waste is transferred over a longer distance to the Buffelsdraai Landfill.

The high unit cost of collection, of approximately R27.23 per service point per month in the recently incorporated rural areas, is due to the low volume of waste being generated in these areas; as well as the initial funding required for infrastructure development and equipment purchases. The average total waste service cost in these areas is also expensive at about R330 per ton. Although these areas were identified as having a sufficiently high population concentration to justify a service, the cost of collection and disposal is very expensive relative to those for an average equivalent residential area within the EMA.

Although the unit cost for waste management in the remote rural areas is high, these costs will be cross-subsidised because poverty levels in the rural areas would not accommodate full payment for these services by these residents.

4.5.6 Scenario 3: The effect of a 15% waste minimisation on the solid waste management service



No	Site/Transfer Station	Availability of Site / RTS (Years) 2 4 6 8 10 12 14
1.	La Mercy Landfill	
2.	Bisasar Road Landfill	
3.	Mariannhill Landfill	
4.	Shongweni H:h Landfill	
5.	Bulbul Drive H:h Landfill	
6.	Chatsworth RTS	
7.	Flower Road RTS	
8.	Amanzimtoti RTS	
9.	New Germany RTS	
10.	Umlazi RTS	
11.	Hammarsdale RTS	

No	Site/Transfer Station	Availability of Site / RTS (Years) 2 4 6 8 10 12 14
12.	New Lovu Landfill	
13.	New Buffelsdraai Landfill	
14.	New EDSW Shongweni Landfill	
15.	New Tongaat RTS	
16.	New Mt Edgecombe RTS	
17.	New Electron Road RTS	
18.	New Clermont RTS	

Figure 4.3 – Location of Sites and Site Availability Scenario 3: Master Plan 2004

a) Scenario Definition

The purpose of this scenario is to illustrate the positive impact that waste minimisation could have on solid waste management services in the eThekwini Municipality.

This scenario offers exactly the same levels of service to the communities as Scenario 2. The only difference is that an assumed rate of 15% voluntary waste minimisation at source, whether due to re-use or recycling, has been introduced. In other words, the waste stream is reduced by 15% which has a cost saving right through from collection to disposal.

The location and availability of sites analysed in this scenario is given in Figure 4.3. The availability and operational periods are exactly the same as for Scenario 2, therefor this is not repeated for Scenario 3.

b) Analysis of Results

The chart displays a similar picture to that of Scenario 2. However the total cost of waste management in year one alone has dropped by R 17.4 million. 98% of this saving is due to a saving in collection and transfer costs.

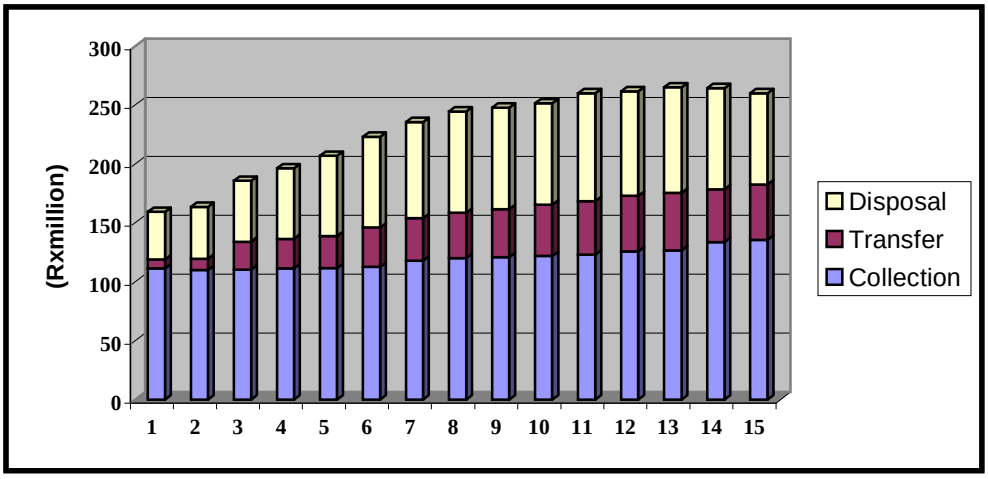


Chart 4.3 – Estimated Total Waste Service Cost per year for Scenario 3.

The estimated total cost of waste services in the EMA for Scenario 2 over the 15-year projection is shown in Chart 4.3.

The total cost of the waste service over the 15-year analysis period, in 2004 Rand value, is R 3 427 million. This equates to a saving of 8% in the total waste service budget for the 15-year analysis period, compared to Scenario 2.

The Table below indicates the total cost of waste services for Scenario 3 for a period of five, ten and fifteen years.

Accumulative Total Cost for:	5 Years	10 Years	15 Years
Scenario 3	912,494,000	2,115,118,000	3,426,765,000

Table 4.5 – Accumulative Total Cost for waste services for Scenario 3

c) Synopsis of Results

The cost of opening and closure of facilities for Scenario 3 has the same effect on the total solid waste management service in the eThekwini Municipality as for Scenario 2. However, the difference between Scenario 2 and Scenario 3 is that vehicles should last longer due to a reduced workload and/or less equipment will be required to service the areas. At the same time there is an added positive effect at the landfills due to the saving of valuable airspace, which means that landfills could operate for longer periods. (This was however, not included in the analysis, as the objective of this scenario was to compare it to Scenario 2).

As mentioned before, the estimated saving of R 17.4 million in the first year is mainly due to the 98% saving in collection and transfer costs. This proves the statement made earlier in this Chapter (see paragraph 4.5.2) that recycling/reclamation should take place at source to create a direct cost saving to the Municipality.

Note that this scenario does not take into account the additional costs of transporting recyclables as it is assumed that reclamation takes place at source, by the generator. Transport cost could have a major impact on the sustainability or profitability of recycling.

4.6 Comparative Economic Analysis

4.6.1 Introduction

The various scenarios analysed and their respective results have been detailed in Section 4.5 of this Report. The total cost for the waste service in the eThekwini Municipal Area in the simulations forms the basis for evaluation of any specific scenario against the others. In addition to the total life cycle or overall cost, various other results are compared. These are:

- Total cost of collection,
- Total cost of transfer,
- Total cost of disposal and or treatment, and
- Total cost of waste service, including collection, transfer and disposal, for each scenario over the full period under consideration (15 years).

Street cleaning services, beach cleaning as well as garden refuse transfer and transport are excluded from the systems analysis because this does not affect the comparative study.

4.6.2 Relative Cost Comparison

The relative cost charts, Charts 4.4 to 4.7, have been used to compare the various scenarios with each other. It should be noted that the analysis performed in this project was quantitative, and that the various scenarios were compared against each other on strictly quantitative terms.

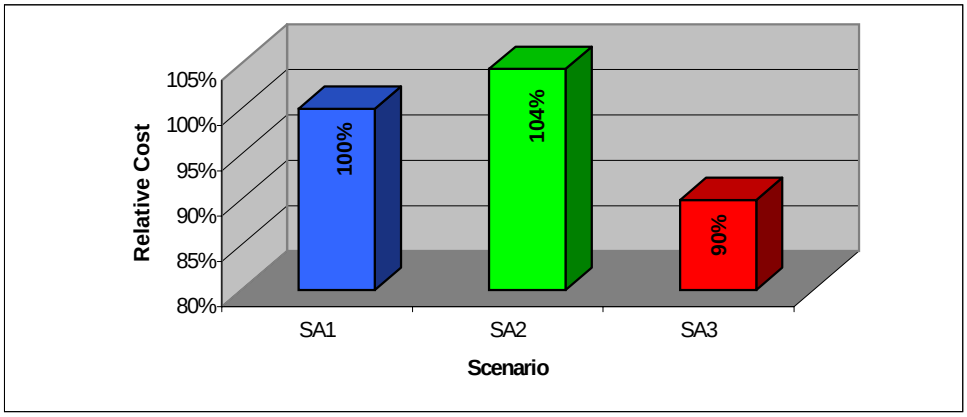


Chart 4.4 – Relative Cost of Collection and Transportation (15 years)

The saving in collection and transportation costs due to waste minimisation/recycling at source, are obvious in Chart 4.4. Optimally placed transfer stations and landfill sites keep the cost of collection and transportation in Scenario 2 in line with that of the Status Quo, Scenario 1, although the incorporation of the rural areas resulted in a small increase.

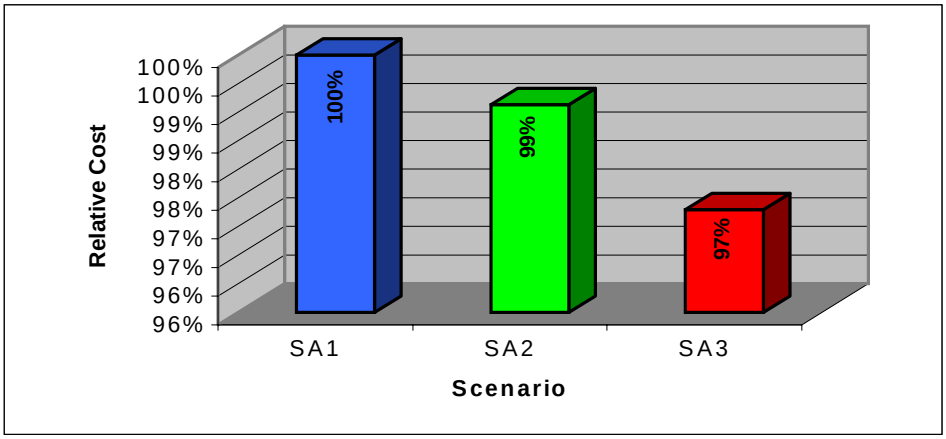


Chart 4.5 – Relative Cost of Transfer (15 years)

As seen in the Chart 4.5, there is very little difference in the transfer costs for the three scenarios. This is mainly due to the fact that the same optimised implementation of facilities is used in all three scenarios. The 3% difference between Scenarios 3 and 1 is due to the saving of waste minimisation/recycling at source.

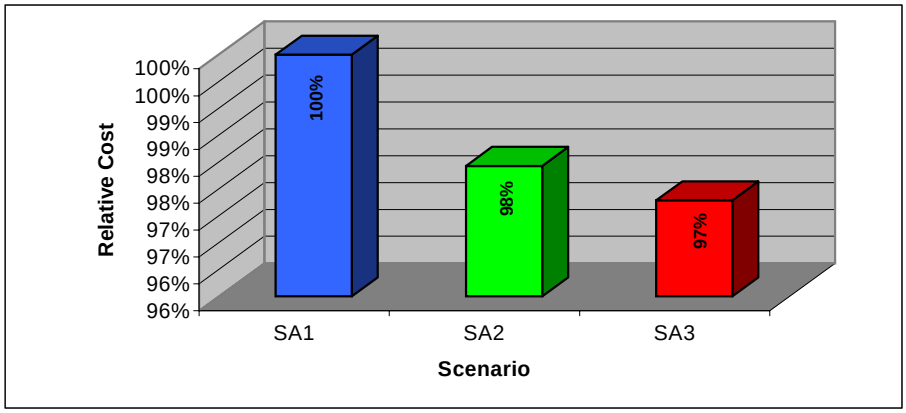


Chart 4.6 – Relative Cost of Disposal or Treatment (15 years)

Chart 4.6 illustrates the comparison of the disposal cost between the three scenarios. The reduction in cost of disposal can be attributed to the higher volume of waste being disposed at the existing and proposed new landfills, therefore lowering the relative unit cost of disposal.

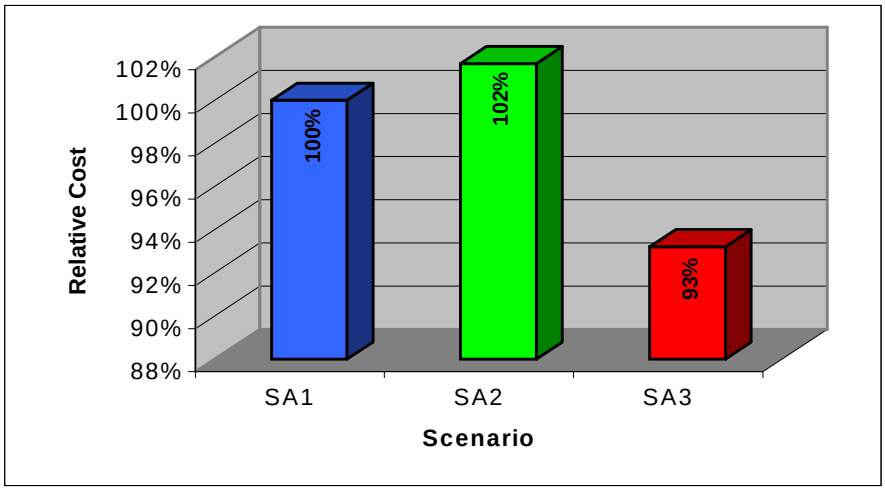


Chart 4.7 – Relative Cost of Total Waste Service (15 years)

When comparing the total cost of the waste service for the various scenarios it is clear that implementation of a waste collection service in the recently incorporated rural areas, adds more cost to the total waste management service in the eThekwini Municipal Area and this is reflected in the increased cost for Scenario 2 over the Status Quo in Scenario 1.

The positive impact of waste minimisation/recycling at source is also evident from the charts above. However, a waste minimisation culture needs to be established throughout the eThekwini Municipal Area, and residents need to actively remove 15% of waste generated from the entire waste stream **at source**.

The opening and closing of the various facilities have already been optimised through previous analyses conducted by SKC Engineers. However, implementation of the facilities has not taken place as planned due to financial constraints, and future implementation plans as indicated in this Report could also be similarly affected.

Scenario 2 is the preferred and most practical option at this stage. Further groundwork on education and waste awareness is required before a scenario inclined towards Scenario 3 could become a reality.

The Table below indicates the comparison of the accumulative total cost for each of the scenarios analysed for five, ten and fifteen year periods.

Accumulative Total Cost for:	5 Years	10 Years	15 Years
Scenario 1	973,911,000	2,247,172,000	3,646,972,000
Scenario 2	1,004,615,000	2,304,112,000	3,733,244,000
Scenario 3	913,615,000	2,118,718,000	3,433,872,000

Table 4.6 – Accumulative Total Cost for waste services for all three scenarios analysed

Scenario 3 assumes a 15% recycling/reclamation effort by the general public to recycle or minimise on waste generation **at source**. Therefor there are no direct costs to the Municipality in this regard.

Scenario 3 is the most economical scenario after 5, 10 and 15 years. This scenario can only be realised if waste reduction is successfully implemented **at source**. It should be possible for the Municipality to recycle after generation, but it is difficult to quantify the costs to collect and transport these materials to the point of sale. Supply and demand is market driven. Prices for any specific recyclable products are unpredictable and tend to fluctuate.

ETHEKWINI MUNICIPALITY

INTEGRATED WASTE MANAGEMENT PLAN

CHAPTER 5

Master Plan: Integration and Optimisation

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5 MASTER PLAN: INTEGRATION AND OPTIMISATION

5.1 Description of Selected Scenario

Various scenario analyses were conducted by SKC Engineers over the past six years and in consultation with DSW. The proposed and most economically viable scenarios were determined in each case. The best IWMP scenario, included in this Report as Scenario 2, has been updated with the latest available figures to represent current 2004 figures.

The implementation of Master Plan Scenario 2 of the IWMP 2004 is further described below in more detail.

5.1.1 Year 1 of IWMP 2004 (Year 2004/2005)

Five landfill sites are currently open and accepting waste in the eThekwini Municipal Area (EMA) in Year 1, as indicated on the following graphic. La Mercy Landfill is scheduled to close in Year 2 (2005/2006). Buffelsdraai Landfill is scheduled to open in January 2006 (Year 2).

Six domestic refuse transfer stations (RTS) are in operation in Year 1. These comprise the existing Chatsworth, Flower Road, Amanzimtoti, Mt Edgecombe, Umlazi and Hammarsdale transfer stations.

Disposal destinations and tonnages of waste from each transfer station are depicted in the Table below.

Transfer Station	Waste Received (tonnes/annum)	Disposal Destination
Chatsworth	23 441	Bisasar Road Landfill
Flower road	24 953	Bisasar Road Landfill
Amanzimtoti	28 827	Bulbul Drive H:h Landfill
Mt Edgecombe	18 523	La Mercy Landfill
Umlazi	27 735	Bisasar Road Landfill
Hammarsdale	4 248	Mariannhill Landfill

Table 5.1 - Transfer stations and destinations Year 1

The total amount of waste handled by the six transfer stations in Year 1 is estimated at 127 727 tonnes/annum.

The amount of waste, namely 1 163 959 tonnes/annum, collected and transported by EDSW and by private waste operators to the five operational landfill sites in the EMA in Year 1 is given in the Table below.

Landfill Site	Waste Received (tonnes/annum)
La Mercy	83 078
Bisasar Road	740 223
Mariannhill	118 578
Shongweni H:h	52 950
Bulbul Drive H:h	169 130

Table 5.2- Landfill sites and tonnages received Year 1

The tonnages indicated in Table 5.2 for Shongweni and Bulbul Drive Landfills are for solid waste required to fulfil the co-disposal ratio requirements for H:h rating. Private sector collected waste quantities disposed at these two landfills is unknown.

Currently no reclamation operations are under way. All collected waste is disposed of by landfilling.

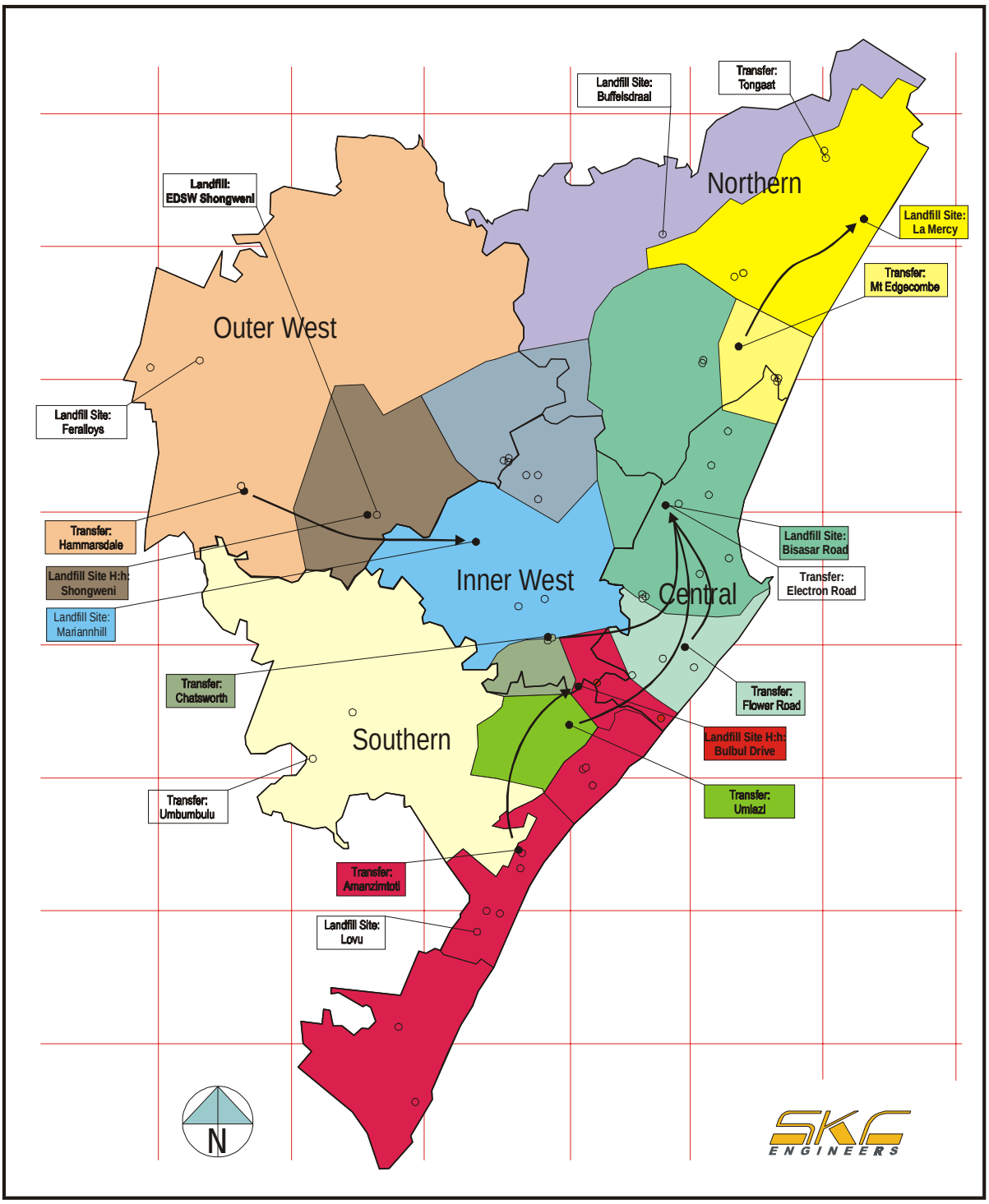


Figure 5.1 - Waste Generation Areas and Transportation Destinations - Year 1

5.1.2 Year 2 of IWMP 2004 (Year 2005/2006)

Six landfill sites are open and accepting waste in the EMA in Year 2, as indicated on the following graphic. At the end of Year 2 the existing La Mercy Landfill site is closed. Operation of Buffelsdraai Landfill site commences in January 2006 (Year 2). Solid waste is collected from each service area using the relevant vehicles, and is delivered to the nearest landfill, for disposal.

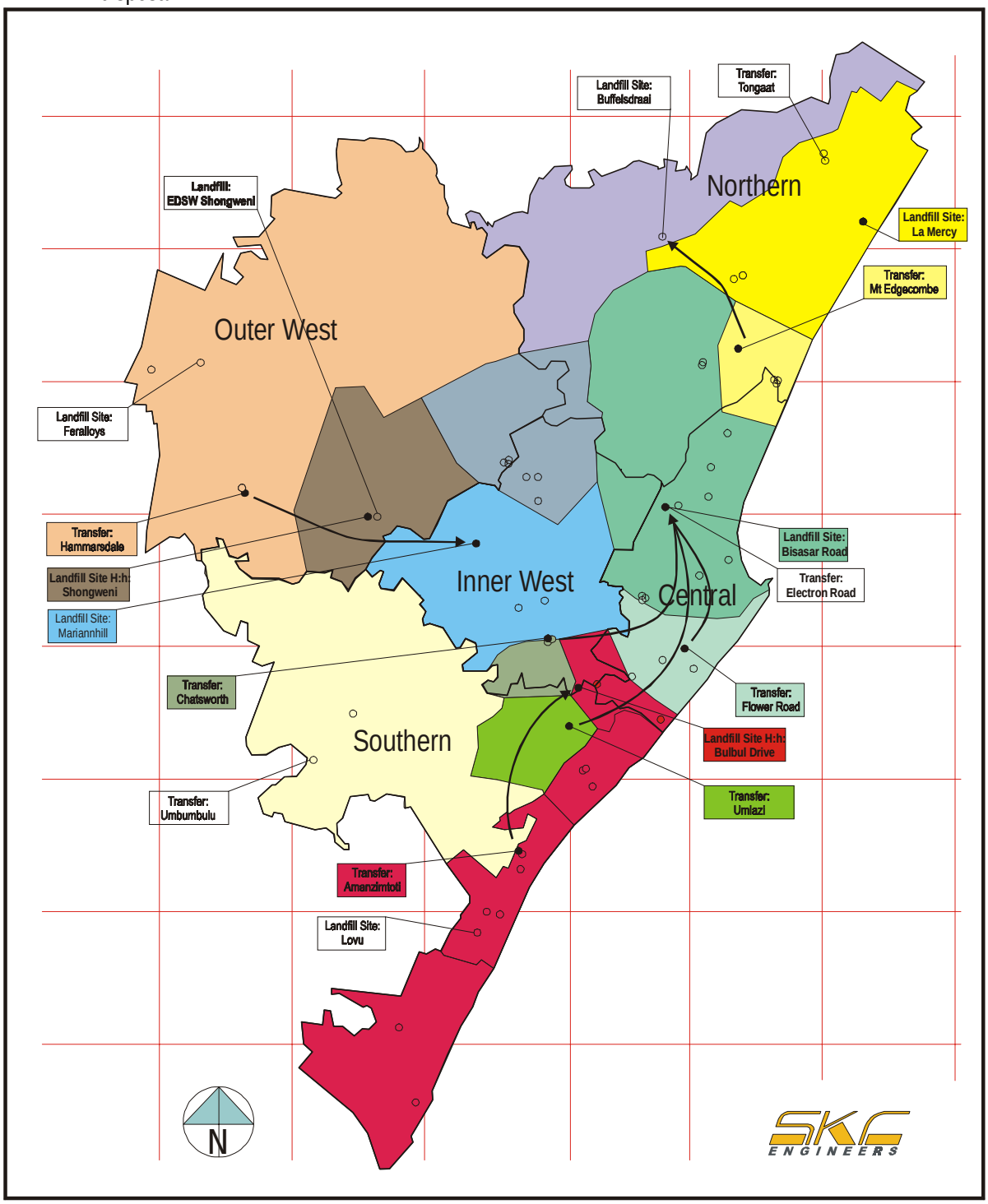


Figure 5.2 - Waste Generation Areas and Transportation Destinations - Year 2

Six road transfer stations are in operation in Year 2. These comprise the existing Chatsworth, Flower Road, Amanzimtoti, Mount Edgecombe, Umlazi and Hammarsdale transfer stations.

Waste from the Mount Edgecombe transfer station will be transported to the La Mercy Landfill until the new Buffelsdraai Landfill site is operational in January 2006.

Disposal destinations and tonnages of waste from each transfer station are depicted in the Table below.

Transfer Station	Waste Received (tonnes/annum)	Disposal Destination
Chatsworth	23 792	Bisasar Road Landfill
Flower road	25 328	Bisasar Road Landfill
Amanzimtoti	29 260	Bulbul Drive H:h Landfill
Mount Edgecombe	25 700	La Mercy Landfill
Umlazi	28 151	Bisasar Road Landfill
Hammarsdale	4 311	Mariannhill Landfill

Table 5.3 - Transfer stations and destinations Year 2

The total amount of waste handled by the six transfer stations in Year 2 is estimated at 136 542 tonnes/annum in the Table above.

The amount of waste, namely 1 183 577 tonnes/annum, collected and transported by EDSW and by private waste operators to the six operational landfill sites in the EMA in Year 2 is given in the Table below.

Landfill Site	Waste Received (tonnes/annum)
La Mercy	43 298
Bisasar Road	741 544
Mariannhill	120 539
Shongweni H:h	53 745
Bulbul Drive H:h	171 667
Buffelsdraai	52 784

Table 5.4 - Landfill sites and tonnages received Year 2

The tonnages in the Table above for Shongweni and Bulbul Drive Landfills are for solid waste required to fulfil the co-disposal ratio requirements for H:h rating. Private sector collected waste quantities disposed at these two landfills is unknown.

No reclamation operations are under way. All collected waste is disposed of by landfilling.

5.1.3 Year 5 of IWMP 2004 (Year 2008/2009)

Six landfill sites are open and accepting waste in the EMA in Year 5, as illustrated in the following graphic. At the end of Year 2 the La Mercy Landfill was closed and was replaced by the Buffelsdraai Landfill, which opened in January 2006 (Year 2). It is estimated that the Lovu Landfill will open in July 2008 (Year 5). Solid waste is collected from each serviced area using the relevant vehicles, and delivered to the nearest landfill, where disposal takes place.

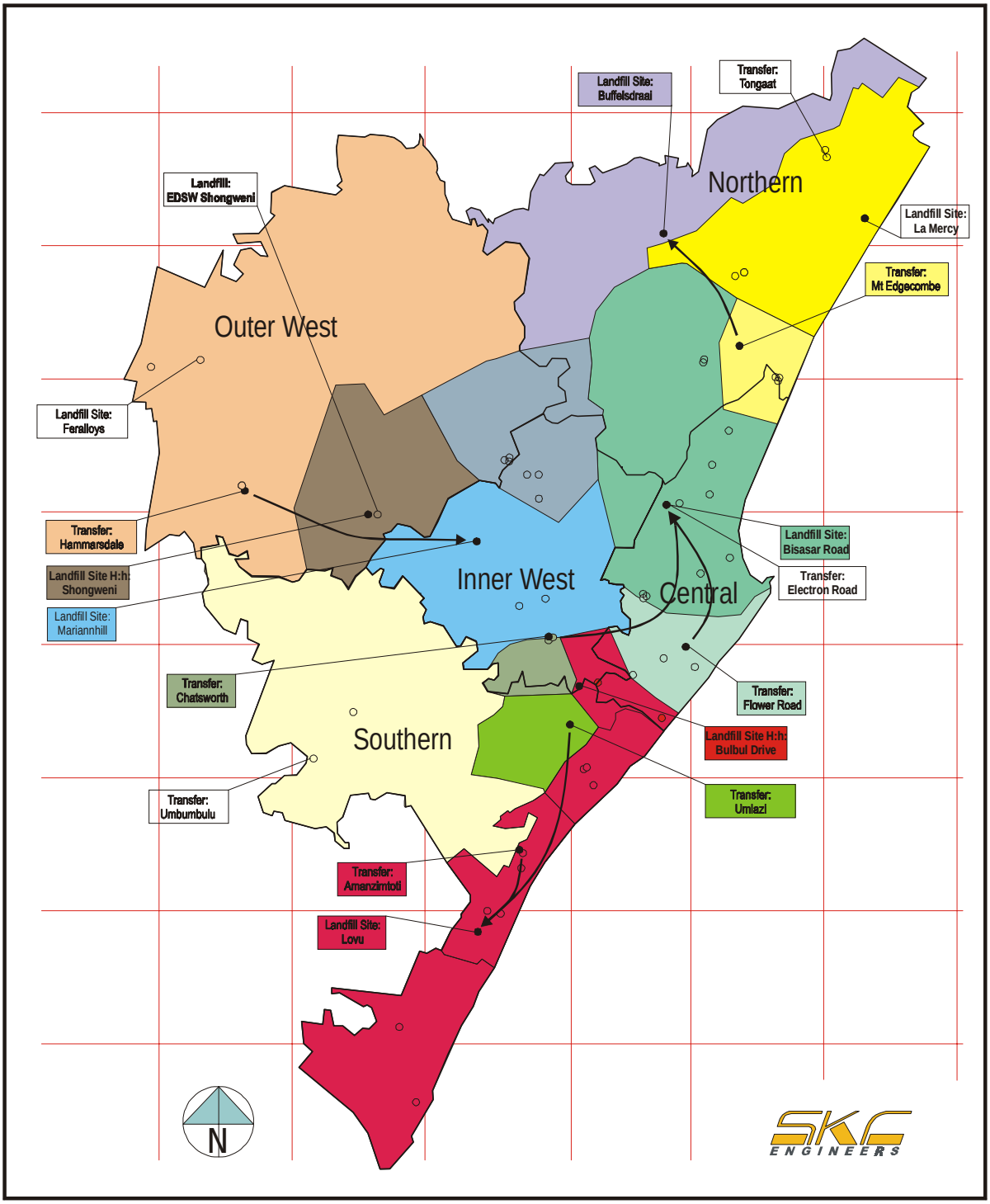


Figure 5.3 - Waste Generation Areas and Transportation Destinations - Year 5

The same six refuse transfer stations are in operation in Year 5, comprising the Chatsworth, Flower Road, Amanzimtoti, Mount Edgecombe, Umlazi and Hammarsdale transfer stations.

Waste received at the Umlazi transfer station will be diverted to the Lovu Landfill once operational in Year 5. The diversion of the waste from this transfer station to Lovu Landfill will save valuable airspace at the Bisasar Road Landfill.

Disposal destinations and tonnages of waste from each transfer station are depicted in the Table below.

Transfer Station	Waste Received (tonnes/annum)	Disposal Destination
Chatsworth	24 879	Bisasar Road Landfill
Flower road	26 484	Bisasar Road Landfill
Amanzimtoti	19 279	Bulbul Drive H:h Landfill
Mount Edgecombe	26 874	Buffelsdraai Landfill
Umlazi	29 437	Lovu Landfill
Hammarsdale	4 508	Mariannhill Landfill

Table 5.5 - Transfer stations and destinations Year 5

The total amount of waste handled by the six transfer stations in Year 5 is estimated at 131 461 tonnes/annum.

The amount of waste, namely 1 239 136 tonnes/annum, collected and transported by EDSW and by private waste operators to the five operational landfill sites in the EMA in Year 5 is given in the Table below.

Landfill Site	Waste Received (tonnes/annum)
Bisasar Road	734 781
Mariannhill	126 621
Shongweni H:h	54 392
Bulbul Drive H:h	126 628
Buffelsdraai	95 212
Lovu	101 502

Table 5.6 - Landfill sites and tonnages received Year 5

The tonnages in the Table above for Shongweni and Bulbul Drive landfills are for solid waste required to fulfil the co-disposal ratio requirements for H:h rating. Private sector collected waste quantities disposed at these two landfills is unknown.

No reclamation operations are under way. All collected waste is disposed of by landfilling.

5.1.4 Year 6 of IWMP2004 (Year 2009/2010)

Six landfill sites are open and accepting waste in the EMA in Year 6. The following graphic indicates all the facilities in use during Year 6.

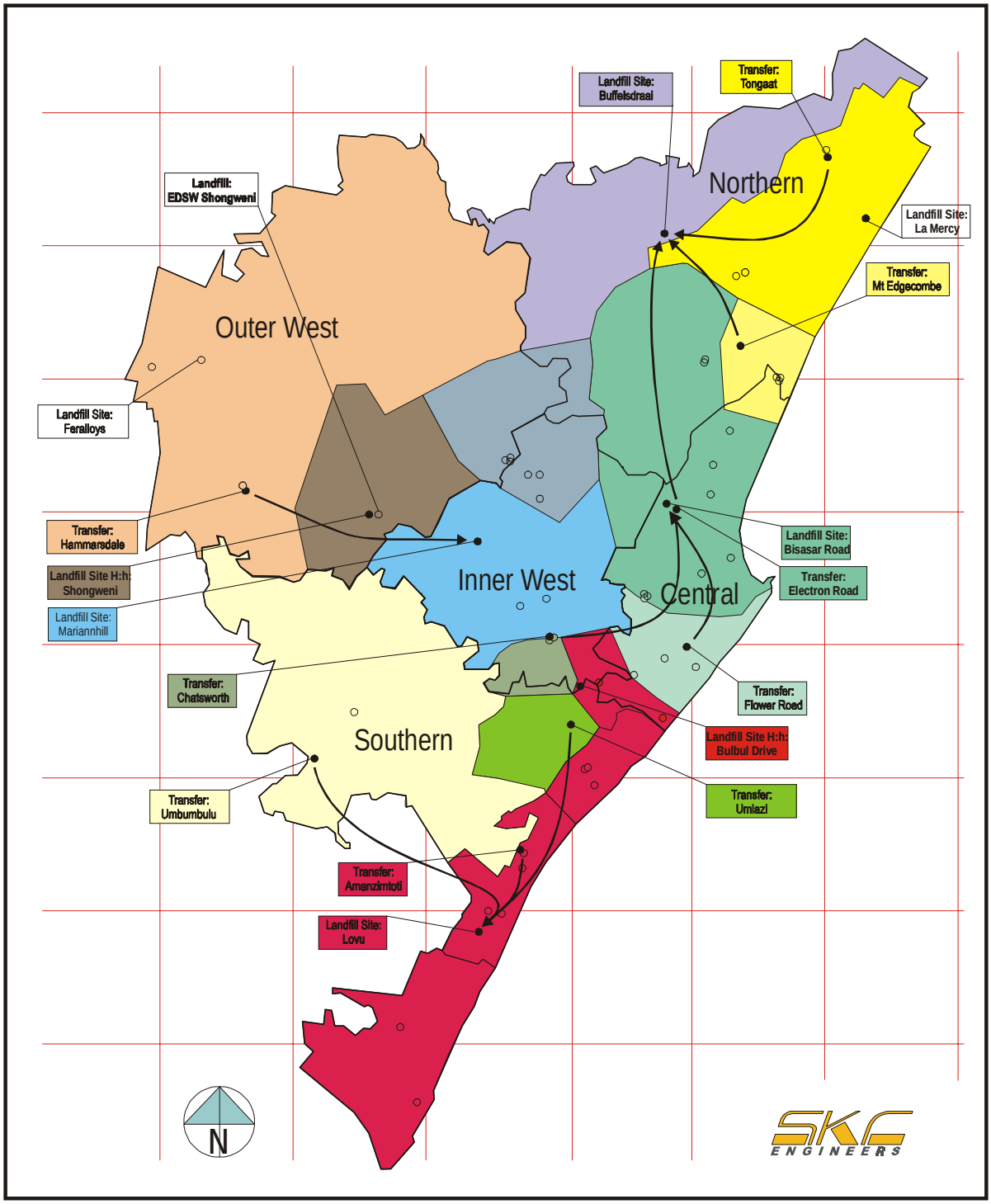


Figure 5.4 - Waste Generation Areas and Transportation Destinations - Year 6

Nine refuse transfer stations are in operation in Year 6.

It is anticipated that three new transfer stations may open in Year 6. These are the new Tongaat, Electron Road and Umbumbulu refuse transfer stations. Electron Road transfer station will be established adjacent to the Bisasar Road Landfill with operation commencing in January 2010 (Year 6). This will result in the diversion of certain waste away from this landfill to Buffelsdraai Landfill. This will also result in saving airspace at the Bisasar Road Landfill. The Tongaat transfer station will handle waste from its surrounding northern areas, including the more remote recently incorporated rural areas. Umbumbulu transfer station will handle waste from the surrounding and recently incorporated rural areas in the Southern Region.

Disposal destinations and tonnages of waste from each of the nine transfer stations are depicted in the Table below.

Transfer Station	Waste Received (tonnes/annum)	Disposal Destination
Chatsworth	25 252	Bisasar Road Landfill
Flower road	26 882	Bisasar Road Landfill
Amanzimtoti	19 568	Lovu Landfill
Umlazi	29 878	Lovu Landfill
Hammarsdale	4 576	Mariannhill Landfill
Electron Road	175 656	Buffelsdraai Landfill
Mount Edgecombe	27 277	Buffelsdraai Landfill
Tongaat	7 760	Buffelsdraai Landfill
Umbumbulu	1 835	Lovu Landfill

Table 5.7 - Transfer stations and destinations Year 6

The total amount of waste handled by the nine transfer stations in Year 6 is estimated at 318 684 tonnes/annum.

The amount of waste, namely 1 256 439 tonnes/annum, collected and transported by EDSW and by private waste operators to the six operational landfills in Year 6 in the EMA is given in the Table below.

Landfill Site	Waste Received (tonnes/annum)
Bisasar Road	569 075
Mariannhill	128 308
Bulbul Drive H:h	128 572
Shongweni H:h	55 208
Buffelsdraai	272 296
Lovu	103 025

Table 5.8 - Landfill sites and tonnages received Year 6

The tonnages in the Table above for Shongweni and Bulbul Drive Landfills are for solid waste required to fulfil the co-disposal ratio requirements for H:h rating. Private sector collected waste quantities disposed at these two landfills is unknown.

No reclamation operations are under way. All collected waste is disposed of by landfilling.

5.1.5 Years 7 to 13 of IWMP 2004 (Year 2010/2011 to 2016/2017)

Six landfill sites are open and accepting waste in the EMA in Year 7. The new EDSW Shongweni Landfill opens in Year 7 to accept waste. This strategically placed landfill could also accommodate waste by rail from more distant regions such as Pietermaritzburg. The following graphic indicates all the facilities in use during Year 7 to 13.

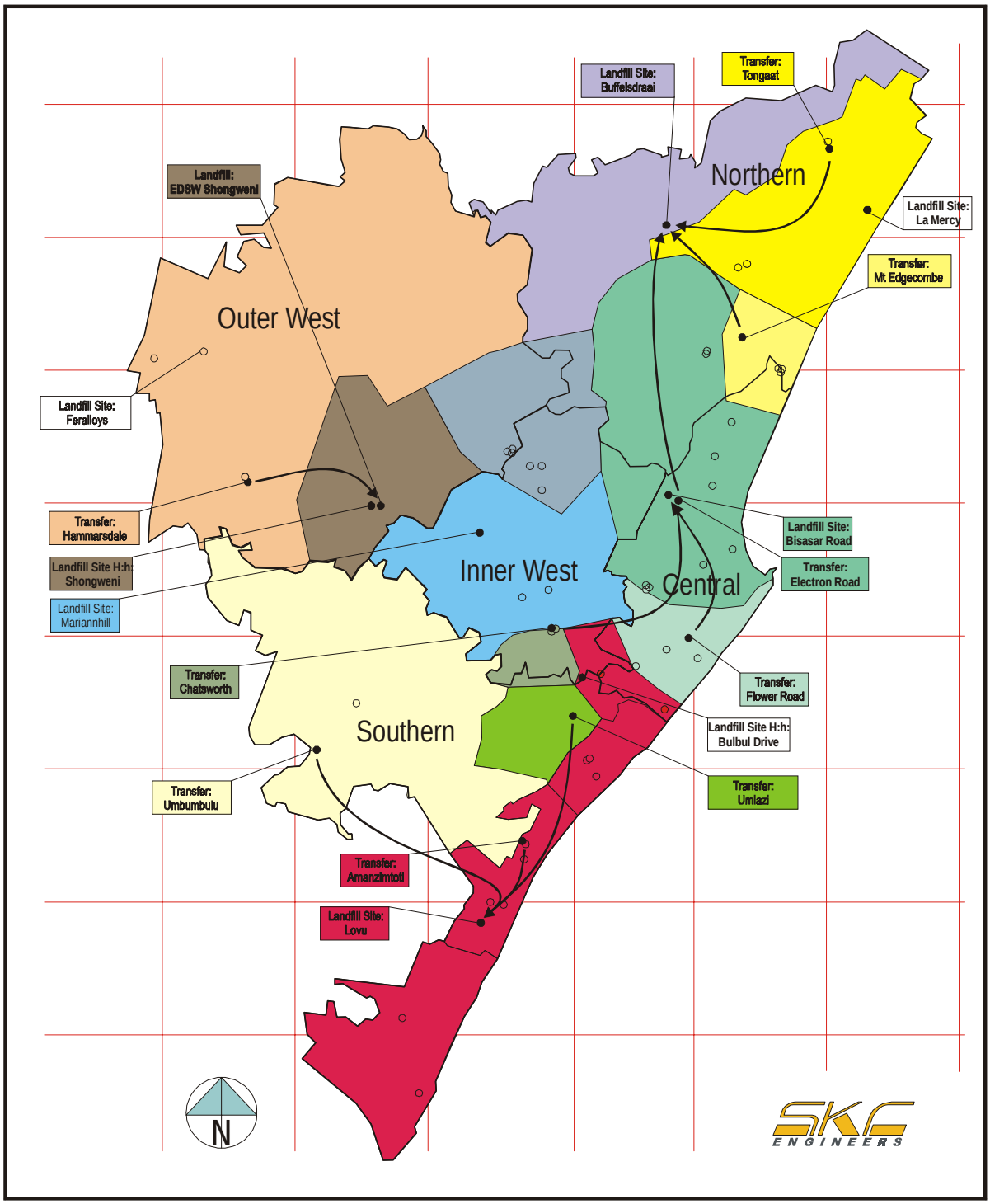


Figure 5.5 - Waste Generation Areas and Transportation Destinations - Year 7 to 13

Feralloys Landfill is an alternative to the New EDSW Shongweni Landfill should the development thereof not transpire. The implementation of this landfill will depend on the successful development of the New EDSW Shongweni Landfill.

Nine refuse transfer stations are in operation in Year 7. Disposal destinations and tonnages of waste from each transfer station are depicted in the Table below.

Transfer Station	Waste Received (tonnes/annum)	Disposal Destination
Chatsworth	31 198	Bisasar Road Landfill
Flower road	27 480	Bisasar Road Landfill
Amanzimtoti	19 861	Lovu Landfill
Umlazi	36 266	Lovu Landfill
Hammarsdale	4 645	EDSW Shongweni Landfill
Electron Road	214 708	Buffelsdraai Landfill
Mount Edgecombe	27 686	Buffelsdraai Landfill
Tongaat	7 876	Buffelsdraai Landfill
Umbumbulu	1 862	Lovu Landfill

Table 5.9 - Transfer stations and destinations Year 7

The total amount of waste handled by the nine transfer stations in Year 7 is estimated at 371 582 tonnes/annum.

The amount of waste, namely 1 278 042 tonnes/annum, collected and transported by EDSW and by private waste operators to the six operational landfills in the EMA in Year 7 is given in the Table below.

Landfill Site	Waste Received (tonnes/annum)
Bisasar Road	604 013
Mariannhill	152 551
Shongweni H:h	40 510
Buffelsdraai	312 799
Lovu	140 642
EDSW Shongweni	27 527

Table 5.10 - Landfill sites and tonnages received Year 7

The tonnages in the Table above for Shongweni H:h Landfill is for solid waste required to fulfil the co-disposal ratio requirements for H:h rating. Private sector collected waste quantities disposed at this landfill is unknown.

No reclamation operations are under way. All collected waste is disposed of by landfilling.

5.1.6 Year 14 and 15 of Master Plan 2004 (Year 2017/2018 to 2018/2019)

Five landfill sites are open and accepting waste in the EMA in Year 14. Bisasar Road Landfill was closed in Year 13. The following graphic indicates all the facilities in use during Year 14 and 15.

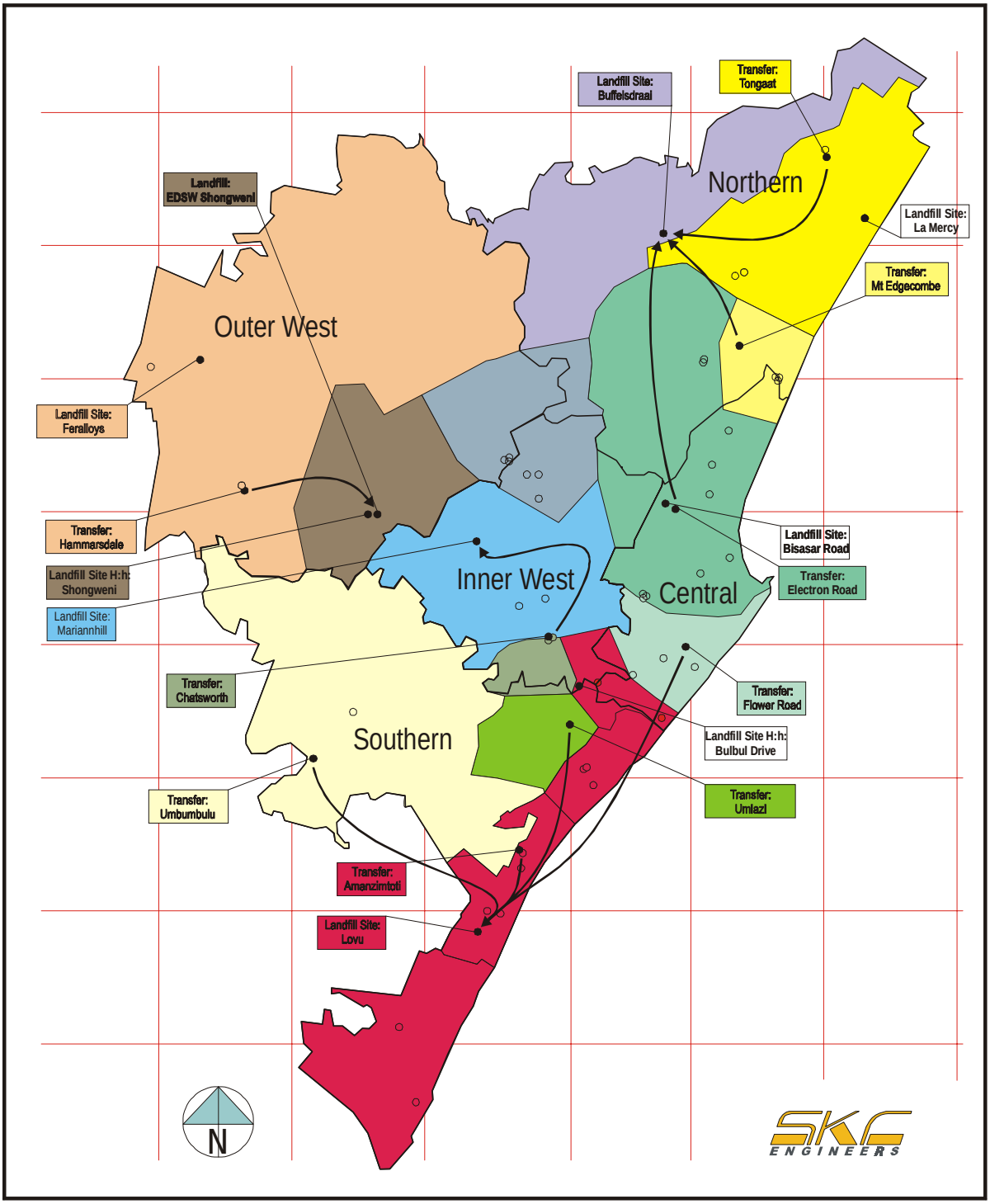


Figure 5.6 - Waste Generation Areas and Transportation Destinations - Year 14 and 15

Nine refuse transfer stations are in operation in Year 14. Disposal destinations and tonnages of waste from each transfer station are depicted in the Table below.

Transfer Station	Waste Received (tonnes/annum)	Disposal Destination
Chatsworth	34 625	Mariannhill Landfill
Flower road	30 498	Lovu Landfill
Amanzimtoti	22 043	Lovu Landfill
Umlazi	40 249	Lovu Landfill
Hammarsdale	5 155	DSW Shongweni Landfill
Electron Road	139 890	Buffelsdraai Landfill
New Mount Edgecombe	31 945	Buffelsdraai Landfill
New Tongaat	8 741	Buffelsdraai Landfill
New Umbumbulu	2 067	Lovu Landfill

Table 5.11 - Transfer stations and destinations Year 14

The total amount of waste handled by the nine transfer stations in Year 14 is estimated at 315 213 tonnes/annum.

The amount of waste, namely 935 988 tonnes/annum, collected and transported by EDSW and by private waste operators to the five operational landfills in the EMA in Year 14 is given in the Table below.

Landfill Site	Waste Received (tonnes/annum)
Mariannhill	390 706
Shongweni H:h	44 960
Buffelsdraai	283 182
Lovu	186 589
EDSW Shongweni	30 551

Table 5.12 - Landfill sites and tonnages received Year 14

The tonnage in the Table above for Shongweni H:h Landfill is for solid waste required to fulfil the co-disposal ratio requirements for H:h rating. Private sector collected waste quantities disposed at this landfill is unknown.

No reclamation operations are under way. All collected waste is disposed of by landfilling.

5.2 Best Practice

5.2.1 Waste Separation/Reduction At Source

The National Government, through their National Waste Management Strategy, has the intention of setting targets for the recycling of specific types of waste material. Therefore Government will, in future, exert more pressure on Local Government to increase waste minimisation and recycling efforts.

Sanitary landfill is currently the most economical and satisfactory means of disposal of domestic solid waste, provided that suitable land is available to develop such landfill sites within an economic transportation range. The natural growth and development of the eThekweni Municipal Area will result in an increase in solid waste generation, which needs to be collected, transported and disposed.

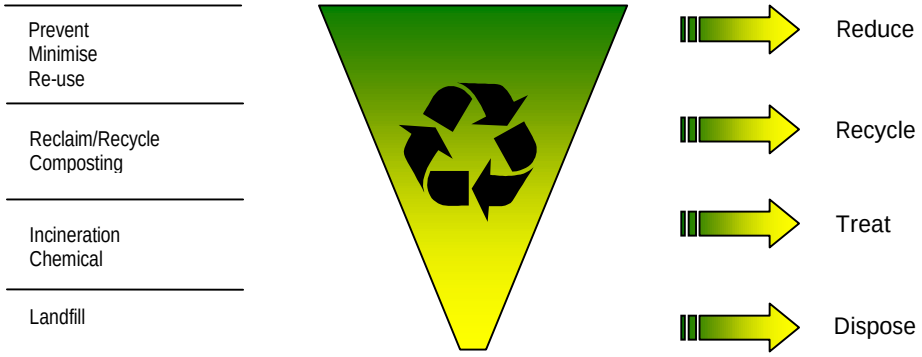
From the Systems Analysis it is clear that collection and transportation account for between 60 to 70 percent of the total cost of the solid waste disposal process as a whole. The cost of collection and transportation could be curtailed by reducing the volume/mass of material that needs to be transported to disposal sites. The volume of material can be reduced by the minimisation of waste generated at source, or by the recovery of material through recycling and/or composting, preferably at source. This will ultimately reduce the volume of material disposed of at the landfills as well, saving valuable airspace.

Scenario 3 of the Systems Analysis was conducted to determine the impact of waste minimisation at source.

5.2.2 Waste Hierarchy

The waste hierarchy should always be borne in mind when solid waste management services are planned and implemented. Waste avoidance is the most desirable goal but also the most difficult to achieve. Waste minimisation can be achieved through cleaner production methods and also by re-use and recycling processes. Waste treatment processes can minimise the impact of waste on the environment. Disposal of waste on a landfill is the least desirable goal in the hierarchy, but currently remains a necessary and environmentally acceptable practice.

The diagram below indicates the hierarchy of waste.



5.2.3 Recycling And Composting

Waste recycling is one of the ways to reduce the quantity of waste ending up on a landfill. Recycling, by definition, means to reprocess material back to its original useful format. An example of recycling could be the reworking of old used paper which is used to make new (recycled) paper.

The term "recycling" is more broadly used to refer to any waste that is recovered and returned or reprocessed to a further useful purpose. For example, many carboard boxes are recovered from waste and resold as used cardboard boxes. This could be more accurately described as "reclamation".

Many recycling programs are run throughout the eThekwini Municipality, but these efforts should be expanded and exploited to the full extent that the very nature of the specific waste types allow.

5.2.4 Composting

Introducing composting facilities could ensure that the need for new sites for the disposal of garden cuttings would be minimised.

Composting was addressed in Scenario 8: Material Recovery and Composting of the original Systems Analysis in 1998. The scenario suggested a composting facility located close to Bisasar Road Landfill. The implementation of a composting facility has not been analysed in this Study, however it was proposed in the 1998 analysis that the new Electron Road Refuse Transfer Station should incorporate such a facility in future.

Such composting facilities could provide compost to various public institutions (e.g. roads and parks authorities) and for sale to the general public. It could even be considered to provide compost to the general public at no cost, since the saving in airspace costs (i.e. the cost of developing landfill space to dispose of this volume of organic waste) could be sufficient to recoup the cost of operation of the composting plant.

The raw materials for the composting plant will be received from the public disposal at garden refuse transfer stations, and from new and existing transfer stations where organic waste is received.

5.2.5 Collection and Transport

The short and long term objective is to implement an optimised, sustainable (economically viable) and environmentally acceptable collection service throughout the entire eThekwini Municipal Area.

A possible solution to address this issue is to empower communities to take responsibility for the provision of an environmentally acceptable and affordable waste collection service. This has been successfully implemented in areas such as Umlazi, Kwa Mashu, Inanda etc.

a) Municipal

EDSW and their appointed contractors provide collection services throughout the entire eThekweni Municipal Area, except for the areas recently incorporated through the demarcation process where services are not economically viable at present. Contractors appointed by EDSW are paid to render collection services in the areas below:

- Chesterville
- Kwa-Mashu
- Inanda
- Umlazi
- Ntuzuma
- Lamontville

b) Community Driven

Prior to the restructuring of local government, waste services in townships were provided mainly by the Provincial Authorities. However, the responsibility was transferred to DSW in September 1996 after incorporation of the townships into the Durban Area. EDSW were tasked with implementing a programme to extend the waste service up to the same standard as that being provided in other areas, to all communities. EDSW planned and introduced a programme, in consultation with communities, which created an opportunity for emerging contractors from the communities, with a range of capacity and capabilities, to service these areas.

The variety of access conditions and settlement patterns required that the methodology of service provision in the formal and informal communities be different. Communities with a high level of road access to individual households are serviced by collecting waste directly from the road verge into the collection vehicle. Communities with limited road access to individual households are serviced by collecting waste outside the household, from where it is taken to a skip from where it is collected on a weekly basis.

All collection work is undertaken by contractors from the communities. This includes the areas listed above in Section 5.2.5.a).

5.2.6 Bulk Transport from RTS vs. Direct to Landfill

The identification of suitable new landfill sites within an economic transportation range has become increasingly difficult, especially with the perceptions held by the general public with regard to landfills. Politics and ignorance regarding land use and properly engineered and operated landfills also play a major part in the difficulty of selection of new sites. Due to these factors, landfill sites are being established further and further away from the source of waste generation and beyond the present economic transportation range of existing waste carriers/collection vehicles. An increasing need to convert the solid waste collected by the existing short haul collection vehicles to long haul vehicles is developing in the EMA.

Although not necessarily an economic option, refuse transfer stations (RTS) are constructed and utilised to accumulate waste collected from the various collection areas, from where it is transported via containers to distant landfills. Transfer stations result in double handling of waste, which in turn almost certainly ensures increased costs for transporting waste.

5.2.7 Waste by Rail

Rail transfer stations are not a familiar concept in the RSA, although the Cape Town Metro does make use of waste transfer by rail. Various rail options were analysed for Durban in 1998 and the project team selected a number of possible locations in the eThekwini Municipal Area from potential stations as identified by Spoornet at that time.

The original analysis of the “waste by rail” option was based on the assumption that solid waste is to be transported by road to the rail transfer stations, then by rail to one or more of the regional waste disposal sites.

Potential rail transfer stations previously identified and evaluated in the various scenarios are listed below.

- Tongaat rail transfer station,
- Ottawa rail transfer station,
- Springfield rail transfer station,
- Escombe rail transfer station,
- Wyebank rail transfer station,
- Cato Ridge rail transfer station,
- Isipingo rail transfer station, and
- Lovu rail transfer station.

The waste by rail option has always resurfaced in subsequent studies following on the initial study done in 1998. However, from previous analyses it became evident that waste by rail was only a viable option for transporting large quantities of waste over long distances to regional landfills. None of the above mentioned rail transfer stations have been considered in the analyses done in this Report, but information regarding cost analyses of waste by rail can be found in previous reports done by SKC Engineers as listed earlier in paragraph 4.1.1.

5.2.8 Compaction/ Non-compaction

The type and quantity of waste generated in a specific area will determine whether or not waste can be effectively and economically compacted. Other factors such as distance to the nearest landfill as well as the ease of access into an area may also influence the choice of compaction or non-compaction and the related transport vehicle.

Compacting waste before transporting it to a landfill reduces the cost of transport. However capital cost of compaction vehicles is generally higher than that of non-compaction vehicles.

Compaction of waste, where the waste type is suitable for proper compaction, should generally result in efficient transport costs.

5.2.9 Waste Disposal

As a short term objective, all waste facilities should be permitted (registered) in terms of the Minimum Requirements for Waste Disposal by Landfill, DWAF. This includes all existing, former and future landfill sites. Former landfills such as Magabeni, Mpumalanga and Kwa Ndengezi, although closed, still need to obtain closure permits. Permitting a site is a time consuming procedure, and therefore planning and permitting should be done well in advance for the new landfills such as Buffelsdraai, Lovu, Shongweni etc.

Best practice ensures that all waste generated is collected and handled in the most economically viable and environmentally acceptable methods and are safely disposed of at the various landfills.

5.2.10 Alternative Technologies

Over the past few years various alternative waste disposal technologies have been developed, all with one common disadvantage, i.e. high capital cost. However, a list depicting these technologies and their respective advantages and disadvantages follows:

ADVANTAGES	DISADVANTAGES
Biological Treatment	
Composting, the most cost effective solution of all alternative treatment systems, can create a valuable product that can be utilised in various sectors.	
• Reasonably low capital cost compared to other technologies • Environmental management can be easily implemented • Sellable product to a wide market for a good product	• Extensive land required • Long period required for composting process • Odours could become a problem if not well managed • Could contain unacceptable levels of heavy metals • Requires education and investigation into sustainability of markets
Waste to Fertiliser Facility. This controlled biological system uses specific biological organisms to decompose organic waste under heat and pressure into fertiliser within a few hours.	
• Small area required for operation • Good quality organic fertiliser • Good earning potential	• High capital cost • Requires education and investigation into sustainability of markets • Segregation/sorting of waste required
Thermal Treatment	
Incineration is controlled burning of waste of in sufficient quantities as a treatment method.	
• Reduces waste stream • Controlled handling of waste • Could be used to generate energy when combined with other technologies	• High capital cost • Against national policy for reuse and recycling • Public resistance • Air pollution control required
Steam treatment is a new technology developed, which will reduce the waste stream and also enable recycling in an environmentally acceptable process.	
• Enable environmentally safe recycling • By product can be used as a renewable energy source	• High capital cost • Extraction of recyclables require resources • Technology must be imported • Requires investigation into sustainability

Table 5.13 – Alternative Technologies to Sanitary Landfilling.

There are a variety of alternative treatment processes, each providing their own benefits and deficiencies. Invariably the cost is prohibitive to the RSA consumer.

Landfilling is still the most cost effective solution for disposal of waste in South Africa. Although it is considered to be the least desirable solution, it should always form part of an integrated waste management system irrespective of how efficiently the reuse and recycling of waste products is practised.

5.3 Timeous Budgeting

The selection, permitting and development of a waste facility is a long process which could take a number of years. Future disposal requirements are firstly determined in order to establish when planning of new facilities should start. Modelling these future requirements enables EDSW to determine when to plan and when to open or close facilities, as well as where these facilities are required. Closure of certain facility sites may also necessitate the establishment of new facilities to handle the future waste streams. A good example of this is the recently developed Mt Edgecombe transfer station, which will be used to transfer waste from the surrounding areas to the Buffelsdraai Landfill.

The previous section, Chapter 4 (Systems Analysis), dealt with the optimisation of facilities, resources and waste flows.

Preliminary planning, budgeting and implementation programmes have been determined for all waste facilities for EDSW. Short term detailed plans and budgets have been prepared for the first 5 year period, and medium to long term planning have been done for a 15-year period.

5.3.1 5 Year Projection

Detailed 5 year programs/cash flows have been determined for all existing and proposed EDSW waste facilities and are attached as Appendix 5.1 of this Chapter.

5.3.2 15 Year Projection

A master program/budget has been determined for a 15-year period for infrastructure capital expenditure as well as capital expenditure for landfill plant and equipment, and collection and transfer vehicles. This program/budget allows for closed, existing and proposed future facilities. It also allows for replacement and/or refurbishment of equipment and vehicles. The master program/budget is attached as Appendix 5.2 of this Chapter.

5.3.3 Financial Analysis of 5 and 15 Year Budget Projections

SKC WasteModel© does not take account of inflation when analysing and comparing scenarios. All calculations are done in current value monetary terms, which applies to the purpose for which the model is used. However, when the projected annual capital expenditure is increased by the inflation rate a different picture presents itself.

For purposes of explanation, only the capital expenditure for landfill sites, refuse transfer stations, vehicle replacement and vehicle augmentation were considered. Operational costs were not escalated, but a similar effect will result in terms of cost escalation.

An annual inflation rate of six per cent and an interest rate at prime interest rate (currently 11 per cent) were used to do the calculations. The straight-line repayment method of repayment was used. The repayment term for capital expenditure on landfill sites and transfer stations were taken at thirty years and for vehicles the repayment term was taken at seven years as prescribed by the GAMAP as appropriate write-off periods.

Table 5.14 presents a summary of an extract from the calculations provided by *SKC WasteModel©* and the new calculations using the above-mentioned guidelines.

Year	Capital Repayments	% Escala-tion	Interest Payments	% Escala-tion	Total Payments	% Escala-tion	Outstanding Capital	% Escala-tion	New Additions
04/05	R 6,576,248		R 25,310,718		R 31,886,966		R 214,531,257		R 216,226,717
05/06	R 11,263,391	71%	R 26,735,737	6%	R 37,999,128	19%	R 243,052,156	13%	R 39,784,290
06/07	R 13,870,634	23%	R 31,634,758	18%	R 45,505,392	20%	R 287,588,709	18%	R 58,407,187
07/08	R 17,505,021	26%	R 39,931,298	26%	R 57,436,320	26%	R 363,011,803	26%	R 92,928,115
08/09	R 21,823,589	25%	R 48,751,980	22%	R 70,575,569	23%	R 443,199,820	22%	R 92,928,115
09/10	R 27,602,953	26%	R 53,190,441	9%	R 80,793,394	14%	R 483,549,467	9%	R 102,011,605
10/11	R 30,923,403	12%	R 56,979,243	7%	R 87,902,645	9%	R 517,993,115	7%	R 67,952,600
11/12	R 35,607,709	15%	R 60,967,799	7%	R 96,575,508	10%	R 554,252,723	7%	R 65,367,051
12/13	R 35,706,405	0%	R 65,127,940	7%	R 100,834,345	4%	R 592,072,184	7%	R 73,525,866
13/14	R 41,612,615	17%	R 66,565,015	2%	R 108,177,631	7%	R 605,136,504	2%	R 54,676,935
14/15	R 42,882,219	3%	R 68,945,228	4%	R 111,827,447	3%	R 626,774,801	4%	R 64,520,516
15/16	R 49,607,724	16%	R 69,390,028	1%	R 118,997,753	6%	R 630,818,438	1%	R 53,651,362
16/17	R 51,157,256	3%	R 93,389,962	35%	R 144,547,218	21%	R 848,999,655	35%	R 269,338,473
17/18	R 68,681,606	34%	R 93,316,385	0%	R 161,997,991	12%	R 848,330,774	0%	R 68,012,725
18/19	R 70,156,994	2%	R 89,273,057	-4%	R 159,430,051	-2%	R 811,573,246	-4%	R 33,399,466
Total	**R 524,977,766**		**R 889,509,591**		**R 1,414,487,357**				**R 1,352,731,023**

Table 5.14 – Summary of the Financial Analysis of the 15 Year Budgets.

The opening balance in the New Additions column depicts the outstanding loan balance as at the beginning of the 2005 financial year. From the above table it is evident that substantial amounts of capital will have to be laid out over the next 15 years on the Solid Waste Service. It is anticipated that these monies will be funded through external loans which will carry interest as indicated. Total payments will escalate from the current R32 million in the 2004/05 budget year to a maximum of R162 million in year 2017/2018 when it will start to reduce.

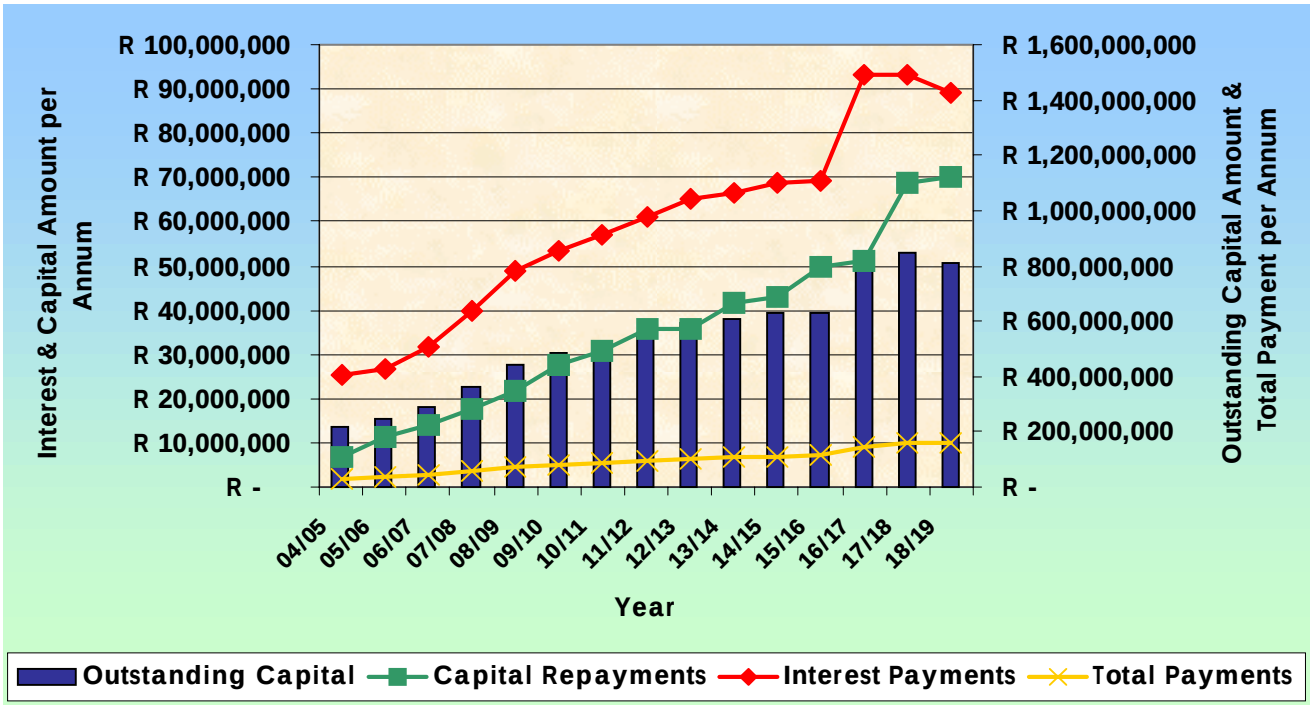


Figure 5.7 – Graphical Representation of Financial Analysis

The acquisition of new vehicles is included in the above calculations, however vehicles could be acquired in terms of a base structure which may reduce the capital expenditure requirements, but the annual operating cost of utilising such vehicles will not differ materially.

Should the Municipality not be able to spend these capital monies, the operational cost of the service will escalate more relative to the additional capital expenditure. Any delays in spending capital as planned may increase the capital requirement as well as the operating cost of EDSW.

5.4 *Management Objectives / Targets*

Specific objectives for EDSW were discussed in Chapter 3 of this Document. EDSW will strive to implement and sustain these objectives. EDSW has set targets, together with their respective implementation plans/programs and projected cash flows. However, the risk involved in not meeting the specific targets must be evaluated and rated when implementation does not occur according to this IWMP. Postponing and/or speeding up development of new facilities may impact negatively on the long term planning and cost of solid waste management. The same may happen with inadequate vehicle and equipment replacement and refurbishment.

Should the required funding not be made available to achieve the proposed milestones or target dates indicated in the budget attached as Appendix 5.2, the following implications could result:

- *Delaying development of facilities could result in increased capital costs in future.*
- *The cost of landfilling all waste could increase due to the potential non-availability of operational vehicles, which will increase the length of time required for daily operations. This will also increase maintenance and repair costs, thus affecting the operations budget.*
- *Delaying the purchase of new equipment and vehicles could result in increased capital costs in the future.*
- *Maintenance and repair costs for the collection and transportation fleet could increase thus affecting the operations budget*
- *Costs will compound over time due to replacement occurring simultaneously and implementation becomes more difficult.*
- *Operational costs could further be influenced by potential overtime payment to collection and transfer staff due to decreased vehicle availability and efficiency*
- *All of the above will impact negatively on the overall cost of service provision*
- *The costs will eventually have to be passed on to the consumer.*

5.5 IWMP Outputs

5.5.1 Landfills & Transfer Stations

The figure below indicates the landfills and refuse transfer stations, existing and proposed, required for servicing the eThekwini Municipality.

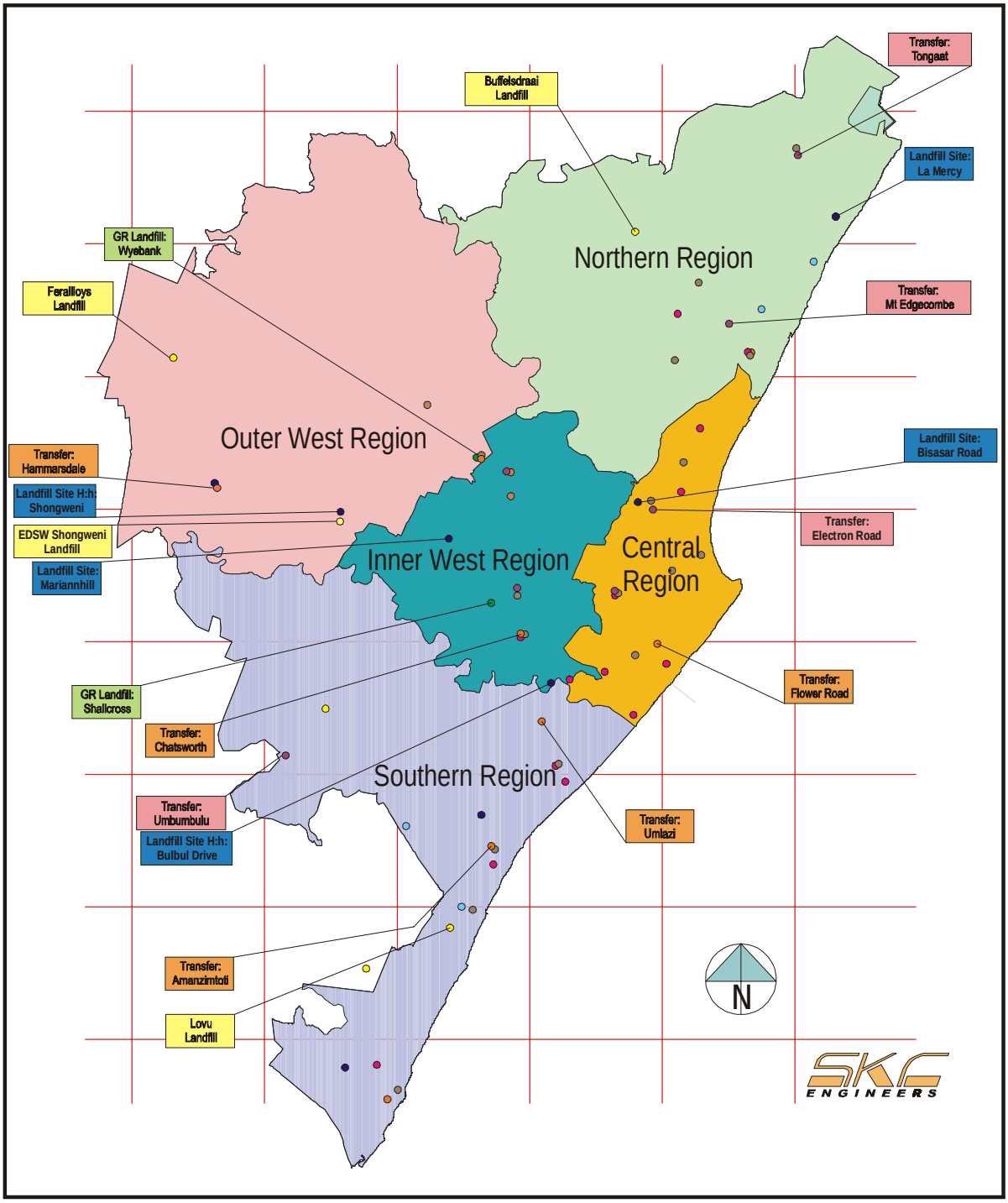


Figure 5.8 - Solid Waste Facilities in eThekwini Municipality in IWMP 2004

The Table below indicates the estimated dates when facilities open and/or close as well as the period for which they will be operative.

	Financial Year	4/5	5/6	6/7	7/8	8/9	9/10	10/11	11/12	12/13	13/14	14/15	15/16
ID	**FACILITY NAME**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	La Mercy Landfill			**June 2006**									
2	Bisasar Road Landfill												
3	Mariannhill Landfill												
4	Shongweni (H:h) Landfill (Private)												
5	Bulbul Drive (H:h) Landfill (Private)							**June 2010**					
6	Chatsworth Transfer Station												
7	Flower Road Transfer Station												
8	Amanzimtoti Transfer Station												
9	Umlazi Transfer Station												
10	Hammarsdale Transfer Station												
11	Feralloys Landfill												
12	Lovu Landfill					**July 2008**							
13	Buffelsdraai Landfill		**January 2006**										
14	EDSW Shongweni Landfill							**July 2010**					
15	Tongaat Transfer Station						**July 2009**						
16	Mt. Edgecombe Transfer Station												
17	Electron Road Transfer Station						**January 2010**						
18	Umbumbulu Transfer Station						**July 2009**						

Table 5.15 – Operational Periods of Solid Waste Facilities in eThekwini Municipality IWMP 2004.

The Table below shortly describes the facilities indicated on Figure 5.7, the waste flow to and from facilities, and operational aspects.

Operational General Waste Landfill Sites	
La Mercy	The La Mercy Landfill is to be operated up to the end of June 2006 (Year 2). From July 2006 onwards all waste is to be directed to the Buffelsdraai Landfill opening in January 2006 (Year 2).
Bisasar Road	The Bisasar Road Landfill is to be operated for the indicated planning period or as long as available airspace, socio-economic and other circumstances allow the landfill to be operated. It was predicted at the time of writing that Bisasar Road Landfill will be operative until year 13 (June 2017). Waste from the Umlazi transfer station is diverted from Bisasar Road Landfill to the Lovu Landfill site when it opens in Year 5. The diversion of the waste from this transfer station will save valuable airspace at the Bisasar Road Landfill site. It is predicted that the Electron Road Transfer Station will open in January 2010. It will be established close to the Bisasar Road Landfill with operation commencing in Year 6. This will divert some waste from this landfill to Buffelsdraai Landfill, minimising certain vehicle types on the landfill; and providing the landfill operation staff with more time per day for completion of cells in use, thus reducing possible public pressure for closure of the landfill. This will also assist in saving valuable airspace at the Bisasar Road Landfill.

Mariannhill	The Mariannhill Landfill was commissioned in July 1997. The landfill is to be operated for the entire 15-year planning period. The life expectancy of the landfill is dependent on the volumes of waste received and based on the current volumes received it is estimated at 15 years.
Hazardous Waste Landfill Sites (Privately owned and operated)	
Shongweni (H:h)	The Shongweni H:h Landfill operated by EnviroServ will receive general waste from surrounding areas in the Outer West. This waste will be diverted to the EDSW Shongweni Landfill site when it opens in Year 7.
Bulbul Drive (H:h)	The Bulbul Drive Landfill operated by Waste Services will receive waste from the Amanzimtoti transfer station in the South. The future use of this landfill by EDSW will be reviewed subject to available capacity and the opening of the Lovu Landfill site in year 5
Future Regional General Waste Disposal Sites	
Buffelsdraai	The Buffelsdraai Landfill is scheduled to open in January 2006. The landfill will be developed during year 2005 and will accept waste from the Northern Region and eventually from the new Electron Road Transfer Station. The landfill will also compensate for the closure of the La Mercy Landfill in June 2006 (Year 2)
Lovu	The Lovu Landfill will open to accept waste in July 2008. Development will start in 2007. The landfill will accept waste from the Southern Region.
Feralloys	The Feralloys Landfill will open in July 2016 **provided sufficient waste is available to justify efficient operation**. This regional landfill will accept waste from the Outer West Region and could also accommodate waste generated in the Msunduzi (Pietermaritzburg) Area.
EDSW Shongweni	The EDSW Shongweni Landfill will open in July 2010 to accept waste from the Outer West and could also be utilised for waste generated in the Inner West, handled at Chatsworth transfer station, and the Flower Road transfer station. This landfill could also be utilised to handle waste generated in the Msunduzi Area.
Garden Refuse Disposal Sites	
Shallcross Kloof/Wyebank Umkomaas	The three existing garden refuse sites located in the EMA should be operated for as long as possible. The planning and development of composting facilities or alternative disposal facilities for garden refuse should be performed well in advance of the closure of each site, followed immediately by establishment and operation. Such composting facilities could provide compost to various public institutions (e.g. road and parks authorities) and for sale to the general public. It could be considered to provide compost to the general public at no or low cost, since the saving in airspace costs (i.e. the cost of developing landfill space to dispose of this volume of organic waste) could be sufficient to recoup the cost of operation of the composting plant. The raw materials for the composting plant will be received from the public disposal at garden refuse transfer stations, and from new and existing transfer stations where organic waste is received.
Existing Refuse Transfer Stations	
Chatsworth	The Chatsworth transfer station is to remain operational for the planning period. All waste received at Chatsworth transfer station will be transported to the Bisasar Road Landfill until it closes; and thereafter to Mariannhill Landfill.
Flower road	The Flower Road transfer station is to remain operational for the full planning period. All waste received at Flower Road transfer station will be transported to the Bisasar Road Landfill for disposal.

Amanzimtoti	The Amanzimtoti transfer station is to remain operational for the planning period. All waste received at Amanzimtoti transfer station will be transported to the Bulbul Drive Landfill in years 1 to 4, whereafter waste will be transported to the new Lovu Landfill for disposal.
New Germany / Clermont	The New Germany transfer station is currently being upgraded and will henceforth be known as Clermont Transfer station handling garden refuse only.
Umlazi transfer	The Umlazi transfer station will be operational for the full planning period. All waste received at the Umlazi transfer station will be transported to the Bisasar Road Landfill for disposal up to the end of Year 4 and thereafter to the Lovu Landfill.
Hammarsdale	The Hammarsdale transfer station will be operational for the full planning period. All waste received at the Hammarsdale transfer station is initially transported to the Bisasar Road Landfill site and thereafter to the EDSW Shongweni Landfill site subsequent to its opening in July 2010.
Mt Edgecombe	The Mt Edgecombe transfer station was commissioned in January 2004. All waste received here will initially be transported to the Bisasar Road Landfill and thereafter to the Buffelsdraai Landfill site once operative.
New Refuse Transfer Stations	
Tongaat	The Tongaat transfer station is to be developed and will be commissioned at the beginning of Year 6 (July 2009) of the planning period. All waste received here will be transported to the new Buffelsdraai Landfill.
Electron Road	The Electron Road transfer station will be developed in the vicinity of the Bisasar Landfill site and will open in January 2010 (Year 6). All waste received here will be transported to the Buffelsdraai Landfill for disposal.
Umbumbulu	A proposed new transfer station is located in the Southern Region. **Development is subject to available funding and the implementation of a collection service of the small area around Umbumbulu.** The area has a sufficient population to justify a small transfer station, similar to the now closed Umkomaas RTS, for handling the waste generated in the area. All waste received will be transported to the Lovu Landfill.

Table 5.16 – Solid Waste Facilities in eThekwini Municipality, waste flow and operational aspects IWMP 2004.

5.5.2 Fleet Requirements

The replacement and augmentation of vehicles and equipment used for collection, transportation and landfilling must be done in a pre-planned and a carefully co-ordinated manner.

The growth in solid waste, provision of additional facilities, extended services and normal ageing, wear and tear depletes fleet capacity.

a) Disposal Site Plant and Equipment

EDSW has established, from previous experience, that landfill site plant and equipment have an average lifetime of 7 to 10 years, depending on the type of vehicle. Although regular maintenance and essential refurbishment occurs subsequent to purchase, the maintenance costs become excessive between 5 and 7 years after purchase. Plant and equipment utilized on the three existing EDSW landfill sites are listed in Section 2.1.1a).

The *"Capital Expenditure Budget – Disposal Site Plant and Equipment"* attached as Appendix 5.2 at the end of this Chapter indicates the projected budget requirements for the next 15 years.

The amounts indicated for La Mercy, Bisasar Road and Mariannhill are replacement values for elements of the current equipment on the landfill sites. The present proposal is that the vehicles operating at La Mercy and Bisasar Road are redeployed to Buffelsdraai Landfill upon closure of the relevant sites. This may be revised or reconsidered in the future, depending on the state of vehicles at the operative landfills.

The values indicated in 2004-2005 for Buffelsdraai, 2007-2008 for Lovu, 2009-2010 for EDSW Shongweni and 2015-2016 for Feralloys represent the initial costs of equipping each relevant site for operational purposes. Thereafter, the replacement of equipment follows the 7 to 10 year cycle. In the case of Buffelsdraai, the vehicles purchased in 2004-2005 represent the augmentation of the current vehicles operating at the La Mercy Landfill.

b) Impacts of Replacement and Refurbishment Non-Compliance

It is to be noted that should the required funding not be made available to follow the proposals for replacement and refurbishment of plant and equipment as indicated in the budget projections, the implications could be as follows:

- *The cost of landfilling all waste will increase due to the potential non-availability of vehicles, which will increase the length of time required for operations;*
- *Maintenance and repair costs will increase thus affecting the operations budget.*
- *Delaying the purchase will result in increased future capital costs;*
- *The costs will compound over time due to replacement occurring simultaneously at two or more sites;*
- *In the case of the new landfills, the sites will not be operated efficiently and economically.*
- *Operational costs will be further influenced by potential overtime payment to collection and transfer staff due to decreased vehicle availability and efficiency;*
- *All of the above will impact negatively on the overall cost of service provision, as well as on the environment and public health.*

See the *"Capital Expenditure Budget - Collection and Transport Vehicles"* in Appendix 5.2 at the end of this Chapter.

c) Collection and Transfer Vehicles

An analysis of the status of the entire EDSW collection and transfer fleet was carried out early in 1999 and the results were presented to and discussed with DSW in mid 1999. Recommended life spans for each category of vehicle were defined based upon EDSW and other experience.

The above data is updated regularly. (A detailed summary analysis for 1999-2000 and 2000-2001 was reported to DSW in Section 6 of the *"Solid Waste Master Plan 2001"*, SKC Document No 1950/D0106). The vehicle replacement and augmentation schedule was updated in August 2004. A summary analysis of the current data is given in Table 5.17.

EDSW - COLLECTION AND TRANSPORTATION VEHICLES				
VEHICLE TYPE	**VEHICLE USAGE**	**TOTAL No. OF VEHICLES**	***PENDING DE-REGISTRATION***	**EXPECTED LIFE (Years)**
10.5m³ Paddlepackers	Round collection of domestic and commercial waste	0	*1*	12
10.5m³ REL Compactors	Round collection of domestic and commercial waste	82	*28*	12
12m³ REL Compactors	Round collection of domestic and commercial waste	19	*5*	12
19m³ REL Compactors	Collection of domestic and commercial waste	11	*4*	14
Industrial 20m³ REL Compactors	Skip clearing in ligth industrial areas and garden refuse transfer stations	24	*2*	14
20m³ Rotopress	Commercial 240 litre mobile containers	7	*0*	15
3.5t Cage Tippers	Street sweeping and ilegal dumping	13	*1*	8
3t Cage Tippers	Street sweeping and illegal dumping	3	*1*	8
4t Cage Tipper	Street sweeping and illegal dumping	1	*0*	8
4t Tipper	Collection	27	*0*	8
4m³ Tipper	Collection	1	*0*	8
4 x 4	Maintenance	3	*0*	6
5000 litre Tanker	Pavement Washing	1	*0*	15
8t Crane Truck	Miscellaneous	2	*0*	20
Breakdown	Recovery Vehicle	1	*1*	15
Hooklift 4 x 4 15 t Roll-on/off	Open 18m³ Roll-on/off containers	2	*0*	10
Hooklift 6 x 4 15t Roll-on/off	Open 27m³ Roll-on/off containers	11	*3*	10
Hooklift 8 x 4 20t Roll-on/off	Closed 27m³ Roll-on/off containers	8	*0*	10
LDV 1t	Maintenance	52	*5*	6
LDV 0.5t	General	8	*0*	6
Mad-Vac	Street sweeping	1	*0*	6
Tenant Vacuum	Cleaning	1	*0*	6
Mechanical Sweeper	Mechanical street sweeping	6	*1*	8
Telehoist	Collection of 5.5- 11m³ skips	10	*2*	9
Tractor-Trailer Comb.	Round collection of domestic waste	1	*0*	9
Tractor	Round collection of domestic waste	4	*1*	9
Pavewash	Cleaning	1	*0*	9
Trailer between 3 and 4.5t	Skip collection	11	*0*	15
Trailer up to 1t	Transport	3	*0*	9
Telehoist Trailer	Skip collection	2	*0*	15
Payloader	Garden Refuse and Illegal Dumping	2	*1*	18
Box Tipper 16 m³	Round collection of domestic waste	0	*1*	12
Easy Pak 6m³	Round collection of domestic waste	0	*1*	12
Tip Pak 6m³	Round collection of domestic waste	0	*1*	12
Bus	General and Educational	1	*0*	15
Total Vehicles		**319**	***59***	

Table 5.17 – Current EDSW collection and transport vehicle fleet (Aug 2004)

The following vehicles included in the Table above are leased from MAN Truck & Bus (Pty) Ltd:

- 15 x 10m³ REL Compactors;
- 2 x Telehoist Vehicles;
- 5 x 20m³ Rotopresses;
- 7x 20m³ Industrial REL Compactors.

See Appendix 5.3 at the end of this Chapter for the comprehensive vehicle replacement schedule.

d) Impacts of Waste and Population Growth on the Vehicle Fleet

The *SKC WasteModel©* programme was utilised to assess the required augmentation of the vehicle fleet due to projected waste and population growth within the eThekwini Municipal Area.

A waste growth rate of 1.5% per annum has been applied generally throughout the eThekwini Municipal Area including the Umlazi, Chesterville, Inanda, KwaMashu and Ntuzuma areas. The departure point is very low at 0.150 kg/person/day and unit waste generation increases once the service level is improved. A population growth rate of between 1.07% and 1.16% per annum has been applied throughout the eThekwini Municipal Area in accordance with latest available information.

The vehicles required for the collection of each waste type were analysed and scrutinised. The following Table was compiled from these results. The Table indicates the additional vehicles required to service the projected population growth in the Municipal Area.

Year	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
10.5 m³ REL	0	1	1	1	1	1	1	2	1	1	1	2	1	1	2
20m³ Rotopress	0	0	1	0	0	0	0	1	0	0	0	0	1	0	0
20m³ Tractor/trailer	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Telehoist	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0
20m³ Ind Compactor	0	0	1	0	0	0	0	0	0	0	1	0	0	0	1
Hook LR15	0	0	0	0	1	0	0	0	1	0	0	0	0	0	1

Table 5.18 – Vehicle Augmentation Years 1 to 15 of Master Plan 2004

The capital costs of vehicle replacement and augmentation have been calculated and are included in the *"Capital Expenditure Budget – Collection and Transport Vehicles"* attached as Appendix 5.2.

e) Vehicle Suitability

The *SKC WasteModel©* programme was utilised to assess the suitability and capacity of all vehicles currently in use in the eThekwini Municipal Area. It was also utilised to determine the future requirements in capacity and quantity of vehicles required. The methods of collection and transportation were taken into consideration based on topography, waste type, waste generation quantities and the location of generation areas, transfer and disposal facilities for each year of the 15 year period under consideration for the IWMP.

Vehicles listed in Table 5.17 and 5.18 were found to be the most suitable and economical for the task at hand.

Appendix 5.1

Detailed 5-year Capex Planning

EDSW - Detailed 5 year Capital Expenditure Plan

September 2004

Site Name: **La Mercy Landfill Site**

Site Status: **Existing Site to be Operated to Closure**

Tasks	2004/2005	2005/2006	2006/2007	2007/2008	2008/2009	Total Cost R
	J A S O N D J F M A M J	J A S O N D J F M A M J	J A S O N D J F M A M J	J A S O N D J F M A M J	J A S O N D J F M A M J	
Site Operations						
Closure/ Rehabilitation Planning						
Submit to DWAF for approval						
Tender Procedure						
Closure/ Rehabilitation Works						
Gas Extraction						
Gas Extraction	7,350,000	1,575,250		3,096,642		12,021,892
Closure and Rehabilitation Planning	50,000	155,000				205,000
Closure and Rehabilitation Works		1,300,000				1,300,000
Total Annual Costs	7,400,000	3,030,250		3,096,642		13,526,892

Comment: Closure of La Mercy Site end June 2006

EDSW - Detailed 5 year Capital Expenditure Plan

Site Name: **Mariannhill Landfill Site**
Site Status: **Existing Site**

Tasks	2004/2005												2005/2006												2006/2007												2007/2008												2008/2009												Total Cost R
	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	
Site Operations																																																													
Future Development Works:																																																													
Phase 3 (Cell 3-1)																																																														
Development Planning																																																														
Tender Procedure																																																														
Development Works																																																														
Phase 4 (Cell 4-1)																																																														
Development Planning																																																														
Tender Procedure																																																														
Development Works																																																														
Phase 5 (Cell 4-2)																																																														
Development Planning																																																														
Tender Procedure																																																														
Development Works																																																														
Phase 6 (Cell 3-2)																																																														
Development Planning																																																														
Tender Procedure																																																														
Development Works																																																														
Phase 7 (Cell 3-3)																																																														
Development Planning																																																														
Tender Procedure																																																														
Development Works																																																														
Phase 8 (Cell 4-3)																																																														
Development Planning																																																														
Tender Procedure																																																														
Development Works																																																														
Leachate Handling/Storage																																																														
Gas Extraction																																																														
Auditing/Monitoring																																																														
Closure/ Rehabilitation Works																																																														
Annual Planning Costs	786,000												200,000												75,000												460,000												100,000												1,621,000
Annual Construction Costs	6,114,000																																				2,000,000												2,600,000												10,714,000
Leachate Handling/Storage	50,000																																																													50,000
Gas Extraction	5,200,000																								2,970,371																																					8,170,371
Auditing and Monitoring																																																														-
Closure and Rehabilitation																																																														-
Total Annual Costs	12,150,000												200,000												3,045,371												2,460,000												2,700,000												20,555,371

EDSW - Detailed 5 year Capital Expenditure Plan

September 2004

Site Name: **Bisasar Road Landfill Site**
Site Status: **Existing Site**

Tasks	2004 / 2005												2005 / 2006												2006 / 2007												2007 / 2008												2008 / 2009												Total Cost R
	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	
Site Operations																																																													
Benoni 4																																																													
Development Planning																																																													
Tender Procedure																																																													
Development Works																																																													
Randles 3 & 4																																																													
Development Planning																																																													
Tender Procedure																																																													
Development Works																																																													
Benoni 5																																																													
Development Planning																																																													
Tender Procedure																																																													
Development Works																																																													
Benoni 6																																																													
Development Planning																																																													
Tender Procedure																																																													
Development Works																																																													
Randles 5																																																													
Development Planning																																																													
Tender Procedure																																																													
Development Works																																																													
Weighbridge & Entrance																																																													
Leachate Handling/Storage																																																													
Gas Extraction																																																													
Auditing/Monitoring																																																													
Closure/ Rehabilitation Works																																																													
Annual Planning Costs	1,100,000												1,000,000												1,200,000												1,000,000												850,000												5,150,000
Annual Construction Costs	10,500,000												9,000,000												11,000,000												9,000,000												8,200,000												47,700,000
Leachate Handling/Storage													2,000,000												2,000,000																																				4,000,000
Gas Extraction	8,505,000												12,373,320												5,266,583												3,337,890												4,245,520												33,728,313
Auditing and Monitoring	500,000												800,000												1,100,000												1,100,000												1,100,000												4,600,000
Closure and Rehabilitation planning	330,000												550,000												660,000												880,000												880,000												3,300,000
Closure and Rehabilitation	3,000,000												5,000,000												6,000,000												8,000,000												8,000,000												30,000,000
Total Annual Costs	**23,935,000**												**30,723,320**												**27,226,583**												**23,317,890**												**23,275,520**												**128,478,313**

Comments:

COSTS	As at July 2004
CLOSURE & REHABILITATION	Will incorporate capping, vegetation & stormwater upgrading
"Auditing and Monitoring"	Has been included as per the previous SKC budgets. This is not a W&P function.

EDSW - Detailed 5 year Capital Expenditure Plan

September 2004

Site Name: **New Buffelsdraai Landfill Site**

Site Status: **New Landfill in Window**

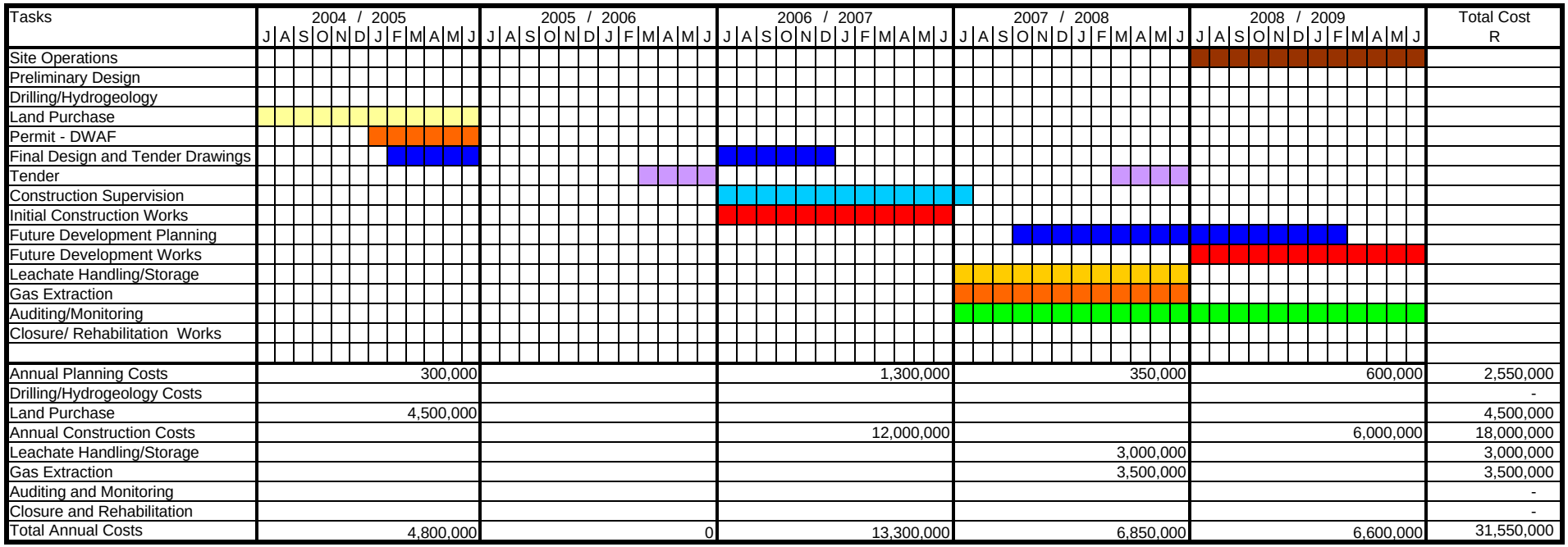
Tasks	2004/2005												2005/2006												2006/2007												2007/2008												2008/2009												Total Cost R
	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	
Site Operations																																																													
Preliminary Design																																																													
Drilling/Hydrogeology																																																													
Land Purchase																																																													
Permit - DWAF																																																													
Final Design and Tender Drawings																																																													
Tender																																																													
Construction Supervision																																																													
Initial Construction Works																																																													
Future Development Planning																																																													
Future Development Works																																																													
Leachate Handling/Storage																																																													
Gas Extraction																																																													
Closure/ Rehabilitation Works																																																													
Initial Planning Costs																																																													-
Drilling/Hydrogeology Costs																																																													-
Land Purchase																																																													-
Initial Construction Costs												20,000,000												7,000,000																																							27,000,000
Leachate Handling/Storage																								4,000,000																																							4,000,000
Gas Extraction																																				3,600,000												3,600,000															3,600,000
Future Development Planning																								600,000												600,000												600,000												600,000			1,200,000
Future Development Works																																																	8,000,000														-
Closure and Rehabilitation																																																													-
Total Annual Costs												20,000,000												11,600,000												4,200,000												12,200,000												600,000			35,800,000

Comment: Buffelsdraai Site Operations commence beginning January 2006

EDSW - Detailed 5 year Capital Expenditure Plan

September 2004

Site Name: **New Lovu Landfill Site**
Site Status: **New Landfill in Window**



Comment: Lovu Site Operations commence beginning July 2008

EDSW - Detailed 5 year Capital Expenditure Plan

September 2004

Site Name: **Tongaat Transfer Station**

Site Status: **New Transfer Stations to be Developed**

Tasks	2004/2005												2005/2006												2006/2007												2007/2008												2008/2009												Total Cost
	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	R
Site Operations																																																													
Planning and Design																																																													
EIA																																																													
Tender Procedure																																																													
Construction																																																													
Annual Planning Costs																																																245,000												132,000	377,000
Annual Construction Costs																																																760,000												3,036,000	3,796,000
Total Annual Costs																																																**1,005,000**												**3,168,000**	**4,173,000**

Comment: Transfer Station to be opened on 1 July 2006

EDSW - Detailed 5 year Capital Expenditure Plan

September 2004

Site Name: **Electron Road Refuse Transfer Station**

Site Status: **New Transfer Stations to be Developed**

Tasks	2004/2005												2005/2006												2006/2007												2007/2008												2008/2009												Total Cost
	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	R
Site Operations																																																													
Conceptual Planning and Design																																																													
Planning and Design																																																													
EIA																																																													
Tender Procedure																																																													
Construction																																																													
Conceptual Planning																																																													
Annual Planning Costs																																																													4,136,000
Annual Construction Costs																																																													27,610,000
Equipment																																																													26,510,000
Equipment at Buffelsdraai																																																													5,357,000
Total Annual Costs												0												0												0												**42,075,000**												**21,538,000**		**63,613,000**

Comment:
Transfer Station to be opened on 1 January 2010
Design to include research into alternative technologies for large transfer stations (ie see Hong Kong designs)

EDSW - Detailed 5 year Capital Expenditure Plan

September 2004

Site Name: **Umbumbulu Transfer Station**

Site Status: **New Transfer Station**

Tasks	2004/2005												2005/2006												2006/2007												2007/2008												2008/2009												Total Cost
	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	R
Site Operations																																																														
Planning and Design																																																														
EIA																																																														
Tender Procedure																																																														
Construction																																																														
Annual Planning Costs																																																														45,000	45,000
Annual Construction Costs																																																														500,000	500,000
Total Annual Costs																																																														**545,000**	**545,000**

Comment:
Transfer Station opens in July 2009
Development subjject to funding and viability due to waste quantities

Appendix 5.2

Master 15-year Capex Planning

eThekwini Municipal Area Integrated Waste Management Plan - 2004 (2004-09)

Infrastructural Capital Expenditure Budget

	Consultants	Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
		Total Budget	Jul04-Jun05	Jul05-Jun06	Jul06-Jun07	Jul07-Jun08	Jul08-Jun09	Jul09-Jun10	Jul10-Jun11	Jul11-Jun12	Jul12-Jun13	Jul13-Jun14	Jul14-Jun15	Jul15-Jun16	Jul16-Jun17	Jul17-Jun18	Jul18-Jun19
Existing Landfill Sites																	
La Mercy																	
Gas Extraction	WP/ENVIROS	12,021,892	7,350,000	1,575,250		3,096,642											
Closure/rehabilitation planning	DMP	205,000	50,000	155,000													
Closure/rehabilitation works	DMP	1,300,000		1,300,000													
Bisasar Road																	
Future development planning	PASS	8,050,000	1,100,000	1,000,000	1,200,000	1,000,000	850,000	1,100,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000
Future development works		57,700,000	10,500,000	9,000,000	11,000,000	9,000,000	8,200,000	10,000,000									
Leachate Handling/Storage		10,000,000		2,000,000	2,000,000								2,000,000	2,000,000	2,000,000		
Gas Extraction	WP/ENVIROS	67,253,832	8,505,000	12,737,320	5,266,583	3,337,890	4,245,520	4,716,514	4,379,430	1,202,904	1,912,618		6,447,052	6,454,215	8,048,786		
Auditing and Monitoring		8,100,000	500,000	800,000	800,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000
Closure/rehabilitation planning		5,210,000	330,000	330,000	350,000	350,000	350,000	350,000	350,000	350,000	350,000	350,000	350,000	350,000	350,000	350,000	350,000
Closure/rehabilitation works		40,500,000	3,000,000	3,000,000	3,000,000	3,000,000	3,000,000	2,500,000	2,500,000	2,500,000	2,500,000	2,500,000	2,500,000	2,500,000	2,500,000	2,500,000	3,000,000
Mariannhill																	
Future development planning	SE	2,046,000	786,000			460,000	100,000					200,000	100,000		400,000		
Future development works		16,514,000	6,114,000			2,000,000	2,600,000						2,500,000		3,300,000		
Leachate Handling/Storage	?	150,000	50,000							100,000							
Gas Extraction	WP/ENVIROS	12,325,672	5,200,000		2,970,371			1,338,226							2,817,075		
Closure/rehabilitation planning		675,000		200,000	75,000					100,000							300,000
Closure/rehabilitation works		-															
KwaNdengezi																	
Closure/rehabilitation planning	AAL	50,000		50,000													
Closure/rehabilitation works		455,000		455,000													
Mpumalanga																	
Closure/rehabilitation planning	AAL	142,000		102,000	40,000												
Closure/rehabilitation works		4,290,000			4,290,000												
Magabeni																	
Closure/rehabilitation planning	AAL	40,000			40,000												
Closure/rehabilitation works		572,000			572,000												
Umdloti																	
Closure/rehabilitation planning	?	40,000			40,000												
Closure/rehabilitation works	?	660,000			660,000												
New Landfill Sites																	
Lovu																	
Initial development planning	PASS	2,250,000	300,000		1,300,000	350,000	600,000										
Drilling		-															
Land Purchase		-	4,500,000														
Initial development works		18,000,000			12,000,000		6,000,000										
Gas Extraction		13,500,000				3,000,000				3,500,000			3,500,000			3,500,000	
Leachate Handling/Storage		3,500,000				3,500,000											
Future development planning		1,800,000								600,000			600,000			600,000	
Future development works		18,000,000								6,000,000			6,000,000			6,000,000	
Feralloys																	
Initial development planning	AAL	1,320,000											1,320,000				
Drilling		-															
Land Purchase		9,460,000											9,460,000				
Initial development works		12,650,000												12,650,000			
Gas Extraction		5,280,000													3,960,000		1,320,000
Leachate Handling/Storage		-															
Future development planning		2,530,000												550,000	660,000	660,000	660,000
Future development works		15,180,000													5,060,000	5,060,000	5,060,000
EDSW Shongweni																	
Initial development planning	SKC	3,581,500		300000		650,000	2,255,000	676,500									
Drilling and Geotechnical		-															
Land Purchase		9,350,000			9,350,000												
Initial development works		22,550,000					5,500,000	17,050,000									
Gas Extraction		9,020,000									3,960,000	2,200,000			2,860,000		
Leachate Handling/Storage		-															
Future development planning		4,442,900							979,000	293,700	539,000	161,700	539,000	568,700	661,100	161,700	539,000
Future development works		30,030,000								9,790,000		5,390,000		5,390,000	4,070,000	5,390,000	
Buffelsdraai																	
Initial development planning	TGC	-															
Drilling		-															
Land Purchase		-															
Initial development works		27,000,000	20,000,000	7,000,000													
Gas Extraction	?	16,800,000				3,600,000		3,600,000		1,200,000		3,600,000		1,200,000		3,600,000	
Leachate Handling/Storage		4,000,000		4,000,000													
Future development planning	TGC	9,000,000			600,000	600,000	600,000	600,000	600,000	600,000	600,000	600,000	1,200,000	1,200,000	600,000	600,000	600,000
Future development works		65,000,000				8,000,000		8,000,000		8,000,000		8,000,000		25,000,000		8,000,000	
Landfill Public Relations		750,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000
Sub-Total Carried Over		**553,294,796**	**68,335,000**	**44,054,570**	**55,603,954**	**42,494,532**	**34,850,520**	**50,481,240**	**9,558,430**	**34,986,604**	**10,611,618**	**23,751,700**	**37,266,052**	**58,612,915**	**38,036,961**	**37,171,700**	**12,579,000**

Note : All amounts are stated in current (2004) Rands

eThekwini Municipal Area Integrated Waste Management Plan - 2004 (2004-09)

Infrastructural Capital Expenditure Budget (Continued)

	Consultants	Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
		Total Budget	Jul04-Jun05	Jul05-Jun06	Jul06-Jun07	Jul07-Jun08	Jul08-Jun09	Jul09-Jun10	Jul10-Jun11	Jul11-Jun12	Jul12-Jun13	Jul13-Jun14	Jul14-Jun15	Jul15-Jun16	Jul16-Jun17	Jul17-Jun18	Jul18-Jun19
Sub-Total Brought Forward		**553,294,796**	**68,335,000**	**44,054,570**	**55,603,954**	**42,494,532**	**34,850,520**	**50,481,240**	**9,558,430**	**34,986,604**	**10,611,618**	**23,751,700**	**37,266,052**	**58,612,915**	**38,036,961**	**37,171,700**	**12,579,000**
New Transfer Stations																	
Tongaat																	
Planning and design	?	377,000				245,000	132,000										
Initial development		3,796,000				760,000	3,036,000										
Electron Road																	
Conceptual Planning and design	SKC/Arup JV	-															
Initial Detailed Planning and Design		4,136,000				2,750,000	1,386,000										
Initial infrastructure development		27,610,000				18,370,000	9,240,000										
Initial equipment at RTS		26,510,000				17,490,000	9,020,000										
Equipment at Buffelsdraai		5,357,000				3,465,000	1,892,000										
Future Detailed Planning and Design		3,146,000												2,365,000	781,000		
Future infrastructure development		21,010,000													21,010,000		
Future equipment at RTS		21,230,000													21,230,000		
Future equipment at Buffelsdraai		1,320,000													1,320,000		
Umbumbulu																	
Initial Detailed Planning and Design	?	45,000					45,000										
Initial infrastructure development		500,000					500,000										
New Garden Refuse Sites																	
Waterfall																	
Planning and design	SKC	155,000			155,000												
Initial development		1,320,000			1,320,000												
Hillcrest																	
Planning and design	SKC	155,000			155,000												
Initial development		1,320,000			1,320,000												
Kloof																	
Planning and design	SKC	155,000			155,000												
Initial development		1,320,000			1,320,000												
R293 Townships																	
Planning and design	?	110,000			110,000												
Initial development		1,000,000			1,000,000												
Provision of Offices																	
Queensburgh Offices																	
Planning and design	?	100,000			100,000												
Initial development		800,000			800,000												
New Germany Offices																	
Planning and design	?	350,000			350,000												
Initial development		4,000,000			4,000,000												
Durban Central Depot Offices																	
Planning and design	?	165,000			165,000												
Initial development		1,500,000			1,500,000												
Tongaat Depot Upgrading																	
Initial development		500,000			500,000												
Waterfall Depot																	
Planning and design		120,000			120,000												
Initial development		1,000,000			1,000,000												
Waterfall Washbay																	
Planning and design	?	35,000			35,000												
Initial development		300,000			300,000												
Total / Annual Totals Infrastructure		**682,736,796**	**68,335,000**	**44,054,570**	**70,008,954**	**85,574,532**	**60,101,520**	**50,481,240**	**9,558,430**	**34,986,604**	**10,611,618**	**23,751,700**	**37,266,052**	**60,977,915**	**82,377,961**	**37,171,700**	**12,579,000**

Note : All amounts are stated in current (2004) Rands

eThekwini Municipal Area Integrated Waste Management Plan - 2004 (2004-09)

Capital Expenditure Budget - Disposal Site Plant and Equipment

	Consultants	Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
		Total Budget	Jul04-Jun05	Jul05-Jun06	Jul06-Jun07	Jul07-Jun08	Jul08-Jun09	Jul09-Jun10	Jul10-Jun11	Jul11-Jun12	Jul12-Jun13	Jul13-Jun14	Jul14-Jun15	Jul15-Jun16	Jul16-Jun17	Jul17-Jun18	Jul18-Jun19
Disposal Site Plant and Equipment																	
La Mercy																	
Site Vehicle Replacement		3,190,000		3,190,000													
Bisasar Road																	
Site Vehicle Replacement		51,920,000		3,740,000	1,540,000	3,740,000	6,600,000	6,600,000	5,720,000	2,860,000	2,310,000	3,740,000	1,540,000	2,420,000	3,190,000	4,510,000	3,410,000
Mariannhill																	
Site Vehicle Replacement		15,070,000		1,540,000			1,320,000	1,320,000	1,980,000	4,070,000				1,540,000	1,320,000		1,980,000
Shallcross																	
Site Vehicle Replacement		2,420,000	1,210,000										1,210,000				
Wyebank																	
Site Vehicle Replacement		3,080,000	1,540,000								1,540,000						
Lovu																	
Site Vehicle Replacement		16,500,000				8,250,000								5,170,000		3,080,000	
Feralloys																	
Site Vehicle Replacement		8,250,000												8,250,000			
EDSW Shongweni																	
Site Vehicle Replacement		13,420,000						8,250,000								5,170,000	
Buffelsdraai																	
Site Vehicle Replacement		21,450,000	4,950,000	3,300,000						1,760,000	6,380,000	1,980,000	1,760,000	1,320,000			
Total / Annual Totals Disposal Site Plant		**135,300,000**	**7,700,000**	**11,770,000**	**1,540,000**	**11,990,000**	**7,920,000**	**16,170,000**	**7,700,000**	**8,690,000**	**10,230,000**	**5,720,000**	**4,510,000**	**18,700,000**	**4,510,000**	**12,760,000**	**5,390,000**

Note : All amounts are stated in current (2004) Rands

NOTE: On Closure of La Mercy and Bisasar Road Landfills, Disposal Site Plant and Equipment Will be Redeployed to Buffelsdraai Landfill Site.

eThekwini Municipal Area Integrated Waste Management Plan - 2004 (2004-09)

Capital Expenditure Budget - Collection and Transfer Vehicles

	Consultants	Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Collection and Transfer Vehicles		Total Budget	Jul04-Jun05	Jul05-Jun06	Jul06-Jun07	Jul07-Jun08	Jul08-Jun09	Jul09-Jun10	Jul10-Jun11	Jul11-Jun12	Jul12-Jun13	Jul13-Jun14	Jul14-Jun15	Jul15-Jun16	Jul16-Jun17	Jul17-Jun18	Jul18-Jun19
Vehicle Replacement		262,075,000	32,810,000	10,260,000	10,465,000	8,750,000	15,990,000	6,110,000	15,310,000	12,320,000	29,800,000	8,820,000	32,490,000	12,650,000	48,140,000	11,110,000	7,050,000
Vehicle Augmentation		28,170,000	-	880,000	3,510,000	880,000	1,880,000	1,440,000	1,760,000	3,190,000	1,880,000	880,000	2,080,000	2,640,000	2,310,000	880,000	3,960,000
Total / Annual Totals Collection/Transfer Vehicles		**290,245,000**	**32,810,000**	**11,140,000**	**13,975,000**	**9,630,000**	**17,870,000**	**7,550,000**	**17,070,000**	**15,510,000**	**31,680,000**	**9,700,000**	**34,570,000**	**15,290,000**	**50,450,000**	**11,990,000**	**11,010,000**

Note : All amounts are stated in current (2004) Rands

Appendix 5.3

Comprehensive Vehicle Replacement Schedule

22/04/05

SKC ENGINEERS COASTAL

OVERALL VEHICLE REPLACEMENT CENTRAL AND EXTERNAL REGIONS

eThekwini Water Services - Cleansing and Solid Waste

Vehicle Life Expectancy and Replacement Proposed by SKC (Revised 2004 - October)

Depot	Pending Deregistration	Ex Reg. No.	Reg. No.	Make	Model	Year	Category	Capacity	Usage	Km (03/10)	Cond	Life years	Utilise	79/80	80/81	81/82	82/83	83/84	84/85	85/86	86/87	87/88	88/89	89/90	90/91	91/92	92/93	93/94	94/95	95/96	96/97	97/98	98/99	99/00	00/01	01/02	02/03	03/04	04/05	05/06	06/07	07/08	08/09	09/10	10/11	11/12	12/13	13/14	14/15	15/16	16/17	17/18
S/field			Ndc 4349	Ford	Cargo	1995	Sweeper	5 m³	Cleaning	76823	Fair		Full																																								
S/field			Ndc 4596	Ford	Cargo	1996	Sweeper	5 m³	Cleaning	53092	Fair	1	Full																																								
N/German			Ndc 4783		Trailer	1988	Sweeper	4m³ / 1Ton	Cleaning		Good		Partial																																								
Bisasar	Ndm 4000			Isuzu	KB 200	1997	LDV	1 ton	Disp/site	107185	Good		Full																																								
S/field			Ndm 4001	Erf	EC 14	1998	Hooklift 8x4	20 ton	Shuttle	98372	Good	5	Partial																																								
S/field			Ndm 4002	Mercedes	24.26	1998	T/Hoist	10 ton	Skips	310533	Good	4	Full																																								
Sydney Rd			Ndm 4003	Mercedes	16.17	1998	Comp	12 m³	Collection	96394	Good	7	Full																																								
Que/burgh			Ndm 4004	Mercedes	16.17	1998	Comp	12 m³	Collection	84381	Good	7	Full																									replaces Npn 34475											Refurbished May 2002					
C/wood			Ndm 4005	Mercedes	16.17	1998	Comp	12 m³	Collection	139998	Good	7	Full																																								
M/Landfill			Ndm 4006	Nissan	2.7D	1998	LDV	1 ton	Transport	127487	Good	1	Full																																								
C/wood			Ndm 4007	Nissan	2.7D	1998	LDV	1 ton	Transport	131135	Good	1	Full																																								
Alice St			Ndm 4009	Nissan	2.7D	1998	LDV	1 ton	Transport	45119	Good	1	Full																																								
Bisasar			Ndm 4010	Toyota	L/cruiser	1998	4x4	1 ton	Transport	101005	Good	1	Full																																								
Amanzimtoti			Ndm 4011	F/liner	F L. 70	1998	Comp	12 m³	Collection	613130	Good	7	Full																																								
S/field			Ndm 4012	Nissan	CW 290	1998	Ind Comp	19 m³	Collection	136555	Good	9	Full																																								
S/field			Ndm 4013	Erf	EC 14	1998	Hooklift 8x4	20 ton	Shuttle	130464	Good	5	Partial																														accident damage 21/11/2002 (Repaired)									
S/field			Ndm 4014	Nissan	Cabstar	1998	Tipper	3.5 ton	Collection	119646	Good	3	Full																																								
Sydney Rd			Ndm 4015	Nissan	Cabstar	1998	Tipper	3.5 ton	Collection	96926	Good	3	Full																																								
C/wood			Ndm 4016	Nissan	Cabstar	1998	Tipper	3.5 ton	Collection	205681	Good	3	Full																																								
C/wood			Ndm 4017	Nissan	Cabstar	1998	Tipper	3.5 ton	Collection	141928	Good	3	Full																																								
L/Landfill	Ndm 4018			Nissan	2.7D	1998	LDV	1 ton	Transport	152682	Good	1	Full																																								
S/field			Ndm 4020	M.A.K.	Trailer	1998	RTS Trailer	4.5 ton	Shuttle		Good	10	Full																																								
C/wood			Ndm 4021	M.A.K.	Trailer	1998	RTS Trailer	4.5 ton	Shuttle		Good	10	Full																																								
S/field			Ndm 4022	Toyota	Hino	1998	T/Hoist	10 ton	Collection	199286	Good	4	Full																																								
S/field			Ndm 4023	Toyota	Hino	1998	T/Hoist	10 ton	Collection	169003	Good	4	Full																																								
Alice St			Ndm 4024	Lasco	Trailer	1998	Pavewash	0.5 ton	Cleaning		Good	4	Full																																								
S/field			Ndm 4025	Peterbilt	M11	1996	Ind Comp	19 m³	Collection	97530	Good	7	Partial																																								
S/field		Npn 24294	Ndm 4026	Nissan	Cabstar	1997	Tipper	3.5 ton	Collection	20792	Good	2	Full																																								
Beach			Ndm 4027	Mercedes	Sprinter	1997	Tipper	3.5 ton	Collection	100983	Good	2	Full																																								
C/wood			Ndm 4028	Nissan	Cabstar	1999	Tipper	3.5 ton	Collection	132251	Good	4	Full																																								
Dbn Nth			Ndm 4029	Nissan	Cabstar	1999	Tipper	3.5 ton	Collection	110293	Good	4	Full																																								
F. Garage			Ndm 4030	Nissan	Cabstar	1999	Tipper	3.5 ton	Collection	64724	Good	4	Partial																																								
C/wood			Ndm 4031	Nissan	Cabstar	1999	Tipper	3.5 ton	Collection	106516	Good	4	Full																																								
S/field			Ndm 4032	Mercedes	24.26	1999	Hooklift 6x4	15 ton	Skips	232276	Good	6	Full																																								
S/field			Ndm 4033	Nissan	2.7D	1999	LDV	1 ton	Transport	48812	Good	2	Full																																								
S/field			Ndm 4034	Nissan	2.7D	1999	LDV	1 ton	Transport	45662	Good	2	Full																																								
S/field			Ndm 4035	M.A.K.	Trailer	1999	GRTS Trailer	4.5 ton	Skips		Good	11	Partial																																								
Beach			Ndm 4036	Tennant	Sweeper	2000			Collection		Good	2	Full																																								
Dbn Nth			Ndm 4046	Isuzu	NPR 400	2000	Tipper	4 ton	Collection	27111	Good	5	Full																																								
Sydney Rd			Ndm 4047	Isuzu	NPR 400	2000	Tipper	4 ton	Collection	33877	Good	5	Full																																								
S/field			Ndm 4048	Isuzu	NPR 400	2000	Tipper	4 ton	Collection	34090	Good	5	Full																																								
S/field	Ndm 4049			M.A.N.	16.24	1983	Breakdown	8 ton	Recovery	471474	Fair	1	Partial																											Converted to recovery van 99/00														
C/wood			Ndm 4050	Isuzu	NPR 400	2000	Tipper	4 ton	Collection	71749	Good	5	Full																																								
C/wood			Ndm 4051	Mercedes	Atego15.17	2000	Comp	10 m³	Collection	48603	Good	9	Full																																								
S/field			Ndm 4052	Mercedes	Atego15.17	2000	Comp	10 m³	Collection	21275	Good	9	Full																																								
C/wood			Ndm 4053	Mercedes	Atego15.17	2000	Comp	10 m³	Collection	52437	Good	9	Full																																								
S/field			Ndm 4055	Poole	Trailer	1984	GRTS Trailer	4.5 ton	Skips		Fair		Full																																								
S/field			Ndm 4056	Mercedes	Atego15.17	2000	Comp	10 m³	Collection	21395	Good	9	Full																																								
S/field			Ndm 4057	Mercedes	Atego15.17	2000	Comp	10 m³	Collection	27008	Good	9	Full																																								
S/field			Ndm 4058	Mercedes	Atego15.17	2000	Comp	10 m³	Collection	20796	Good	9	Full																																								
S/field			Ndm 4059	Nissan	2.7D	2001	LDV	1 ton	Liaison		Good	4	Full																																								
S/field			Ndm 4060	Nissan	2.7D	2001	LDV	1 ton	Liaison		Good	4	Full																																								
S/field		Ndm 4054	Ndm 4062	Mercedes	26.28	2001	Hooklift 6x4	15 ton	Skips		Good	8	Full																																								
Phoenix		Ndc 4469	Ndm 4063	TATA	713 S	2002	Tipper	4 ton	Collection		Good		Full																																								
C/wood		Ndc 4424	NDM 4064	TATA	713 S	2002	Tipper	4 ton	Collection		Good	7	Full																																								
C/wood		Ndc 4384	Ndm 4065	TATA	713 S	2002	Tipper	4 ton	Collection	24183	Good	7	Full																																								
Phoenix			Ndm 4066	TATA	713 S	2002	Tipper	4 ton	Collection		Good	7	Full																																								
C/wood			Ndm 4067	TATA	713 S	2002	Tipper	4 ton	Collection	25546	Good	7	Full																																								
C/wood		Ndm 4044	Ndm 4068	M.A.N.	14.224L	2002	Comp	10 m³	Collection	20632	Good	11	Full																																								
C/wood		Ndm 4038	Ndm 4069	M.A.N.	14.224L	2002	Comp	10 m³	Collection	24700	Good	11	Full																																								
Que/burgh			Ndm 4070	M.A.N	14.224L	2002	Comp	10 m³	Collection	17003	Good	11	Full																																								
N/German			Ndm 4071	M.A.N	14.224L	2002	Comp	10 m³	Collection		Good	11	Full																																								
Dbn Nth		Ndm 4040	Ndm 4072	M.A.N.	14.224L	2002	Comp	10 m³	Collection		Good	11	Full																																								
Dbn Nth		Ndm 4042	Ndm 4073	M.A.N.	14.224L	2002	Comp	10 m³	Collection		Good	11	Full																																								
C/wood		Ndm 4039	Ndm 4074	M.A.N.	14.224L	2002	Comp	10 m³	Collection	14052	Good	11	Full																																					Accident damage 2003/07/29			
Wyebank			Ndm 4075	M.A.N	14.224L	2002	Comp	10 m³	Collection	21890	Good	11	Full																																								
Dbn Nth			Ndm 4076	M.A.N.	14.224L	2002	Comp	10 m³	Collection		Good	11	Full																																								
Dbn Nth		Ndm 4037	Ndm 4077	M.A.N.	14.224L	2002	Comp	10 m³	Collection		Good	11	Full																																								
F. Garage			Ndm 4078	M.A.N.	14.224L	2002	Comp	10 m³	Collection		Good	11	Partial																																								
Alice St			Ndm 4079	M.A.N.	14.224L	2002	Comp	10 m³	Collection		Good	11	Full																																								
Amanzimtoti			Ndm 4080	M.A.N.	14.224L	2002	Comp	10 m³	Collection	11582	Good	11	Full																																								
C/wood		Ndm 4045	Ndm 4081	M.A.N.	14.224L	2002	Comp	10 m³	Collection	13603	Good	11	Full																																								
C/wood		Ndm 4041	Ndm 4082	M.A.N.	14.224L	2002	Comp	10 m³	Collection	17132	Good	11	Full																																								
F. Garage			Ndm 4083	M.A.N.	14.224L	2002	Comp	10 m³	Collection		Good	11	Partial																																								
C/wood		Ndm 4043	Ndm 4084	M.A.N.	14.224L	2002	Comp	10 m³	Collection	13928	Good	11	Full																																								
SOE			Ndm 4085	M.A.N.	14.224L	2002	Comp	10 m³	Collection	13445	Good	11	Full																																								
C/wood			Ndm 4086	M.A.N.	14.224L	2002	Comp	10 m³	Collection	15090	Good	11	Full																																								
N/German			Ndm 4087	M.A.N	14.224L	2002	Comp	10 m³	Collection	15200	Good	11	Full																																								
Umhlanga			Ndm 4088	M.A.N.	14.224L	2002	Comp	10 m³	Collection	20896	Good	11	Full																																								
S/field			Ndm 4089	M.A.N.	14.224L	2002	Comp	10 m³	Collection		Good	11	Full																																								
S/field			Ndm 4090	M.A.N.	14.224L	2002	Comp	10 m³	Collection		Good	11	Full																																								
Dbn Nth	Ndm 4091			Mercedes	14.13	1992	Comp	10 m³	Collection	178046	Fair	1	Full																																								
C/wood	Ndm 4092			Mercedes	14.13	1992	Comp	10 m³	Collection	176523	Fair	1	Full																																								
C/wood	Ndm 4093			Mercedes	14.13	1992	Comp	10 m³	Collection	79415	Fair	1	Full																																								
SOE	Ndm 4094			Mercedes	14.13	1992	Comp	10 m³	Collection	184910	Fair	3	Full																													Refurbished May 2002												
Amanzimtoti	Ndm 4095			Mercedes	14.13	1992	Comp	10 m³	Collection	177093	Fair	1	Full																																								
Beach	Ndm 4097			Mercedes	14.13	1992	Comp	10 m³	Collection	108520	Fair	1	Full																																								
C/wood	Ndm 4098			Mercedes	14.13	1992	Comp	10 m³	Collection	357275	Fair	1	Full																																								
S/field	Ndm 4099			Mercedes	14.13	1992	Comp	10 m³	Collection	209153	Fair	1	Full																																								
S/field			Ndm 4100	M.A.N.	26.284K	2002	T/Hoist	12 ton	Skips	30984	Good	8	Full																																								
S/field			Ndm 4101	M.A.N.	26.284K	2002	T/Hoist	12 ton	Skips		Good	8	Full																																								
S/field		Ndm 4320	Ndm 4102	M.A.N.	26.284L	2002	Rotopress	19 m³	Collection		Good	14	Full																																								
Sydney Rd		Ndm 4389	Ndm 4103	M.A.N.	26.284L	2002	Rotopress	19 m³	Collection		Good	14	Full																																								
Sydney Rd		Ndm 4348	Ndm 4104	M.A.N.	26.284L	2002	Rotopress	19 m³	Collection		Good	14	Full																																								
Sydney Rd		Ndm 4308	Ndm 4105	M.A.N.	26.284L	2002	Rotopress	19 m³	Collection		Good	14	Full																																								
Sydney Rd		Ndm 4370	Ndm 4106	M.A.N.	26.284L	2002	Rotopress	19 m³	Collection		Good	14	Full																																								
S/field			Ndm 4107	M.A.N.	26.284L	2002	Rotopress	19 m³	Collection		Good	14	Partial																																								
Sydney Rd		Ndm 4306	Ndm 4108	M.A.N.	26.284L	2002	Rotopress	19 m³	Collection		Good	14	Full																																								
S/field			Ndm 4109	M.A.N.	26.284L	2002	Ind Comp	19 m³	Collection		Good	13	Full																																								
S/field			Ndm 4110	M.A.N.	26.284L	2002	Ind Comp	19 m³	Collection		Good	13	Full																																								
S/field			Ndm 4111	M.A.N.	26.284L	2002	Ind Comp	19 m³	Collection	22881	Good	13	Partial																																								
S/field		Ndm 4324	Ndm 4112	M.A.N.	26.284L	2002	Ind Comp	19 m³	Collection	31326	Good	13	Full																																								**accident 17/11/2002**
S/field	Ndm 4113			Mercedes	19.24	1991	T/Hoist	9 ton	Skips	470688	Fair		Partial																																								
Phoenix	Ndm 4114			M.A.N.	30.24	1991	Ind Comp	19 m³	Collection	304736	Fair	2	Partial																																								
S/field			Ndm 4115	M.A.N.	26.284L	2002	Ind Comp	19 m³	Collection		Good	13	Full																																								
Phoenix			Ndm 4116	M.A.N.	26.284L	2002	Ind Comp	19 m³	Collection		Good	13	Full																																								
S/field			Ndm 4117	M.A.N.	26.284L	2002	Ind Comp	19 m³	Collection		Good	13	Partial																																								
Chatsworth			Ndm 4118	M.A.N.	41.374L	2002	Hooklift 8x4	20 ton	Shuttle		Good	9	Full																																								
Umlazi			Ndm 4119	M.A.N.	41.374L	2002	Hooklift 8x4	20 ton	Shuttle		Good	9	Full																																								
Amanzimtoti			Ndm 4120	Nissan	1400	2002	LDV	0.5 ton	Transport	40800	Good	5	Full																																								
Amanzimtoti			Ndm 4121	Nissan	1400	2002	LDV	0.5 ton	Transport	33800	Good	5	Full																																								
Umhlanga	Ndm 4122	Nur 361		Mazda	B 1600	1989	LDV	1 ton	Transport	?	Poor		Full																																								
Ottawa	Ndm 4123	Nj 52218		Nissan	Cabstar	1994	Tipper	3.5ton	Collection	46994	Fair	1	Partial																																								
Ottawa		Nur 22359	Ndm 4125	Ford	1800	1999	LDV	0.75 ton	Transport	96485	Good	2	Full																																								
S/field	Ndm 4126			M.A.N.	15.17	1991	Comp	12 m³	Collection	100425	Fair		Partial																																								
C/wood			Ndm 4127	Isuzu	KB 200	1995	LDV	1 ton	Post	221525	Fair		Full																																								
C/wood			Ndm 4129	Isuzu	KB 200	1995	LDV	1 ton	Liason	189772	Fair		Full																																								
Dbn Nth			Ndm 4130	Isuzu	KB 200	1995	LDV	1 ton	Liason	189134	Fair		Full																																								
N/German		Npn 26875	Ndm 4131	Bell	754 D	1988	Tractor		Collection	934	Fair		Partial																																								
Dbn Nth	Ndm 4132			Mercedes	14.13	1992	Comp	10 m³	Collection	215518	Fair	1	Full																																								
S/field	Ndm 4133			Mercedes	14.13	1992	Comp	10 m³	Collection	213909	Fair	1	Partial																																								
SOE	Ndm 4134			Mercedes	14.13	1992	Comp	10 m³	Collection	174564	Fair	1	Full																								Refurbished																
C/wood	Ndm 4135			Mercedes	14.13	1992	Comp	10 m³	Collection	126229	Fair	1	Full																																								
S/field	Ndm 4136			Mercedes	14.13	1992	Comp	10 m³	Collection	449777	Fair	1	Full																																								
S/field	Ndm 4137			Mercedes	14.13	1992	Comp	10 m³	Collection	211769	Fair	1	Partial																																								
SOE	Ndm 4138			Mercedes	14.13	1992	Comp	10 m³	Collection	181004	Fair	1	Full																											New Engine March 2002														
N/German		Nu 4865	Ndm 4139	Isuzu	FTR800TD	1999	Comp	10 m³	Collection	58213	Good	7	Full																																								
Ottawa		Nur 13757	Ndm 4140	Isuzu	F 8000 D	1996	Comp	12 m³	Collection	47883	Fair	4	Full																																								
C/wood	Ndm 4142			Mercedes	14.13	1992	Comp	10 m³	Collection	198368	Fair	1	Full																																								

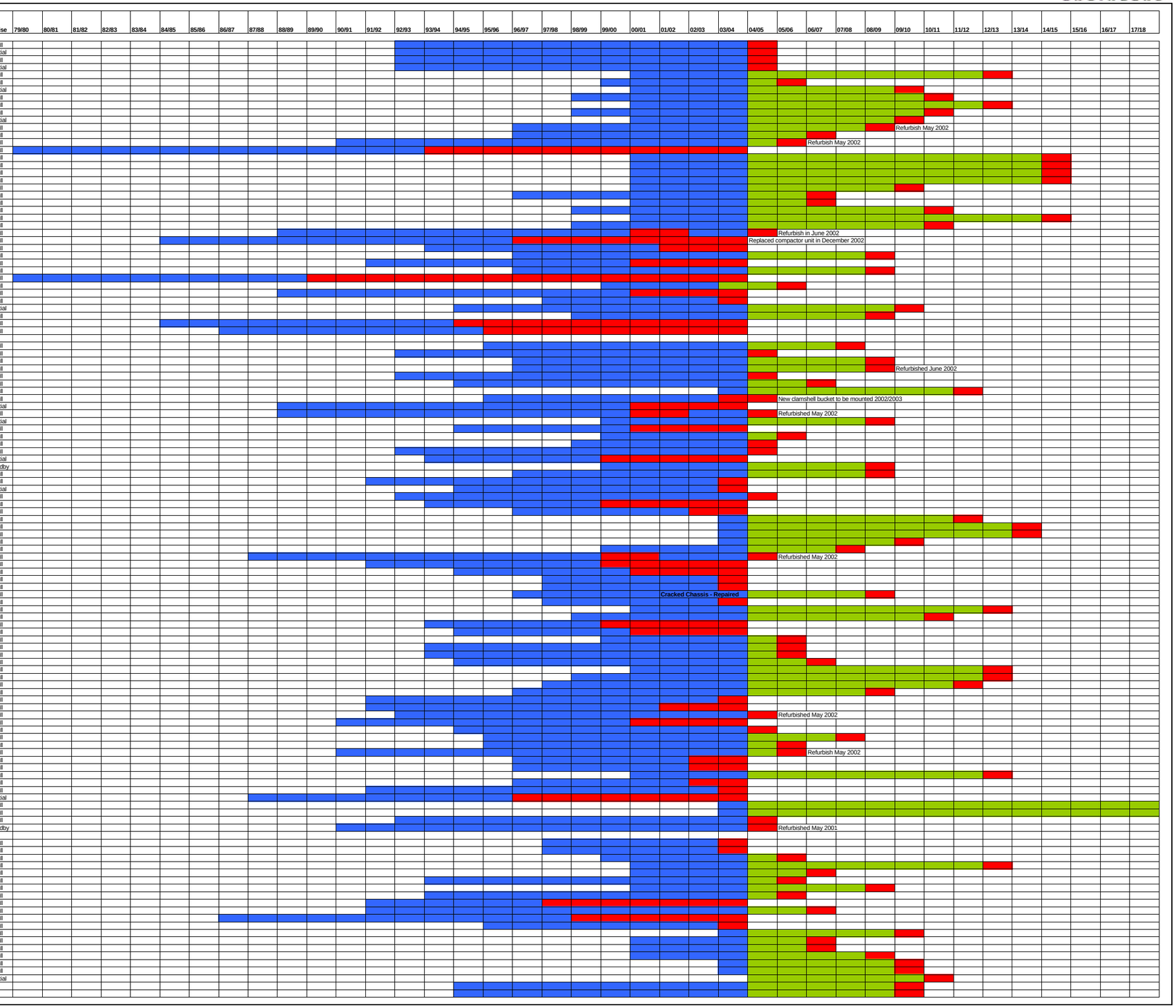
SKC ENGINEERS COASTAL

OVERALL VEHICLE REPLACEMENT CENTRAL AND EXTERNAL REGIONS

eThekwini Water Services - Cleansing and Solid Waste

Vehicle Life Expectancy and Replacement Proposed by SKC (Revised 2004 - October)

Depot	Pending Deregistration	Ex Reg. No.	Reg. No.	Make	Model	Year	Category	Capacity	Usage	Km (03/10)	Cond	Life years	Utilise
C/wood	Ndm 4143			Mercedes	14.13	1992	Comp	10 m³	Collection	130354	Fair	1	Full
S/field	Ndm 4144			Mercedes	14.13	1992	Comp	10 m³	Collection	?	Fair	1	Partial
SOE	Ndm 4145			Mercedes	14.13	1992	Comp	10 m³	Collection	183469	Fair	1	Full
S/field	Ndm 4146			Mercedes	14.13	1992	Comp	10 m³	Collection	151557	Fair	1	Partial
Ottawa		Nur 25602	Ndm 4147	Mercedes	Nego 15/1	2000	Comp	12 m³	Collection	71237	Good	9	Full
Umhlanga		Nur 22356	Ndm 4148	Mazda	B 1800	1999	LDV	1 ton	Transport	137343	Good	2	Full
Tongaat		Nur 24510	Ndm 4149	Smarty Bod	Box Body	2000	Mini-Trailer	0.6 ton	Transport		Good	12	Partial
Que/burgh		Npn 98970	Ndm 4150	Freightliner	FL 70 D	1998	Comp	12 m³	Collection	69772	Good	7	Full
N/German		Npn 42952	Ndm 4152	Isuzu	FTR800D	2000	Comp	10 m³	Collection	47565	Good	9	Full
N/German		Npn 98984	Ndm 4153	Freightliner	FL 70 D	1998	Comp	12 m³	Collection	62753	Good	7	Full
Tongaat		Nur 25571	Ndm 4154	Smarty Bod	Drop Side	2000	Trailer	1 ton	Transport		Good	6	Partial
Umhlanga		Nur 13600	Ndm 4155	Nissan	CM 16	1997	Comp	12 m³	Collection	80305	Fair	5	Full
N/German		Npn 19490	Ndm 4156	Toyota	Hino	1998	Hooklift 4x4	7 ton	Skips	65120	Good	3	Full
Umhlanga	Ndm 4157	Nur 4678		Isuzu	F 9000	1991	Comp	12 m³	Collection	131971	Fair	2	Full
Tongaat		Nj 9335	Ndm 4158	Caterpillar	920	1975	Payloader		Cleaning	3358hours	Fair		Full
Tongaat		Nur 26204	Ndm 4160	Mercedes	26.28	2000	Ind Comp	19 m³	Collection	52144	Good	11	Full
Tongaat		Nur 17100	Ndm 4161	Mercedes	26.28	2000	Ind Comp	19 m³	Collection	46224	Good	11	Full
Tongaat		Nur 1421	Ndm 4162	Mercedes	26.28	2000	Ind Comp	19 m³	Collection	49112	Good	11	Full
Umhlanga		Nur 19927	Ndm 4163	Mercedes	26.28	2000	Ind Comp	19 m³	Collection	57413	Good	11	Full
N/German		Npn 41487	Ndm 4164	Jet	Trailer	2000	Tractor/Traile	1 ton	Collection		Fair	6	Full
N/German		Npn 16965	Ndm 4165	Toyota	Hino	1997	Hooklift 4x4	7 ton	Skips	104334	Good	3	Full
Tongaat		Nur 14278	Ndm 4166	Ford	Ranger 1.8	2000	LDV	1 ton	Transport	?	Good	3	Full
N/German		Npn 25402	Ndm 4167	Freightliner	FL 70 D	1998	Comp	10 m³	Collection	68913	Good	7	Full
Ottawa		Nur 26206	Ndm 4168	Mercedes	26.28	2000	Ind Comp	19 m³	Collection	58955	Good	11	Full
Que/burgh		Npn 14961	Ndm 4169	Freightliner	FL 70 D	1998	Comp	10 m³	Collection	69541	Good	7	Full
Amanzimtoti	Ndm 4170	Nd 445414		Mercedes	12.13	1988	Comp	10 m³	Collection	174026	Fair	1	Full
Amanzimtoti	Ndm 4171	Nd 359564		Mercedes	12.13	1985	Comp	10 m³	Collection	312200	Fair		Full
Que/burgh		Npn 21339	Ndm 4172	Isuzu	N 4000 D	1994	Cage Tipper	4 ton	Tran/Clean	99014	Fair		Full
N/German		Npn 92217	Ndm 4173	Mercedes	16.17/48 D	1996	Comp	12 m³	Collection	110156	Good	5	Full
OWOE	Ndm 4174	Npn 18738		Nissan	CM 12	1991	Telehoist	8 m³	Skips	88488	Fair		Full
N/German		Npn 21398	Ndm 4175	Toyota	Hino	1997	Comp	10 m³	Collection	76129	Good	5	Full
Wyebank	Ndm 4176	Npn 45610		Caterpillar	930	1972	Payloader	?	Gard Ref		Fair		Full
Wyebank		Nu 22366	Ndm 4177	Nissan	2.7 D	2000	LDV	1 ton	Transport	126605	Good	2	Full
Amanzimtoti	Ndm 4179	Nu 19381		Toyota	Hino	1989	Paddle-packe	10 m³	Collection	106667	Fair		Full
Amanzimtoti		Nd 120602	Ndm 4180	Opel	Corsa	1997	LDV	0.5 ton	Transport	158662	Good		Full
KDBA		Ndc 3806	Ndm 4181	ERF	single deck	1994	Bus	12 &more	Transport		Good	6	Partial
Amanzimtoti		Nd 358267	Ndm 4182	Mercedes	24.26	1998	Hooklift 6x4	15 ton	Shuttle	237091	Good	5	Full
Amanzimtoti	Ndm 4183	Nd 89868		Mercedes	22.19	1985	Hooklift 6x4	15 ton	Shuttle	351516	Fair		Full
Amanzimtoti	Ndm 4184	Nd 116258		Mercedes		1986	Box Tipper	16 m³	Collection	304931	Poor		Full
Umhlanga	Ndm 4186	Nur 9502		Isuzu	F 8000	1995	Comp	12 m³	Collection	97195	Fair	4	Full
Que/burgh		Npn 29032	Ndm 4187	Toyota	Hino 14-17	1992	Comp	10 m³	Collection	113050	Fair	1	Full
N/German		Npn 3940	Ndm 4188	Toyota	Hino	1997	Comp	10 m³	Collection	98024	Good	5	Full
Que/burgh		Npn 3899	Ndm 4189	Toyota	Hino 16-17	1998	Comp	10 m³	Collection	69012	Good	5	Full
Ottawa		Nj 4316	Ndm 4190	Nissan	CM 12	1993	Comp	12 m³	Collection	106944	Fair	1	Full
Kloof		Npn 63279	Ndm 4192	Mercedes	12.14/48D	1995	Comp	12 m³	Collection	125028	Fair	3	Full
OWOE			Ndm 4193	TATA	713 S	2003	Tipper	4 ton	Collection	4902	Good	8	Full
Tongaat		Nur 9523	Ndm 4194	Nissan	CM 12	1995	Tipper	8 ton / 4m³	Collection	76493	Good		Full
N/German		Nu 103116	Ndm 4195	Isuzu	FTR 800 D	1988	Comp	10 m³	Collection	164257	Poor		Partial
Amanzimtoti		Nd 445867	Ndm 4196	Mercedes	12.13	1989	Comp	10 m³	Collection	251095	Fair	1	Full
Tongaat		Nur 2051	Ndm 4197	M Ferguson	240	1999	Tractor		Cleaning	191hours	Good	5	Partial
Umhlanga		Nur 13516	Ndm 4198	Mazda	B 1800	1994	LDV	1 ton	Transport	287658	Poor		Full
Ottawa		Nur 3741	Ndm 4200	Isuzu	KB 200	1999	LDV	1 ton	Transport	65158	Good	2	Full
Tongaat		Nur 3512	Ndm 4201	Isuzu	KB 200i	1999	LDV	1 ton	Transport	58674	Good	1	Full
Umhlanga		Nur 4676	Ndm 4202	Isuzu	F 9000	1993	Comp	12 m³	Collection	120000	Fair	1	Full
Amanzimtoti		Nd 103658	Ndm 4203	Ford	1.8Courier	1993	LDV	1 ton	Transport	225523	Good		Partial
N/German		Npn 16295	Ndm 4204	Hunter	Trailer	1999	Trailer	0.165 ton	Rd.Spill		Good	5	Standby
N/German		Npn 19492	Ndm 4205	Toyota	Hino	1997	Comp	10 m³	Collection	89262	Good	5	Full
N/German	Ndm 4206	Nu 125504		Mercedes	12.13 D	1991	Comp	10 m³	Collection	128418	Good		Full
N/German		Nu 30952	Ndm 4207	Mercedes	12.14/48 D	1994	Telehoist	18 m³	Skips	137129	Good		Partial
Ottawa		Nj 17831	Ndm 4208	Toyota	Hino	1993	Comp	10 m³	Collection	160800	Fair	1	Full
Que/burgh		Npn 36899	Ndm 4209	Toyota	1.8 Hilux	1994	LDV	1 ton	Transport	304115	Good		Full
Tongaat		Nj 61901	Ndm 4210	Ford	1300	1996	LDV	0.5 ton	Transport	115674	Poor		Full
Umhlanga			Ndm 4212	TATA	713 S	2003	Tipper	4 ton	Collection		Good	8	Full
Amanzimtoti			Ndm 4213	Mercedes	Atego	2003	Hooklift 6x4	15 ton	Shuttle	1419	Good	10	Full
Mt. Edgecom			Ndm 4214	M.A.N	41.374L	2003	Hooklift 8x4	20 ton	Shuttle		Good	10	Full
OWOE			Ndm 4215	Ford Range	2.0	2003	4x4 DC	1 ton	Liaison	6105	Good	6	Full
Ottawa		Nur 14691	Ndm 4216	Mitsubishi	300 Cante	2000	Tipper	4 ton	Collection	48278	Good	4	Full
Kingsburgh	Ndm 4217	Nd 49763		Mercedes	12.13	1987	Comp	10 m³	Collection	227300	Fair	1	Full
N/German	Ndm 4218	Npn 8957		Mitsubishi	Canter	1991	CageTipper	3 ton	Transport	155634	Fair		Full
N/German		Npn 63086	Ndm 4219	Nissan	1.8	1995	LDV	1 ton	Transport	196844	Good		Full
Wyebank		Nu 8843	Ndm 4220	Isuzu	KB 250 D	1998	LDV	1 ton	Transport	227872	Good		Full
N/German		Npn 98612	Ndm 4221	Mitsubishi	Colt 2.2D	1998	LDV	1 ton	Transport	83679	Good		Full
N/German		Npn 92085	Ndm 4222	Toyota	Hino	1996	Comp	10 m³	Collection	60462	Poor	5	Full
Que/burgh		Npn 16858	Ndm 4223	Mitsubishi	Colt 2.2D	1998	LDV	1 ton	Transport	118622	Good		Full
Que/burgh		Npn 47912	Ndm 4224	Isuzu	FTR800TD	2000	Comp	10 m³	Collection	44206	Good	9	Full
N/German		Npn 38261	Ndm 4225	Isuzu	FTR800TD	1999	Comp	10 m³	Collection	86501	Good	7	Full
Amanzimtoti	Ndm 4226	Nd 227843		Nissan	1800	1993	LDV	1 ton	Transport	354975	Fair		Full
N/German		Npn 40733	Ndm 4227	Mazda	1.8 SWB	1994	LDV	1 ton	Transport	?	Good		Full
Amanzimtoti		Nd 288526	Ndm 4228	Ford	Courier	1999	LDV	1 ton	Transport	?	Fair	2	Full
Amanzimtoti		Nd 147104	Ndm 4229	Mercedes	12.14	1993	Comp	12 m³	Collection	210493	Fair	2	Full
N/German		Npn 27633	Ndm 4230	Mercedes	12.14/48D	1994	Comp	10 m³	Collection	117192	Fair	2	Full
N/German	Ndm 4231	Npn 61960		Mercedes	12.14/48D	1995	Comp	12 m³	Collection	99648	Fair	3	Full
N/German		Npn 48861	Ndm 4232	Isuzu	FTR800TD	2000	Comp	10 m³	Collection	36839	Good	9	Full
Kingsburgh		Nd 383309	Ndm 4233	Mercedes	24.26	1999	Comp	19 m³	Collection	81268	Good	9	Full
Kingsburgh		Nd 358270	Ndm 4234	Mercedes	24.26	1998	Comp	19 m³	Collection	99000	Fair	8	Full
Que/burgh		Npn 27696	Ndm 4235	Isuzu	F 8000 D	1996	Comp	10 m³	Collection	121086	Good	5	Full
Amanzimtoti	Ndm 4236	Nd 461745		Toyota	Hino	1992	Easy Pak	6 m³	Collection	118424	Fair		Full
Amanzimtoti		Nd 324731	Ndm 4238	Mercedes	26.28	1991	Hooklift 6x4	15 ton	Shuttle	421488	Fair		Full
Amanzimtoti	Ndm 4239	Nd 463023		Mercedes	12.14	1992	Comp	10 m³	Collection	139128	Fair	1	Full
Amanzimtoti	Ndm 4240	Nd 276045		Mercedes	26.28	1990	Hooklift 6x4	15 ton	Skips	449433	Fair		Full
Amanzimtoti		Nd 495855	Ndm 4241	Mercedes	24.26	1995	Hooklift 6x4	15 ton	Skips	426776	Good	1	Full
Umkomaas		Nd 394707	Ndm 4242	Toyota	Hino	1996	Comp	6 m³	Collection	88290	Fair	4	Full
Amanzimtoti		Nd 28745	Ndm 4243	Mercedes	24.26	1996	Hooklift 6x4	15 ton	Skips	340105	Good	2	Full
Umhlanga	Ndm 4244	Nur 4677		Isuzu	F 9000	1991	Comp	12 m³	Collection	315379	Fair	2	Full
Que/burgh		Npn 10680	Ndm 4245	Nissan	2.7 LWB	1997	LDV	1 ton	Transport	161083	Good		Full
N/German		Npn 11774	Ndm 4246	Nissan	2.7 LWB	1997	LDV	1 ton	Transport	93172	Good		Full
N/German		Nu 8790	Ndm 4247	Isuzu	FTR800D	2000	Comp	10 m³	Collection	66150	Good	9	Full
N/German		Npn 11785	Ndm 4248	Nissan	2.7 LWB	1997	LDV	1 ton	Transport	?	Good		Full
N/German		Npn 11522	Ndm 4249	Toyota	Hino	1991	Comp	10 m³	Collection	88019	Fair		Full
N/German	Ndm 4250	Npn 25397		Bell	754 D	1988	Tractor		Collection	454	Fair		Partial
Mt. Edgecom			Ndm 4251	Motor Trail		2003	RTS Trailer	4.5 ton	Shuttle		Good	15	Full
Amanzimtoti			Ndm 4252	Motor Trail		2003	RTS Trailer	4.5 ton	Shuttle		Good	15	Full
Amanzimtoti	Ndm 4253	Nx 10451		Toyota	Hino	1992	Comp	10 m³	Collection	85170	Fair	1	Full
Tongaat	Ndm 4254	Nj 15860		Mercedes	14.17	1990	Comp	10m³	Collection	187917	Good	1	Standby
Umhlanga		Nur 19668	Ndm 4256	Nissan	2000	1998	LDV	1 ton	Transport	61000	Fair		Full
Ottawa		Nur 8420	Ndm 4258	Nissan	LDV 2000	1998	LDV	1 ton	Transport	123239	Good		Full
Tongaat		Nur 22290	Ndm 4259	Mazda	1800	1999	LDV	1 ton	Transport	91965	Good	2	Full
N/German		Npn 49658	Ndm 4260	Isuzu	FTR800TD	2000	Comp	10 m³	Collection	45111	Good	9	Full
N/German		Npn 4190	Ndm 4261	Ford	Bantam1.3	2000	LDV	0.5 ton	Transport	27868	Good	3	Full
Que/burgh	Ndm 4262	Nd 279291		Isuzu	F 8000 D	1993	Comp	10 m³	Collection	123842	Good	2	Full
N/German		Nu 29281	Ndm 4263	Toyota	Dyna	2000	Cage Tipper	3 ton	Transport	8465	Good	5	Full
N/German		Npn 44030	Ndm 4264	Mercedes	12.14/48D	1994	Comp	10 m³	Collection	123214	Fair	2	Full
Amanzimtoti	Ndm 4266	Nd 126250		Mazda	B 1800	1992	LDV	1 ton	Transport	321880	Fair		Full
Amanzimtoti		Nd 390808	Ndm 4267	Uni Power	?	1992	Trailer	2.4 ton	Collection		Fair	3	Full
Amanzimtoti	Ndm 4268	Nd 205069		Mercedes	11.13	1986	Tip Pak	6 m³	Collection	222731	Fair		Full
Amanzimtoti		Ndm 1040	Ndm 4270	Isuzu	N3500D	1995	Tipper	3.5 ton	Collection		Fair		Full
S/field			Ndm 4271	Isuzu	KB 250	2003	4x4	1 ton	Liaison		Good	6	Full
S/field		Ndc 870	Ndm 4272	Ford	Ranger	2000	LDV	1 ton	Service		Good	2	Full
S/field		Ndc 959	Ndm 4273	Ford Range	Ranger	2000	LDV	1 ton	Service		Good	2	Full
S/field		Ndc 1127	Ndm 4274	Toyota	Dyna	2001	Cage Truck	3 ton	Service		Good	4	Full
			Ndm 4275	Nissan	1400	2003	LDV	0.5 ton	Transport		Good	5	Full
			Ndm 4276	Nissan	1400	2003	LDV	0.5 ton	Transport		Good	5	Full
			Ndm 4277	Isuzu	KB 220	2004	4x4	1 ton	Transport		Good		Partial
S/field			Ndm 4278	Poole	Trailer	1994	T/HoistTrailer	3.5 ton	Skips		Fair	6	
S/field			Ndm 4280	Poole	Trailer	1994	T/HoistTrailer	3.5 ton	Skips		Fair	6	



SKC ENGINEERS COASTAL

OVERALL VEHICLE REPLACEMENT CENTRAL AND EXTERNAL REGIONS

22/04/05

Vehicle Life Expectancy and Replacement Proposed by SKC (Revised 2004 - October)

Depot	Pending Deregistration	Ex Reg. No.	Reg. No.	Make	Model	Year	Category	Capacity	Usage	Km (03/10)	Cond	Life years	Utilise	79/80	80/81	81/82	82/83	83/84	84/85	85/86	86/87	87/88	88/89	89/90	90/91	91/92	92/93	93/94	94/95	95/96	96/97	97/98	98/99	99/00	00/01	01/02	02/03	03/04	04/05	05/06	06/07	07/08	08/09	09/10	10/11	11/12	12/13	13/14	14/15	15/16	16/17	17/18
S/field			Ndm 4281	Toyota Hilux	2000	2004	LDV	1 ton	Transport		Good	6	Full																																								
S/field			Ndm 4282	Toyota Hilux	2000	2004	LDV	1 ton	Transport		Good	6	Full																																								
S/field			Ndm 4283	Toyota Hilux	2000	2004	LDV	1 ton	Transport		Good	6	Full																																								
S/field			Ndm 4284	Toyota Hilux	2000	2004	LDV	1 ton	Transport		Good	6	Full																																								
S/field			Ndm 4285	Toyota Hilux	2000	2004	LDV	1 ton	Transport		Good	6	Full																																								
S/field			Ndm 4286	Toyota Hilux	2000	2004	LDV	1 ton	Transport		Good	6	Full																																								
			Ndm 4292	Toyota Hilux	2000	2004	LDV	1 ton	Collection		Good	6	Full																																								
			Ndm 4293	Toyota Hilux	2000	2004	LDV	1 ton	Collection		Good	6	Full																																								
			Ndm 4294	Toyota Hilux	2000	2004	LDV	1 ton	Collection		Good	6	Full																																								
			Ndm 4295	Toyota Hilux	2000	2004	LDV	1 ton	Collection		Good	6	Full																																								
			Ndm 4296	Toyota Hilux	2000	2004	LDV	1 ton	Collection		Good	6	Full																																								
			Ndm 4297	Toyota Hilux	2000	2004	LDV	1 ton	Collection		Good	6	Full																																								
Umhlanga		Nur 270	Ndm 4298	Isuzu	F 9000	1994	Comp	10 m³	Collection	122030	Fair	3	Full																																								
			Ndm 4299	Toyota Hilux	2000	2004	LDV	1 ton	Collection		Good	6	Full																																								
S/field	Ndm 4300			Mercedes	22.25	1988	Hooklift 6x4	15 ton	Skips	600331	Poor		Full																										To be replaced by Hooklift 6x4 15ton														
Otawa		Nur 1886	Ndm 4303	Ford Ranger	1.8	2000	LDV	1 ton	Liaison		Good	3	Full																																								
			Ndm 4325	TATA	LPT713	2004	Tipper	4 ton	Collection		Good	8	Full																																								
			Ndm 4326	TATA	LPT713	2004	Tipper	4 ton	Collection		Good	8	Full																																								
			Ndm 4327	TATA	LPT713	2004	Tipper	4 ton	Collection		Good	8	Full																																								
			Ndm 4328	TATA	LPT713	2004	Tipper	4 ton	Collection		Good	8	Full																																								
			Ndm 4329	TATA	LPT713	2004	Tipper	4 ton	Collection		Good	8	Full																																								
			Ndm 4333	Titron	Trailer	2004	RTS Trailer	4.5 ton	Shuttle		Good	15	Full																																								
Sydney Rd		Ndc 4601	Ndm 4338	Isuzu	L 4000	1996	Tipper	3.5 ton	Collection	131063	Fair	1	Full																																								
Alice St		Ndc 994	Ndm 4339	Mercedes	15.17	1987	W/tankr	5000 litr	Pavewash	114752	Good	1	Full																											Refurbished May 2002														
		Npn 37094	Ndm 4340	Mercedes	Actros	2003	Comp	19 m³	Collection		Good	13	Full																																								
		Nj 35759	Ndm 4341	JCB		1995	TLB			8	Fair	8	Partial																																								
C/wood			Ndm 4382	Mercedes	12.13	1982	Crane	8 ton	Misc	298822	Poor	2	Full																													Refurbished November 2002													
S/field			Ndm 4383	Erf	D380	1985	Hooklift 8x4	20 ton	Shuttle		Poor	1	Partial																																								
S/field	Ndm 4387			Mercedes	26.24	1982	Comp	19 m³	Collection	186983	Fair		Partial																																								
Kloof	Ndm 4388			Mercedes	26.24	1982	Comp	19 m³	Collection	213474	Fair		Full																																								
Phoenix	Ndm 4391	Ndc 4391		Mercedes	26.24	1982	Comp	19 m³	Collection	288470	Fair		Full																																								
Phoenix	Ndm 4394			Mercedes	26.24	1982	Comp	19 m³	Collection	332582	Fair		Full																																								
S/field	Ndm 4398			Mercedes	26.24	1982	Ind Comp	19 m³	Collection	434296	Poor		Partial																											To be scrapped and replaced by NDM 4110 MAN 26.284L 19m³ Industrial Compactor in 2002/2003														
M/hill			Ndm 4400	Mercedes	22.19	1990	Tipper	20 m³	Disp/site	97280	Fair		Full																											Used as Landfill Vehicle														
S/field			Ndm 4411	Erf	D380	1985	Hooklift 8x4	20 ton	Shuttle	387576	Poor		Partial																											Replaced by NDM 4119 MAN 33.374L Ro-Ro in 2002/2003														
S/field			Ndm 4429	Poole	Trailer	1985	RTS Trailer	4.5 ton	Shuttle		Fair		Partial																																								
S/field			Ndm 4432	Poole	Trailer	1985	RTS Trailer	4.5 ton	Shuttle		Fair		Partial																																								
C/wood			Ndm 4441	Mercedes	12.13	1979	Crane	8 ton	Misc	257385	Fair		Full																											To be refurbished in 2003/2004														
S/field			Ndm 4449	Mercedes	24.26	1992	T/Hoist	12 ton	Skips	168383	Fair		Full																																								
C/wood	Ndm 4472			Mercedes	12.13	1982	Sweeper	5 m³	Cleaning	225168	Poor		Full																																								
Phoenix		Ndc 4475	Ndm 4475	Mercedes	22.25	1994	Ind Comp	19 m³	Collection	194613	Fair	5	Full																																								
Phoenix		Ndc 4477	Ndm 4477	Mercedes	22.25	1994	Ind Comp	19 m³	Collection	114713	Fair	5	Partial																																								
S/field		Ndc 4478	Ndm 4478	Mercedes	24.26	1994	T/Hoist	12 ton	Skips	380772	Fair		Full																										To be replaced by NDM 4101 MAN 26.284K Tele-Hoist in 2002/2003 ???														
B/Landfill			Ndm 4492	Isuzu	F 8000D	1990	Sweeper	5 m³	Cleaning		Poor	4	Full																																								
S/field			Ndm 4499	Mercedes	22.25	1994	Ind Comp	19 m³	Collection	258969	Fair	4	Partial																																								
			Ndm 4822	TATA	LPT713	2004	Tipper	4 ton	Collection		Good	8	Full																																								
			Ndm 4823	TATA	LPT713	2004	Tipper	4 ton	Collection		Good	8	Full																																								
			Ndm 4824	TATA	LPT713	2004	Tipper	4 ton	Collection		Good	8	Full																																								
			Ndm 4825	TATA	LPT713	2004	Tipper	4 ton	Collection		Good	8	Full																																								
			Ndm 4826	TATA	LPT713	2004	Tipper	4 ton	Collection		Good	8	Full																																								
			Ndm 4827	TATA	LPT713	2004	Tipper	4 ton	Collection		Good	8	Full																																								
			Ndm 4828	TATA	LPT713	2004	Tipper	4 ton	Collection		Good	8	Full																																								
			Ndm 4829	TATA	LPT713	2004	Tipper	4 ton	Collection		Good	8	Full																																								
			Ndm 4830	TATA	LPT713	2004	Tipper	4 ton	Collection		Good	8	Full																																								
			Ndm 4831	Sterling	Sterling	2004	Sweeper	5 m³	Cleaning		Good	8	Full																																								
			Ndm 4832	M.A.N	15.224	2004	Comp	10 m³	Collection		Good	12	Full																																								
			Ndm 4833	M.A.N	15.224	2004	Comp	10 m³	Collection		Good	12	Full																																								
			Ndm 4834	M.A.N	26.284L	2004	Comp	19 m³	Collection		Good	14	Full																																								
			Ndm 4835	M.A.N	26.284L	2004	Comp	19 m³	Collection		Good	14	Full																																								
			Ndm 4836	M.A.N	26.284L	2004	Comp	19 m³	Collection		Good	14	Full																																								
			Ndm 4837	M.A.N	26.284L	2004	Comp	19 m³	Collection		Good	14	Full																																								
			Ndm 4838	M.A.N	26.284L	2004	Ind Comp	19 m³	Collection		Good	14	Full																																								
			Ndm 4839	M.A.N	26.284L	2004	Ind Comp	19 m³	Collection		Good	14	Full																																								
			Ndm 4840	M.A.N	26.284L	2004	Ind Comp	19 m³	Collection		Good	14	Full																																								
			Ndm 4841	M.A.N	26.284L	2004	Ind Comp	19 m³	Collection		Good	14	Full																																								
			Ndm 4842	M.A.N	26.284L	2004	Ind Comp	19 m³	Collection		Good	14	Full																																								
			Ndm 4843	Mercedes	Atego 26.28	2004	Hooklift 6x4	15 ton	Skips		Good	10	Full																																								
Mpuflanga			Nu 30245	Trailer	Trailer	1990	Trailer	3 ton	Skips		Poor	1																																									
Mpuflanga			Nu 30247	Ford	Tractor	1990	Tractor	?	Skips	?	Fair		Partial																																								
Umhlanga			Ton 098	Mad-Vac	101D	1999	Litter Vac-Cl		Cleaning	548	Good	1	Partial																																								
				Mercedes	Actros	2004	Hooklift 8x4	20 ton	Shuttle		Good	10	Full																																								

Type	Expected life
4x4	6 years
LDV	6 years
Trailer 4.5 ton	15 years
Trailer 1 ton	9 years
Box Tipper	12 years
Breakdown	15 years
4 m³ or 6m³ Comp	12 years
10 m³ Comp	12 years
19 m³ Comp	14 years
Ind Comp 19m³	14 years
Crane	20 years
Hooklift 8x4 20ton	10 years
Hooklift 6x4 15ton	10 years
13m³ Rotopress Comp	15 years
19m³ Rotopress Comp	15 years
T/Hoist	9 years
Telehoist Trailer 3.5ton	15 years
Sweeper	8 years
Tipper 3.5 ton	8 years
Tipper 4m³	8 years
W/tanker	15 years
Pavewash	9 years
Payloader	18 years
Tractor	9 years
Litter Vac	6 years
Service Wagon	10 years

LEGEND
- Life years already in use
- Expected life years left
- Year in which vehicle should be replaced
- Lease Vehicles

ETHEKWINI MUNICIPALITY

INTEGRATED WASTE MANAGEMENT PLAN

CHAPTER 6
Instruments for Implementation of the IWMP

6 INSTRUMENTS FOR IMPLEMENTATION OF THE IWMP 6-1

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APPENDIX 6.1: RISK ANALYSIS

6 INSTRUMENTS FOR IMPLEMENTATION OF THE IWMP

6.1 Introduction

The development of the IWMP for eThekwini Municipality includes the need to develop a financing and revenue plan for EDSW. In order to do so, it is necessary to recap the current financial position of EDSW. Certain other issues and unique characteristics which contextualise solid waste management need to be highlighted; and thus, in doing so it is necessary to take cognisance of the following:

- The existing cost structure, considering direct and indirect cost, is not adequately ring-fenced and as a result of that, certain costs are "given" to EDSW or expensed to the service division on a "cost allocation" basis.
- The establishment of eThekwini on 5 December 2000 resulted in the amalgamation of 6 different solid waste management units. One financial implication was that duplication of cost resulted. This is still being felt as the integration of the operation is implemented.
- Significant analysis and modelling of the operational and capital expenditure were undertaken by SKC Engineers over the past five years, as summarised in Chapters 4 and 5 of this Document.
- The sources of revenue for EDSW and the extent to which they are available, are determined by the operations of EDSW or by other revenue drivers.
- Sources of funding for operational as well as capital expenditure.
- Solid waste is in most cases an undesired service item, unlike water and electricity; and the issue of "not in my back yard" is one that needs to be managed with due care.
- Solid waste, unlike water and electricity, which flow from the Municipality to the consumer, is generated by the customer and flows towards the Municipality.
- A solid waste service, unlike water and electricity, cannot be cut-off should a customer elect not to pay for any reason.
- The "monopoly rights" inherent in the waste management service are less than that of water and electricity.
- Mismanagement of solid waste can lead to serious health and environmental risks.
- Certain sub-services in solid waste management operate in competition with the private sector.
- The policing of illegal dumping was poorly executed in the past.
- Education and awareness campaigns regarding environmental health contribute to improvement of consumer understanding.
- Private operators were not licensed, which lead to limited control over their modus operandi.
- Knowledge of waste generated, transported and disposed is still incomplete.

6.2 Policy Principles and Instruments

The following policy principles and instruments should be noted when considering the economics and financing of waste management:

- The local regulatory landscape should be developed in such a manner that it complies with the policy principles specified in NEMA, IP & WM, NWMS, e.g. accountability, cradle-to-grave responsibility, equity, full cost accounting, good governance, integrated and open information, participation and the polluter pays principle.
- EDSW should be financially and operationally ring-fenced and the process should start for the creation of an independent business unit which is responsible for the waste management service of eThekwini Municipality and which is fully accountable and responsible for all aspects of the rendering of the solid waste management service.
- The sub-services within the solid waste management function should also be ring-fenced in order to understand the exact cost and income of such sub-service. Such information will enhance decision-making.
- EDSW promotes job creation with a specific focus on previously disadvantaged communities.
- Unit costs should be calculated for all activities.
- By-laws should provide for the principle of "polluter pays", a waste information system and the permitting of private sector waste operators.

It is of importance that EDSW take control of the final development of the new by-law as far as it relates to waste management and cleansing matters.

6.3 Funding Sources

In order to provide solid waste services in a financially sustainable manner, the Municipality should have a sound revenue base for both operational costs and the repayment of capital funding. Solid waste management services are relatively capital intensive and capital is required for replacement programmes, new facilities and expansion. Should the Municipality's financial position be of such a nature that it cannot provide the necessary capital commitments, alternative service delivery mechanisms for the solid waste management service as a whole will have to be investigated. All the major funding sources available to the Municipality should therefore be identified.

Sources of revenue are sub-divided into capital finance sources and operating finance sources.

6.3.1 Sources Of Capital Finance

It may not be possible for the Municipality to bear all the costs of providing a comprehensive solid waste infrastructure to all un-served or under-served users. It may only be able to make a limited contribution and the rest will have to be raised from other sources. It is therefore important to assess the extent to which loan funding will be required, since the cost of servicing loans affects the tariffs (and general rates) that should be set to raise recurrent expenditure. In the case of EDSW certain services are charged through tariffs and others are charged through the general rates account. The following are possible sources which can be utilised by the Municipality:

- Municipal Infrastructure Grant (MIG).
- Consolidated Municipal Infrastructure Programme (CMIP).
- Municipal Systems Improvement Programme (MSIP).
- Extended Public Works Program (EPWP).
- National poverty relief programs.
- Other *ad hoc* grants.
- Private commercial loans from developmental financial intermediaries, DBSA, commercial and merchant banks;
- Debentures (re-entering of the capital market);
- Restructuring of debt portfolio of the Municipality; and
- Own sources.

The Municipality may also consider using operating and/or financial leases to fund certain capital assets that were previously funded by internal and external loans. Certain income streams can be ring-fenced and allocated to a specific capital item which allows for very innovative funding mechanisms and funding structures.

EDSW cannot borrow or enter into any funding agreement on its own. It is a department of the Municipality and not a separate legal entity, hence all agreements for funding, or otherwise, are in the name of the Municipality.

6.3.2 Sources of Operating Finance

The type of solid waste infrastructure provided, the associated levels of service, the technology used, waste recycling and minimisation and the disposal methodology all have a significant impact on operating costs of the solid waste management service. The primary sources of revenue for operating expenditure are:

a) Tariffs:

Solid waste services are provided to individual households and businesses and therefore it is appropriate and possible to establish tariffs for these services which are payable by each customer served. In the case of EDSW, the individual households are charged as part of the general rates account and not as a tariff. This is a cost effective way of charging for the individual household and should be maintained as far as possible. However, hidden inefficiencies may result from this practice. The issue of hidden inefficiencies can be overcome by proper financial and operational ring fencing (including service delivery and service level agreements) of the solid waste service. Such an exercise should include an Activity Based Cost exercise.

b) Rates:

Solid waste services include public services, such as street and beach cleaning. They also have a "public good" component in the sense that the cleanliness of each individual stand affects the overall environmental health quality of the Region. In this regard it may be appropriate to finance solid waste services through rates which are typically used to finance the public good.

Currently eThekwini Municipality is funding the deficit of EDSW through a transfer from the general rates account. A further benefit of charging through the rates account is the extended prescription period that is associated with it.

c) *Equitable share:*

The equitable share subsidy from national government is meant for the provision of basic municipal services to the poor. A solid waste collection service is regarded as a basic municipal service.

d) *Carbon credits and sale of energy:*

There is an opportunity to implement a methane gas extraction plant which generates energy which can be sold. Carbon credits can be earned. These funds should be ring-fenced into EDSW.

e) *Other subsidies:*

There may be other operating subsidies e.g. for environmental health, that could be applied for.

f) *Donations:*

DSW Education receives certain donations from environmentally conscious bodies which are applied to the funding of waste education. These donations are normally done through an external entity which EDSW controls. This is a useful source of income and relieves EDSW from a further operational expenditure. EDSW should explore these sources extensively since resources can be pooled in order to expand the efficient utilisation of individual donations. This can take the form of a public-private partnership.

g) *Additional income streams:*

EDSW needs to explore the sale of knowledge skills to other municipalities and provinces, as well as the sale of training and related material to other municipalities, in order to bolster operational income and to further motivate their staff. This can take the form of a public-public partnership.

h) *Additional landfill income:*

EDSW is fortunate to have substantial management skills and long term airspace availability. An opportunity that is being explored is the acceptance of refuse from neighbouring municipalities in order to generate additional income. This can also be seen as a public-public partnership. EDSW will need to know their opportunity cost in order to price the offer properly.

6.4 Determination of Institutional Arrangements

A variety of role-players are involved in solid waste service provision and the Municipality must establish a clear institutional map in terms of who is responsible for what in the solid waste management system. The following issues need to be clarified:

6.4.1 The Municipal Environment

a) Metropolitan municipality powers and functions:

The functions of refuse collection and public waste management services, such as street and area (e.g. beach) cleaning, have been allocated to metropolitan municipalities. This includes responsibility for the establishment of tariffs for solid waste services, recycling and education, solid waste disposal sites [serving the area of the metropolitan municipality as a whole], in so far as it relates to:

- the determination of a waste disposal strategy;
- the regulation of waste disposal;
- the establishment, operation and control of waste disposal sites, bulk waste transfer facilities and other waste disposal facilities.

Where the metropolitan municipality is responsible for the waste disposal site it has responsibility for the setting of disposal charges. This includes charges for disposing of municipal waste and also charges for private waste disposal at these sites.

b) Internal division of responsibilities:

Since EDSW is not ring-fenced, with no service level and delivery agreements in place, and due to the fact that the ultimate responsibility for tariff setting typically lies with the municipal treasury, EDSW should ensure that there is proper communication and co-operation between EDSW and the treasury in order to have a co-ordinated tariff setting process.

6.4.2 External Service Provider Involvement

The municipality, as the responsible authority on institutional arrangements for solid waste provision, has to decide on the service delivery mechanism. External service providers can play a significant role in the reduction of operational and capital cost of managing EDSW. Further benefits emanating from the utilisation of external service providers are the removal of risk from the municipality and efficiency improvements; if correctly managed and monitored. These opportunities are briefly discussed below.

a) Internal service provision:

The municipality elects to provide all municipal solid waste services by means of its own internal resources.

b) External service providers:

The municipality is empowered under the Municipal Systems Act, to provide municipal solid waste services by an external mechanism by entering into a service delivery agreement with an outside organisation. This outside organisation can be another public sector body, a private sector firm or a community based organisation. The Systems Act (Section 78) establishes a mechanism which must be followed to assess whether to provide the service internally or externally and procedures to manage external providers:

- If the decision is to involve external service providers (fully or in part), the municipality will need to set up monitoring and regulatory mechanisms to regulate the performance of the

service providers. EDSW inherited certain private service providers and monitoring and regulatory mechanisms are not in place. Further investigation and rectification by the eThekwini Municipality is required.

- The municipality may either collect tariffs through its normal channels or it can allocate the responsibility of tariff collection to the external service provider. In the latter case Section 81(1)(d) of the Systems Act requires the municipality to "control the setting and adjustment of tariffs by the service provider for the municipal service in question" in accordance with the tariff policy determined by the council of the municipality. This should be investigated by eThekwini Municipality.
- The municipality may allow some adjustment of tariffs by the service providers within limitations set by the municipality.
- Agreement on the nature of the service contracts should be reached. The different service providers will have different contractual arrangements with the municipality, depending on the role which they play in solid waste management.

As indicated in Chapter 2 of this Document, EDSW did investigate alternative service delivery mechanisms for the rendering of the disposal function. eThekwini is not in favour of entering into a piecemeal endeavour at this stage. However, no formal decision has been taken in this regard.

c) *Small contractors:*

The use of small contractors for refuse collection and street cleaning at a fixed fee in some areas of eThekwini has been successful. Service delivery agreements have been entered into with small single community-based contractors. This mechanism is effective in reducing capital and operational expenditure and it contributes significantly to economic development, skills enhancement and a clean environment. This mechanism will be supported as long as it holds benefits for EDSW.

d) *Private waste service providers:*

In some cases, private firms contract directly with commercial customers to remove and dispose of solid waste. This would typically be with large commercial or industrial waste generators for the removal of general waste. In such instances, the municipality does not have a tariff setting or regulatory role, except insofar as this waste removal falls under other legislation or by-laws, such as those concerning health and safety, environmental protection or transport. Currently private sector operators operate in competition with EDSW. This section of the business allows for expansion and substantial "profits" can be generated which may be utilised to reduce the deficit on other services. Proper costing has to be undertaken in order to price this business at a "profit". The charges for these EDSW services are promulgated in the Schedule of Tariffs of the Municipality which leaves little room for the negotiation of price, volume discounts and penalties. The option of a maximum tariff needs consideration and further exploration.

Generally, private waste operators and small contractors relieve the municipality of substantial amounts of capital expenditure on vehicles and other infrastructure; and are in many cases more cost effective than the municipality. This contributes significantly towards the economic development of the community. EDSW will explore the use of small contractors where it is beneficial and will compete with the private sector for business waste collection where the service can be rendered at a "profit". The real "profitability" of the business waste collection

service can only be determined when EDSW is properly ring-fenced financially and operationally; and an Activity Based Cost exercise has been undertaken.

It is important that private sector waste collection companies be subject to securing permits for collection, that the by-law provides for such permitting and that the necessary measures are put in place to issue and monitor these permits.

e) General

Opportunities for the funding of service delivery through Public-Private Partnerships could be pursued with institutions which could not do this previously. (Municipalities cannot borrow from sources outside South Africa and many municipalities are also fully borrowed).

Other institutions have a specific focus and may only loan funds subject to prerequisites such as empowerment.

All these options could be explored should this be necessary.

6.5 Measures for Reduction of Other Cost and Capital Requirements

The removal of illegally dumped refuse is a costly exercise and more money should be spent on waste and environmental education and policing, since the saving generated by the reduction of illegal dumping may exceed the cost of such educational and policing efforts. Fees earned from fines should be applied towards waste and environmental education. This can be seen as a Public-Public Partnership between various internal departments.

The community, through NGO's should also get involved in waste and environmental education initiatives. This can be seen as a NGO-Public Partnership.

The different departments in the eThekwini Municipality should co-ordinate their efforts regarding waste and environmental communication and education in order to use allocated funds more effectively.

Waste recycling, minimisation and reduction should be further explored. These functions are particularly suited for Public-Private Partnerships. The reduction in the waste stream will reduce operational and capital expenditure. The opportunity cost principle should be implemented since it may not be beneficial in the short-term to implement these endeavours but it may have significant benefits in the long-term. The eThekwini Municipality may even subsidise these measures in the short- to medium-term to get them off the ground in order to secure the associated long-term benefits. This should be a national initiative and EDSW is eager to work with national and provincial government in order to create a sustainable model for waste recycling, minimisation and reduction. It is dubious that 50% waste recycling or minimisation would be achievable. It is the considered view of management that a maximum of 10% to 20% may be achievable for waste reduction. A scenario was modelled in Chapter 4 based on 15% reduction.

There is an opportunity to explore hazardous waste handling and disposal. This Public Private-Partnership opportunity is well worth investigating.

National Government is in the process of developing a Waste Information System. EDSW could offer their services in an endeavour to create their own Waste Information System and could offer to

be a test area for the model. This could save substantial development costs and can be executed as a Public-Public Partnership.

Should capital funding be in short supply, the development of landfill sites by private sector operators could be encouraged. The inherent risk is that control over key resources such as landfills is relinquished. Private sector enthusiasm however, could be lacking in this regard.

6.6 General

In order to comply with national, provincial and local policies and guidelines it is important to note that when partnerships are entered into, the risks relating to the business opportunity should be allocated to the party who can best manage the risk. Further, agreements need to extend over long enough periods for prospective entrepreneurs to generate sufficient profit and recovery from such projects.

It is recommended that a reserve fund is created for the rehabilitation of existing landfill sites, for the monitoring of the facility after its closure as well as for the development of new disposal facilities. This will overcome the problem of sudden tariff increases to pay for new disposal facilities. In most instances new disposal facilities have a negative influence on the transportation cost, which may include the development of transfer facilities, as is the case for eThekwini Municipality.

Appendix 6.1

Risk Analysis

IWMP RISK ANALYSIS

What is the risk?	Origin?	Financial effect?	Steps to mitigate or minimise the risk
DESIGN AND DEVELOPMENT RISK			
Design defects in landfill, cells, transfer stations or depots plant	Default in tender specifications.	Can be very costly to rectify and the operator (Municipality) will have to carry the cost.	▪ Take insurance against such events ▪ Use experienced staff and refer for check by experienced consultants ▪ Do proper research and check tender specifications before tenders are issued.
	Design consultant fault.	Can be recovered from design consultant if it can be proven that it was a design fault – will only have a short-term effect with regard to project life cycle.	▪ Include provisions in the design contract requiring the design consultant to provide a remedy or pay damages (insurance cover). ▪ Monitor design work and/or replace design consultants insurance.
CONSTRUCTION RISK			
Cost overrun	Within the construction company's control – inefficient working practices and waste of materials and time.	The contractor can run out of money and the Municipality may have to take the project over – direct cost and time value cost	▪ Provide for cost overrun in fixed lump sum price in the construction contract. ▪ Monitor and inspect construction work; provide for early warning mechanisms in the contract and pay on progress only.
	Issues beyond construction company's control – changes in laws, delays in obtaining approvals or permits and increases in taxes.	Increases the cost of a project, but can be insured against or suitable provision can be made.	▪ Allocate cost overruns in the construction contract; purchase business interruption insurance. ▪ Obtain approvals in advance; anticipate problems and allocate risk in contract; use insurance.
Delay in Completion of Transfer Station or Landfill Site	Within the construction company's control – normally due to a lack of co-ordination of sub-contractors.	The contractor normally bears the risk. Once liquidated damages are exhausted, standby finance is drawn down.	▪ Require liquidated damages from the contractor under the construction contract (sufficient to cover interest due to lenders and fixed operating cost.). ▪ Monitor and inspect construction work; provide for early warning mechanisms in the contract.
	Beyond the construction company's control – insure for force majeure event.	The insurer normally bears the risk. Once insurance proceeds are exhausted, the contractor will have to stand in but the Municipality must be prepared to assist under these circumstances.	▪ Draw on proceeds from business interruption policy. ▪ Rely on insurance.
Failure of plant to meet performance criteria at completion	Within the construction company's control of quality shortfall, defects in construction.	The plant (transfer station) is inefficient (performs below expectation) and increases operational cost at plant level as well as at the collection side of the business since vehicles have to queue longer.	▪ Require liquidated damages payable by the construction contractor supplemented by insurance. ▪ Monitor and inspect construction work, provide for early warning mechanisms, use insurance.
OPERATING RISK			
Operating cost overrun on Transfer Station or Landfill Site	Change in operator's practices (if contracted) at Municipality's request.	The plant (Transfer Station or Landfill) is inefficient and costs more to operate than anticipated.	▪ Require operator to provide a remedy or compensation under the operating contract. ▪ Build flexibility into contract, cost changes in practices in advance; define acceptable reasons for changes, provide for changes in remuneration after initial period.
	Operator failure (if contracted).	Additional cost to step in and time delays.	▪ Require liquidated damages payable by the operator under the operating contract. ▪ Monitor and inspect operating practices; provide for early warning mechanisms.
Failure or delay in obtaining permissions, consents, approvals	Public sector discretion.	Increase operating cost.	▪ Follow a due diligence process. ▪ Obtain approvals in advance where possible. ▪ Have a good working relationship with role-players. ▪ Have alternative strategies ready.

What is the risk?	Origin?	Financial effect?	Steps to mitigate or minimise the risk
Vehicles/equipment do not perform to standard	Incorrect specification. Not delivered in terms of specification Bad repairs.	Increase in operating cost.	▪ Involve vehicle specialists when specifications are prepared. ▪ Have proper remedies in contract if vehicle is not in terms of specification. ▪ Have service level agreement with workshop with remedies for bad performance or take control of workshop. ▪ Enforce agreement provisions.
Non-availability of vehicles	Slow response times of workshop. Not replacing vehicles on time – too old.	Increase operation cost – have to keep more vehicles	▪ Have service level agreement with workshop with remedies for bad performance or take control of workshop. ▪ Enforce agreement provisions. ▪ Have a replacement programme agreed to as well as the capital needed for replacement. ▪ Leasing of vehicles may provide a solution. ▪ Outsource maintenance.
Growth in waste	Economic growth higher than expected.	Increase in operating cost.	▪ Do proper research. ▪ Proper measurement. ▪ Waste recycling and minimisation.
Lack of technical expertise.	Staff with expertise may leave service.	Increase in operating cost. Lack of operating controls.	▪ Job satisfaction surveys. ▪ Implement succession plan.
Appropriate by-laws	Not amending by-laws to stay up to date with industry developments.	Financial sustainability can be jeopardised.	▪ Control development of by-laws. ▪ Keep abreast of industry developments.
Uneducated community.	High level of illegal dumping.	Increased operating cost.	▪ Awareness and education campaigns. ▪ Gain political support.
Outsourcing	Contractee contracted at too low a price. Inadequate contract conditions. Contract not properly monitored. Contractor under performs.	Financial viability of project may be jeopardised.	▪ Develop a sound working relationship with contractor and endeavour to understand his business. ▪ Implement early warning system. ▪ Have a back-up strategy. ▪ Improve contract monitoring.
Minimum requirements for disposal facilities	Penalties may be imposed. Permit can be withdrawn.	Increased operating cost.	▪ Develop landfill management checklist. ▪ Have regular management check-ups. ▪ Abide by the policy of "prevention is better than cure".
Waste minimisation and recycling	Reduction in waste stream to landfill. Reduction in waste collected and transported. Over supply of recycled items.	Increase in operating cost per unit. Surplus resources. Reduction in income.	▪ To take control of waste minimisation and recycling process. ▪ Create marketing channels for recycled items.
Lack of waste information	No permitting of private operators.	Increased operating cost and lost income.	▪ Provide for permits in the by-law. ▪ Implement waste management system.
HIV Aids	Impact on staff productivity.	Increased operating costs.	▪ Develop a human resource plan and staff education.
Informal Housing	Unplanned urbanisation	Increasing operating cost	▪ Participate in urban development planning by Municipality. ▪ Make use of third party entrepreneurial contractors.
FINANCIAL RISK			
Increase in tariffs	No co-ordination between treasury and waste management service.	May lose private sector business which will result in a decrease in income.	▪ Waste management division to take control of tariff increases. ▪ Market research. ▪ Flexibility in tariff structure.

What is the risk?	Origin?	Financial effect?	Steps to mitigate or minimise the risk
Decrease in tariffs	No co-ordination between treasury and waste management service.	Service may become unprofitable.	▪ Waste management division to take control of tariff increases. ▪ Market research. ▪ Flexibility in tariff structure.
Relying on one client for 75 per cent of income derived	All income except for commercial income is collected from the Municipality. Non-collection of income by Municipality.	Liquidity and cash flow problems.	▪ Ring fencing of the waste management service. ▪ Education of decision-makers regarding importance of proper waste management. ▪ Community education and awareness campaigns.
Insurance	Insurance cover does not cover all risks.	Reduction in cash due to pay-out of claims and/or replacement of assets.	▪ Ensure that all risks are covered in insurance policies. ▪ Ensure that all assets are on asset register and properly valued.
Interest rate	Increase in interest rates linked to the use of debt.	Increased cost of debt.	▪ Enter into fixed interest rate agreements when interest rates are low. ▪ Manage the amount of borrowing.
Fluctuation (escalation) in fuel price	Fuel price escalates due to the increase in the oil price and taxes on fuel.	Increase the operating cost of the service.	▪ Implement fuel management programmes. ▪ Ensure that fleet is properly maintained. ▪ Make fuel consumption a KPI.
Capital expenditure allocation	Municipality allocates less than needed.	Increase in maintenance cost due to non-replacement of assets. New landfill and transfer facilities not developed timeously, which may increase operating cost.	▪ Motivate need for capital with proper arguments. ▪ Ring fence the service. ▪ Educate decision-makers regarding the importance of waste management and the associated spin-off benefits if service is properly executed. ▪ Enter into leasing arrangements. ▪ Consider other sources of funding.
Budget escalation parameters	National Treasury normally provides maximum budget escalation target number.	Not sufficient budget to render an effective service.	▪ Prepare a proper business plan that indicates issues of growth and the movement of landfill facilities further from the point of collection.
Non-payment culture	Unemployment Legacy of the past	Income uncertain	▪ Community education. ▪ Job creation activities through community entrepreneurial contractors and waste reduction contractors.
BUSINESS RISK			
Legal and regulatory	The absence of clear direction from National and Provincial Government. Issue of policy directives without knowing the financial impact.	Increase cost of managing the waste business.	▪ Be well informed of policy trends. ▪ Know the cost of rendering services. ▪ Improve the flexibility of operations.
Political	National and local politics are not moving in the same direction. Different interpretation of political direction by different levels of government.	Cannot do proper long term planning which may increase the cost of the service.	▪ Render a service that is valued by all. ▪ Have the community on your side by doing proper environmental education and training. ▪ Do effective research.
Strikes (labour intensive service)	Staff is unhappy with certain work related issues including salaries.	Increases the cost of the service.	▪ Have contingency plans in place. ▪ Participate in workplace forums.
Competition	Private waste contractors operate in competition for business waste	Lose business which may result in reduced income	▪ Ensure that a good quality service is rendered by Municipality. ▪ Ensure that municipal service is affordable. ▪ Private operators require permits.
Environmental impact assessment (EIA) requirements	Non-compliance could result in health hazards. Could reduce the credibility of the Municipality.	Expensive to implement but may reduce future costs through claims	▪ Develop good relations with the community. ▪ Have a proper and due process.

ETHEKWINI MUNICIPALITY

INTEGRATED WASTE MANAGEMENT PLAN

CHAPTER 7
Environmental Compliance and Public Cognisance

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7 ENVIRONMENTAL COMPLIANCE AND PUBLIC COGNISANCE

The IWMP is an overall plan which addresses waste management in the Region. All aspects of this plan need to be conveyed to interested and affected parties (IAP's), as well as the general public.

The environmental compliance is addressed by the environment impact assessment (EIA) processes which have to be followed.

Public cognisance is addressed by public awareness campaigns, information releases, public and stakeholder participation. Stakeholder participation took place while the IWMP was being compiled and public cognisance will be addressed at various stages, as required and as set out in this Chapter.

7.1 Environmental Impact Assessment

The EIA Process is prescribed by the EIA Regulations (R1182, R1183 and R1184) in terms of sections 21, 22 and 26 of the Environment Conservation Act (Act 73 of 1989).

7.1.1 Facilities Requiring an EIA

Various waste management facilities require EIA's and the following infrastructure is typically subject to compliance with the above Regulations, as directly relevant to solid waste management in the eThekwini Municipality:

- Operating Landfills
- Windows for future landfills
- Transfer Stations
- Material Recycling Facilities (MRF's)
- Composting Plants
- Transport Routes for hazardous waste
- Garden and Building Rubble Landfills

7.1.2 The EIA Process

Waste management infrastructure required for the disposal of waste (excluding private disposal of domestic waste) is subject to the process followed in the EIA Regulations. This process is basically as follows:

- Application for authorisation to undertake the activity
- Consultation with the relevant authority before application is made
- Submission of a Plan of Study for Scoping
- Submission of the Scoping/EIA Report which includes public participation
- Review of the Scoping/EIA Report by the relevant authority
- Consideration of the application by the relevant authority

- Appeal, if necessary
- Approval and issue of the Record of Decision by the environmental authority

7.1.3 Facilities Subject to EIA's

The waste facilities in the EDSW Regions have been subjected to EIA processes where and when these were applicable.

The present operating municipal landfills which have been subjected to EIA Regulations are:

- Bisasar Road
- La Mercy
- Mariannhill

and the private H:h landfills at:

- Bulbul Drive
- Shongweni

Existing Garden and Building Rubble Landfills have not been subjected to EIA processes at this stage as this had not been a requirement.

The proposed new landfills in the so-called Windows of Opportunity have been subjected to the EIA process up to and as far as was necessary for the stage at which pre-development requirements were needed. These processes are ongoing and in compliance with the EIA Regulations.

The only transfer station which has been fully subjected to the EIA process is the new one recently completed at Mt. Edgecombe.

Existing older transfer stations that are presently in use, as well as those subject to upgrading, do not require the EIA process to be met at this stage. Many of these transfer stations incorporate small recycling or reclamation activities.

Buy back centres have not been subjected to the EIA process.

7.2 Key Stakeholder Participation

The NWMS has identified a number of non-government stakeholders as crucial to the successful *implementation* of integrated waste management planning. These stakeholders include the waste management industry, waste generators, non-government organisations, community based organisations and the general public.

Extensive stakeholder and public participation does not form part of this brief to compile the IWMP for EDSW. Provision was made for Key Stakeholder Participation within the Municipality.

7.2.1 Key Stakeholders

Key stakeholders within the Municipality were identified in consultation with the Client. The persons were selected from related disciplines, management and staff within eThekwini Municipality.

The following key stakeholders participated together with the Consultant Team in the planning and development of the IWMP:

- Raymond Rampersad, Head of Cleansing and Solid Waste at EDSW
- John Parkin, Deputy Head: Plant and Disposal: Cleansing and Solid Waste at EDSW
- Mary Mkhize, Waste Minimisation and Education Co-ordinator: Cleansing and Solid Waste at EDSW
- Robert Abbu, Deputy Head: Strategic and Projects: Cleansing and Solid Waste at EDSW
- Lindsay Strachan, Senior Engineer: Landfills: Cleansing and Solid Waste, and Acting Manager: Engineering and Projects at EDSW
- Danny Ramlahl, Business Manager: Cleansing and Solid Waste at EDSW
- Trevor Palmer, Corporate Executive: Accounting: Cleansing and Solid Waste at EDSW
- John Paley, Senior Legal Advisor at eThekwini Municipality

The Consultant Team comprised:

- George Chantler, Project Manager and Solid Waste Management Consultant from SKC Engineers
- Johan Louw, Financial and Municipal Systems Consultant from Blue Square
- Ms Kate Reynolds, Legal Advisor from Mallinicks
- Riaz Khan, Solid Waste Manager from Masakhe Isizwe Engineers, seconded part-time to EDSW
- Pieter de Coning, Specialist Waste Technologist from Haultec

The majority of the above key stakeholders are involved in the process of implementation of the waste management master plan, as approved.

7.2.2 Participation Processes

Prior to the development of the IWMP, appropriate mechanisms, processes and procedures were already in existence to enable communities, residents and stakeholders in the Municipality to participate in local affairs, also affairs related to waste management issues.

The EIA processes attached to development of new landfills, transfer stations and windows of opportunity for future landfills addressed stakeholder participation in each one of them. Provincial departments, land owners and the public were involved in these EIA's.

The key stakeholder participation in the development of the IWMP was manifested in their involvement in consultant team and EDSW management interaction, monthly project meetings and strategic planning sessions held on two separate occasions with senior eThekwini Municipality stakeholders.

Briefings of councillors are also envisaged, when appropriate, and upon request by the Client.

7.2.3 Communication Strategy

The recommended strategy for communication of the final draft IWMP to the public and key stakeholders is to solicit their input during the approval and implementation phase.

An information package, condensed from the final draft IWMP will be published in the media, eThekwini Municipality newsletters and the internet. The reaction and interest will be gauged and the public participation process will be planned accordingly.

An important function of the final draft IWMP will be to raise public awareness. The short and medium term development and implementation of the plan will take place within an informed environment.

Communication with the public is presently taking place through awareness campaigns championed by DSW Education, reaching the community, commerce and business through their various programs.

Regular dissemination of information by press releases, newsletters, participation in competitions and public recognition awards all contribute to raising awareness with regard to waste management in the Region.

The following initiatives are in progress:

- The public and rural communities are informed about and are exposed to waste management, waste prevention and minimisation, recycling, treatment, disposal, littering, collection by local contractors, etc.
- Waste minimisation and recycling projects are actively promoted and supported through the DSW Education programs.
- Research and development of waste minimisation and treatment technologies is being done in the landfill gas extraction initiative where EDSW is playing a pioneering role in the RSA.

The establishment of the well-known DSW brand name throughout the region, and even the country, also contributes to public awareness regarding the activities and services rendered in the waste management of eThekwini Municipality.

7.3 Public Awareness

The public will be kept informed about the progress with the implementation of the IWMP. The monitoring and review of the implementation process will record milestone successes and failures and the reasons for these.

After raising awareness and effecting communication contact on a broad front, the public will expect to remain informed of further waste management decisions and achievements. The expectations created by the IWMP, regarding the implementation program for closure of installations, development of new infrastructure and optimised service levels will be met.

Waste management decisions which will affect the daily life of members of the public and which they may be interested in are:

- technical and economic solutions
- capital investment programs
- service delivery charges
- opening or closure of facilities for transfer, disposal, waste minimisation etc.

Certain initiatives, which could muster support for the IWMP, will be undertaken, for example:

- publishing ordinances and by-laws pertaining to waste management
- publishing codes of practice and information bulletins on future plans and milestone achievements
- initiating pilot projects for innovative waste disposal and communicating the results to the public
- offering waste related conferences, seminars, training courses and exhibitions and hosting related national events
- preparing audio-visual and other documentary materials of successful projects for local, provincial, national and international audiences.

A powerful medium for these initiatives is the internet, which is becoming more accessible to the public, although it is not yet generally available to the public. (Public information dissemination kiosks containing intranet access could be provided throughout the city by the eThekwini Municipality for this and other purposes in future. This is already being considered for leading world cities).

7.4 Public Participation

Public participation in the process of development of the IWMP will commence after completion of the final draft IWMP and during the approval and implementation phase.

Historic public participation in activities related to the planning and development which preceded the IWMP is considered to be relevant and valid. Planning and development of waste management facilities such as landfills, new landfill windows, new transfer stations etc. are all subject to public participation requirements from DWAF, DEAT and other national and provincial departments. To date, EDSW has complied with any such requirements, as and when stipulated by the applicable state departments, and will continue to do so in future, where relevant and appropriate.

The reader is referred to paragraph 1.3 of Chapter 1 in this Report, where the applicable definitions for planning, development and implementation of the IWMP are set out.

7.4.1 MSA Requirements

The expanded role for local government, as indicated in the Constitution, is addressed in the Municipal Systems Act, 2000 (Act No. 32 of 2000) (MSA). This Act addresses the content of local government's role and the way in which resources should be managed.

The MSA contains extensive requirements relating to public participation, specifically the right of the public to contribute to the decision making process. Appropriate mechanisms must be established to enable stakeholders and the public to participate in local affairs and the eThekwini Municipality will provide for:

- the receipt, processing and consideration of:
  - petitions and complaints by residents, communities and stakeholders
  - written objections and representations relating to matters where public comment is invited
- public meetings of residents
- public hearings by Council when appropriate
- surveys among residents
- processing and publication of the results of these surveys.

7.4.2 Consultation with Authorities

The following authorities may need to be consulted when planning, developing and implementing elements of the IWMP:

- National
  - Department of Water Affairs and Forestry
  - Department of Environmental Affairs and Tourism
  - Department of Provincial and Local Government
- Provincial
  - Department of Traditional and Local Government Affairs KZN
  - Department of Agriculture and Environmental Affairs KZN
  - Department of Health KZN
  - Department of Finance KZN
  - Department of Works KZN
  - Department of Transport KZN
- Local
  - Adjacent Municipalities
- etc.

7.4.3 The Public and Interested and Affected Parties

The elements comprising the IWMP may have positive and negative environmental, social, technical and economic perspectives and impacts on the public and interested and affected parties, thus the development and implementation of the IWMP needs to be discussed with them.

Ward Committees	could be used as the vehicle to liase and consult with the public on issues related to the development of the IWMP.
Waste Management Forums	could be used for consultation with stakeholders in business, industry, NGO's, organised labour etc. Existing business and labour forums could be used for consultation.

A documented and programmed public consultation strategy and process will be drawn up by suitable professional advisors to form part of the discussion, acceptance and approval process of the IWMP after the drafting stage is complete.

Records of meetings, decisions taken, concerns raised etc, need to be kept to ensure that all concerns and issues are properly addressed in a transparent manner. The development of a dedicated web site for direct access by the public could be considered.

7.4.4 New Facilities

The planning, design and construction of new waste treatment and transfer installations will all be subjected to a public participation process, as in the past.

These include:

- landfills
- garden waste sites
- buy back centres
- transfer stations
- material recovery facilities
- etc

The public participation process forms part of the EIA prescribed for projects of this nature.

7.4.5 New Strategic Objectives

After public awareness has been raised, and communication contact has been established, the public and IAP's need to be informed of waste management decisions and strategic objectives regarding technical and economic solutions, new by-laws, operational methods and waste minimisation initiatives. These may all impact on the daily life of the public.

The IWMP may involve waste minimisation, recycling, re-use, composting, service level upgrades, development of new infrastructure, cost increases, penalties and fines for non-compliance, etc.

Consultation is therefore necessary with the public and IAP's on an ongoing basis as the IWMP is implemented over time.

This is a specialist task which will require competent management and should form part of the implementation, monitoring and review process after the draft IWMP has been finalised, approved and subsequently published.

ETHEKWINI MUNICIPALITY

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CHAPTER 8
Implementation, Monitoring and Review

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8 IMPLEMENTATION, MONITORING AND REVIEW

This chapter records the processes which have been or will be developed for the implementation, monitoring and review of the various components of the integrated waste management plan for eThekwini Municipality.

eThekwini DSW is in the fortunate position that it commenced with a master planning process a number of years ago. This process was initiated with the objective of achieving many of the goals which are now being promoted in the development of an IWMP as envisaged by the NWMS.

The process of implementation has already commenced and is ongoing. A monitoring and review process was also initiated when SKC Engineers were appointed in 1998 and up to 1999 for provision of a full management consultancy service with a view to technical monitoring and review of waste management services.

In 2000 a reduced management consultancy service, combined with a seconded solid waste management service was provided due to budget constraints. The seconded solid waste manager service is still being provided, albeit substantially reduced in scope.

The management consultancy service, however, did not address all the requirements which an IWMP specifies, e.g. aspects relating to some financial and all of the legal and institutional affairs.

8.1 Implementation

The implementation strategy and programme is set out for the IWMP in this Document. It is based upon the existing infrastructure and systems recorded in the status quo study, the strategic planning objectives; available and accessible instruments for implementing the IWMP and the actions to create public cognisance, all as documented here.

8.1.1 Implementation Strategy

The preferred scenario for a master plan has been accepted by EDSW, as set out in the SKC Document No. 2085/D0132 dated September 2002, namely, *"Master Plan 2002 for Solid Waste Management in eThekwini Municipal Area"*.

The strategy which was developed to implement this scenario, as adjusted and expanded in this IWMP, will consist of projects identified in the selected scenario to realise targets and objectives. These projects will be initiated and implemented in a specific order to ensure that optimum benefit is achieved in the most cost efficient manner. The extent and timing of each project has been carefully modelled to comply with best practice.

The organisation, planning and implementation of the IWMP will be done by EDSW, who may make use of their consultant base to advise and assist in this regard.

The project implementation programme addresses technical, financial, legal, institutional and public cognisance elements and is shown in detail in Appendix 5.2 of Chapter 5.

The Integrated Development Plan (IDP) is updated annually and the IWMP will be merged with the IDP with the specific objective of eliminating conflicting or incompatible time frames and goals. The maintenance of the City's ecological integrity forms part of the eight point plan for the IDP and is a key element of the IWMP.

Partnerships have already been formed with SMME's who assist with rural waste collection. It is further envisaged that the development of hazardous waste facilities will be done on the basis of a public-private partnership in the near future.

The public participation programme will encompass information dissemination, encouragement of public awareness and development of waste minimisation initiatives over a broad spectrum of the society. Public involvement in decision-making processes aligned to establishment of new waste practices and disposal facilities has transpired in the past and will be complied with in future on an ongoing basis.

The financing of the various projects in the IWMP will employ all available funding mechanisms, care being taken to ensure that projects are feasible and sustainable, and that sound financial management of these projects is applied at all times.

Existing waste management related by-laws will be reviewed and adapted to give effect to the IWMP. New by-laws must be developed for enforcement and implementation of the IWMP programs and projects. By-laws also need to give effect to the implementation and enforcement of the tariff policy. The revision and development of new by-laws are a priority and will be done as soon as possible. The programme indicates when this is envisaged.

Development of tariff structures is dealt with elsewhere in this Document.

8.1.2 Institutional and Organisational Plan

Within EDSW the various responsibilities for each task in the IWMP have been assigned and appropriate organisational structures have been developed to ensure successful implementation thereof.

Where public private partnerships will be considered, e.g. with a hazardous waste disposal initiative, organisational restructuring will be required. This will be developed during the process of evolution of the public private partnership. The impact of private sector involvement on workloads and responsibilities within EDSW will be addressed when a venture such as this is implemented.

8.1.3 Communication Plan

The communication and public participation plan details the processes which are implemented for stakeholder information and participation with regard to progress and feedback into the process of implementation of the IWMP.

Information sharing, public involvement and consultation form an integral part of the successful implementation of the IWMP and EDSW is committed to this concept to ensure success with achievement of the plan's targets and objectives. This process is pro-active and EDSW is already fully involved in this regard.

Existing programs, documented extensively elsewhere in this Report, have been initiated by DSW Education to encourage and support activities related to waste awareness, information exchange, public participation and awareness of waste management issues and projects.

Information campaigns have been implemented which are directed towards households, commerce and industry regarding the use of waste containers, segregation of recyclable materials, waste minimisation and re-use.

When the IWMP has been formulated and accepted, it will be introduced to the public in a condensed version or an executive summary which can be distributed with municipal bills or by publishing in the newsletter which is used to inform the public. Further information could be provided on the web site of EDSW and the Municipality. The emphasis will be on strategic elements and holistic medium to long term visions for waste management in the region.

8.1.4 Project Implementation Programme

The IWMP project implementation program has been developed on an integrated activity basis using *SKC WasteModel©*.

This implementation program comprises a complete analysis of the operational activities to perform the total solid waste management service for EDSW and specifically incorporates the following:

- an economic analysis
- a capital investment plan
- a financial plan

Subject to finalisation of priorities at the IDP level, which could affect the overall IWMP targets and completion milestone dates, the IWMP proposes a project and activity programme for implementation over the medium to long term.

The objective of this programme is to ensure that the various activities and projects, together with the anticipated expenditure, are properly synchronised and that target dates are achieved in accordance with projected budget expenditures. This will assist with timeous financial planning.

Due consideration of priorities, capacity, affordability and achievable funding will be given to address short, medium and long term needs with a view to maintaining appropriate service levels in eThekwini Municipality.

a) Economic Analysis

The economic analysis addresses capital and operational expenditures over the five and the twelve-year periods applicable to the IWMP.

The economic analysis was done by analysing a variety of scenarios by making use of *SKC WasteModel©* and by focussing on the major cost items in the technical operations required to implement an IWMP. Capital and operational expenditure on collection, transfer, transport and disposal was computed and unit cost rates were generated and compared for each scenario to establish what the most cost effective system would be.

The selected optimum technical and financial scenario, with respect to operations and infrastructure, is used as the basis for the IWMP for eThekwini Municipality.

b) Capital Investment

Budget estimates are provided for achieving the strategic objectives of the IWMP. This is set out in detail in Chapter 5 of this Document.

The bar chart in Appendix 5.2 reflects anticipated expenditures on solid waste management as projected for the 15-year period covered by the IWMP. The capital investment plan is based upon the projected expenditures for infrastructure, being vehicles, equipment and fixed assets such as transfer stations, landfills etc.

The raising of capital for infrastructure needs from public and private funding sources is elaborated upon in Chapter 6 of this Document.

c) Finance Plan

The finance plan reflects the waste management priorities as identified in the IWMP. The methodology for raising the revenue or finance required to support the implementation of the IWMP is dealt with in more detail in Chapters 5 and 6 of this Document.

The annual budget projections are based upon short and medium term requirements for managing and supplementing resources necessary for the full implementation of the IWMP. This is also applicable to institutional and human resources, as well as legal aspects related to the IWMP.

The various projects associated with the implementation strategy of the IWMP all need finance in varying degrees. Funding can be raised internally, by loans, grants, revenue and possibly by public private partnerships. Each of these mechanisms must be economically sustainable and affordable.

All projects within the IWMP are subject to detailed financial planning and budgeting in terms of the management and fiscal policy of EDSW. Financial planning addresses the following:

- definition of the project
- finance requirements for the project or components thereof
- models for ownership and operation
- financial risk analyses
- sources of finance and related conditions
- revenue generation
- financial potential and expected performance
- cost implications for rate payers
- etc.

8.2 Monitoring

A monitoring plan for the implementation of the IWMP will be developed and this will be an ongoing activity that will serve to measure the degree of success with which the planning process is accomplished. Monitoring focuses on short-term objectives and ensures that timeous corrective action is taken to ensure that the IWMP is implemented successfully. The monitoring system will be based upon a series of Key Performance Indicators (KPI's), which will be developed for each program and the overall performance will be measured against these KPI's.

8.2.1 Introduction

The objectives of monitoring at local municipal level are to:

- ensure that implementation is according to plan and within the programme.
- ensure that the objectives are being met and that adjustments are made when necessary.
- identify needs and problems related to the IWMP that should be addressed at all three levels of government.
- fulfil monitoring requirements and information needs of the public.

a) Monitoring Systems

These will be put in place to:

- monitor implementation of the approved IWMP.
- monitor performance of services rendered.
- prepare information for reporting and accountability.
- obtain new information to review and refine the IWMP at regular intervals.

Management systems are performance outcome based and this requires that KPI's be developed and that EDSW formulates its own KPI's and performance targets which relate to the approved IWMP.

KPI's should adhere to the following principles:

- Measurability - indicators are readily calculable from information that can easily be generated and at a reasonable cost, given the financial and administrative capacity of EDSW.
- Simplicity - measure one dimension of performance (quantity, quality, efficiency, effectiveness and impact) and avoid combining too much into one indicator.
- Precision - measure only those dimensions that the EDSW intends to gauge.
- Relevance - measure those dimensions that enable the EDSW to measure progress in terms of its objectives.
- Adequacy - measure, quality, quantity, efficiency, effectiveness and impact; and separate indicators are set for each priority and objective, in terms of the latter parameters.
- Objectivity - state clearly and without ambiguity what is to be measured.

An important consideration in choosing suitable indicators is whether data is available for its measurement in the municipal area. EDSW has to be clear about what data it currently collects and what data it will have the capacity to collect in the near future.

The production, obtaining and recording of accurate waste data is an important element of the monitoring process and a basis for planning future management arrangements.

b) Performance Indicators

Performance or monitoring indicators and feedback mechanisms will be developed to assess and adjust the IWMP to meet expectations and to ensure that the projects that are implemented improve waste management in the region.

Performance management is critical in ensuring that

- the plans and projects are implemented.
- resources are applied optimally and efficiently.
- the desired effect is achieved.

Performance monitoring, measuring and review are interrelated activities which provide different levels of analysis.

- *performance monitoring* is an ongoing process to assess whether goals, objectives and policies are being met.
- *performance measurement* is a continuous process of analysis and assessment of measurable results in terms of indicators or targets, to determine success or failure.
- *performance review* takes place over a defined period of time and identifies broad trends and assesses the likelihood of outcomes being achieved.

c) Adjustments

The development of the IWMP was based on a set of circumstances that prevailed when planning commenced, and certain assumptions were made at the time. These could change with the passage of time.

Thus it is advisable to verify such assumptions by monitoring them as they apply to the IWMP, and to adjust and refine the parameters, KPI's and performance targets to ensure that the IWMP remains valid and applicable.

KPI's and performance targets developed during the planning process will be used to monitor the success rate of EDSW and this should be subjected to public scrutiny.

d) Waste Information System

The IWMP needs to be updated and this should be based upon the most accurate available data. A need remains for ongoing data collection to improve and measure the operation of the waste management system.

The NWMS identified the development and implementation of a WIS as one of its priorities. The objective of this system is to qualify and quantify key issues, needs and problems such as illegal dumping, waste quantities and types, recycling quantities, generation rates, waste destinations, etc.

The continuous updating and utilisation of this information is imperative to any refinement and adjustment of the IWMP over the long term; and for budgeting and costing purposes.

8.2.2 Monitoring Framework

Monitoring is essential for strategic planning, financial and technical performance assessment, public accountability and compliance requirements.

Monitoring activities that will be considered include general issues, waste minimisation and prevention, collection and transport, recycling, treatment and disposal.

a) General Issues

- Status of resources.
- Staff appointments, training and allocation of functions.
- Payment for services rendered.
- Waste generation rates and growth.
- Reporting to the WIS.
- Illegal dumping and littering.
- Improvement in the environment and health conditions.
- Reporting to DEAT and Department of Agriculture and Environmental Affairs KwaZulu Natal.
- Status of legislation, regulations, ordinances and / or by-laws.
- Complaints regarding poor waste management.

b) Waste Prevention and Minimisation

- Achievement of targets.
- Information exchange.
- Establishment of waste minimisation clubs.
- Annual reports on waste minimisation programmes and projects.
- Annual environmental reports on emissions to air, water and land.

c) Collection, Transfer and Transport

- Annual reports on status and extension of these services.
- Payment received as opposed to actual cost of service provision.
- Replenishment of vehicles and equipment.

d) Recycling

- Annual reports on waste recycling programmes and projects.
- Stakeholder information exchanges.
- Stakeholder forums for co-ordination of initiatives.
- Social and environmental impacts resulting from recycling.

e) Treatment

- Registration and licensing of waste treatment facilities.
- Auditing of waste incineration facilities by KwaZulu Natal province.
- Environmental performance and impact.
- Provision of hazardous waste treatment facilities.

f) Disposal

- Registration and licensing.
- Auditing of disposal facilities by KwaZulu Natal provincial departments.
- Environmental performance and impact.
- Provision of hazardous waste disposal facilities.
- Management and control of salvaging at landfills.

8.2.3 Monitoring Reports

The results of monitoring activities will be compiled into a monitoring report on an annual basis by EDSW or by consultants to be duly appointed.

The format and content of these reports will be finalised between EDSW and the involved parties where appropriate.

Involved parties could include the relevant EDSW staff, their consultant appointed to do the Monitoring Report and the Department of Agriculture and Environmental Affairs KwaZulu Natal. This Department should specify their information and reporting requirements for the IWMP's within KwaZulu Natal.

EDSW has the responsibility for the compilation of a report on the implementation of their general waste IWMP on an **annual** basis. This report will be submitted to the provincial Department of Agriculture and Environment Affairs KwaZulu Natal. (The provincial authorities are required to compile a report on the implementation of local authority IWMP's; IWMP's from industries who manage and dispose of their own waste; and hazardous waste IWMP's on an annual basis and to submit these reports to DEAT for consideration on a national level).

8.3 Review

An evaluation and review process will be instituted by EDSW for their IWMP.

A critical evaluation and review of the monitoring reports will provide information for assessing the achievement of the IWM plan's goals and strategic objectives. This process will ensure the reappraisal of the IWMP and assess the appropriateness of policies, goals and strategic objectives, and whether they need to be amended and adjusted. Formal evaluation and review by the relevant authorities, in consultation with stakeholders, will be undertaken in five yearly cycles.

The objective of reviewing the IWMP and its implementation is to ensure its continued suitability, adequacy and effectiveness. The review will be documented for formal submission to Council and the relevant KZN Authorities. It should also be made available to the public and IAP's etc. The review will include issues such as performance levels related to the implementation of the IWMP, improvements from baseline conditions / indicators, and the public's perceptions and opinions regarding waste management in general and its associated services.

In terms of the IDP process, annual review is required, but because the development and implementation of the IWMP will take a number of years to complete, a full annual review is not advocated at this stage. Partial reviews or the reviewing and updating of certain areas of information should be adequate. However, as the IWMP provides the planning context for waste development over a 12-year planning horizon, the IWMP should be reviewed in full at least every 5 years in line with the planning time periods.

Certain information, which is required by provincial and national government, should be updated and reviewed according to the required frequency of information requested by government.

ETHEKWINI MUNICIPALITY

INTEGRATED WASTE MANAGEMENT PLAN

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