‘LOOKING AFTER DERBYSHIRE’S WASTE’

TECHNICAL APPENDICES

July 2006

CONTENTS

APPENDIX 1: STATISTICAL PROFILE OF DERBYSHIRE

Figures taken from National Statistics Website

http://www.statistics.gov.uk/census2001/profiles/17.asp

VITAL STATISTICS	Derbyshire (including Derby)	England
Area - acres	649,887	32,225,012
Area - hectares	263,000	13,041,000
POPULATION		
People, Places and Families		
Single people (never married)	146551	11,861,807
Married or Re-married people	329333	19,954,494
Separated or Divorced	61399	4,161,840
Widowed	53040	3,259,109
Transport (all households)		
Households with out car/van	71173	5,488,386
Households with car or van	237696	14,963,041
Composition (all households)		
One Person Households	85400	6,150,264
Married Couple Households	127884	7,465,966
Co-habiting Couple Households	28150	1,704,304
Work		
Status (all people aged 16-74)		
Employed	332605	21,650,270
Unemployed	17014	1,188,855

Long term unemployed	**5358**	**359,728**
Student	**15095**	**1,660,564**
Looking after home/family	**33305**	**2,316,229**
Permanently sick/disabled	**31669**	**1,884,901**

APPENDIX 2: DESCRIPTION OF BEST VALUE PERFORMANCE INDICATORS

2.1 BV 82a

Percentage of Household Waste Recycled.

'Recycled' means reprocessed in a production process for the original purpose, or for other purposes, but excluding energy recovery. Waste recycled to form compost should only be included under BV 82b.

'Household Waste' means all waste collected by Waste Collection Authorities (WCAs) under section45(1) of the Environmental Protection Act 1990, plus all waste arisings from Civic Amenity (CA) Sites, and waste collected by third parties for which collection or disposal recycling credits are paid under Section 52 of the Environmental Protection Act 1990.

For the avoidance of doubt household waste shall include:

- Waste collection rounds (including separate rounds for collection for recyclables)
- Street cleansing and litter collection
- Bulky waste collections
- Hazardous household waste collections
- Household clinical waste collections
- Garden waste collections
- Drop-off/bring systems
- Any other household waste collected by the authority.

Community recycling programmes of household waste can be included in the recycling rate.

Note; the following are excluded:

- Incinerator residues
- Beach cleansing wastes
- Rubble
- Home composted waste
- Clearance of fly-tipped wastes
- Abandoned vehicles

- Re-used waste material.

'Civic Amenity Site' means places provided by the WDA at which persons resident in the area may deposit their household waste (services provided under Section 51(1)(b) of the Environmental Protection Act).

2.1.1 Calculation of Recycling Rate

For Waste Collection Authorities (Amber Valley BC, District of Bolsover Council, Chesterfield BC, Derbyshire Dales DC, Erewash BC, High Peak BC, NE Derbyshire DC, and S Derbyshire DC), calculate as:

X/Y x 100, where:

X = Tonnage of household waste collected by the WCA which is sent for recycling (including private/voluntary collections of household waste for recycling).
Y = Total tonnage of household waste collected by the WCA (including private/voluntary collections of household waste for recycling).

For Waste Disposal Authorities (Derbyshire CC), calculate as:

X/Y x 100, where:

X = Tonnage of household waste collected by the WDA which is sent for recycling plus tonnage of household waste which is sent for recycling by the constituent WCAs (including private/voluntary collections of household waste for recycling).
Y = Total tonnage of household waste collected at Civic Amenity sites by the WDA plus total tonnage of household waste collected by constituent WCAs (including private/voluntary collections of household waste for recycling).

For Unitary Authorities (Derby City Council), calculate as:

X/Y x 100, where:
X = Tonnage of household waste collected by the authority which is sent for recycling (including private/voluntary collections of household waste for recycling).
Y = Total tonnage of household waste collected by the authority (including private/voluntary collections of household waste for recycling).

2.2 BV 82b

Percentage of household waste composted.

Composted means, the controlled biological decomposition and stabilisation of organic waste, under conditions that are predominantly aerobic and that allow the development of thermophilic temperatures as a result of biologically produced heat. It results in a final product that has been sanitised and stabilised, is high in humic substances and can be used as a soil improver, as an ingredient in growing media, or blended to produce a top soil that will meet British Standard BS 3882, incorporating amendment No 1. In the case of vermicomposting these thermophilic temperatures can be substituted by the introduction of worms.

Calculation of this indicator includes composting undertaken at a central, or community, composting facility. Home composting is not to be included. The tonnage to be used in calculation is the material sent for composting to these facilities.

2.3 BV 82c

Percentage of heat, power and other energy recovered from household waste.

To be completed by Waste Disposal Authorities.

Categories are exclusive

'Heat, power and other energy recovered' means:

- The controlled combustion of waste in specialised plant specifically to generate power and/or heat from the waste feedstock.
- The controlled combustion of refuse derived fuel (RDF) in specialised plant specifically to generate power and/or heat from the waste feedstock.
- The production of gaseous fuels by reacting hot carbonaceous waste with air, steam or oxygen (gasification).
- The thermal decomposition of organic waste to produce gaseous, liquid and solid products by pyrolysis.
- The biological degradation of organic wastes by anaerobic digestion.

The following shall not be included:

- Methane recovery from landfill.

2.4 Other BVPIs

Other relevant BVPIs for Waste Collection Authorities and Waste Disposal Authorities are:

BV 82d: Percentage of household waste sent to landfill.

BV84: Kilograms of household waste collected per head of population
BV 86: Cost of waste collection per household
BV87: Cost of waste disposal per tonne for municipal waste
BV90: User satisfaction (every three years and next due in 2006/7)

APPENDIX 3: WASTE TREATMENT AND DISPOSAL TECHNOLOGIES

3.1 Materials Recovery Facilities (MRFs)

MRF's can be 'low tech', whereby there may only be one sorting belt with several line pickers and perhaps an over-band electro-magnet to remove steel cans; these are normally specified in conjunction with 'kerbside' segregation schemes. Alternatively, they can have any number of additional items of equipment for sorting co-mingled dry recyclates.

The success of a 'Clean' MRF is dependent on being able to introduce effective segregation at source, which in turn requires that the public are committed to making it work. There are many examples throughout the UK where 'Clean' MRF's have been shown to be effective, and the development and use of such facilities may need to be considered in future rollout of the waste strategy.

3.2 Composting

There are four main types of composting process:

- Windrow composting
- In-vessel composting
- Vermiculture
- Anaerobic digestion

3.2.1 Windrow composting

Material for windrow composting is first shredded to reduce the material to a more manageable size and also to increase its surface area, as this leads to higher activity by the micro-organisms which drive the process. Materials are usually mixed to produce the ideal composting substrate and are constructed into elongated piles called windrows. Microbial activity in the windrows causes temperatures to rise to between 55-70°C. The windrows are monitored throughout the composting process to ensure that the optimum temperature, oxygen concentration and moisture content are maintained. The windrows are turned periodically, to introduce fresh air, and watered to maintain the ideal conditions for composting.

The high-temperature (thermophillic) phase at the beginning of the composting process usually lasts about 2-4 weeks as the microbes use up the available nutrients in the feedstock materials. During this stage, animal and plant pathogens which may be dangerous for animal and human health are destroyed, ensuring that the final product is safe to use. Composting continues after this initial phase at lower temperatures resulting in the destruction of compounds which might be toxic to

plants (phytotoxins). This active phase lasts for a total of about 12-16 weeks, and once this is complete, the compost is allowed to mature for between 1 and 3 months. Once the compost has been matured, it is screened to remove the larger pieces of material, such as stones and pieces of wood. Compost sold as a soil improver is usually screened to a particle size of 10 mm diameter and smaller.

3.2.2 In-vessel composting

The principles of in-vessel composting are the same as open-air windrow composting, in that the process relies on the action of micro-organisms to break down feed stocks. However, in-vessel systems allow a greater degree of control over the process and can automatically adjust the temperature, oxygen and moisture regimes within the material by being within an enclosed environment. There are many different designs of in-vessel system such as a hall, tunnel or container and the most appropriate system for any given application depends on a variety of factors including nature of feedstock, degree of automation/ flexibility required, and financial and spatial constraints, with many of these systems involving forced aeration of the compost rather than aeration by mechanical turning.

3.2.3 Vermicomposting

Vermicomposting relies on the actions of earthworms, and the micro-organisms in their gut, to break down organic materials, and produce a nutrient rich product.
Vermicomposting is different to composting in that an environment is established in which the worms can thrive and reproduce rather than being killed off. The worms process organic materials and excrete them as castings, similar to finely textured soil.

There are three types of vermicomposting

- Windrow system
- Stacked bins
- Continuous flow reactors.

Vermicomposting is less robust than in vessel composting and is therefore not practised widely in the UK.

3.2.4 Anaerobic Digestion (AD)

AD is a process which breaks down organic matter into simpler materials, under aqueous conditions and in the absence of oxygen. The main product of the digestion process is a methane rich bio-gas which is suitable as gas engine

feedstock with subsequent energy recovery. Alternatively, the bio-gas can be further refined as a vehicle fuel.

AD is a process with a good track record, however this record has been built on the treatment of mainly source specific waste streams such as farm slurries, sewage sludges, botanical wastes and food or industrial organic wastes.

AD systems come in a wide variety of sizes and operating parameters, although as stated earlier, there is no track record of their ability to treat MSW in the UK, although a new facility is operational at Wanlip by Biffa Leicester. This facility has been designed to process the organic material from their recycling facility at Bursom. The composting process is carried out in cylindrical digestion tanks where the organic waste is liquefied, heated, and broken down by bacteria, with the methane gas produced used to generate electricity.

Additionally, there are approximately 12 plants operating in Europe, using MSW as their primary organics feedstock. A good reference plant is the plant installed by Valorga at La Coruna in Northern Spain**,** which has a design capacity of 140,000tpa of MSW. Western Isles Council, Scotland, has specified AD for the treatment of their organic waste from MSW, with the plant due to be built and commissioned during 2005.

Of the companies who have built AD plants for MSW, the one with the most experience is **Valorga, from France**.

Other companies include:-

- **Waasa/WABIO(Finland),**
- **Wehrle Werk (Germany),**
- **Ionics Italbia, Snamprogetti and BTA from Italy, and**
- **Dranco in Spain.**

These companies are responsible for the 12 plants currently using MSW in AD plants.

3.3 Thermal Treatment

3.3.1 Energy from Waste

Energy from Waste is a well established, reliable, cost-effective means of treating MSW and thereby diverting biodegradable materials from landfill disposal. It is a process which is used by most countries in Europe, with plants in such locations as the centres of Paris, Barcelona and Copenhagen. The majority of these plants make

use of Moving Grate technology within the main furnace chambers, although Fixed Gate and Fluidised Bed systems are also in use.

Reference plants (all UK) are many and varied, both in size and location. There are currently thirteen operational Energy from Waste incinerators in the UK, with a number of others at various stages in the planning process.

Table A3.1 Existing and Proposed EfW facilities in the UK

Plant	Location	Operator / Bidder	Status
Basingstoke	Hampshire	Onyx	★
Birmingham	West Midlands	Onyx	★
Bolton	Greater Manchester	Greater Manchester Waste Ltd	★
Cleveland	Teeside	Sita	★
Coventry	West Midlands	Coventry and Solihull Waste Disposal	★
Dudley	West Midlands	Martin Engineering	★
Dundee	Scotland	Dundee Energy Recycling	★
Eastcroft Nottingham	Nottinghamshire	Waste Recycling Group	★
Edmonton	Greater London	Sita	★
Isle of Man	Isle of Man	Sita	★
Isle of Wight	Isle of Wight	Biffa	★
Lerwick	Shetland Islands		★
Porthmellon	Isle of Scilly		★
SELCHEP	Greater London	Onyx	★
Sheffield	South Yorkshire	Onyx	★
Stoke-on-Trent	Staffordshire		★
Swansea	Wales	HLC	★
Wolverhampton	West Midlands	Martin Engineering	★
Aylesbury Vale	Buckinghamshire		◆
Bodmin	Cornwall	Compact Power	◆
Bournemouth	Dorset		◆
Bridgwater	Somerset		◆
Compton Bassett	Wiltshire	Hills Waste	◆
Easington	Durham		◆
Luton	Bedfordshire		◆
Newton Aycliffe	Durham		◆
Preston	Lancashire	Sita	◆
Redruth	Cornwall	Compact Power	◆
Stroud	Gloucestershire		◆
Portsmouth	Hampshire	Onyx	▲
Southampton	Hampshire	Onyx	▲
Lakeside	Slough	Grundon Waste Management	▲

★ Operational

◆ Anticipating Incineration after 2005

▲ Recently completed / under construction

3.3.2 Gasification and Pyrolysis

This is a technology which has been much researched for the treatment of a variety of organic materials. It has, so far, proven to be capable of reliably operating with specific, mainly homogenous materials, such as wood waste or chicken feathers, but has little or no track record when faced with the diverse materials that comprise MSW.

A pilot plant, of a capacity of approximately 8,000tpa, has been operating in Bristol by Compact Power. Compact Power also has planning permission for a 60,000tpa plant in Dumfries, which they would hope to build within the next two years. This plant will be designed to take MSW and other waste streams, including clinical waste and animal by-products.

An example of small scale thermal treatment is ENERGOS AS , a Norwegian company who currently has 8 projects in Scandinavia and South Korea, using a combination of gasification and pyrolysis on a small scale. These plants, which have capacities typically in the order of 10,000 – 50,000 tonnes per annum, provide an economic solution for small scale, local MSW treatment.

3.3.3 Autoclaving

Autoclaving (AC), as an MSW treatment technology has mainly been developed in the USA, and in the UK is marketed by a 6 main suppliers.

The system comprises a sealed, rotating chamber into which unsegregated waste is loaded. The waste is sterilised via application of pressurised steam, which together with mechanical agitation, gives rise to a physical breakdown of the organic materials and sterilisation of the waste mass, making for more easily processed materials and healthier conditions for the management of the recovered products.

At present there are no full scale plants operating in the UK.

AC plants are modular, with typically two AC chambers, fitted in parallel, capable of handling 100,000tpa of MSW in total, being installed. The main advantage of AC is its ability to maximise the quantity of organics separated as sterilised fibre for composting, biogas production, RDF production or any other potential use. Technology providers, being aware of the likely limitation on the outlets for RDF in the UK, are developing products, (and markets), made from the sterilised fibre produced from the AC plant.

3.3.4 Mechanical-Biological Treatment (MBT)

MBT plants have been operated in Europe since the early 90's, particularly in Italy, The Netherlands, Germany, Austria and the Scandinavian countries as a means of pretreating MSW prior to landfill. MBT can be simply described as a process that takes mixed residual wastes from the domestic and commercial waste streams and through various screening, conditioning and sanitising processes extracts recyclable materials and produces a stabilised biowaste. Within the UK, there has been a significant interest in this type of technology by the private sector waste management companies and by Local Authorities as a potential means of converting residual waste to compost or an RDF for combustion in cement kilns, power stations or other high temperature plants. Contracts have been confirmed over the last 2/3 years which make use of MBT, such as Shanks-ELWA with the Ecodeco process and Biffa-Leicester with the Hese Umwelt system. Others are expected to be confirmed in the near future, so there is evidence that MBT is becoming an acceptable treatment process which appears to satisfy the technical needs of the LA's, the commercial requirements of the private sector waste management companies and the financial risk criteria of the banks. The main technology suppliers are as follows:

Table A3.2: Technology Suppliers

Company	UK Plants	Other plants
Ecodeco, Italy	Marketed by Shanks in the UK Proposed 5 plants in East London, one in Dumfries.	6 plants in Italy
Sorain Cecchini, Italy	WRG may market in the UK	Malagrotta, Rome (300,000 tpa)
Herhof Umwelttechnik, Germany	None at present	Many plants in Germany and Italy ranging from 85,000 to 150,000 tpa
Vandenbrook/ Grontmij, Netherlands	None at present	Reference plant at Vagron (230,000 tpa) combined with AD
Haase Energietechnik AG, Germany	None at present	Existing plants in Germany and Spain. 2 new plants in Luebek, Germany (150,000 tpa) & Leon, Spain (200,000 tpa)
Babcock Borsig/Steinmuller Valorga, Austria	None at present	Plants in Austria, Switzerland and other European locations

Hese Umwelt, Germany	Leicester on behalf of Biffa 140,000 tpa	Many plants in Germany
Global Renewables	Preferred bidder for Lancashire waste contract	Eastern Creek, Australia

In total it is estimated that there are over 70 operational MBT plants in mainland Europe, with another 20 or so expected to be constructed in the next 2/3 years, including the ones in the UK already discussed. In addition to the six companies listed, there are a further 20 (approximate) companies, mainly German, Austrian, Italian or Dutch who market MBT plants for MSW treatment.

Juniper Consultancy Services have recently produced a report that analyses all known MBT systems. The report provides a useful guide to the companies, their processes and the way they produce different end products (Juniper Consultancy Services (2005) MBT: A guide for Decision Makers - Processes, Policies, and Markets).

3.4 Landfill

Although many measures are being introduced in the UK and Europe to discourage the reliance on landfill it is inevitable that there will always be residues and waste that cannot be recovered/recycled or treated that will need to be disposed of to landfill. Landfill will therefore always remain an essential element of any fully integrated waste management strategy, whether on a local, regional or national scale, albeit at a much reduced rate.

3.5 Outline of Waste Management Technologies

Table assumptions:

- Small – Medium Scale (up to 80,000 Tonnes per annum) Applications
- Large Scale (From 80,000 Tonnes per annum) Applications

Table A3.3: Waste Treatment Issues and Requirements

Technology	Pre-treatment requirements	Land requirements m^2	Environmental Issues	Visual Considerations	Other Information
Waste Transfer					
Transfer station road/rail/ water	none	Up to 10,000 (small – medium) 10,000 upwards (large) depending on throughput	Odour (not inert sites) and significantly reduced by being in a building with air treatment (unless using intermodal units for collection). Noise, traffic.	Bunkers of materials awaiting transport (inert sites); for biodegradable wastes, it is best if enclosed in a standard industrial type building with air control (unless using intermodal units for collection then storage of ISO containers)	Convenient way of bulking materials for transport purposes – intermodal collection and transport currently being trialled which makes transfer no more than a pile of ISO containers

Technology	Pre-treatment requirements	Land requirements m^2	Environmental Issues	Visual Considerations	Other Information
Transfer station hazardous waste	none	Up to 10,000 (small – medium) 10,000 upwards (large) depending on throughput	Water pollution, safe storage of chemical wastes, depending on size may require COMAH and/or hazardous substances planning regulations. Odour, noise, traffic	Stacked and palletised drums, and bulk tanks – could be housed in standard industrial type building	Convenient way of bulking materials for transport purposes – care must be taken in storage of hazardous wastes
Household Waste Recycling Centre (Civic Amenity Site)	None	1,200 minimum	Traffic, litter, noise	Split level facility with at least 10 roll-on/off skips and vehicle parking	Convenient way of segregating waste for recycling and composting
Recycling and composting					

Technology	Pre-treatment requirements	Land requirements m^2	Environmental Issues	Visual Considerations	Other Information
Composting – invessel	Presorting to ensure biowaste only	75 – 120,000	Risk of odour and bio-aerosols but should be eliminated through process controls and containment, noise, traffic	Very wide range of potential visual appearances from industrial buildings with external maturation of compost product to containerised units with external pipework; external maturation area	Large variety of options including small community or large industrial/commercial producer scale options
Composting – windrow	Presorting to ensure biowaste only; probably only applicable for green wastes in the long term	7,500 – 80,000 plus	Risk of odour and bio-aerosols – should not be located within 250m of occupied property, noise, traffic, windblown material, water pollution risks	Open air composting – rows of waste in various states of composting resulting in a brown earth like material, situated on a concrete pad – should have a water treatment plant to deal with run off.	7,500m^2 just sufficient space for 5,000tpa green waste 80,000 m^2 required for 80,000t

Technology	Pre-treatment requirements	Land requirements m^2	Environmental Issues	Visual Considerations	Other Information
Anaerobic digestion	Presorting to ensure biowaste and size reduction only preferred feedstock but can operate on unsorted waste. However, gives rise to more residuals to dispose of, also can be used for organic industrial wastes	2,000 upwards (small – medium) 26,000 upwards (large)	Traffic, risk of odour and water pollution but both should be controlled through process control,	Sewage works type installation, tanks both enclosed and open, could be housed in an industrial type building with shredder for basic pre-treatment, gas collection pipe-work and gas storage	2,000 m^2 sufficient space for 500m^3 tank processing 6,000tpa – also generates power

Technology	Pre-treatment requirements	Land requirements m^2	Environmental Issues	Visual Considerations	Other Information
Clean Materials Recycling Facility	Presorting via separate collection for dry recyclables	Depends on waste collection method Up to 14,000 (small – medium) 14,000 upwards (large)	Traffic, noise, risk of odour and water pollution but both should be controlled through process control,	Standard industrial type building	
Dirty Materials Recycling Facility	none	Up to 14,000 (small – medium) 14,000 upwards (large)	Traffic, noise, risk of odour and water pollution but both should be controlled through process control	Standard industrial type building	May have long term problems with marketing recyclates

Waste Treatment					
Mechanical biological treatment	Pre-sorting of recyclables preferable through source segregation	10,000 (small – medium) 16,000 upwards (large)	Risk of odour but should be eliminated through process controls. Traffic, noise	High Industrial building	Modular units available at 60,000t size – slight saving on land take per unit when more than one sited together

Gasification	Presorted to remove recyclate & size reduction preferred feedstock	4,500 –7,500 (small – medium) 15,000 upwards (large)	Risk of odour but should be eliminated through process controls, noise, traffic, air emissions well inside Waste Incineration Directive standards, small quantities of hazardous wastes generated from flue gas treatment and water treatment, residuals can be treated as aggregate	Industrial building with stack (typically 30 – 35m high)	Modular units, 7,000 – 50,00tpa. Power generation
Pyrolysis	Presorted to remove recyclate & size reduction preferred feedstock	4,500 – 7,500 (small – medium) 15,000 upwards (large)	Risk of odour but should be eliminated through process controls, noise, traffic, air emissions well inside Waste Incineration Directive standards, small quantities of hazardous wastes generated from flue gas treatment and water treatment, residuals can be treated as aggregate	Industrial building with stack (typically 30 – 35m high)	Modular units, 20,000 – 50,00tpa. Power generation

Waste to Energy	Only residual waste will be combusted	30,000 – 50,000	Risk of odour but should be eliminated through process controls, air emissions well inside Waste Incineration Directive standards, small quantities of hazardous wastes generated from flue gas treatment and water treatment, noise, traffic, water pollution	Industrial plant with stack – height of stack dependant on topography	50,000 m2 area will handle 250,000tpa plant
Final Disposal					
Landfill biodegradable	Source segregation to ensure no hazardous materials	Dependant on depth of fill and length of anticipated life	Dust, noise, traffic, water pollution risk, odour, landfill gas, litter	Similar to quarries but with additional litter problems	Should not be sited within 250m of occupied property

Table A3.4: Advantages and Disadvantages of Residual Treatment Technologies

Technology	Advantages	Disadvantages
Mechanical Biological Treatment, MBT	• ability to accept a wide variety of waste inputs • achieves a weight reduction of the biodegradable fraction of the MSW of up to 25% • ability to accept non source segregated putrescibles from the residual waste • recovery of additional material for recycling • residue stream is reduced, saving on landfill disposal costs	• no discernable track record in the UK • markets for RDF, the main output product from the process are very limited in the UK. • the quality of some of the recyclates can be unacceptable to reprocessors due to the levels of contamination.
Autoclaving	• maximises recovery of organic material as sterilised fibre with a range of potential markets • Sterility of product aids manual sorting and reduces H&S issues • Mobile demonstration unit available	• Not proven in the UK but working plants elsewhere. • Sterilised fibre market is immature
Anaerobic Digestion	• Process is easily controlled • High throughput relative to area of plant footprint • Proven track record in Europe • Potential sales of energy generated from the biogas produced • Unlikely to encounter the planning resistance of incineration • High recovery rates of materials.	• Potential odours and emissions • Difficulty in maintaining biological activity under certain physical conditions • Not proven in the UK on MSW but working plants elsewhere
Pyrolysis and Gasification	• Low output of hazardous emissions • Compact facilities	• Little track-record operating on MSW • May be perceived as incineration
Waste to Energy	• accepts a wide variety of waste inputs	• public perception, and thereby

	• proven track record over many years and in many locations • can make full use of the energy available within the waste to produce power • significant reduction in the weight of material from the original MSW going to landfill • bottom ash can be recycled in the construction industry	political pressure, against new facilities • fly ash produced is a hazardous material, which requires specific, though manageable, treatment • recent rulings from the European courts which suggest that faciltiies built solely for the purpose of incinerating waste will not qualify as recovery.

APPENDIX 4: DEVELOPMENT OF LONG TERM GENERIC WASTE MANAGEMENT OPTIONS

4.1 Baseline Information

The strategy document provides details of municipal waste arisings in Derbyshire for 2004/05. This data has been used as the basis for future waste projections.

4.2 Waste Projections

It is recognised that municipal waste arisings throughout the UK are increasing year by year, with current annual growth for the UK as a whole put at 3% per annum[1]. Figure A4.1 depicts waste arisings in Derbyshire for Municipal Waste up to the year 2020 for a number of growth rate scenarios:

1. Population growth, calculated as a steady growth of 0.29% up until the year 2020.
2. Local growth, calculated as a declining growth rate. Running at 2.5% until the year 2009/10 then declining to 1.5% until the year 2014/15 and finally a growth of just 1% until the final calculated year of 2020.
3. Regional growth, calculated as a steadily declining growth rate, starting at 3.6% and reducing gradually to a zero growth rate in the year 2015/16.
4. Derbyshire regional growth; again a declining growth rate starting at 2.5% and reducing to zero growth by the year 2015/16.
5. Modified local growth, this growth rate is based on the Derbyshire regional growth except includes a 0.75% increase in the year 2007/08 on top of the predicted results. This increase is to account for the introduction of green waste collections by councils.
6. No growth.

Figure A4.1 also depicts years which are of relevance to waste management either because of imposed landfill directives or because of recycling and composting targets coming into force in that year. These targets are:

- By 2010 to reduce BMW land filled to 75% of that produced in 1995.
- By 2013 to reduce BMW land filled to 50% of that produced in 1995.
- By 2015 to reduce BMW land filled to 35% of that produced in 1995.

- To recycle or compost at least 25% of household waste by 2005.
- To recycle or compost at least 30% of household waste by 2010.

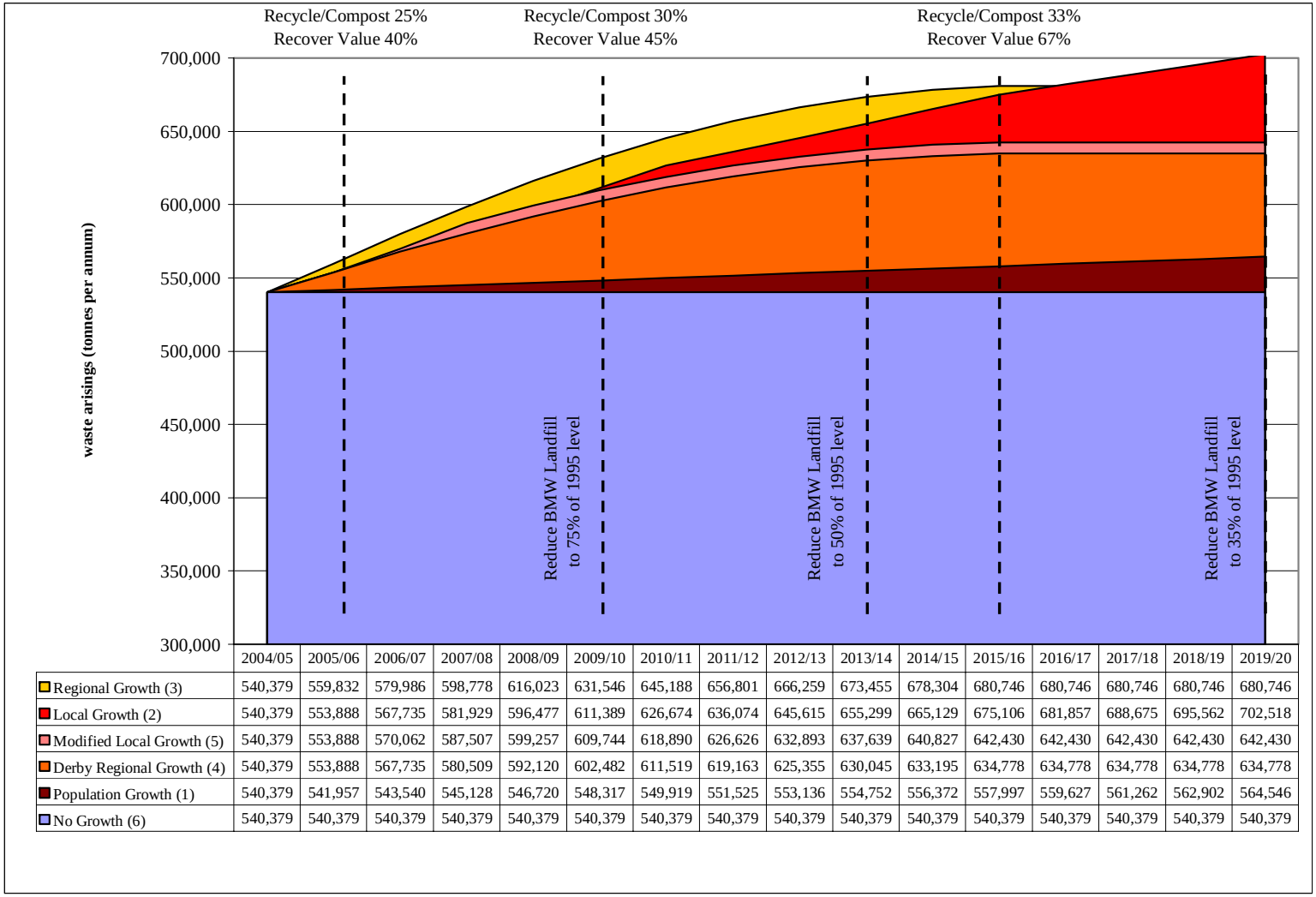
[1] www.defra.gov.uk/environment/waste/index.htm

- To recycle or compost at least 33% of household waste by 2015.

- To recover value from 40% of municipal waste by 2005.
- To recover value from 45% of municipal waste by 2010.
- To recover value from 67% of municipal waste by 2015.

At this point in time, the most appropriate waste growth scenario is deemed to be the modified local growth scenario, as this most closely reflects the Regional Waste Strategy' preferred option. This figure will be used in subsequent development and modelling of the various waste management scenarios.

Figure A4.1 Municipal growth projections for Derbyshire



	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
Regional Growth (3)	540,379	559,832	579,986	598,778	616,023	631,546	645,188	656,801	666,259	673,455	678,304	680,746	680,746	680,746	680,746	680,746
Local Growth (2)	540,379	553,888	567,735	581,929	596,477	611,389	626,674	636,074	645,615	655,299	665,129	675,106	681,857	688,675	695,562	702,518
Modified Local Growth (5)	540,379	553,888	570,062	587,507	599,257	609,744	618,890	626,626	632,893	637,639	640,827	642,430	642,430	642,430	642,430	642,430
Derby Regional Growth (4)	540,379	553,888	567,735	580,509	592,120	602,482	611,519	619,163	625,355	630,045	633,195	634,778	634,778	634,778	634,778	634,778
Population Growth (1)	540,379	541,957	543,540	545,128	546,720	548,317	549,919	551,525	553,136	554,752	556,372	557,997	559,627	561,262	562,902	564,546
No Growth (6)	540,379	540,379	540,379	540,379	540,379	540,379	540,379	540,379	540,379	540,379	540,379	540,379	540,379	540,379	540,379	540,379

4.3 Options Development

The waste hierarchy is broadly accepted as the guiding principle for securing a more sustainable waste management system. The hierarchy suggests that the most effective environmental solution is to minimise the generation of waste. Where further reduction is not practicable, products and materials can sometimes be used again, either for the same or for a different purpose (reuse). Failing that, value should be recovered from waste through recycling or composting, or through energy recovery. Only if none of these offers an appropriate solution should waste be incinerated without energy recovery, or disposed to landfill. In practice, strategic waste management options will comprise a combination of these methods, because the 'best' option will often vary according to the type of waste, its source and composition, and the viability of alternative methods, both generically and in the local context. A variety of different methods can also be used for the collection and transport of waste. Overall, an integrated approach will be required to manage total waste arising, and this will include landfill for residual wastes for which no alternative is available. The Government's statutory and non-statutory landfill diversion, recycling and recovery targets, together with the Landfill Directive (as presented in section A4.2) provide a framework for identifying future waste management strategy for Derbyshire. However, these targets can be met (or exceeded) by various means and a range of options is discussed below.

A number of waste management options have been considered that meet or exceed the Landfill Directive targets. These options are based on achieving a minimum 45% recycling target, with two options based on 55% recycling/composting

4.4 Outline of Options

The following generic waste management options have been developed and evaluated by the Derbyshire Councils:

- **OPTION 1:** Moderate (45%) source segregation for recycling / composting with the residual waste being processed in an Autoclave/MBT plant.
- **OPTION 2:** Moderate (45%) source segregation for recycling / composting with the residual waste being processed in a MBT plant with RDF production to a level to meet LATS requirements.
- **OPTION 3:** Moderate (45%) source segregation for recycling / composting with the residual waste being processed in an Anaerobic Digestion plant (AD).
- **OPTION 4:** Moderate (45%) source segregation for recycling / composting with the residual waste being processed in an Energy from Waste plant (EfW), maximising diversion from landfill.
- **OPTION 5:** High (55%) source segregation for recycling / composting with the residual waste being processed in an Anaerobic Digestion plant (AD).

- **OPTION 6:** High (55%) source segregation for recycling / composting with the residual waste being processed in an Energy from Waste plant (EfW), maximising diversion from landfill.

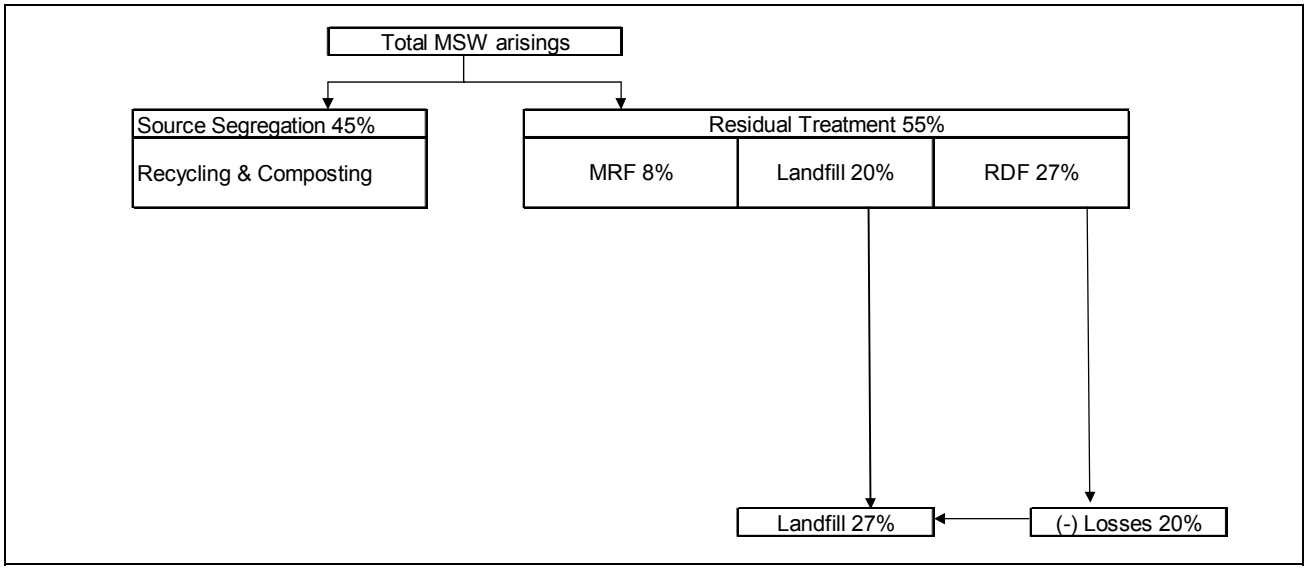
Details of the evaluation process are presented in Appendix 5.

4.5 Outline of Options

Option 1: Moderate source segregation with the residual waste being processed in an autoclave Mechanical Biological Treatment (MBT) plant.

The basis of this option is to achieve a 45% source segregated recycling and composting effort, with residual waste processed through an autoclave MBT process yielding recycling; RDF production, and residual landfill.

FIGURE A4.2: FLOW CHART FOR OPTION 1

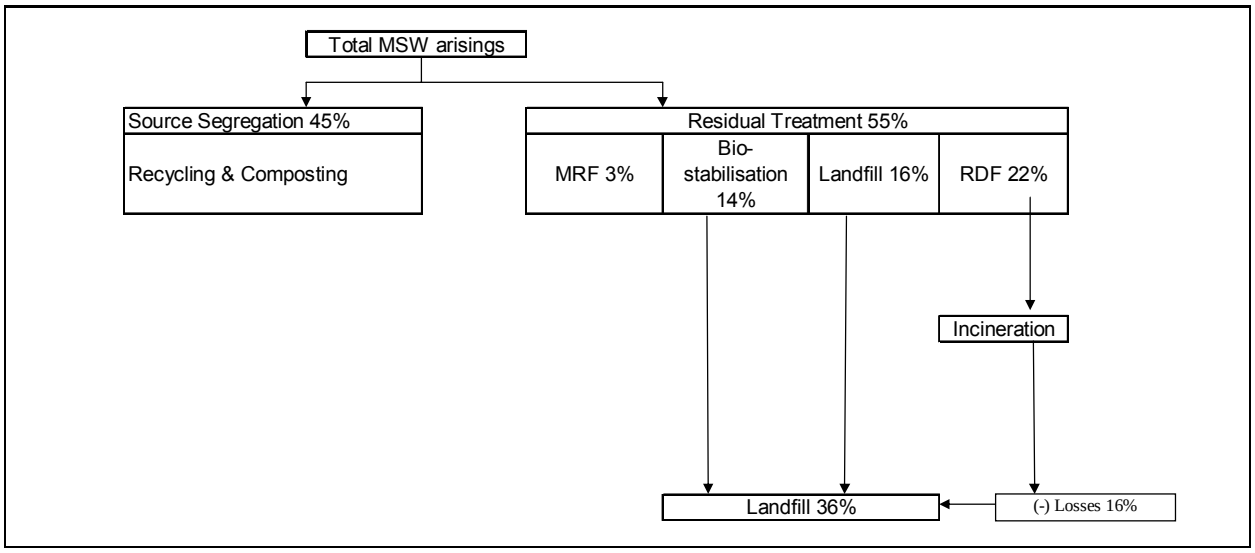


All percentages represent the percentage component of the original total MSW arisings

Option 2: Moderate source segregation with the residual waste being processed in an Mechanical Biological Treatment (MBT) plant with Refuse Derived Fuel (RDF) production to a level to meet the LATS requirements.

The basis of this option is to achieve a 45% source segregated recycling and composting effort, with just enough residual waste sent to an MBT plant to meet LATS targets. This residual waste would be processed by recycling, RDF production, and in-vessel composting.

FIGURE A4.3: FLOW CHART OF OPTION 2 WASTE FLOWS

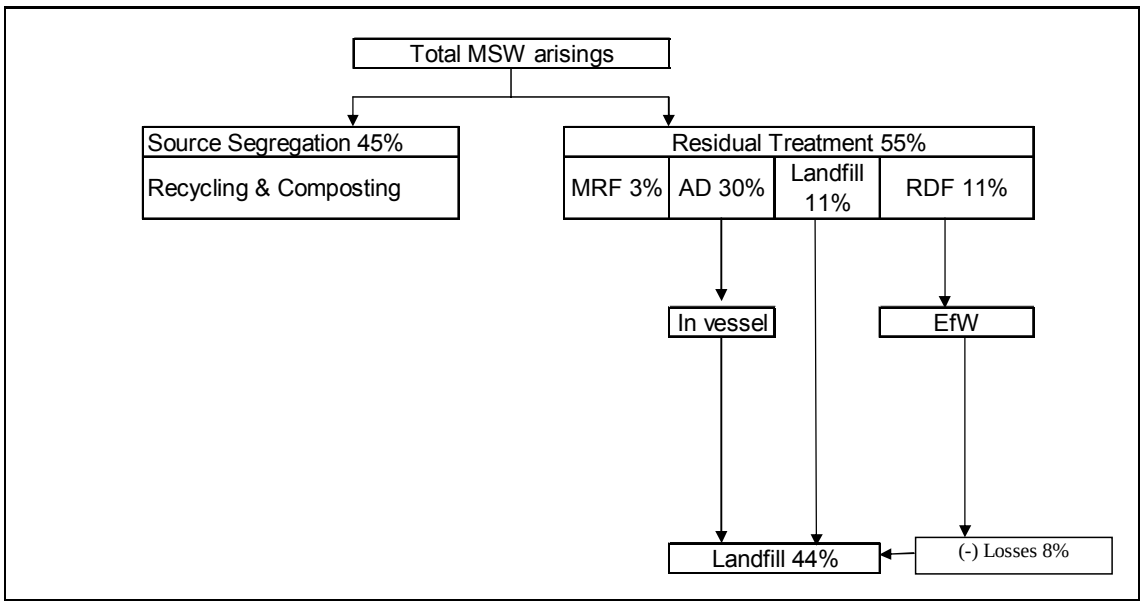


All percentages represent the percentage component of the original total MSW arisings

Option 3: Moderate source segregation with the residual waste being processed in an Anaerobic Digestion plant (AD) e.g. Leicester City.

The basis of this option is to achieve 45% source segregated recycling and composting, with residual waste processed by recycling, RDF production, in-vessel composting, and anaerobic digestion.

FIGURE A4.4: FLOW CHART OF OPTION 3 WASTE FLOWS

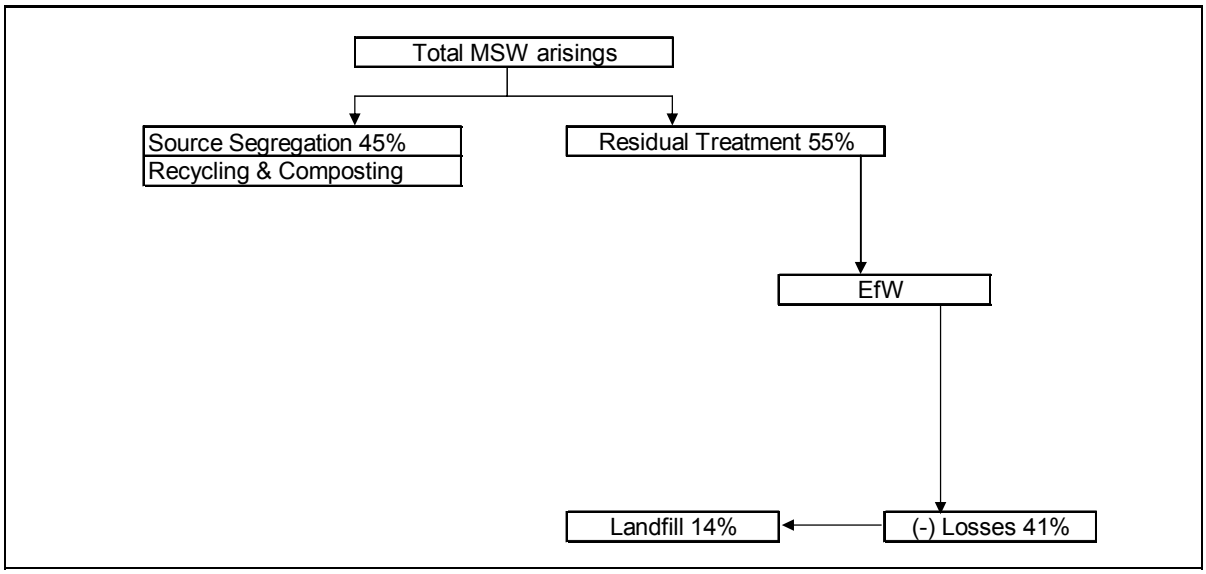


All percentages represent the percentage component of the original total MSW arisings

Option 4: Moderate source segregation with the residual waste being processed in an Energy from Waste (EfW) plant maximising diversion from landfill.

Option 4 replicates levels of source-segregated composting and recycling achieved in Options 1, 2 and 3, with all residual waste being incinerated by means of an EfW plant.

FIGURE A4.5: FLOW CHART OF OPTION 4 WASTE FLOWS

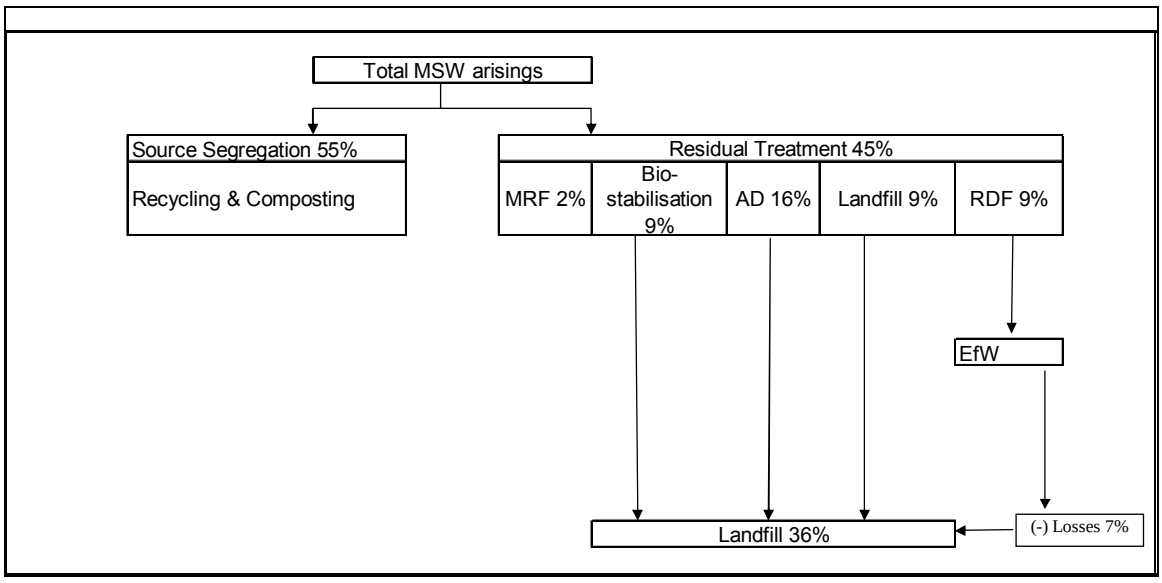


All percentages represent the percentage component of the original total MSW arisings

Option 5: High source segregation with the residual waste being processed in an Anaerobic Digestion plant (AD).

The basis of this option is to achieve a 55% source segregated recycling and composting effort, with residual waste processed by recycling, RDF production, in-vessel composting, and anaerobic digestion.

FIGURE A4.6: FLOW CHART OF OPTION 5 WASTE FLOWS

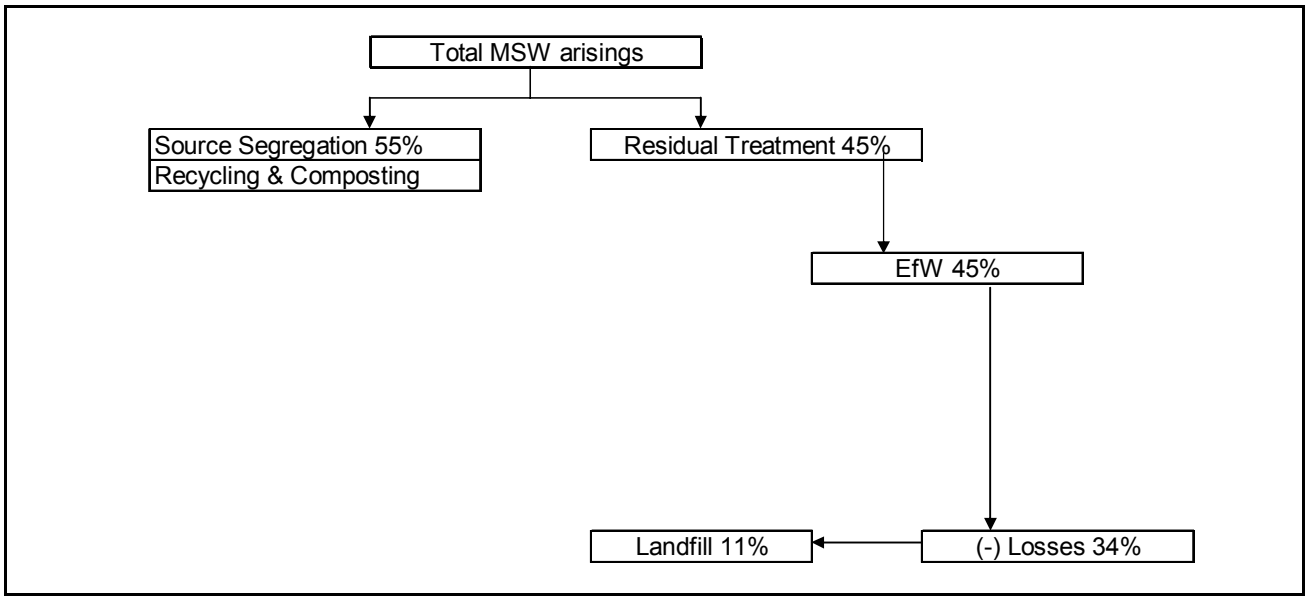


All percentages represent the percentage component of the original total MSW arisings

Option 6: High source segregation with the residual waste being processed in an Energy from Waste (EfW) plant maximising diversion from landfill.

Option 6 replicates levels of source-segregated composting and recycling achieved in Option 5, with all residual waste being incinerated by means of an EfW plant.

FIGURE A4.7: FLOW CHART OF OPTION 6 WASTE FLOWS



All percentages represent the percentage component of the original total MSW arisings

4.6 Overview of Options

Six potential options (Option 1 to 6) for the future management of Municipal Waste in Derbyshire have been presented. These Options have been assessed against the relevant Landfill Directive Targets to determine compliance or non-compliance. Targets up to 2020 have been considered.

All Options achieve or exceed the Landfill Directive Targets for 2020.

Option 3 has the highest percentage of waste going to landfill. Option 6 is the highest landfill diversion option with only the inert ash produced by incineration consigned to landfill.

Tables A5.2 indicates the predicted facility capacity sizes for all options for the year 2010. The predicted numbers of facilities are shown in Tables A4.4A to A4.4E for three scenarios (small, medium and large facilities) based on capacity sizes indicated in Table A4.3. Table A4.4D provides a comparison of total number of facilities for all options. The impact of facility size on the residual treatment facilities is shown in Table A4.4F

TABLE A4.2 PREDICTED FACILITY CAPACITY TOTALS FOR ALL OPTIONS

DESCRIPTION	WASTE TREATMENT CAPACITY												
Option	PRIMARY SOURCE		MBT/Residual waste treatment capacity					Energy from Waste plant capacity required	Capacity total for initial treatment	Landfill capacity	Transfer facilities		Capacity for total waste handled (tpa)
	MRF capacity	Composting (Open Windrow & In-Vessel)	Recycling	Bio-stabilisation	Landfill (rejects)	EfW	TOTAL				CA	OTS	
Option 1 45%SS, MBT, Autoclave	129,811	153,904	52,014	0	124,835	169,914	346,763	0	630,478	167,313	76,232	220,667	1,094,691
Option 2 45% SS, MBT	129,811	153,904	17,338	86,691	104,029	138,705	346,763	0	630,478	225,396	76,232	220,667	1,152,773
Option 3 45% SS, AD Ball mill	129,811	153,904	17,338	190,720	69,353	69,353	346,763	0	630,478	277,411	76,232	220,667	1,204,788
Option 4 45% SS, Efw,	129,811	153,904	0	0	0	0	0	346,763	630,478	86,691	76,232	220,667	1,014,068
Option 5 55%SS, AD ball mill	169,780	176,983	14,186	156,043	56,743	56,743	283,715	0	630,478	226,972	76,232	220,667	1,154,350
Option 6 55% SS, EfW	169,780	176,983	0	0	0	0	0	283,715	630,478	70,929	76,232	220,667	998,306

TABLE A4.3 ASSUMED FACILITY CAPACITY FOR ALL OPTIONS

Facility Type	Facility Capacity (Tonnes Per Annum)		
	Small	Medium	Large
MRF	10,000	25,000	50,000
Composting	10,000	25,000	50,000
EfW	50,000	100,000	150,000
Landfill	-	100,000	-
MBT	50,000	100,000	150,000
CA site (MSW Transfer)	-	10,000	-
Other Transfer Facility	-	60,000	-
AD	50,000	100,000	150,000

TABLE A4.4A PREDICTED FACILITY NUMBERS TO MANAGE MUNICIPAL WASTE (SMALL FACILITIES)

DESCRIPTION	Facility Numbers							
Option	PRIMARY SOURCE SEGREGATION		Residual Treatment Facility	Energy from Waste Plant	Landfills	Transfer facilities		Total number of facilities
	MRF capacity	Composting (Open Windrow & In-Vessel)				CA	OTS	
Option 1 - 45%SS, MBT, Autoclave	13	15	7	0	3	8	4	50
Option 2 - 45%SS, MBT	13	15	7	0	3	8	4	50
Option 3 - 45% SS, AD ball mill	13	15	7	0	3	8	4	50
Option 4 - 45% SS, EfW	13	15	0	7	1	8	4	47
Option 5 - 55% SS, AD Ball mill	17	18	6	0	3	8	4	54
Option 6 - 55% SS, EfW	17	18	0	6	1	8	4	52

TABLE A4.4B PREDICTED FACILITY NUMBERS TO MANAGE MUNICIPAL WASTE (MEDIUM FACILITIES)

DESCRIPTION	Facility Numbers							
Option	PRIMARY SOURCE SEGREGATION		Residual Treatment Facility	Energy from Waste Plant	Landfills	Transfer facilities		Total number of facilities
	MRF capacity	Composting (Open Windrow & In-Vessel)				CA	OTS	
Option 1 - 45%SS, MBT, Autoclave	5	6	3	0	3	8	4	29
Option 2 - 45%SS, MBT	5	6	3	0	3	8	4	29
Option 3 - 45% SS, AD ball mill	5	6	3	0	3	8	4	30
Option 4 - 45% SS, EfW	5	6	0	3	1	8	4	27
Option 5 - 55% SS, AD Ball mill	7	7	3	0	3	8	4	31
Option 6 - 55% SS, EfW	7	7	0	3	1	8	4	29

TABLE A4.4C PREDICTED FACILITY NUMBERS TO MANAGE MUNICIPAL WASTE (LARGE FACILITIES)

DESCRIPTION	Facility Numbers							
Option	PRIMARY SOURCE SEGREGATION		Residual Treatment Facility	Energy from Waste Plant	Landfills	Transfer facilities		Total number of facilities
	MRF capacity	Composting (Open Windrow & In-Vessel)				CA	OTS	
Option 1 - 45%SS, MBT, Autoclave	3	3	2	0	3	8	4	22
Option 2 - 45%SS, MBT	3	3	2	0	3	8	4	23
Option 3 - 45% SS, AD ball mill	3	3	2	0	3	8	4	23
Option 4 - 45% SS, EfW	3	3	0	2	1	8	4	20
Option 5 - 55% SS, AD Ball mill	3	4	2	0	3	8	4	23
Option 6 - 55% SS, EfW	3	4	0	2	1	8	4	21

TABLE A4.4D COMPARISON OF FACILITY NUMBERS TO MANAGE MUNICIPAL WASTE

	Total Number of Facilities		
	Small	Medium	Large
Option 1	50	29	22
Option 2	50	29	23
Option 3	50	30	23
Option 4	47	27	20
Option 5	54	31	23
Option 6	52	29	21

TABLE A4.4E COMPARISON OF RESIDUAL TREATMENT FACILITY NUMBERS TO MANAGE MUNICIPAL WASTE

	Number of Residual Treatment Facilities		
Option	Small	Medium	Large
Option 1	7	3	2
Option 2	7	3	2
Option 3	7	3	2
Option 4	7	3	2
Option 5	6	3	2
Option 6	6	3	2

It is important to consider a range of capacities for waste handling facilities as this directly impacts the number of facilities required to handle the municipal waste stream, which in turn has an implications on land use planning and the distance waste has to travel from its source to the point of treatment. A large number of smaller facilities is more consistent with the Proximity Principle than a small number of large facilities. However, whilst it is the intention to comply as far as possible with the proximity principle, the implication of opting for smaller local facilities is that a greater number of suitable locations for the waste facilities need to be found. Table A4.4E indicates that by opting for smaller local facilities an additional 15 to18 facilities will be required depending on the chosen option. Looking at residual treatment facilities, which often attract the most controversy, 7 local facilities would be required compared to 2 large centralised facilities. Whilst at a local level there may be the potential to co locate different waste facilities on the same site, due to the geographic nature of the County, and restrictions that may be imposed within the National Park boundaries it may be difficult to identify enough suitable sites for the required number of small facilities.

APPENDIX 5: WASTE MANAGEMENT OPTION ASSESSMENT

5.1 Introduction

To ensure a consistent approach in assessing the strategic waste management options for Derbyshire an appraisal methodology has been used based on the approach recommended by the Department for the Environment Food and Rural Affairs. The five principal stages of this methodology can be summarised as follows:

- Establishing sustainability objectives and indicators (Step 1 of the assessment process)
- Developing a range of potentially viable options (Step 2 of the assessment process)
- Identifying overall performance scores for each sustainability indicator (Step 3 of the assessment process).
- Establishing a valued performance score for each sustainability indicator (Step 4 of the assessment process)
- Applying a weighting to each sustainability indicator to generate a final score (Steps 5 & 6 of the assessment process)
- Undertaking a sensitivity analysis of the results (Step 7 of the assessment process)

Performance scores for each option have been developed from two main sources:

- Life Cycle Assessment (LCA), using the Environment Agency WISARD software to generate environmental impacts. A description of LCA methodology and the WISARD software is provided in Section 5.2 of this appendix.
- SLR Consulting's professional judgement based on experience within the UK, the rest of Europe and elsewhere.

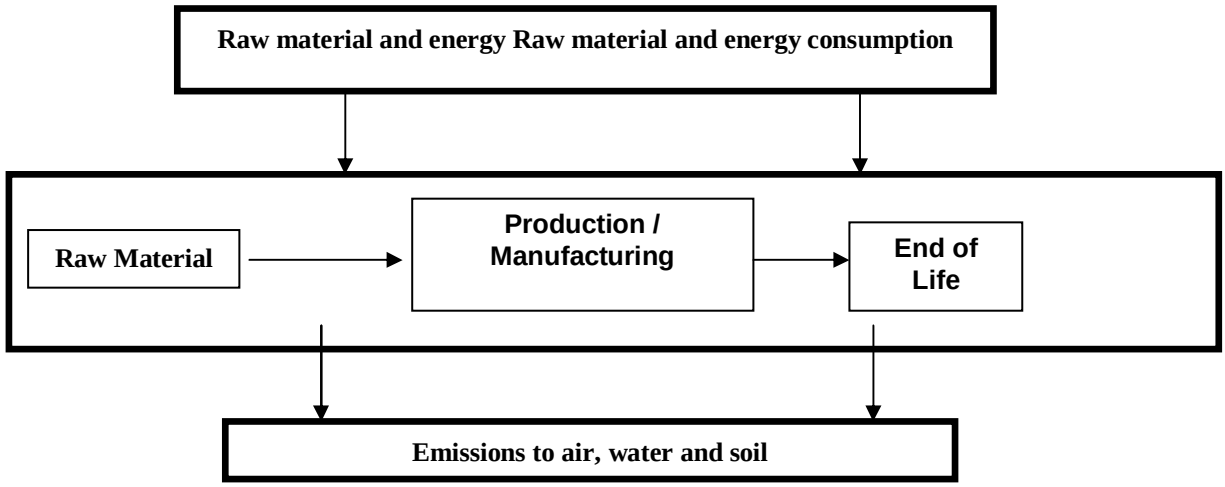
5.2 LCA Modelling & Wisard Software

A life cycle assessment (LCA) approach has been applied, using the Environment Agency WISARD software, to provide an assessment of waste management options for the Year 2020.

LCA is defined in ISO 14040 (Final Draft International Standard) as *'the compilation and evaluation of the inputs and outputs and the potential environmental impacts of*

a product system throughout its life cycle[2]. A simple flow diagram is shown in Figure A5.1.1 that summarises the basic principles of the LCA approach.

Figure A5.1.1: LCA approach.



The versatility of the LCA approach has led to an increase in its application by both industry and Governments throughout the world. At a European level, the LCA approach has been used extensively as a tool for informing policy development, such as the EU regulations on eco-labelling. Another example of its promotion is in the European Directive on Packaging and Packaging Waste (94/62) which states that:

'life cycle assessments should be completed as soon as possible to justify a clear hierarchy between re-usable, recyclable and recoverable packaging[2].

In the UK, studies incorporating LCA have been conducted for the DETR on End-of-Life Vehicles (ELV's), and, Waste Electrical and Electronic Equipment (WEEE). Waste Strategy 2000 describes LCA as a means to "provide a basis for making strategic decisions on the ways in which particular wastes in a given set of circumstances can be most effectively managed, in line with the principles of Best Practicable Environmental Option, the waste hierarchy and the proximity principle".

2 ISO 14040 – LCA: Principles and Framework. Also refer to ISO 14041 – LCA: Inventory Assessment, ISO 14042 – LCA: Impact Assessment, and, 14043 – LCA: Interpretation.

2 European Directive 94/62/EC on Packaging and Packaging Waste – OJ No L 365. 31/12/94.

Within the same document specific reference is made to the EA WISARD life cycle software.

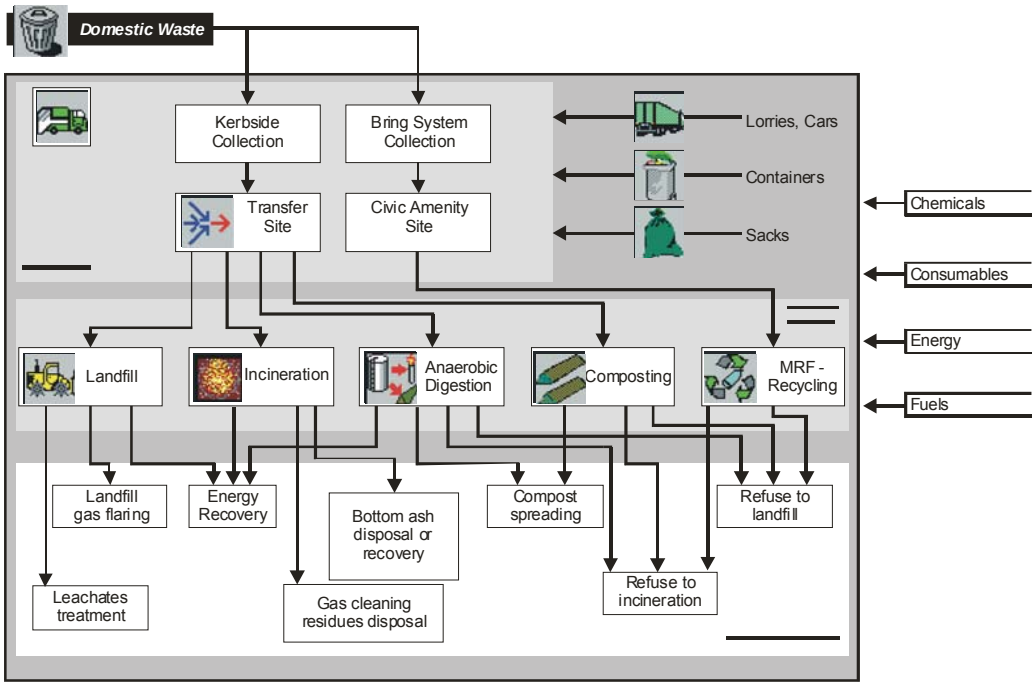
It should be noted however, that LCA is rarely a precise science and that its application should be in conjunction with, rather than instead of, other policy forming strategies.

WISARD Software

The EA launched their WISARD LCA tool in 1999 with the aim of providing an objective mechanism to assist in decision making for waste managers and planners in regard to managing non-inert municipal waste. This has required the inert waste streams (C&I and C&D) to be modelled as glass reflecting a generally inert waste stream.

The program considers all stages in the management and processing of waste from a community for a period of one year, from the household front door through to the controlled disposal or recovery of the waste. Using WISARD, a comparative study of differing waste management services can be made at a community, sub-region, or regional level.
The scope of the WISARD program and the various stages included in the analysis of the system is illustrated in Figure A5.1.2, below.

Figure A5.1.2: Scope of WISARD tool.



The EA have claimed that the software is consistent with the demands of Government policy in identifying BPEO and BAT for waste management options. WISARD has also been developed following the ISO series of standards discussed in the above section[2].

The EA have stated their intention to upgrade the current version of WISARD 3.3 in the near future to include additional features such as a financial assessment function, gasification and pyrolysis database options, and, improving the user interface features.

5.3 Choice of Sustainability Objectives and Evaluation Criteria

Guidance within the Waste Strategy for England and Wales has been used to identify the sustainability objectives and criteria against which all options are to be measured (Step 1 of the assessment process), a summary of which is given in Table A5.1.3. The sustainability objectives and indicators established broadly divide into four categories; environmental criteria, socio-economic criteria, operational criteria and waste management policy criteria.

Table A5.1.3 includes a number of sustainability criteria previously not associated with BPEO determination, for example employment opportunities, noise, local transport impacts and the conservation of landscapes and townscapes. These (and other) criteria identify the sustainability of each option and therefore when added to the BPEO criteria serve to identify the SWMO, the sustainable waste management option, as defined within Waste Strategy 2000. The criteria used to determine the SWMO and BPEO are summarised within Table A5.1.3. In summary however, BPEO determination uses all criteria measured by WISARD, together with deliverability, cost and conforming with waste policy. Evaluation of the SWMO and BPEO is made later in this report (see Section 5.11).

A brief review of each sustainability objective follows. At this stage each sustainability indicator should be regarded as having equal importance. The application of weighting to each indicator is discussed in Section 5.9 of this Appendix.

5.4 Environmental Related Criteria

5.4.1 To Ensure Prudent Use of Land and Other Resources

A key sustainable development objective is to use finite natural resources (such as fossil fuels and land) more efficiently. Producing more with less, for example by reusing or recycling waste, reduces the environmental pollution and degradation caused by extraction, use and disposal of natural resources.

The choice of waste management option can have a significant influence on the consumption of finite natural resources. For example, an option involving reuse and recovery of materials should result in a reduction in the consumption of primary raw materials. Non-renewable resource depletion is assessed for all Options using the WISARD life cycle assessment tool, and is summarised in Table A5.2a (performance scores) and Table A5.2b (valued scores).

Land is also a finite resource, and the emphasis of Government policy is to `recycle' the use of land and buildings through brownfield site development and re-use of buildings. Some waste management options are more `land hungry' than others. Landtake is measured using professional judgement based on the typical size of different facilities. An estimate of landtake (in hectares) for each facility type is given in Table A5.3a. A summary of the potential 'total landtake' for all Options is given in Table A5.3b, indicating landtake ranging from 15 – 23ha.

Renewable resource depletion is used for determination of both the BPEO and SWMO, whereas landtake is used in determination of the SWMO only.

5.4.2 To Reduce Greenhouse Gas Emissions

Global climate change is widely recognised as one of the greatest environmental challenges facing the world today. The clear message from the scientific community is that climate change is due, at least in part, to the increasing concentrations of greenhouse gases in the atmosphere.

A number of waste management operations give rise directly or indirectly to greenhouse gas emissions. The decomposition of waste in landfill sites also gives rise to methane (CH_4), which is around 20 times more potent as a greenhouse gas than carbon dioxide ($CO_{2)}$. A key objective of the Landfill Directive is to reduce our reliance on landfill and to thereby cut methane emissions. Measurement of this sustainability objective is made through assessing greenhouse gas emissions for all

Options using the WISARD life cycle assessment tool, and is summarised in Table A5.2a (Performance Scores) and Table A5.2b (Valued Scores).

Greenhouse gas emissions are used for determination of both the BPEO and SWMO.

5.4.3 To Minimise Adverse Impacts on Air Quality and Public Health

A key sustainable development objective is to control air pollution in order to reduce the risks to human health, the natural environment and quality of life. Pollutants of most concern include: Nitrogen Dioxide; Sulphur Dioxide; Carbon Monoxide; particles (PM10); and Ozone. Measurement of these indicators is made for all Options using the WISARD life cycle assessment tool, and summarised in Table A5.2a (Performance Scores) and Table A5.2b (Valued Scores) for the following impact assessment categories; human toxicity, air acidification and ozone depletion.

Dust is defined as small particles in the range 1-75 microns in diameter. Small particles of dust (PM10) are injurious to public health. Measurement of this indicator has been made using Human Toxicity, one of the impact assessment categories within WISARD (see Table A5.2a (Performance Scores) and Table A5.2b (for Valued Scores).

However, it is the soiling of property that is the most common cause of complaint. A range of waste management processes potentially give rise to dust, particularly where mechanical operations and storage of waste take place in the open. Vehicle movements can also be a significant dust generator, both on and off site. Professional judgement based on experience of existing facilities is used to measure (on a nominal scale) dust generation for each facility type, as shown in Table A5.4a, indicating that large landfills are over 60 times more likely to have an adverse dust impact than transfer stations. A summary of performance scores for dust for each option is given in Table A5.4b.

Odour is a common cause of public concern in relation to waste management. Like dust, odours can be particularly acute where mechanical operations and storage of waste take place in the open. Odours are difficult and expensive to abate. Measurement of this indicator is made using professional judgement based on experience of existing facilities. A qualitative scoring allocation for each facility type is given in Table A5.4a.

Air acidification, human toxicity and ozone depletion are used for determination of both the BPEO and SWMO, whereas odour and dust are used in determination of the SWMO only.

5.4.4 To Conserve Landscapes and Townscapes

Landscapes and townscapes have strong economic, social and community value. All waste management options involve development components such as buildings, processing plant, access roads, lighting/signage, storage mounds and perimeter bunds. These can have landscape impacts (effects on the general landscape character and quality of the surrounding area) and visual impacts (including changes in available views, the extent of impact of the change on potential receptors and the overall impact on visual amenity). Whilst the extent of landscape and visual impacts is strongly influenced by the nature of the receiving environment, concern is likely to be greatest where options involve emissions stacks, large enclosed facilities or significant storage/disposal of waste above ground level.

In this report measurement of this sustainability objective is made using professional judgement based on the typical nature, size and number of facilities proposed for each of the options considered. A qualitative scoring allocation for each facility type is given in Table A5.5a, suggesting landfills have a far greater impact than any other facility type. A summary of the total 'landscape impact' scores for all Options is given in Table A5.5b.

This criterion is used for determination of the SWMO only and does not form part of the BPEO assessment.

5.4.5 To Protect Local Amenity

Living and working environments make an important contribution to 'quality of life.' In addition to attractive streets and buildings, access to green spaces, and community safety, low levels of noise and litter are also important considerations. All waste management options have the potential to generate noise and litter if not managed properly, as they involve the storage, treatment and transport of waste. However, litter is most likely to be of concern where the waste is stored or processed/ deposited in the open. Noise is most likely to be of concern in relation to sites that operate outside standard working hours, or use particularly noisy unenclosed plant (e.g. screening/ crushing machinery).

In this report measurement of this sustainability objective is made using professional judgement based on the current performance of existing facilities proposed for each

of the options considered. For 'noise impacts' a qualitative scoring allocation for each facility type is given in Table A6.6a, suggesting EfW and MBT facilities score noticeably worse than composting. A summary of the total 'noise impact' scores for all Options is given in Table A5.6b.

For 'litter impact' a qualitative scoring allocation for each facility type is assumed to be the same for dust and odour impacts and therefore summarised in Table A5.4a. A summary of the total 'litter impact' scores for all Options is given in Table A5.4b.

These criteria are used for determination of the SWMO only and do not form part of the BPEO assessment.

5.5.6 To Minimise Adverse Effects on Water Quality

All waste management options will create potential impacts on water as they involve the following:

- The storage of waste (e.g. run off from rain and dust suppression sprays, leaching of contaminants etc)
- The transport of waste (e.g. run off from the delivery and tipping of materials and wheel washing)
- The operation of plant and vehicles (e.g. potential pollution from oil and solvents, including the risk of accidental spillage)

However, some waste management options present a greater risk to water quality than others, for example:

- Composting: Water is generated as part of the process and the compost has to be turned and wetted. The liquor generated from this process may contain heavy metals and other contaminants.
- Anaerobic digestion: The process results in a digestate liquor which may contain high levels of metals and other contaminants.
- Incineration: Cooling and cleaning water may contain high levels of contaminants, whilst the storage and disposal of ash and air pollution control residues poses a further threat to water quality.
- Landfill/landraising: The risk of pollution depends on the characteristics of the wastes, the standard of site engineering, the underlying geology and the proximity of water courses and abstraction points. The Environment Agency's advice is that however well engineered a landfill site, there is a risk of leachate release to the aqueous environment.

In this report WISARD has been used to quantify water eutrophication as a measure of water contamination and is summarised in Table A5.2a (for Performance Scores) and Table A5.2b (for Valued Scores). Professional judgement has also been used to determine the current performance of existing facilities. A qualitative scoring allocation for each facility type is given in Table A5.7a, suggesting the adverse impact of landfill is far greater than for all other facility types. A summary of the potential 'water contamination impact' scores is given in Table A5.7b.

Eutrophication of water is used for determination of both the BPEO and SWMO, whereas potential for water contamination is used in determination of the SWMO only.

5.5 Socio Economic Related Indicators

5.5.1 To Minimise Local Transport Impacts

An efficient transport system is needed to support a strong and prosperous economy and to maintain and improve people's quality of life. However, congestion and unreliability of journeys add to the costs of business, and undermine competitiveness. Major traffic arteries cause 'severance' within a community when people become separated from places and other people and 'fear and intimidation' amongst pedestrians. Heavy levels of traffic also cause damage to towns and cities, and harm the countryside.

All waste management options have local transport impacts as they involve some degree of off-site movement of waste. The scale of impacts will be influenced by factors such as vehicle size, frequency of vehicle movements, road/pavement width, and traffic speeds. The scope to mitigate or avoid impacts (e.g. by avoiding sensitive receptors, restricting hours of operation and 'backloading' vehicles) is also important.

Measurement of this sustainability objective uses total waste kilometres travelled for each option. This information[3] is estimated for input data to the WISARD modelling undertaken to measure environmental objectives such as air quality, water quality and resource depletion. A summary for all Options is given in Table A5.8.

This criterion is used for determination of the SWMO only and therefore is excluded from the BPEO assessment.

[3] Obtained from Department for Transport, road traffic figures.

5.5.2 To Provide Employment Opportunities

A high employment rate is one of the key objectives of sustainable development. It is considered that employment enables people to meet their needs and improve their living standards, and thereby to help tackle poverty and social exclusion.

Development of new waste management facilities will create temporary construction employment, which may be available to local people, and their long-term operation will create jobs, the nature of which will depend on the facility.

Professional judgement based on experience of job creation at existing facilities is made to measure this sustainability objective. A qualitative scoring allocation for each facility type is given in Table A5.9a, suggesting facilities employing greater than 10 staff include all MBT, most EfW and some MRFs. A summary of the 'total jobs' estimated for all Options is given in Table A5.9b.

This criterion is used for determination of the SWMO only and therefore is excluded from the BPEO assessment.

5.5.3 To Provide Opportunities for Public Involvement and Education

Public participation is at the heart of sustainable development. Indeed, the notion of '*thinking globally, acting locally'* underpins the Local Agenda 21 process.

In this context it is important for Government, locally and regionally, to *'send the right signals'* to the public in order to encourage changes in behaviour and lifestyles.

Measurement of this sustainability objective is made using professional judgement based on experience of existing facilities and the extent to which they are likely to provide opportunities for positive public involvement. A qualitative scoring allocation for each facility type is given in Table A5.10a, suggesting the facilities with least opportunity include landfill, transfer stations, EfW and AD. A summary of the potential 'public involvement' scores for all Options is given in Table A5.10b

This criterion is used for determination of the SWMO only and therefore is excluded from the BPEO assessment.

5.6 Operational Related Indicators

5.6.1 To Minimise the Costs of Waste Management

Costs are clearly a key concern for local authorities, waste contractors and the general public and can have a significant impact in determining the nature of waste management to be developed. The principal costs relate to waste collection and waste treatment/disposal.

Professional judgement based on experience of waste management costs is made to measure this sustainability indicator. Unit costs and their derivation are provided for each waste treatment, disposal and transfer route and are generally based on current costs as at 2003. The exception to this is landfill tax which has been assumed to increase to £35/t by 2010, the assessment year. Operational costs at landfills are also assumed to rise to £35/t by the year 2010 to ensure compliance with the Landfill Directive requirements. Unit costs assumed within this assessment are summarised within A5.11a.

This criterion is used for determination of both the BPEO and SWMO.

5.6.2 To Ensure Reliability of Delivery

Although a waste management option may perform well against a range of indicators, it may not be possible to implement the option due to practical constraints. Such constraints may include:

- Availability of financial resources
- Technological issues, related to the availability of the appropriate plant and machinery
- Difficulties in obtaining planning consents

These constraints are extremely difficult to predict. Nonetheless, measurement of this objective in this report is made using a qualitative assessment based on planning likelihood, hours of operation, and perceived adverse environmental and health impacts. A qualitative scoring allocation for each facility type is given in Table A5.12a, suggesting EfW facilities are least likely to be deliverable. A summary of the total 'deliverability' scores is given in Table A5.12b. This criterion is used for determination of both the BPEO and SWMO.

5.7 Waste Management Policy Related Indicators

5.7.1 To Conform With Waste Policy

The Government actively promotes the waste hierarchy, including (in the following order of preference) waste reduction, re-use, recycling and composting, energy recovery, with disposal as a last resort. The Government also wishes to see waste managed in line with the proximity principle which states that waste should generally be disposed of as near to its source as possible. This is in part to ensure that waste problems are not simply exported to other regions or countries, and also recognises that the transportation of wastes can have significant environmental impacts. However, due to the geographical and social structure of Derbyshire, in some instances, it is more practical to both export and import wastes from neighbouring counties with existing strong cross boundary flows.

The principal aim of this waste strategy process is to conform with local, national and European waste policy. A range of statutory and non statutory targets have been used to develop the options described earlier in this report.

Derby City Council and Derbyshire County Council published a Joint Waste Local Plan (2005), that covers the administrative areas of Derby City and Derbyshire County, that lie out side the Peak District National Park. Any applications for waste facilities should show accordance with the Policies and Proposals within the Waste Local Plan.

The principal aim of waste local planning in Derby and Derbyshire states in general terms what land use planning is trying to achieve and is derived from European legislation, National Government, Government Policy Guidance and the Derbyshire Waste Management Strategy and the Derby and Derbyshire Joint Structure Plan.

Aim of the Waste Planning Strategy
To establish a planning framework which enables the provision of adequate facilities and an integrated system for the management of waste whilst:

- Respecting the principles of sustainable development; and
- Protecting people and communities, the countryside natural resources, and the built heritage from the adverse effects of waste management

PPS10 provides guidance on how Plans should make provision for development when a need for new or replacement facilities has been identified with Paragraph 33 stating that "the identification of specific sites for development is the best way that the planning system can make provision for waste management facilities, and if this is not possible, justify why this approach has not been followed". This Waste Local Plan detracts from this approach for the following reasons:

- Derbyshire's particular geographical location, current waste movements, and the current lack of clearly suitable landfill sites;
- The need for flexibility, reflecting the recommendations of the Derbyshire Waste Management Strategy;
- Catering for future changes in waste management contracts; and
- The existence of unimplemented major planning permissions for waste developments.

The Peak District National Park has produced a separate Local Plan in recognition of the special characteristics of the area, setting stringent criteria on the assessment of applications for waste management facilities, with the necessary provision being made for the development of such facilities outside the Park.

Measurement of this sustainability objective is through assessment of the percentage landfill and recovery achieved for each option considered. A summary of performance for each option is summarised in Table A5.13.

This criterion is used for determination of both the BPEO and SWMO.

5.7.2 Closure

The evaluation criteria discussed in this section represents a comprehensive sustainability and environmental appraisal framework for assessment of all Options. Wherever possible, the performance of each option against the above criteria is quantified, for example through the use of the Environment Agency's WISARD life cycle assessment tool. Where this is not possible a qualitative assessment of performance is made.

Clear distinction between those criteria used to determine the SWMO only and those criteria used to determine both the BPEO and SWMO is made following guidance from DEFRA.

The next section of this Appendix presents an overview of the performance of all Options using the evaluation criteria summarised above.

5.8 Performance of Options

5.8.1 Overall Performance Scores

The purpose of appraising the performance of all Options against the objectives and indicators summarised in the previous section is to inform decision makers about their relative advantages and disadvantages. The appraisal undertaken in this report is systematic in scoring each option against each indicator. The overall performance scores are presented in Table A5.14.

Analysis of Table A5.14 is difficult because of the matrix's complexity and the use of different units for each sustainability criterion. Establishing 'valued' performance scores provides a solution to this problem and is discussed in the next section.

5.8.2 Valued Performance Scores

'Valued' performance scores interpret overall performance scores on a scale of 0 to 1, where 0 is the worst performance, and 1 the best. This enables the discrepancy between scores to be retained, whilst allowing the performance of options against all criteria to be placed on a common scale. In this report it is assumed that a linear relationship exists between the best and worst 'value' scores. This approach is used to apply a linear function relationship to the performance scores and the resulting 'valued' performance scores are summarised in Table A5.15.

Table A5.15 indicates that should each evaluation criteria be given equal weighting the better scoring option for all criteria (SWMO analysis) is Option 6, followed by Option 1. Consideration of environmental indicators only (BPEO analysis) gives a slightly different position, with Option 6 and 1 still performing best but in reverse order.

5.9 Weighting of Sustainability Indicators

It is unlikely that each assessment criterion is of equal significance. It is therefore necessary to apply extra weight to those criteria of greater importance. At present there is no national guidance on the relative significance of each performance criteria.

One group not represented within the weightings exercise is the general public due to time constraints imposed by the strategy preparation process. It should be recognised however, that an extensive consultation process is planned for this

Strategy and alternative weightings will be considered and combined with those already secured.

Table A5.16 identifies the top two most important criteria identified in determining the sustainability of a waste management option are the waste policy objective of percentage recycling and composting and to ensure the prudent use of land and other resources. The weighted 'valued performance' scores for Options 1 to 6 are summarised in Table A5.17 for both the SWMO and BPEO.

Table A5.17 indicates that after weighting of each evaluation criteria according to relative importance Option 6, followed by Option 5 is the preferred choice for both the SWMO and the BPEO. The worst performing option is Option 3 for both the SWMO and the BPEO.

5.10 Sensitivity Analysis

The adopted approach for identifying the SWMO ensures that a number of significant indicators are addressed explicitly in arriving at a choice of option. However, the process has inherent uncertainties, associated with the choice of options, the chosen indicators and the weights derived for the indicators. To examine the robustness of the overall results, an examination of their sensitivity to these uncertainties should be undertaken.

Sensitivity analysis can be carried out in one of three ways:

1. ***Alter the way waste is dealt with by considering additional strategic waste options.*** The six options for consideration in this study were agreed at an earlier stage, and for this reason this study has not considered additional waste management options.

2. ***Addition or subtraction of indicators.*** The range of indicators to be used in the study was agreed at an earlier stage of the process and for this reason additional indicators have not been considered. However it is possible to subtract indicators, and this has been carried out by applying BPEO indicators only; namely environmental indicators, cost and recycling/landfill performance. The results from application of BPEO indicators only have been discussed in the previous section.

3. ***Change weightings applied to each indicator.*** This has been carried out by applying weightings obtained from consultation with East

Midlands Regional Technical Advisory Body to the valued performance scores. The results of this analysis are discussed below.

Table A5.18 and A5.19 provide Regional weightings and inverted weightings for each of the indicators and these have then been applied to the valued performance scores (Table A6.15). Table A5.20 indicates that after weighting of each criteria using the East Midlands Regional Technical Advisory Body weightings as a comparison, Option 6 is the preferred waste management option for the SWMO, followed by Options 1 and 5. Option 6 also scores highly for the BPEO using both sets of weightings, with Options 5 and 1 following closely. The worst performing option is still Option 3 for both the BPEO and SWMO.

5.11 What is the BPEO?

By adopting the methodology described in this Appendix it is possible to compare different options against a number of different assessment criteria. This sustainability assessment has considered 6 options for the management of Derbyshire's waste, namely:

- **OPTION 1:** Moderate source segregation with the residual waste being processed in an Autoclave/MBT plant.
- **OPTION 2:** Moderate source segregation with the residual waste being processed in a MBT plant with RDF production to a level to meet LATS requirements.
- **OPTION 3:** Moderate source segregation with the residual waste being processed in an Anaerobic Digestion plant (AD).
- **OPTION 4:** Moderate source segregation with the residual waste being processed in an Energy from Waste plant (EfW), maximising diversion from landfill.
- **OPTION 5:** High source segregation with the residual waste being processed in an Anaerobic Digestion plant (AD).
- **OPTION 6:** High source segregation with the residual waste being processed in an Energy from Waste plant (EfW), maximising diversion from landfill.

The overall ranking of all options is indicated in Table A5.21, which shows that Option 5 and Option 6 are the preferred strategy options for Derbyshire.

Option 6 represents a situation whereby existing recycling and composting targets are exceeded with the remainder of waste sent to EfW.

Option 5 represents a situation whereby existing recycling and composting targets are exceeded with the remainder of waste sent to AD.

5.12 What Is The Preferred Option For Derbyshire?

Options 1,5 and 6 are identified as the Best Practicable Environmental Options and Sustainable Waste Management Options, and as a result of this, it is felt at the present time that these generic options provide the most appropriate way forward for Derbyshire.

Option 6 assumes an expansion of recycling schemes to achieve a 55% performance, resulting in a high performing option. To achieve, and in fact exceed, the longer term Landfill Directive targets all remaining residual municipal waste is treated in an energy from waste facility (or facilities). This option meets the required Landfill Directive target in 2010 and maintains this position exceeding targets from 2010 up until the final year modelled in 2020.

Options 1 and 5 also provide a high level of sustainability and will achieve similar levels of recycling and diversion of BMW from landfill to Option 6. Whilst option 1 is based on 45% source segregated recycling and composting, the nature of the residual treatment facility means that the recovery of additional recyclates from the residual waste can be maximised.

All three options assume a significantly enhanced level of kerbside source segregation of waste materials for recycling and composting. The success of any of these options will require considerable goodwill and participation from the public of Derbyshire. In parallel, the councils will need to develop integrated systems to ensure that suitable facilities are in place to enable all segregated materials to be recycled and composted. Reaching 45% to 55% recycling and composting levels will be demanding on everyone.

Option 6 proposes the use of Energy from Waste facilities to treat residual waste. It is acknowledged that the public's acceptance of this technology is influenced by perceived health risks. However, the Environment Agency exercises very strict

controls on the emissions from these facilities to ensure compliance with the very onerous EU Waste Incineration Directive.

The treatment technologies considered in options 1 and 5, namely autoclave/ MBT and anaerobic digestion, are relatively new concepts in the UK for MSW treatment. Whilst these processes do not rely directly on combustion of the waste in each case there may be a need for combustion of the by-products (refuse derived fuel in the case of autoclave/ MBT and methane gas in the case of anaerobic digestion) As such, these options will present similar planning, environmental and logistical issues as option 6.

Due to the geographic nature of the county it is likely that at least two residual treatment facilities would be required to treat the waste remaining after recycling and composting have been maximised.

Table A5.1.3: Performance Criteria against which Waste Strategy Options are Assessed

OBJECTIVES	INDICATORS/CRITERIA	METHOD OF MEASUREMENT
Environmental Objectives	**Environmental Indicators/Criteria**	**Method of Measurement**
1. To ensure prudent use of land and other resources	a) Depletion of resources, such as wood, water, fuels and ores (BPEO &SWMO) b) Landtake (SWMO only)	WISARD output result Professional judgement based on performance of existing facilities
2. To reduce greenhouse gas emissions	c) Greenhouse gases emitted (BPEO & SWMO)	WISARD output result
3. To minimise adverse impacts on air quality and public health	d) Emissions which are injurious to public health (BPEO &SWMO) e) Emisions contributing to air acidification (BPEO & SWMO) f) Emissions contributing to depletion of the ozone layer (BPEO & SWMO) g) Extent of odour problems (SWMO only) h) Extend of dust problems (SWMO only)	WISARD output result WISARD output result WISARD output result Professional judgement based on performance of existing facilities Professional judgement based on performance of existing facilities
4. To conserve landscapes and townscapes	i) Extent of visual and landsacpe impacts (SWMO only)	Professional judgement based on performance of existing facilities
5. To protect local amenity	j) Extent of noise problems (SWMO only) k) Extent of litter and vermin problems (SWMO only)	Professional judgement based on performance of existing facilities Professional judgement based on performance of existing facilities
6. To minimise adverse effects on water quality	l) Emissions contributing to eutrophication (BPEO & SWMO) m) Extent of water pollution (SWMO only)	WISARD output result Professional judgement based on performance of existing facilities
Socio-economic Objectives	**Socio-economic Indicators/Criteria**	**Method of Measurement**
7. To minimise local transport impacts (congestion, severence, fear and intimidation, physical damage)	n) Total waste kilometres (by mode) (SWMO only) o) Transport along roads other than motorways (SWMO only)	WISARD input data WISARD input data
8. To provide employment opportunities	p) Number of jobs likely to be created (SWMO only)	Professional judgement based on performance of existing facilities
9. To provide opportunities for public involvement and education	q) Extent of opportunitites for public involvement and education (concerning sustainable waste management practices) (SWMO only)	Professional judgement based on performance of existing facilities
Operational Objectives	**Operational Indicators/Criteria**	**Method of Measurement**
10. To minimise the increased costs of waste management	r) Costs of collection, management and disposal, including material and energy revenues (BPEO & SWMO)	Professional judgement based on performance of existing facilities
11. To ensure reliability of delivery	s) Likelihood of implementation wihtin required timescale, taking account of maturity of technology, necessary level of public participation, and the need for planning permission (taking account of scale of development and likely perceived adverse impacts) (BEPO & SWMO)	Professional judgement based on performance of existing facilities
Waste Management Policy Objectives	**Waste Management Policy Indicators/Criteria**	**Method of Measurement**
12. To conform to waste policy	t) Percentage landfill (BPEO & SWMO) u) Percentage recycled/composted (BPEO & SWMO)	Agreed waste targets (Stage 2b report) Agreed waste targets (Stage 2b report)

Notes:
SWMO - Sustainable Waste Management Option process
BPEO - Best Practicable Environmental Option process

Table A5.2a – Total Waste Flows (Performance Scores)

Flow	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6
CML-Air Acidification (g eq. H+)	-45,322,947	-27,847,018	-29,810,275	-18,333,570	-37,870,009	-28,809,866
CML-Eutrophication (water) (g eq. PO4)	126,912,433	216,840,368	205,632,944	122,107,724	219,989,856	151,563,345
EB(R*Y)-Depletion of non renewable resources (yr-1)	-3,774,979	-3,899,222	-3,471,836	-3,830,266	-3,699,334	-3,927,837
IPCC-Greenhouse effect (direct, 20 years) (g eq. CO2)	16,076,143,249	40,710,264,196	44,290,719,673	86,985,518,394	51,411,034,945	81,164,738,905
CML-Human Toxicity (g)	-1,649,245,853	-1,014,171,684	-1,084,063,053	-645,499,117	-1,366,640,020	-1,018,911,629
WMO-Depletion of the ozone layer (average) (g	-10,328	-2,382	-8,989	25,684	-15,860	12,480

Table A5.2b – Total Waste Flows (Value Scores)

Flow	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6
CML-Air Acidification (g eq. H+)	1.00	0.35	0.43	0.00	0.72	0.39
CML-Eutrophication (water) (g eq. PO4)	0.95	0.03	0.15	1.00	0.00	0.70
EB(R*Y)-Depletion of non renewable resources (yr-1)	0.66	0.94	0.00	0.79	0.50	1.00
IPCC-Greenhouse effect (direct, 20 years) (g eq. CO2)	1.00	0.65	0.60	0.00	0.50	0.08
CML-Human Toxicity (g)	1.00	0.37	0.44	0.00	0.72	0.37
WMO-Depletion of the ozone layer (average) (g	0.87	0.68	0.83	0.00	1.00	0.32
TOTAL	5.48	3.02	2.45	1.79	3.44	2.86

Table A5.3a – Typical breakdown of land-take for each facility type

Facility type	Capacity (t/a)	Landtake1 (ha)
MRF - Clean	80,000	2.5
	25,000	1.2
	15,000	0.8
	5,000	0.4
Composting - Windrow	20,000	20.0
	15,000	15.0
	7,500	7.5
	5,000	5.0
	2,500	2.5
Composting - In vessel	40,000	2.5
	25,000	1.3
	15,000	1.2
	10,000	0.8
	5,000	0.6
	2,500	0.4
EfW	160,000	1.5
	135,000	1.4
	100,000	1.2
	70,000	0.8
	60,000	0.8
	50,000	0.7
	30,000	0.5
Landfill	200,000	25.0
	100,000	20.0
	75,000	15.0
HWRC Site	25,000	0.5
	20,000	0.5
	10,000	0.4
	5,000	0.3
Transfer Station	60,000	0.6
	40,000	0.5
	30,000	0.4
	20,000	0.3
	10,000	0.2
Anaerobic Digestion	50,000	0.4
	25,000	0.3
MBT (residual to EfW)	160,000	1.5
	100,000	1.2
MBT (residual to l/fill)	160,000	1.5
	100,000	1.2
	60,000	0.8

Notes:
1 - Landtake based on capacity and nature of facility

Table A5.3a – Summary of total land-take impacts for options A to F

Description	Landfill	Energy from Waste	MRF	In Vessel Composting	Windrow Composting	Anaerobic Digestion	Mechanical Biological Treatment	Transfer Station	HWRC Site	Landtake[1] (ha)
Option 1	33	-	5	5	23	-	3	2	3	75
Option 2	45	-	5	5	23	-	3	2	3	87
Option 3	55	-	5	5	23	3	-	2	3	97
Option 4	17	3	5	5	23	-	-	2	3	59
Option 5	45	-	7	6	23	3	-	2	3	89
Option 6	14	3	7	6	23	-	-	2	3	58

Notes:
1 - Highest value is least likely to be deliverable … lowest value is most likely to be deliverable.
2 - Summary is calculated by multiplying facilities requirement and assigned factor.
3 - See Appendix B for further details.

Scoring Methodology (Landtake)

For each facility type and size, representative land areas for a single facility have been assigned. For example a landfill (100,000 t/a capacity) is assumed to require 20 hectares of land area compared to a small HWRC site (5,000 t/a capacity which only requires 0.3 hectares of land.

Multiplying the typical land area figure for each facility by the number of required facilities of that type gives total land take.

Highest value is least likely to be deliverable … lowest value is most likely to be deliverable.

Table A5.4a – Typical Breakdown of Litter, Dust and Odour scores for each facility type

Facility type	Capacity (t/a)	Aggregate Scores[1]	Covered storage[2]	Vehicle Movements[2]	Open or closed operations[2]
MRF - Clean	80,000	7	6	8.5	2
	25,000	2	5	8.0	2
	15,000	1	4	6.5	2
	5,000	0	3	5.0	2
Composting - Windrow	20,000	14	10	7.0	10
	15,000	9	10	6.0	10
	7,500	3	10	3.5	10
	5,000	2	10	3.0	10
	2,500	1	10	2.0	10
Composting - In vessel	40,000	4	7	7.5	2
	25,000	2	6	7.0	2
	15,000	1	6	7.0	2
	10,000	1	5	5.0	2
	5,000	0	4	3.0	2
	2,500	0	3	2.0	2
EfW	160,000	6	2	9.0	2
	135,000	5	2	8.8	2
	100,000	3	2	8.5	2
	70,000	2	2	8.0	2
	60,000	2	2	7.5	2
	50,000	1	2	7.0	2
	30,000	1	2	6.0	2
Landfill	200,000	200	10	10.0	10
	100,000	90	10	9.0	10
	75,000	60	10	8.0	10
HWRC Site	25,000	16	8	10.0	8
	20,000	12	8	9.0	8
	10,000	5	8	7.5	8
	5,000	2	8	6.0	8
Transfer Station	60,000	2	2	9.0	2
	40,000	1	2	9.0	2
	30,000	1	2	8.0	2
	20,000	1	2	7.0	2
	10,000	0	2	6.0	2
Anaerobic Digestion	50,000	1	2	6.0	2
	25,000	0	2	3.0	2
MBT (residual to EfW)	160,000	6	2	9.0	2
	100,000	3	2	8.5	2
MBT (residual to l/fill)	160,000	6	2	9.0	2
	100,000	3	2	8.0	2
	60,000	2	2	7.5	2

Notes:
Highest value has greatest odour, litter and dust impact
1 - Aggregate scores = (Capacity x Covered Storage x Vehicle movements x Open/closed facility)/1000000

2 - Nominal scale used for all variables (10 = worst, 0 = best)

Table A5.4b – Summary of Litter, Dust and Odour Impacts for options 1 to 6

Description	Landfill	Energy from Waste	MRF	In Vessel Composting	Windrow Composting	Anaerobic Digestion	Mechanical Biological Treatment	Transfer Station	HWRC Site	Aggregate Scores[1]
Option 1	151	-	16	8	16	-	12	8	38	249
Option 2	203	-	16	8	16	-	12	8	38	301
Option 3	250	-	16	8	16	12	-	8	38	348
Option 4	78	12	16	8	16	-	-	8	38	176
Option 5	204	-	19	10	16	10	-	8	38	306
Option 6	64	10	19	10	16	-	-	8	38	166

Notes:
1 - Highest value is least desirable … lowest value is most desirable
2 - Summary is calculated by multiplying facilities requirement and assigned factor.
3 - See Appendix B for further details.

Scoring methodology (litter, dust and odour)

Litter, dust and odour are represented by a single score.

Factors affecting the level of litter, dust and odour nuisance are assumed to be:

- Facility capacity
- Whether the facility has covered or uncovered storage of waste (covered storage)
- The number of vehicle movements (vehicle movements)
- Whether the facility is a closed or open operation (open or closed operation)

For each facility type and size, representative scores (nominal scale of 0 to 10), for a single facility have been assigned against each factor, based on professional judgement. The aggregate score is calculated as:

Aggregate Score = Facility Capacity * Covered Storage * Vehicle movements * Open/closed facility

Each aggregate score is factored down by 1,000,000 to provide an easily understandable score in the range 0 – 100. For example, for MRF (25,000 t/a);

Facility capacity = 25,000, Covered storage = 5, Vehicle movements = 8, Open/closed operation = 2

Aggregate score = 25,000 * 5 * 8 * 2 /1,000,000 = 2

This figures compares to a large landfill (100,000 t/a) which scores a total of 90, indicating the much higher potential to cause litter, dust and odour.

Multiplying the aggregate score for each facility by the number of required facilities of that type gives a total impact score (Table C3B).

Highest value is least likely to be deliverable … lowest value is most likely to be deliverable**.**

Table A5.5a – Conserve Townscapes and Landscapes for each facility type

Facility type	Capacity (t/a)	Aggregate Scores[1]	Landscape Impact[2]	Height of facility[2]	Scale of facility[3]
MRF - Clean	80,000	89	6.8	5.3	2.5
	25,000	36	6.0	5.0	1.2
	15,000	13	4.0	4.0	0.8
	5,000	2	2.0	3.0	0.4
Composting - Windrow	20,000	260	6.5	2.0	20.0
	15,000	180	6.0	2.0	15.0
	7,500	42	4.5	1.3	7.5
	5,000	20	4.0	1.0	5.0
	2,500	8	3.0	1.0	2.5
Composting - In vessel	40,000	58	5.8	4.0	2.5
	25,000	26	5.0	4.0	1.3
	15,000	24	5.0	4.0	1.2
	10,000	10	4.0	3.0	0.8
	5,000	4	3.0	2.0	0.6
	2,500	2	2.0	2.0	0.4
EfW	160,000	90	7.5	8.0	1.5
	135,000	78	7.3	8.0	1.4
	100,000	67	7.0	8.0	1.2
	70,000	38	6.0	8.0	0.8
	60,000	30	5.0	8.0	0.8
	50,000	22	4.0	8.0	0.7
	30,000	8	2.0	8.0	0.5
Landfill	200,000	2,025	9.0	9.0	25.0
	100,000	1,280	8.0	8.0	20.0
	75,000	735	7.0	7.0	15.0
HWRC Site	25,000	16	8.0	4.0	0.5
	20,000	14	7.5	4.0	0.5
	10,000	9	6.5	3.5	0.4
	5,000	5	6.0	3.0	0.3
Transfer Station	60,000	17	7.0	4.0	0.6
	40,000	14	7.0	4.0	0.5
	30,000	10	6.0	4.0	0.4
	20,000	5	4.0	4.0	0.3
	10,000	1	2.0	3.0	0.2
Anaerobic Digestion	50,000	2	3.0	2.0	0.4
	25,000	1	2.0	2.0	0.3
MBT (residual to EfW)	160,000	95	7.0	9.0	1.5
	100,000	67	7.0	8.0	1.2
MBT (residual to l/fill)	160,000	84	7.0	8.0	1.5
	100,000	58	6.0	8.0	1.2
	60,000	32	5.0	8.0	0.8

Notes:
Highest value has greatest impact on landscape
1 - Aggregate scores = Landscape impact x facility height x Scale of facility
2 - Nominal scale used for landscape impact and facility height (10 = worst, 0 = best)
3 - Scale of facility related to landtake factor

Table A5.5b – Summary of Landscape impacts for each facility type

Description	Landfill	Energy from Waste	MRF	In Vessel Composting	Windrow Composting	Anaerobic Digestion	Mechanical Biological Treatment	Transfer Station	HWRC Site	Aggregate Scores[1]
Option 1	2,142	-	186	96	298	-	205	62	73	3,062
Option 2	2,885	-	186	96	298	-	205	62	73	3,805
Option 3	3,551	-	186	96	298	205	-	62	73	4,471
Option 4	1,110	195	186	96	298	-	-	62	73	2,020
Option 5	2,905	-	231	120	298	168	-	62	73	3,856
Option 6	908	160	231	120	298	-	-	62	73	1,851

Notes:
1 - Highest value is least desirable … lowest value is most desirable
2 - Summary is calculated by multiplying facilities requirement and assigned factor.
3 - See Appendix B for further details.

Scoring Methodology (Landscape)

The landscape objective is presented as a single aggregated score.

Factors affecting landscape amenity are assumed to be:

- Landscape impact
- Height of facility
- Scale of facility

A score (nominal scale of 0 (best or least impact) to 10 (worst or greatest impact)) has been assigned to each factor for different facilities of selected capacities based on professional judgement.

The aggregated score is calculated as follows:

Aggregate score = Landscape Impact * Height of Facility * Scale of Facility

The aggregated scores indicate that a large windrow (score = 180) as 5 times greater impact on the landscape compared to a large MRF (score = 36)

Multiplying the aggregate for each facility type by the number of required facilities of the necessary capacity gives a total impact score (Table C4B). The final landscape impact is presented as the summation of the impact scores for each waste facility required by all options.

Table A5.6a – Typical breakdown of Noise impact scores for each facility type

Facility type	Capacity (t/a)	Aggregate Scores[1]	Noisy Plant & Machinery[2]	Vehicle Movements[2]	Hours of Operation[3] (hrs/yr)
MRF - Clean	80,000	15.6	7.0	8.5	2,625
	25,000	13.7	6.5	8.0	2,625
	15,000	10.2	6.0	6.5	2,625
	5,000	6.6	5.0	5.0	2,625
Composting - Windrow	20,000	9.2	5.0	7.0	2,625
	15,000	6.3	4.0	6.0	2,625
	7,500	3.0	3.3	3.5	2,625
	5,000	2.4	3.0	3.0	2,625
	2,500	1.1	2.0	2.0	2,625
Composting - In vessel	40,000	11.3	5.8	7.5	2,625
	25,000	10.1	5.5	7.0	2,625
	15,000	9.2	5.0	7.0	2,625
	10,000	5.3	4.0	5.0	2,625
	5,000	2.4	3.0	3.0	2,625
	2,500	1.1	2.0	2.0	2,625
EfW	160,000	45.4	7.0	9.0	7,200
	135,000	42.5	6.8	8.8	7,200
	100,000	39.8	6.5	8.5	7,200
	70,000	34.6	6.0	8.0	7,200
	60,000	29.7	5.5	7.5	7,200
	50,000	25.2	5.0	7.0	7,200
	30,000	17.3	4.0	6.0	7,200
Landfill	200,000	23.6	9.0	10.0	2,625
	100,000	16.5	7.0	9.0	2,625
	75,000	12.6	6.0	8.0	2,625
HWRC Site	25,000	13.1	5.0	10.0	2,625
	20,000	11.2	4.8	9.0	2,625
	10,000	8.9	4.5	7.5	2,625
	5,000	6.3	4.0	6.0	2,625
Transfer Station	60,000	20.1	8.5	9.0	2,625
	40,000	18.9	8.0	9.0	2,625
	30,000	14.7	7.0	8.0	2,625
	20,000	11.0	6.0	7.0	2,625
	10,000	7.9	5.0	6.0	2,625
Anaerobic Digestion	50,000	6.3	4.0	6.0	2,625
	25,000	2.4	3.0	3.0	2,625
MBT (residual to EfW)	160,000	45.4	7.0	9.0	7,200
	100,000	39.8	6.5	8.5	7,200
MBT (residual to l/fill)	160,000	45.4	7.0	9.0	7,200
	100,000	34.6	6.0	8.0	7,200
	60,000	29.7	5.5	7.5	7,200

Notes:
Highest value has greatest noise impact
1 - Aggregate scores = Noisy Plant and Machinery x Vehicle movements x Hours of Operation/10000
2 - Nominal scale used for all variables (10 = worst, 0 = best)
3 - Hours of operation based on typical yearly figures (2625 hrs = 52.5hrs/wk x 50wks, 7200hrs = 20hrs/day x 52wks)

Table A5.6b – Summary of Noise impacts for options A to F

Description	Landfill	Energy from Waste	MRF	In Vessel Composting	Windrow Composting	Anaerobic Digestion	Mechanical Biological Treatment	Transfer Station	HWRC Site	Aggregate Scores[1]
Option 1	28	-	33	37	11	-	98	74	71	351
Option 2	37	-	33	37	11	-	98	74	71	361
Option 3	46	-	33	37	11	98	-	74	71	370
Option 4	14	98	33	37	11	-	-	74	71	338
Option 5	38	-	41	47	11	80	-	74	71	361
Option 6	12	80	41	47	11	-	-	74	71	335

Notes:
1 - Highest value is least desirable … lowest value is most desirable
2 - Summary is calculated by multiplying facilities requirement and assigned factor.
3 - See Appendix B for further details.

Scoring Methodology (Noise)

The noise impact is presented as a single aggregated score. Factors used in calculating the noise impact are:

- Noisy Plant and Machinery
- Vehicle Movements
- Hours of Operation

A score (nominal scale of 0 (best or no impact) to 10 (worst or severe impact)) has been assigned to the factors of plant and machinery and vehicular movement. These are based on professional judgement. The hours of operation are based on typical yearly figures and have been calculated by:

2625 hrs = 52.5hrs/wk x 50wks, or
7200hrs = 20hrs/day x 52wks

The aggregated score is the product of the three noise features factorised by 10,000 (to generate an easily understandable score). For example, for a large MRF:

Aggregate score = 7 * 8 * 2,625/10,000 = 15

This compares to a large windrow (score = 5) indicating the greater noise levels associated with MRF compared to composting operations.

The noise impact per treatment is multiplied by the facility requirement and finally summated for each option to present an overall score relating to noise impact for each option.

Table A5.7a – Typical Breakdown of Water Contamination Impact Scores for Each Facility

Facility type	Capacity (t/a)	Aggregate Scores[1]	Covered storage[2]	Water releases [2]	Open or closed operations[2]
MRF - Clean	80,000	4.4	6	5	2
	25,000	1.0	5	4	2
	15,000	0.4	4	3	2
	5,000	0.1	3	2	2
Composting - Windrow	20,000	19.0	10	10	10
	15,000	13.5	10	9	10
	7,500	4.5	10	6	10
	5,000	2.5	10	5	10
	2,500	1.0	10	4	10
Composting - In vessel	40,000	3.9	7	8	2
	25,000	2.0	6	7	2
	15,000	1.1	6	6	2
	10,000	0.5	5	5	2
	5,000	0.2	4	4	2
	2,500	0.0	3	3	2
EfW	160,000	1.3	2	2	2
	135,000	1.1	2	2	2
	100,000	0.8	2	2	2
	70,000	0.6	2	2	2
	60,000	0.5	2	2	2
	50,000	0.4	2	2	2
	30,000	0.2	2	2	2
Landfill	160,000	160.0	10	10	10
	100,000	100.0	10	10	10
	75,000	71.3	10	10	10
HWRC Site	25,000	9.6	8	6	8
	20,000	7.7	8	6	8
	10,000	3.2	8	5	8
	5,000	1.0	8	3	8
Transfer Station	60,000	0.5	2	2	2
	40,000	0.5	2	3	2
	30,000	0.4	2	3	2
	20,000	0.2	2	3	2
	10,000	0.1	2	2	2
Anaerobic Digestion	50,000	0.6	2	3	2
	25,000	0.2	2	2	2
MBT (residual to EfW)	160,000	2.6	2	4	2
	100,000	0.8	2	2	2
MBT (residual to l/fill)	160,000	3.8	2	6	2
	100,000	2.4	2	6	2
	60,000	1.2	2	5	2

Notes
Highest value has greatest water contamination impact
1 - Aggregate scores = (Capacity x Covered Storage x Water releases x Open/closed facility)/10,000,00
2 - Nominal scale used for all variables (10 = worst, 0 = best)

Table A5.7b – Summary of Water Contamination Impacts for options 1 to 6

Description	Landfill	Energy from Waste	MRF	In Vessel Composting	Windrow Composting	Anaerobic Digestion	Mechanical Biological Treatment	Transfer Station	HWRC Site	Aggregate Scores[1]
Option 1	167	-	9	7	22	-	6	2	26	238
Option 2	225	-	9	7	22	-	6	2	26	297
Option 3	277	-	9	7	22	6	-	2	26	349
Option 4	87	2.77	9	7	22	-	-	2	26	155
Option 5	227	-	11	9	22	5	-	2	26	301
Option 6	71	2.27	11	9	22	-	-	2	26	143

Notes:
1 - Highest value is least desirable … lowest value is most desirable
2 - Summary is calculated by multiplying facilities requirement and assigned factor.
3 - See Appendix B for further details.

Scoring Methodology (Water Contamination)

Water contamination is presented as a single aggregate score. Factors affecting the potential for water contamination are:

Covered Storage
Water Releases
Open or Closed Operations

A score (nominal scale of 0 (best or no impact) to 10 (worst or severe impact)) has been assigned to each factor for different facilities of selected capacities based on professional judgement.

The aggregated score is calculated as follows:

Aggregate score = Covered Storage * Water releases * Open or Closed Operations

Based on this mechanism the large MRF scores 1 compared to a score of 13.5 for the large windrow indicating the higher potential for water contamination from composting.

The water contamination potential per treatment is multiplied by the facility requirement and finally summated for each option to present an overall score relating to water contamination for each option.

Table A5.8 – Estimated total annual kilometres by road type for options 1 to 6

Transport associated with…	CA to Recycling	CA to Composting	Kerbside to MRF	Kerbside to In-vessel	MBT	Total (km)
Annual Distance (km)						
Option 1	975,002	979,961	329,402	158,140	296,388	**2,738,893**
Option 2	975,002	979,961	329,402	158,140	296,388	**2,738,893**
Option 3	975,002	979,961	329,402	158,140	237,025	**2,679,530**
Option 4	975,002	979,961	329,402	158,140	592,775	**3,035,280**
Option 5	975,002	979,961	431,888	197,594	193,999	**2,778,443**
Option 6	975,002	979,961	431,888	197,594	193,999	**2,778,443**

Table A5.9a – Typical breakdown of employment opportunities for each facility type

Facility type	Capacity (t/a)	No of Jobs created[1]
MRF - Clean	80,000	25
	25,000	10
	15,000	8
	5,000	6
Composting - Windrow	20,000	8
	15,000	7
	7,500	6
	5,000	5
	2,500	3
Composting - In vessel	40,000	13
	25,000	10
	15,000	9
	10,000	6
	5,000	4
	2,500	3
EfW	160,000	18
	135,000	16
	100,000	14
	70,000	12
	60,000	11
	50,000	10
	30,000	8
Landfill	200,000	8
	100,000	5
	75,000	5
HWRC Site	25,000	3
	20,000	3
	10,000	3
	5,000	2
Transfer Station	60,000	6
	40,000	5
	30,000	5
	20,000	4
	10,000	3
Anaerobic Digestion	50,000	3
	25,000	2
MBT (residual to EfW)	160,000	18
	100,000	14
MBT (residual to l/fill)	160,000	18
	100,000	14
	60,000	11
Inert reprocessing	75,000	4
	30,000	3

Notes:
1 - Employment score = estimate for type of plant, size of plant and hours of operation
No scaling factor … absolute job numbers

Table A5.9b – Summary of employment opportunities for options 1 to 6

Description	Landfill	Energy from Waste	MRF	In Vessel Composting	Windrow Composting	Anaerobic Digestion	Mechanical Biological Treatment	Transfer Station	HWRC Site	No of Jobs created[1]
Option 1	8	-	53	37	9	-	39	22	24	192
Option 2	11	-	53	37	9	-	39	22	24	195
Option 3	14	-	53	37	9	39	-	22	24	198
Option 4	4	39	53	37	9	-	-	22	24	188
Option 5	11	-	65	46	9	32	-	22	24	210
Option 6	4	32	65	46	9	-	-	22	24	202

Notes:
1 - Highest value is most desirable … lowest value is least desirable
2 - Summary is calculated by multiplying facilities requirement and assigned factor.
3 - See Appendix B for further details.

Scoring Methodology (Employment)

The BPEO criterion of employment is presented as a single aggregated score. The single factor used in calculating the effect on employment is:

Number of jobs created.

A score (nominal scale of 0 to 10, with the lowest being least desirable and the highest being most desirable) has been assigned to the criterion. For example, more jobs are likely to be created in a clean MRF than in an Anaerobic Digestion plant. The assignment of the scores is based on professional judgement considering the type of plant, size of plant and hours of operation.

The employment potential per treatment is multiplied by the facility requirement and finally summated for each option to present an overall score relating to employment for each option.

Table A5.10a - Typical breakdown of public involvement scores for each facility type

Facility type	Capacity (t/a)	Aggregate Scores[1]	Sending right message[2]	Potential for public involvement[3]
MRF - Clean	80,000	40	10	4.0
	25,000	20	10	2.0
	15,000	20	10	2.0
	5,000	20	10	2.0
Composting - Windrow	20,000	40	10	4.0
	15,000	40	10	4.0
	7,500	30	10	3.0
	5,000	30	10	3.0
	2,500	30	10	3.0
Composting - In vessel	40,000	40	10	4.0
	25,000	40	10	4.0
	15,000	40	10	4.0
	10,000	30	10	3.0
	5,000	30	10	3.0
	2,500	30	10	3.0
EfW	160,000	9	3	3.0
	135,000	8	3	2.8
	100,000	8	3	2.5
	70,000	6	3	2.0
	60,000	6	3	2.0
	50,000	6	3	2.0
	30,000	6	3	2.0
Landfill	200,000	2	1	2.0
	100,000	2	1	2.0
	75,000	2	1	2.0
HWRC Site	25,000	50	10	5.0
	20,000	50	10	5.0
	10,000	50	10	5.0
	5,000	50	10	5.0
Transfer Station	60,000	3	3	1.0
	40,000	3	3	1.0
	30,000	3	3	1.0
	20,000	3	3	1.0
	10,000	3	3	1.0
Anaerobic Digestion	50,000	7	7	1.0
	25,000	7	7	1.0
MBT (residual to EfW)	160,000	50	10	5.0
	100,000	40	10	4.0
MBT (residual to l/fill)	160,000	45	10	4.5
	100,000	40	10	4.0
	60,000	40	10	4.0
Inert reprocessing	75,000	10	10	1.0
	30,000	10	10	1.0

Notes:
Highest value has least opportunity for public involvement
1 - Aggregate scores = Sending right message x potential for public involvement in recycling/composting
2 - Nominal scale used for sending right message (10 = best, 0 = worst)
3 - Nominal scale used for potential for public involvement in recycling /composting (1 = worst, 5 = best)

Table A5.10b – Summary of public involvement opportunities for options 1 to 6

Description	Landfill	Energy from Waste	MRF	In Vessel Composting	Windrow Composting	Anaerobic Digestion	Mechanical Biological Treatment	Transfer Station	HWRC Site	Aggregate Scores[1]
Option 1	3	-	84	148	46	-	108	11	400	801
Option 2	5	-	84	148	46	-	108	11	400	802
Option 3	6	-	84	148	46	108	-	11	400	803
Option 4	2	20	84	148	46	-	-	11	400	710
Option 5	5	-	104	185	46	89	-	11	400	839
Option 6	1	16	104	185	46	-	-	11	400	763

Notes:
1 - Highest value is most desirable … lowest value is least desirable
2 - Summary is calculated by multiplying facilities requirement and assigned factor.
3 - See Appendix B for further details.

Scoring Methodology (Public Involvement)

Public Involvement is represented by a single score. Factors affecting the public involvement are assumed to be:

The potential for public involvement (potential for public involvement)
Sending the recycling message (sending the right message)

For each facility type and size, representative scores (nominal scale of 0 to 10 for sending the right message and 1-5 for public involvement, where higher scores are better), for a single facility have been assigned against each factor, based on professional judgement. For example; a household waste recycling centre (HWRC) offers high potential for public involvement and sends out the right recycling message, thus it scores high for both factors. Conversely, landfill offers little potential for public involvement and doesn't promote the recycling message, thus it scores low for both factors.

The aggregate score is calculated as

Aggregate Score = sending right message * potential for public involvement

For example, for MRF (25,000 t/a);

Sending right message = 10
Potential for public involvement = 2

Aggregate score = 10 * 2 = 20

Multiplying the aggregate for each facility by the number of required facilities of that type gives a total impact score (Table C9B).

Highest value is least likely to be deliverable … lowest value is most likely to be deliverable.

Table A5.11a – Summary of Net Present Value for Options 1 to 6

	Net Present Value
Option 1	**£447,000,000**
Option 2	**£434,000,000**
Option 3	**£454,000,000**
Option 4	**£448,000,000**
Option 5	**£400,000,000**
Option 6	**£395,000,000**

Estimates of Net Present Value costs have been taken from a separate economic analysis report.

Table A5.12a – Typical breakdown of deliverability scores for each facility type

Facility type	Capacity (t/a)	Aggregate Scores[1]	Planning likelihood[2]	Perceived Adverse Impacts[2]	Hours of Operation[2] (hrs/yr)
MRF - Clean	80,000	14.7	8.0	7.0	2,625
	25,000	9.5	6.0	6.0	2,625
	15,000	4.2	4.0	4.0	2,625
	5,000	1.1	2.0	2.0	2,625
Composting - Windrow	20,000	10.2	6.0	6.5	2,625
	15,000	9.5	6.0	6.0	2,625
	7,500	7.9	5.5	5.5	2,625
	5,000	6.6	5.0	5.0	2,625
	2,500	4.2	4.0	4.0	2,625
Composting - In vessel	40,000	15.3	7.8	7.5	2,625
	25,000	14.8	7.5	7.5	2,625
	15,000	12.9	7.0	7.0	2,625
	10,000	6.6	5.0	5.0	2,625
	5,000	2.4	3.0	3.0	2,625
	2,500	0.5	1.0	2.0	2,625
EfW	160,000	87.1	11.0	11.0	7,200
	135,000	83.2	10.8	10.8	7,200
	100,000	79.4	10.5	10.5	7,200
	70,000	72.0	10.0	10.0	7,200
	60,000	65.0	9.5	9.5	7,200
	50,000	58.3	9.0	9.0	7,200
	30,000	46.1	8.0	8.0	7,200
Landfill	200,000	26.3	10.0	10.0	2,625
	100,000	21.3	9.0	9.0	2,625
	75,000	19.0	8.5	8.5	2,625
HWRC Site	25,000	16.8	8.0	8.0	2,625
	20,000	14.8	7.5	7.5	2,625
	10,000	12.9	7.0	7.0	2,625
	5,000	9.5	6.0	6.0	2,625
Transfer Station	60,000	13.8	7.0	7.5	2,625
	40,000	12.9	7.0	7.0	2,625
	30,000	9.5	6.0	6.0	2,625
	20,000	4.2	4.0	4.0	2,625
	10,000	1.1	2.0	2.0	2,625
Anaerobic Digestion	50,000	12.9	7.0	7.0	2,625
	25,000	6.6	5.0	5.0	2,625
MBT (residual to EfW)	160,000	72.0	10.0	10.0	7,200
	100,000	65.0	9.5	9.5	7,200
MBT (residual to l/fill)	160,000	58.3	9.0	9.0	7,200
	100,000	46.1	8.0	8.0	7,200
	60,000	35.3	7.0	7.0	7,200

Notes:

Highest value is least likely to be deliverable … lowest value is most likely to be deliverable

1 - Aggregate scores = Planning likelihood x perceived adverse impacts x hours of operation/10000

2 - Nominal scale used for planning likelihood and perceived adverse impacts (11 = worst, 0 = best)

3 - Hours of operation based on typical yearly figures (2625 hrs = 52.5hrs/wk x 50wks, 7200hrs = 20hrs/day x 52wks)

Table A5.12b – Summary of deliverability of options 1 to 6

Description	Landfill	Energy from Waste	MRF	In Vessel Composting	Windrow Composting	Anaerobic Digestion	Mechanical Biological Treatment	Transfer Station	HWRC Site	Deliverability[1]
Option 1	36	-	31	55	12	-	156	51	103	442
Option 2	48	-	31	55	12	-	156	51	103	455
Option 3	59	-	31	55	12	156	-	51	103	466
Option 4	18	189	31	55	12	-	-	51	103	458
Option 5	48	-	38	68	12	128	-	51	103	448
Option 6	15	154	38	68	12	-	-	51	103	441

Notes:
1 - Highest value is least likely to be deliverable … lowest value is most likely to be deliverable
2 - Summary is calculated by multiplying facilities requirement and assigned factor.
3 - See Appendix B for further details.

Scoring Methodology (Deliverability)

Litter, dust and odour are represented by a single score. Factors affecting the deliverability are assumed to be:

- The likelihood of planning being granted (planning likelihood)
- The perceived adverse impact (perceived adverse impacts)
- Annual hours of operation (hours of operation)

For each facility type and size, representative scores (nominal scale of 0 to 10, where 0 is best… 10 is worst), for a single facility have been assigned against each factor, based on professional judgement. For example; the likelihood of a large-scale energy from waste plant being granted planning permission is relatively low, thus EfW (70,000 t/a) is assigned a score of 10. Conversely, a small-scale in-vessel composting unit with few planning concerns is assigned a score of 1.

The aggregate score is calculated as

Aggregate Score = planning likelihood * perceived adverse impacts * hours of operation

Each aggregate score is factored down by 10,000 to provide more manageable scores

For example, for MRF (25,000 t/a);

Planning likelihood = 6
Perceived adverse impacts = 6
Hours of operation = 2625

Aggregate score = 6 * 6 * 2625 /10,000 = 9.5

Based on this scoring mechanism, a large EFW plant (score 72) is 50 times more difficult to install than a small MRF (score =1.1) Multiplying the aggregate for each facility by the number of required facilities of that type gives a total impact score. Highest value is least likely to be deliverable … lowest value is most likely to be deliverable

Table A5.13a – Summary of recycling and landfill performance (%) for all options

Description	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6
% Landfill	26.5	35.75	44	13.75	36	11.25
% Recycling & Composting	53.25	47.75	47.75	45	57.25	55

Table A5.13b – Ranking of recycling and landfill performance for all options

Description	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6
Landfill (ranking)	3	4	6	2	5	1
Recycling & Composting (ranking)	3	4	5	6	1	2

Percentage landfill is calculated as the quantity of waste consigned to landfill (including rejects from residual treatment) divided by total waste arisings.

Similarly, percentage recycling and composting is calculated as the quantity of waste recycled and composted (including material from residual treatment facilities) divided by total waste arisings.

Table A5.14 Overall Performance Scores for Options 1 to 6

Sustainability Objective	Sustainability Criteria	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6	Comments
Minimise Costs	Net Present Value (£M)	447	434	454	448	400	395	A lower score is preferable
Conform with Waste Policy	% Landfill	27%	36%	44%	14%	36%	11%	A lower score is preferable
	% Recycling & Composting	53%	48%	48%	45%	57%	55%	A higher score is preferable
Ensure Reliability of Delivery	Planning Likelihood, Operating Hours, etc.	442	455	466	458	448	441	A lower score is preferable
Conserve Landscapes and Townscape	Nature, scale and number of facilities	3,062	3,805	4,471	2,020	3,856	1,851	A lower score is preferable
Protect Local Amenity	Noise	351	361	370	338	361	335	A lower score is preferable
	Litter	249	301	348	176	306	166	A lower score is preferable
Minimise Local Transport Impact	Total Waste Kilometres	2,738,893	2,738,893	2,679,530	3,035,280	2,778,443	3,069,442	A lower score is preferable
	Transport along roads other than motorways	0	0	0	0	0	0	A lower score is preferable
Create Employment Opportunities	Number of jobs created	192	195	198	188	210	202	A higher score is preferable
Opportunities for Public Involvement	Potential for participating in recycling/composting	801	802	803	710	839	763	A higher score is preferable
Prudent Land use	Resource Depletion	-3.77E+06	-3.90E+06	-3.47E+06	-3.83E+06	-3.70E+06	-3.93E+06	A lower score is preferable
	Land take	75	87	97	59	89	58	A lower score is preferable
Reduce Greenhouse Gases	Total CO2 Emissions	1.61E+10	4.07E+10	4.43E+10	8.70E+10	5.14E+10	8.12E+10	A lower score is preferable
Minimise Air Quality	Human Toxicity	-1.65E+09	-1.01E+09	-1.08E+09	-6.45E+08	-1.37E+09	-1.02E+09	A lower score is preferable
	Air Acidification	-4.53E+07	-2.78E+07	-2.98E+07	-1.83E+07	-3.79E+07	-2.88E+07	A lower score is preferable
	Ozone Depletion	-1.03E+04	-2.38E+03	-8.99E+03	2.57E+04	-1.59E+04	1.25E+04	A lower score is preferable
	Odour	249	301	348	176	306	166	A lower score is preferable
	Dust	249	301	348	176	306	166	A lower score is preferable
Minimise Water Quality	Eutrophication	1.27E+08	2.17E+08	2.06E+08	1.22E+08	2.20E+08	1.52E+08	A lower score is preferable
	Potential extent of water contamination	238	297	349	155	301	143	A lower score is preferable

Notes:
Units for each criteria vary

Table A5.15 – Valued Performance Scores for Options 1 to 6

Sustainability Objective	Sustainability Criteria	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6
Minimise Costs	Net Present Value (£M)	0.12	0.34	0.00	0.10	0.92	1.00
Conform with Waste Policy	% Landfill	0.53	0.25	0.00	0.92	0.24	1.00
	% Recycling & Composting	0.67	0.22	0.22	0.00	1.00	0.82
Ensure Reliability of Delivery	Planning Likelihood, Operating Hours, etc.	0.96	0.45	0.00	0.32	0.74	1.00
Conserve Landscapes and Townscape	Nature, scale and number of facilities	0.54	0.25	0.00	0.94	0.23	1.00
Protect Local Amenity	Noise Impact	0.52	0.25	0.00	0.90	0.26	1.00
	Litter Impact	0.54	0.26	0.00	0.94	0.23	1.00
Minimise Local Transport Impact	Total Waste Kilometres	0.85	0.85	1.00	0.09	0.75	0.00
	Transport along roads other than motorways	1	1	1	1	1	1
Create Employment Opportunities	Number of jobs created	0.19	0.32	0.44	0.00	1.00	0.64
Opportunities for Public Involvement	Potential for participating in recycling/composting	0.70	0.71	0.72	0.00	1.00	0.41
Prudent Land use	Resource Depletion	0.66	0.94	0.00	0.79	0.50	1.00
	Land take	0.56	0.26	0.00	0.97	0.21	1.00
Reduce Greenhouse Gases	Total CO2 Emissions	1.00	0.65	0.60	0.00	0.50	0.08
Minimise Air Quality Impact	Human Toxicity	1.00	0.37	0.44	0.00	0.72	0.37
	Air Acidification	1.00	0.35	0.43	0.00	0.72	0.39
	Ozone Depletion	0.87	0.68	0.83	0.00	1.00	0.32
	Odour	0.54	0.26	0.00	0.94	0.23	1.00
	Dust	0.54	0.26	0.00	0.94	0.23	1.00
Minimise Water Quality Impact	Eutrophication	0.95	0.03	0.15	1.00	0.00	0.70
	Potential extent of water contamination	0.54	0.25	0.00	0.94	0.23	1.00
TOTAL VALUED PERFORMANCE SCORES FOR ALL CRITERIA (SWMO)		**14.28**	**8.95**	**5.83**	**10.79**	**11.71**	**15.73**
TOTAL VALUED PERFORMANCE SCORES FOR BPEO CRITERIA ONLY		**7.76**	**4.28**	**2.67**	**3.13**	**6.34**	**6.68**

Note: A score of 1 represents the best option … a score of 0 represents the worst of options
For all criteria a maximum possible score is 21
For BPEO criteria only a maximum possible score is 10

Table A5.16 – Weighting of Evaluation Criteria (Weightings derived from internal consultation with Council Officers and Members

OBJECTIVES			INDICATORS/CRITERIA		
Environmental Objectives	**Weighting**	**Ranking**	**Environmental Indicators**	**Weighting**	**Ranking**
1. To ensure prudent use of land and other resources	6.3%	7	a) Depletion of resources, such as wood, water, fuels and ores	4.74%	8
			b) Landtake	1.54%	16
2. To reduce greenhouse gas	6.8%	6	c) Greenhouse gases emitted	6.81%	7
3. To minimise adverse impacts on air quality and public health	14.0%	3	d) Emissions which are injurious to public health	8.62%	5
			e) Emisions contributing to air acidification	0.67%	21
			f) Emissions contributing to depletion of the ozone layer	1.54%	16
			g) Extent of odour problems	1.38%	19
			h) Extend of dust problems	1.77%	12
4. To conserve landscapes and townscapes	1.5%	12	i) Extent of visual and landsacpe impacts	1.54%	16
5. To protect local amenity	3.9%	8	j) Extent of noise problems	1.77%	12
			k) Extent of litter and vermin problems	2.17%	11
6. To minimise adverse effects on water quality	3.7%	9	l) Emissions contributing to eutrophication	1.04%	20
			m) Extent of water pollution	2.65%	10
Socio-economic Objectives	**Weighting**	**Ranking**	**Socio-economic Indicators**	**Weighting**	**Ranking**
7. To minimise local transport impacts (congestion, severence, fear and	10.2%	4	n) Total waste kilometres (by mode)	8.52%	6
			o) Transport along roads other than motorways	1.71%	15
8. To provide employment opportunities	2.8%	10	p) Number of jobs likely to be created	2.80%	9
9. To provide opportunities for public involvement and education	1.8%	11	q) Extent of opportunitites for public involvement and education (concerning sustainable waste management practices)	1.77%	12
Operational Objectives	**Weighting**	**Ranking**	**Operational Indicators**	**Weighting**	**Ranking**
10. To minimise the increased costs of waste management	17.2%	2	r) Costs of collection, management and disposal, including material and energy revenues	17.21%	1
11. To ensure reliability of delivery	9.5%	5	s) Likelihood of implementation wihtin required timescale, taking account of maturity of technology, necessary level of public participation, and the need for planning permission (taking account of scale of development and likely perceived adverse impacts)	9.50%	4
Waste Management Policy Objectives	**Weighting**	**Ranking**	**Waste Management Policy Indicators**	**Weighting**	**Ranking**
12. To conform to waste policy	22.2%	1	t) Percentage landfill	11.07%	3
			u) Percentage recycled/composted	11.17%	2

Table A5.17 – Weighted 'Valued Performance Scores' for Options 1 to 6

	Option	Option	Option	Option	Option	Option 6
TOTAL WEIGHTED PERFORMANCE SCORES FOR ALL CRITERIA (SWMO)	63.75	43.14	24.84	34.26	66.27	73.94
TOTAL WEIGHTED PERFORMANCE SCORES FOR BPEO CRITERIA ONLY	46.12	28.78	12.10	19.76	50.65	56.88

	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6
RANKED PERFORMANCE SCORES FOR ALL CRITERIA (SWMO)	3	4	6	5	2	1
RANKED PERFORMANCE SCORES FOR BPEO CRITERIA ONLY	3	4	6	5	2	1

Table A5.18 – Weighting of Evaluation Criteria (Regional Consultation Response)

OBJECTIVES			INDICATORS/CRITERIA		
Environmental Objectives	**Weighting**	**Ranking**	**Environmental Indicators**	**Weighting**	**Ranking**
1. To ensure prudent use of land and other resources	12.1%	2	a) Depletion of resources, such as wood, water, fuels and ores	7.07%	3
			b) Landtake	5.05%	7
2. To reduce greenhouse gas	6.1%	8	c) Greenhouse gases emitted	6.06%	5
3. To minimise adverse impacts on air quality and public health	23.2%	1	d) Emissions which are injurious to public health	8.08%	1
			e) Emisions contributing to air acidification	4.04%	12
			f) Emissions contributing to depletion of the ozone layer	5.05%	7
			g) Extent of odour problems	3.03%	16
			h) Extend of dust problems	3.03%	16
4. To conserve landscapes and townscapes	4.0%	10	i) Extent of visual and landsacpe impacts	4.04%	12
5. To protect local amenity	4.0%	10	j) Extent of noise problems	2.02%	20
			k) Extent of litter and vermin problems	2.02%	20
6. To minimise adverse effects on water quality	7.1%	6	l) Emissions contributing to eutrophication	3.03%	16
			m) Extent of water pollution	4.04%	12
Socio-economic Objectives	**Weighting**	**Ranking**	**Socio-economic Indicators**	**Weighting**	**Ranking**
7. To minimise local transport impacts (congestion, severence, fear and	9.1%	4	n) Total waste kilometres (by mode)	5.05%	7
			o) Transport along roads other than motorways	4.04%	12
8. To provide employment opportunities	3.0%	12	p) Number of jobs likely to be created	3.03%	16
9. To provide opportunities for public involvement and education	5.1%	9	q) Extent of opportunitites for public involvement and education (concerning sustainable waste management practices)	5.05%	7
Operational Objectives	**Weighting**	**Ranking**	**Operational Indicators**	**Weighting**	**Ranking**
10. To minimise the increased costs of waste management	8.1%	5	r) Costs of collection, management and disposal, including material and energy revenues	8.08%	1
11. To ensure reliability of delivery	7.1%	6	s) Likelihood of implementation wihtin required timescale, taking account of maturity of technology, necessary level of public participation, and the need for planning permission (taking account of scale of development and likely perceived adverse impacts)	7.07%	3
Waste Management Policy Objectives	**Weighting**	**Ranking**	**Waste Management Policy Indicators**	**Weighting**	**Ranking**
12. To conform to waste policy	11.1%	3	t) Percentage landfill	5.05%	7
			u) Percentage recycled/composted	6.06%	5

Table A5.19 – Weighting of Evaluation Criteria (Inverted Weightings)

OBJECTIVES		INDICATORS/CRITERIA		
Environmental Objectives	**Weighting**	**Environmental Indicators**	**Weighting**	**Ranking**
1. To ensure prudent use of land and other resources	10.7%	a) Depletion of resources, such as wood, water, fuels and ores	1.8%	14
		b) Landtake	8.9%	4
2. To reduce greenhouse gas emissions	1.7%	c) Greenhouse gases emitted	1.7%	15
3. To minimise adverse impacts on air quality	42.1%	d) Emissions which are injurious to public health	1.5%	17
		e) Emisions contributing to air acidification	17.2%	1
		f) Emissions contributing to depletion of the ozone layer	8.9%	4
		g) Extent of odour problems	11.1%	3
		h) Extend of dust problems	3.4%	8
4. To conserve landscapes and townscapes	8.9%	i) Extent of visual and landsacpeimpacts	8.9%	4
5. To protect local amenity	5.6%	j) Extent of noise problems	3.4%	8
		k) Extent of litter and vermin problems	2.2%	11
6. To minimise adverse effects on water quality	12.9%	l) Emissions contributing to eutrophication	11.2%	2
		m) Extent of water pollution	1.8%	12
Socio-economic Objectives	**Weighting**	**Socio-economic Indicators**	**Weighting**	**Ranking**
7. To minimise local transport impacts (congestion, severence, fear and intimidation,	8.3%	n) Total waste kilometres (by mode)	1.5%	16
		o) Transport along roads other than motorways	6.8%	7
8. To provide employment opportunities	1.8%	p) Number of jobs likely to be created	1.8%	13
9. To provide opportunities for public involvement and education	3.4%	q) Extent of opportunitites for public involvement and education	3.4%	8
		(concerning sustainable waste management practices)	0.0%	0
Operational Objectives	**Weighting**	**Operational Indicators**	**Weighting**	**Ranking**
10. To minimise the increased costs of waste management	0.7%	r) Costs of collection, management and disposal, including material and energy revenues	0.7%	21
			0.0%	0
11. To ensure reliability of delivery	1.5%		1.5%	18
		s) Likelihood of implementation wihtin required timescale, taking account of maturity of technology, necessary level of public participation, and the need for planning permission (taking account of scale of development and likely perceived adverse impacts)	0.0%	0
			0.0%	0
			0.0%	0
Waste Management Policy Objectives	**Weighting**	**Waste Management Policy Indicators**	**Weighting**	**Ranking**
12. To conform to waste policy	2.4%	t) Percentage landfill	1.4%	19
		u) Percentage recycled/composted	1.0%	20

Table A5.20 – Weighted 'Valued Performance' Scores for Options 1 to 6 (using Regional and Inverted County weightings)

	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6
Sensitivity Analysis (Regional Weightings)						
SWMO Assessment (all criteria)3	2	4	6	5	3	1
BPEO Assessment (BPEO criteria)3	1	4	6	5	3	2
Sensitivity Analysis (Inverted Weightings)						
SWMO Assessment (all criteria)4	1	5	6	3	4	2
BPEO Assessment (BPEO criteria)4	1	5	4	6	2	3

Table A5.21 – Overall Scores for options 1 to 6

	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6
Valued Performance Scores						
SWMO Assessment (all criteria)[1]	2	5	6	4	3	1
BPEO Assessment (BPEO criteria)[1]	1	4	6	5	3	2
Weighted Performance Scores						
SWMO Assessment (all criteria)[2]	3	4	6	5	2	1
BPEO Assessment (BPEO criteria)[2]	3	4	6	5	2	1
Sensitivity Analysis (Regional Weightings)						
SWMO Assessment (all criteria)[3]	2	4	6	5	3	1
BPEO Assessment (BPEO criteria)[3]	1	4	6	5	3	2
Sensitivity Analysis (Inverted Weightings)						
SWMO Assessment (all criteria)[4]	1	5	6	3	4	2
BPEO Assessment (BPEO criteria)[4]	1	5	4	6	2	3

	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6
Average Performance Scores	1.75	4.375	5.75	4.75	2.75	1.625
Ranking of average Performance Scores	2	4	6	5	3	1

APPENDIX 6: LANDFILL ALLOWANCE TRADING SCHEME (LATS) PERFORMANCE

6.1 Introduction

Guidance on Developing Municipal Waste Management Strategies requires that Councils prepare a Biodegradable Municipal Waste (BMW) Diversion Plan to identify the proposed strategy for diverting biodegradable municipal waste away from landfill in order to achieve the EU Landfill Directive targets.

6.2 Background

The Landfill Directive was brought into force in the UK on the 15th June 2002 as the Landfill (England and Wales) Regulations 2002 and since then has been introduced in stages to give UK industry time to adapt. The Landfill Directive is seen as providing the principal legal framework influencing MSW management and strategy development in the UK. The Directive seeks to prevent or reduce negative environmental effects from the landfilling of waste by introducing uniform standards throughout the European Union. The main regulatory provisions of the Directive stipulate:

- Classes of landfill
- Requirements for obtaining a permit for operating a landfill
- Waste acceptance procedures
- Control and monitoring procedures for operating a landfill
- Closure procedures.

The first requirement of the Regulations was for all landfill operators to submit a conditioning plan by 26th July 2002, which reclassified the site as inert, hazardous or non-hazardous. This is one of the key provisions of the Directive as previously UK landfills had either been inert or practiced co-disposal of hazardous and non-hazardous material. Now, non-hazardous sites can accept only non-hazardous waste, while hazardous sites can continue co-disposal until 2004, when it is finally banned.

The most significant part of the Directive is Article 5 which proposes a strict timetable for reductions in the landfilling of biodegradable waste. These are onerous requirements and have been the principal influence on the formulation of *'Waste Strategy 2000'*. The EC Landfill Directive sets mandatory targets which means the UK must adhere to the following (these include the 4 year extensions granted to the UK.):

- By 2010 to reduce biodegradable municipal waste landfilled to 75% of that produced in 1995
- By 2013 to reduce biodegradable municipal waste landfilled to 50% of that produced in 1995
- By 2020 to reduce biodegradable municipal waste landfilled to 35% of that produced in 1995

On the 10th November 2003, Parliament approved the Waste and Emissions Trading Bill. This implements Articles 5(1) and 5(2) of the EC Landfill Directive in the UK. The Waste and Emissions Trading Act 2003 introduced a system of tradable allowances to help the UK meet the 99/31 BMW requirements. The Secretary of State has set gradually reducing BMW landfill limits for England, Wales, Scotland and Northern Ireland, and can set specific targets for any year (target years) and any individual country. Regional Governments (the Scottish Minister, the Government for Wales and the Department of the Environment for Northern Ireland and, in the future, regional assemblies) share out the total BMW landfill allowance for their regions between the local disposal authorities. The total regional allowance cannot be exceeded, however, individual authorities can:

- Bank any unused allowance for later use
- In addition, councils may borrow up to 5% of their own allocations from future years as well as banking allowances for future use
- Transfer any unused allowance by trading with another disposal authority who wishes to landfill more than its allowance
- Buy allowances from another disposal authority if needed
- Councils will be fined £150 per tonne, almost three times the average cost of landfill, if they do not take reasonable steps to secure sufficient landfill allowances for the amount of waste they need to landfill.
- No banking or borrowing in target years 2009/10, 2013/14.

Regulations for the Landfill Allowance Trading Scheme (LATS) were delayed until 2005. On 14th May 2004 the Government announced that the LATS will begin for English county and unitary council authorities on 1st April 2005. LATS is regarded as the Governments key measure in meeting landfill reduction targets.

Derbyshire have received their final LATS allocations as shown in the table below. The table displays the allowances for both Derby City and Derbyshire County.

Table A6.1 Summary of Derbyshire County and Derby City Landfill Allowances

Year	Derbyshire County (Tonnes)	Derby City (Tonnes)	Total Allocation (Tonnes)
2005/06	232,504	71,476	303,980
2006/07	219,522	67,440	286,962
2007/08	202,212	62,059	264,271
2008/09	180,575	55,333	235,908
2009/10	154,610	47,261	201,871
2010/11	137,401	42,001	179,402
2011/12	120,191	36,740	156,931
2012/13	102,981	31,479	134,460
2013/14	98,564	30,129	128,693
2014/15	94,147	28,779	122,926
2015/16	89,729	27,428	117,157
2016/17	85,312	26,078	111,390
2017/18	80,894	24,728	105,622
2018/19	76,477	23,377	99,854
2019/20	72,059	22,027	94,086

6.3 What Does This Mean For Derbyshire County and Derby City Council?

The proposed landfill allowances for Derbyshire and the resulting additional diversion requirements are displayed in Table A6.2.

Table A6.2 BMW Diversion Requirements for Derbyshire

Year	BMW Landfill Allowance (tonnes)	Total MSW Arisings (assuming revised local growth rate) (tonnes)	Predicted BMW Arisings (tonnes) (68% of MSW is BMW)	Diversion requirements (tonnes)
2005	303,980	546,010	371,287	67,307
2006	286,962	559,660	380,569	93,607
2007	264,271	572,252	389,132	124,861
2008	235,908	588,109	399,914	164,006
2009	201,871	598,401	406,913	205,042
2010	**179,402**	607,377	413,016	233,614
2011	156,931	614,969	418,179	261,248
2012	134,460	621,119	422,361	287,901
2013	**128,693**	625,777	425,529	296,836
2014	122,926	628,906	427,656	304,730
2015	117,157	630,478	428,725	311,568
2016	111,390	630,478	428,725	317,335
2017	105,622	630,478	428,725	323,103
2018	99,854	630,478	428,725	328,871
2019	94,086	630,478	428,725	334,639

Table A6.3 shows the total diversion requirements in order to meet national targets. It should be noted that the dry recyclate has been calculated as having a biodegradability of 60%.

Table A6.3 BMW Diversion requirements in order to meet targets

Year	Total BMW Diversion required	Compostables	Dry Recyclate (60% BMW)	Additional BMW Diversion required
2005	67,307	34,499	55,960	-23,153
2006	93,607	43,325	62,228	-11,946
2007	124,861	52,443	68,606	3,812
2008	164,006	62,264	75,623	26,119
2009	**205,042**	**71,869**	**71,869**	**61,305**
2010	233,614	81,589	88,667	63,358
2011	261,248	91,359	95,125	74,764
2012	**287,901**	**101,111**	**101,479**	**85,311**
2013	296,836	110,774	107,684	78,378
2014	304,730	120,276	113,693	70,761
2015	311,568	129,548	119,462	62,558
2016	317,335	138,519	124,946	53,870
2017	323,103	138,519	124,946	59,638
2018	328,871	138,519	124,946	65,406
2019	**334,639**	**138,519**	**124,946**	**71,174**

Table A6.4 below shows the residual diversion requirements when the EfW facility comes on line in 2009/10 (preferred option 6). As can be seen from the table below once the EfW facility is active there will be considerable surplus allowance.

Table A6.4 BMW Diversion Requirements for preferred Waste Management Options

Year	Total BMW Diversion required	Compostables	Dry Recyclate (60% BMW)	BMW diverted through residual treatment	Additional BMW diversion required
2005	67,307	34,499	55,960	0	-23,153
2006	93,607	43,325	62,228	0	-11,946
2007	124,861	52,443	68,606	0	3,812
2008	164,006	62,264	75,623	0	26,119
2009	205,042	71,869	71,869	0	61,305
2010	233,614	81,589	88,667	182,204	-118,846
2011	261,248	91,359	95,125	180,063	-105,300
2012	287,901	101,111	101,479	177,705	-92,394
2013	296,836	110,774	107,684	175,094	-96,716
2014	304,730	120,276	113,693	172,187	-101,426
2015	311,568	129,548	119,462	168,931	-106,373
2016	317,335	138,519	124,946	165,260	-111,390
2017	323,103	138,519	124,946	165,260	-105,622
2018	328,871	138,519	124,946	165,260	-99,854
2019	334,639	138,519	124,946	165,260	-94,086

Figure A6.1 identifies the individual factors and requirements associated with achieving the statutory BMW diversion targets through the preferred Option 6. In particular:

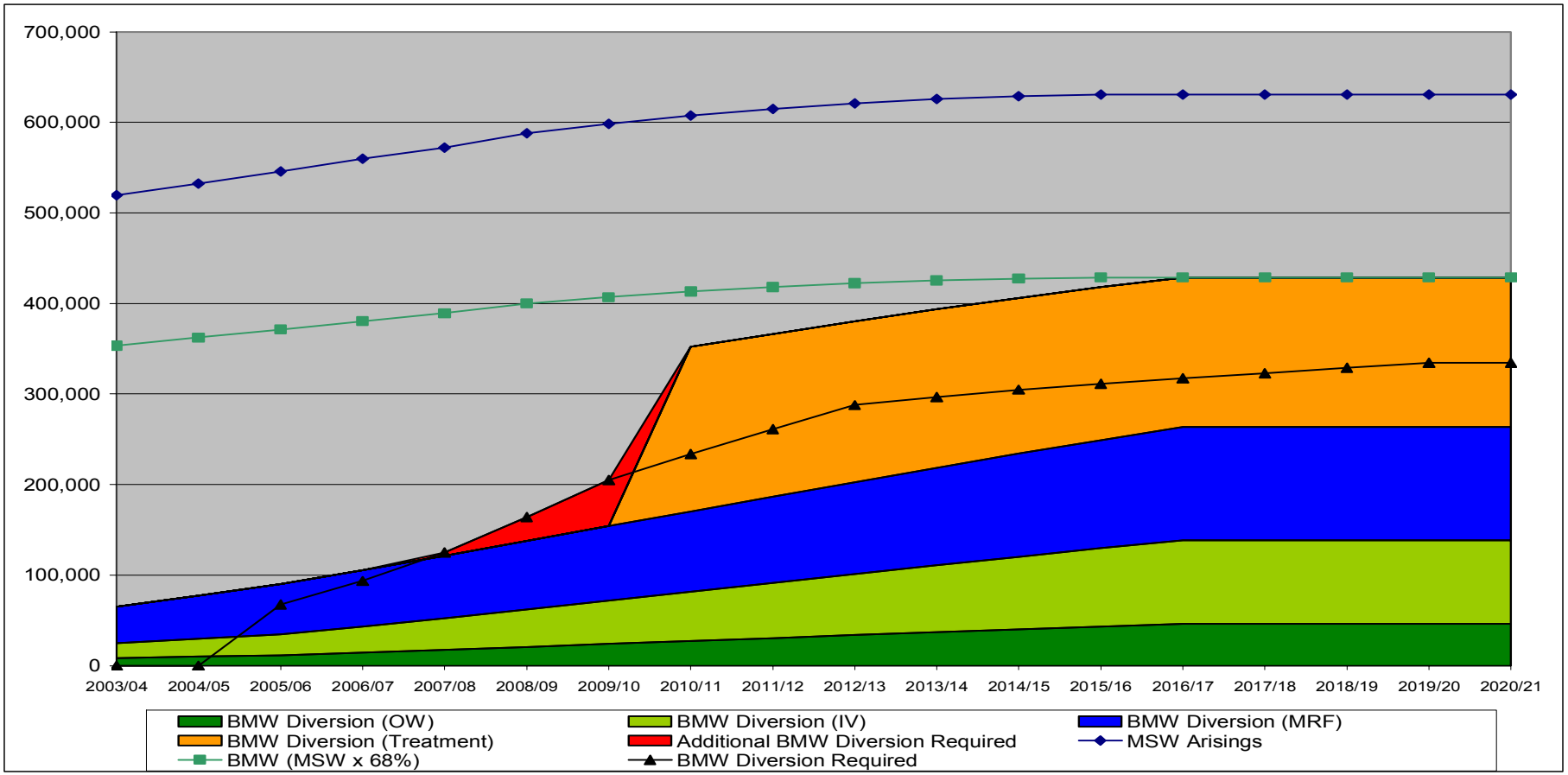
The following key notes apply to Figure A6.1:

- **Line 1 (in blue)** represents the total municipal waste arisings.
- **Line 2 (in green)** represents the total biodegradable municipal waste arisings (assuming 68% biodegradable content in municipal waste).
- **Line 3 (in black)** represents the quantity of biodegradable waste to be diverted from landfill to satisfy the Landfill Directive requirements. The area bounded by Line 2 and Line 3 represents the total quantity of biodegradable material permitted to be land filled.
- **Area 1 (in green)** represents the composting performance to be achieved under the preferred option (Option F) through source segregation alone (ie, Civic Amenity sites and kerbside collection of organics)
- **Area 2 (in blue)** represents the biodegradable portion of the recyclate collected through source segregation alone to achieve the preferred option (ie,

bring banks, kerbside collections and CA sites). The biodegradable portion of the dry recyclate collected includes paper, card, textiles and wood, all of which will contribute to the diversion of biodegradable material from landfill.

- **Area 3 (in darker orange)** represents the minimum quantity of BMW to be diverted to a residual treatment facility to meet the BMW diversion requirements assuming 100% treatment of the biodegradable portion.

Figure A6.1: BMW Diversion Profile for the Preferred Option 6 - EfW on line in 2010 (revised regional growth scenario), based on 60% biodegradability of material collected for recycling



Note: Biodegradability factor for MSW assumed to be 68%(in line with government recommendations)

6.4 Consequences of Failing to Meet Targets

The UK Government has responsibility to ensure that it meets its obligations under the EC Landfill Directive, not least to ensure that it does not incur infraction fines. The Government is therefore concerned that any penalties imposed on authorities for exceeding their landfill allowance allocations should encourage future compliance. In the first instance the Government will attempt to work with a failing waste disposal authority to ensure that remedial action allows the authority to meet its targets in future years. If, however, an authority demonstrates an inability to achieve its landfill allowance targets, the Government will initiate penalty procedures as follows:

- An audit of the waste disposal authority's performance and future plans for compliance to identify the reason for failure. Where an audit report highlights failings in an authority's performance which make future failure likely, and a waste disposal authority demonstrates an inability to take remedial action, then the Government may initiate further action, namely;

    - a financial penalty on a waste disposal authority failing to meet its landfill allowance targets, equivalent to £150 for each tonne of BMW landfilled, in excess of the landfill allowance limit. This level of penalty has been chosen to exceed the highest likely cost of diverting BMW from landfill. The Government will increase this financial penalty if necessary.

    - where the audit procedure and the financial penalty fail to encourage a waste disposal authority to ensure compliance with the landfill allowance scheme, the Government will take this as evidence that the waste management service in the authority is failing to conform to its obligations under the Best Value requirements of the Local Government Act 1999 and may initiate steps to remove the waste management function from the authority.

Where the failure of a waste disposal authority results in the Government incurring infraction fines, the Government may pass on the fines, in part or whole, to the authority.

An additional fine of £1,000 may be levied for instances where a waste disposal authority fails to maintain records, gather prescribed information, make prescribed returns or produce records for inspection.

A landfill site operator failing to comply with the Regulations will be liable to:

- On summary conviction, a fine not exceeding the statutory maximum.

- On conviction or indictment, either imprisonment for a term not exceeding 2 years, a fine, or both.

6.5 Potential Cost Implications incurred with just meeting recycling and composting targets.

The Table below indicates the landfill diversion deficit for Derbyshire assuming only recycling and composting targets are met.

Table A6.5 Potential cost implications in line with meeting recycling and composting targets

Year	Landfill Directive Diversion	Composting	Dry Recyclate (60% BMW)	Additional BMW Diversion Required	Potential Cost implications at £150 per tonne
2005	67,307	34,499	55,960	-23,153	2,315,300
2006	93,607	43,325	62,228	-11,946	1,194,600
2007	124,861	52,443	68,606	3,812	571,832
2008	164,006	62,264	75,623	26,119	3,917,914
2009	205,042	71,869	71,869	61,305	9,195,692
2010	233,614	81,589	88,667	63,358	9,503,727
2011	261,248	91,359	95,125	74,764	11,214,547
2012	287,901	101,111	101,479	85,311	12,796,584
2013	296,836	110,774	107,684	78,378	11,756,699
2014	304,730	120,276	113,693	70,761	10,614,115
2015	311,568	129,548	119,462	62,558	9,383,753
2016	317,335	138,519	124,946	53,870	8,080,458
2017	323,103	138,519	124,946	59,638	8,945,658
2018	328,871	138,519	124,946	65,406	9,810,858
2019	334,639	138,519	124,946	71,174	10,676,058
				Total Cost	112,958,012

In 2005 and 2006 Derbyshire will be in a position to trade allowances, but, by 2007 a deficit of 71,174 tonnes will arise if no additional residual treatment is undertaken. Applying the penalty of £150 per tonne for non compliance the financial penalties between 2005 and 2019 could amount to around £112,958,012 (nb, in this example a revenue in 2005 and 2006 of £100 per tonne has been assumed, although there is no guarantee that excess allowances will trade at this level.).

6.6 Potential Revenue implications of the preferred option assuming recycling, composting and residual treatment is achieved

Table A6.6 Potential revenue from the preferred option

Year	Landfill Directive Diversion	Composting	Dry Recyclate (60% BMW)	BMW for Residual Treatment (Excess)	Potential Revenue implications at £100 per tonne
2005	67,307	34,499	55,960	23,153	2,315,280
2006	93,607	43,325	62,228	11,946	1,194,602
2007	124,861	52,443	68,606	3,812	-571,800
2008	164,006	62,264	75,623	26,119	-3,917,850
2009	205,042	71,869	71,869	61,305	-9,195,750
2010	233,614	81,589	88,667	118,846	11,884,572
2011	261,248	91,359	95,125	105,300	10,529,952
2012	287,901	101,111	101,479	92,394	9,239,416
2013	296,836	110,774	107,684	96,716	9,671,555
2014	304,730	120,276	113,693	101,426	10,142,597
2015	311,568	129,548	119,462	106,373	10,637,271
2016	317,335	138,519	124,946	111,390	11,139,000
2017	323,103	138,519	124,946	105,622	10,562,200
2018	328,871	138,519	124,946	99,854	9,985,400
2019	334,639	138,519	124,946	94,086	9,408,600
				Total	93,025,008

Table A6.6 indicates the landfill diversion excess for Derbyshire assuming EfW is added to the recycling and composting activities. By 2019 an excess of 94,086 tonnes of waste can be achieved. Adopting Option 5 would potentially allow Derbyshire to trade their excess allowances on the open market. The cost of tradable permits will undoubtedly fluctuate over the years. A figure of £100 per tonne has been assumed for this exercise. Between 2005 and 2020 a potential £93,025,008 could be generated. This revenue could be used to offset the cost of waste management service provision within Derbyshire.

APPENDIX 7: WASTE MINIMISATION PLAN

7.1 Introduction

This Technical Appendix highlights how the Councils in Derbyshire are developing and implementing waste minimisation initiatives.

Many such projects and initiatives have been developed and implemented across the county in recent years as part of the partners efforts to develop sustainable waste management solutions and to meet Government targets.

The eight district/borough councils provide waste and recycling collections and recycling banks in their area, Derby City Council has the same collection and recycling bank responsibilities along with the responsibility to provide Household Waste Recycling Centres and treat and dispose of the waste it collects. Derbyshire County Council has responsibilities to provide Household Waste Recycling Centres, to treat and dispose of all household waste that it, and the district and borough councils collect. All the Councils work in partnership on many aspects of waste minimisation.

In many cases the work links to the national initiative Recycle Now that aims, through high profile national media campaigns, to promote waste reduction, reuse, recycling and composting.

The partner authorities main minimisation objective is to establish and operate effective communication mechanisms that raise public awareness and change public attitudes and consequently enable the public to undertake waste minimisation practices in their everyday lives. Whilst this primarily aims to reduce the amounts of waste that is generated in the home environment it is the intention to influence waste production in business and industry as a by-product of the partners activities.

7.2 Partnership projects across parts or the whole of the County

7.2.1 Countywide Home Composting Scheme

This WRAP (Waste Resources Action Programme) funded project seeks to encourage Derbyshire residents to actively use Home Composters to reduce the amount of waste that is collected by councils. This will enable residents to produce a natural product for use in their gardens at minimal cost to themselves and reduce the amount of greenhouse gases produced by landfilling of biodegradable material.

Key Objectives including timescale

To sell 25,000 units in the 2005/6 two year programme

Progress as at March 2006

As at September 2005 – 18,000 bins sold

7.2.2 'Time for a Change' Real Nappy Campaign

This project runs countywide to promote the use of real/washable nappies instead of disposable nappies. It aims to inform parents of the benefits of using real nappies, whilst dispelling the myths which surround them, allowing parents to make an informed choice so that they can help reduce the estimated 15,000 tonnes of nappies that go into landfill sites each year from Derbyshire. The campaign has a dedicated real nappy outreach worker who promotes the scheme with partner authorities, real nappy retailers and laundering services to the community and healthcare professionals. A £25 incentive scheme currently operates in the county to encourage parents to choose real nappies.

Key Objectives including timescale

To provide a £25 cashback incentive for parents who use real nappies.
To encourage 590 parents in the County to use real nappies by March 2006.
To develop an On-Ward real nappy initiative in a Derbyshire Hospital.

Progress as at March 2006

By January 2006 225 parents had applied for the £25 cashback on real nappies.

7.2.3 Reducing unwanted Junk Mail

The partners promote the work of the Mail Preference Service (MPS) who can reduce unwanted junk mail. The MPS advises Direct Mail companies who remove contact details from their records.

Key Objectives including timescale

To continually promote the work of the Mail Preference Service through the Waste Marketing Plan.

Progress as at March 2006

The service is actively promoted through the Waste Exhibition Vehicle (WEV).

7.2.4 Promoting waste re-use through Charities

The partners actively promote the work of Charities who take furniture, clothing and bric-a-brac for re-use and resale through their retail outlets.
This work is promoted through the WEV, on request through Recycling Officers, and in Derby via a landfill tax funded leaflet that promotes the work of all charities in that area.

Key Objectives including timescale

To continually promote the work of charities through the Waste Marketing Plan.

Progress as at March 2006

Charities are actively promoted through the WEV, and by all the councils and will be included in the forthcoming Waste Marketing Plan.

7.2.5 Bags for Life

To reduce society's reliance and demand for plastic carrier bags, bags for life are available from most major retailers. The partners actively promote this on the WEV and give away cotton bags for life at certain events.

Key Objectives including timescale
To continually promote bags for life through the Waste Marketing Plan.

Progress as at March 2006
Bags for life are actively promoted through the WEV and will be included in the forthcoming Waste Marketing Plan.

7.2.6 Promotional Work in Schools

All the partner authorities are undertaking a range of promotional work in schools on an ongoing basis.

7.2.7 Schools theatre project

Speakeasy Theatre Company is currently touring 'The Trashtown Mystery' around Primary Schools in the County. The interactive show raises awareness of ways to Reduce, Reuse and Recycle rubbish and encourages children to take this message home with them. The project will run until December 2006 and is part-funded by County and District Councils.

Objectives including timescale
Speakeasy performed over 170 shows of The Trashtown Mystery at more than 130 schools to 5000 pupils during 2005 and will undertake a similar number of shows in 2006.

Progress as at March 2006
170 shows were performed during 2005 at more than 130 schools to over 5000 pupils.

7.2.8 Eco Schools

Key Objectives including timescale
To provide advice and support to schools in the County to encourage them to take part in the Eco Schools scheme, with the aim of assisting 20 schools to achieve Green Flag Eco Schools status by December 2005.
Whilst working to achieve this target we will work to encourage schools to minimise their waste.

Progress as at March 2006
120 schools (almost 1/3) of schools are registered as Eco Schools.
25 schools have achieved Eco Schools status.

7.2.9 Waste Composition Analysis

Key Objectives including timescale

To provide quality data on individual domestic waste streams to enable officers to consider what waste minimisation, recycling and composting schemes and initiatives should be developed.

Progress as at March 2006

Awaiting a final report from the consultants.

7.2.10 Waste Marketing Plan

This plan promotes all aspects of waste management to all sectors of the community throughout the county. It seeks to raise public awareness, change attitudes and ultimately modify public behaviour to ensure that we all adopt sound waste management practices in our everyday lives. This plan is documented in Appendix 9.

7.3. Individual activities at specific authorities

7.3.1 Establishing separate waste streams

As part of the development of collection infrastructure for recycling and composting all the partner authorities have established separate collections of several waste streams. This has a significant influence in reducing the amount of residual waste produced by households by encouraging the householder to divert waste from the residual waste container into the relevant recycling and composting schemes.

Key Objectives including timescale

To continually review the provision of separate collection to provide effective and efficient provision of kerbside and bank facilities.

Progress as at March 2006

All authorities provide a range of facilities at banks and the kerbside and are continually expanding this provision

APPENDIX 8: RECYCLING AND COMPOSTING PLAN

8.1 Introduction

This Technical Appendix documents the details of each authority's recent and forthcoming waste recycling and composting projects and initiatives.

Many such projects and initiatives have been developed and implemented across the county in recent years as part of the partners efforts to develop sustainable waste management solutions and to meet Government targets.

The eight district/borough councils provide waste and recycling collections and recycling banks in their area,. Derby City Council has the same collection and recycling bank responsibilities along with the responsibility to provide Household Waste Recycling Centres and treat and dispose of the waste it collects. Derbyshire County Council has responsibilities to provide Household Waste Recycling Centres, to treat and dispose of all household waste that it, and the district and borough councils collect. All the Councils work in partnership on many aspects of recycling and composting.

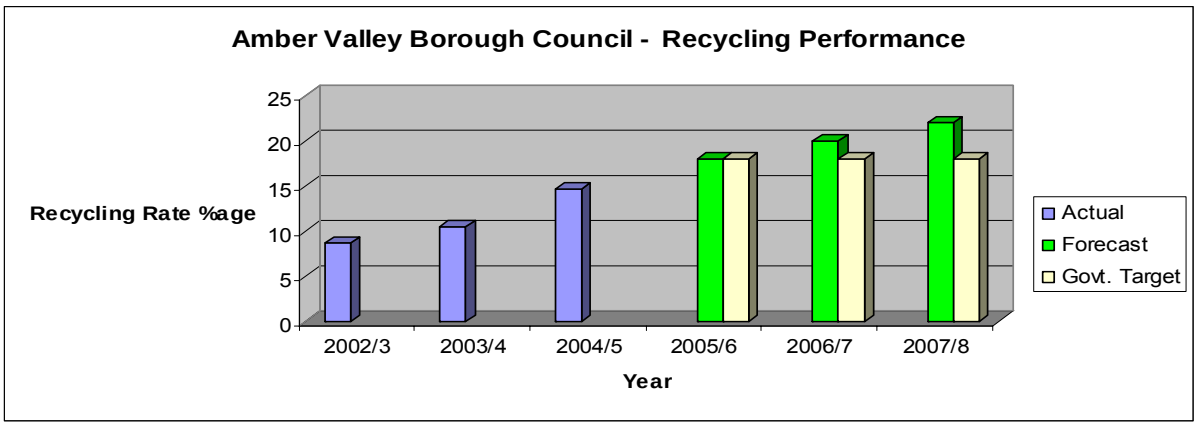
In many cases the work links to the national initiative Recycle Now that aims, through high profile national media campaigns, to promote waste reduction, reuse, recycling and composting.

The partner authorities' have identified two recycling and composting objectives:

- To develop and implement appropriate recycling and composting infrastructure across the county and
- To establish and operate effective communication mechanisms that raise awareness, change attitudes and ultimately our behaviour to ensure that we all undertake waste recycling and composting practices in our everyday lives.

Whilst this primarily aims to ensure that we recycle and compost waste that is generated in the home environment it is the intention to influence waste recycling and composting in business and industry as a by-product of the partner's activities.

8.2 Amber Valley Borough Council



8.2.1 What's happening now and in the future in Amber Valley?

Kerbside Recycling

Amber Valley's new recycling and refuse scheme was launched in June 2005. Under the scheme, residents have their recyclable material collected one week and their general 'wheelie bin' waste collected the next week. Households have been given:

- an orange 55-litre box to recycle card packaging, mixed cans and tin foil;
- a yellow 55-litre box to recycle mixed glass bottles and jars; and
- a re-usable blue plastic bag to recycle newspapers and magazines.

Many multi-occupancy buildings, such as flats have been given communal wheelie bins instead of boxes and bags.

Key Objectives including timeframe

The Council aims to exceed its statutory recycling targets of 18% in 2005/06, 20% in 2006/07 and 22% in 2007/08.

Progress as at March 2006

99.31% of households are already part of the new recycling and refuse scheme. The aim is to convert 100% of households to the scheme during 2006/07.

Green Waste Kerbside Collections

Progress as at March 2006

The Council is surveying every household to see if there is sufficient demand to support a paid-for collection service. Saying this, through the partnership with Derbyshire County Council, our emphasis is placed on home composting as a sustainable use of garden and food waste.

Recycling Banks

Key Objectives including timeframe

To increase the number of types of materials that is accepted at recycling centres. There is no timeframe for this objective, as the provision is constantly reviewed.

Progress as at March 2006

99.31% of residents are within one kilometre radius of a recycling centre or have access to the kerbside recycling scheme.

The Council has 46 recycling centres - 45 accept glass, 20 accept cans, 6 accept textiles, 34 accept plastic bottles and 24 accept mixed paper and card. In addition to this, there is one mini recycling site at a youth club where people can recycle their cans.

Marketing and Communications Plan

Key Objectives including timescale

To increase take-up of recycling services with a view to exceeding statutory recycling targets.

Progress as at March 2006

The Council is using existing communication channels to publicise its new recycling and refuse scheme. These include:

- An advice booklet delivered to each home
- Media releases
- 'Helping You' information leaflets
- Annual collection date calendars
- The Council's annual residents' newspaper
- The Council's website

In addition, six advertorials (paid-for features) were published in local newspaper between December 2005 and January 2006.

8.2.2 What partnership projects is Amber Valley involved in?

Annual waste educational activities

This has involved working with eight schools worked with in 2005/06 with a bid for more hours put in for 2006/07 through Groundwork Erewash Valley SLA

Provision of recycling facilities to multiple occupancy/housing association tenants

An ongoing trial in these types of property is happening in partnership with Amber Valley Housing and the Guinness Trust

Christmas Tree Recycling

This is an annual even with Shipley Garden Centre

Schools recycling trials

This involves four schools on 2006 for a three month trial with the waste contractor Cleanaway to establish the viability of schools recycling collections.

Home composter discount scheme

See details under Derbyshire County Council's partnership projects.

Real Nappy scheme – 'Time for a Change'

See details under Derbyshire County Council's partnership projects.

County-wide Waste Analysis project funded by DEFRA

See details under Derbyshire County Council's partnership projects.

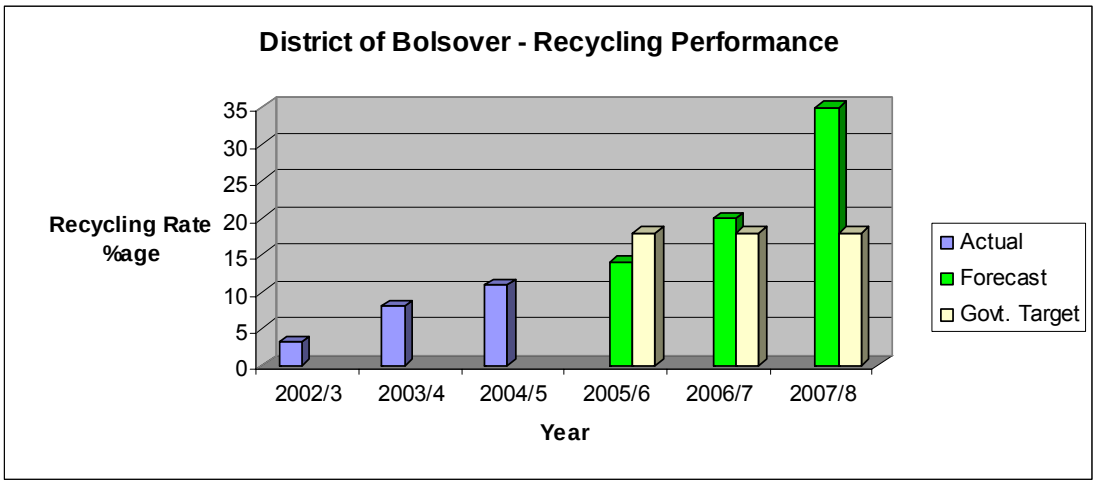
Trashtown Mystery, Primary school touring theatre show

See details under Derbyshire County Council's partnership projects.

Waste Exhibition Vehicle

See details under Derbyshire County Council's partnership projects.

8.3 Bolsover District Council



8.3.1 What's happening now and in the future in Bolsover?

Kerbside Recycling

Bolsover has implemented a kerbside recycling collection scheme. This involves the collection of paper, cans, glass and textiles via a blue box and bag. Collections are made once every two weeks and are district wide. In addition a pilot scheme for the collection of garden waste has been introduced during June 2005. The distribution of 11,500 green bins to residents in the south of the district allowes garden waste to be collected from the kerbside. This is collected on a fortnightly basis, whilst residual waste continues to be collected weekly.

A Waste Awareness and Promotions Officer has been employed to assist in the introduction and promotion of recycling initiatives.

Key Objectives including timeframe

To meet the statutory recycling and composting target of 18% in 2005/06. To continue with the garden waste collection scheme during 2006. To expand the scheme to the whole of the district when in-vessel composting facilities are available, (forecast for 2007-see Derbyshire County Council section: North Derbyshire Composting Project). To employ a Waste Projects Officer during 2006 on a fixed term 2 year contract to implement the Councils Waste Improvement Plan.

Recycling Banks

The number of recycling sites in Bolsover currently stands at 25. A variety of materials are collected from these sites, including glass, paper, cans, textiles and shoes.

Marketing and Communications Plan

A Waste Awareness and Promotions Officer is employed to raise awareness of waste related issues and promote the use of recycling bring and kerbside schemes to residents. This includes working closely with Derbyshire County Council on some projects such as the 'Time for a Change' Real Nappy Campaign.

A County-wide plan hasl been established and adopted in April 2006. It is being implemented in 2006/07 to maximise public awareness of the Waste Management agenda.

8.3.2 What partnership projects are Bolsover involved in?

Touchstone furniture recycling project

Touchstone provide a recycling service for used furniture in the north Derbyshire area

North Derbyshire Composting Project

See details under Derbyshire County Council's partnership projects.

Home composter discount scheme

See details under Derbyshire County Council's partnership projects.

Real Nappy scheme – 'Time for a Change'

See details under Derbyshire County Council's partnership projects.

County-wide Waste Analysis project funded by DEFRA

See details under Derbyshire County Council's partnership projects.

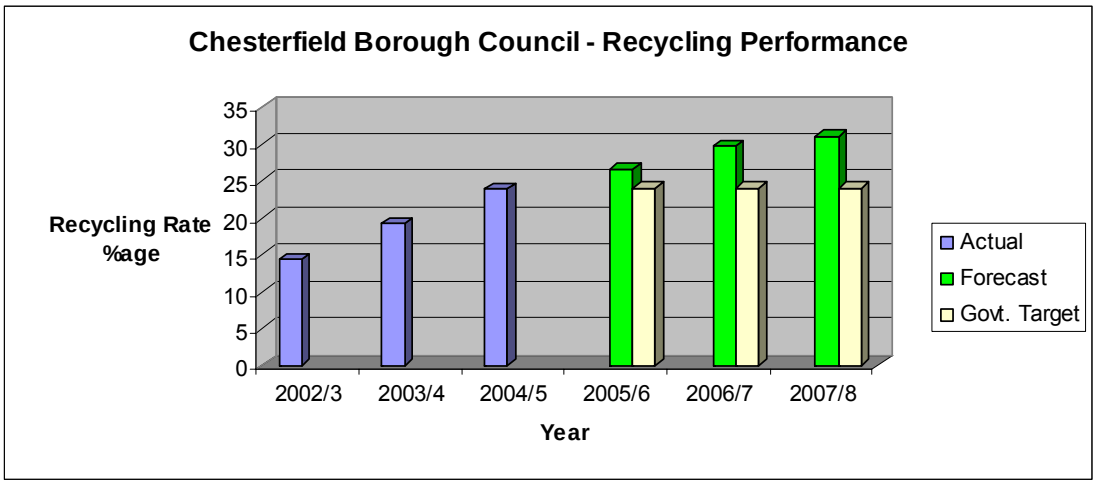
Trashtown Mystery, Primary school touring theatre show

See details under Derbyshire County Council's partnership projects.

Waste Exhibition Vehicle

See details under Derbyshire County Council's partnership projects.

8.4 Chesterfield Borough Council



8.4.1 What's happening now and in the future in Chesterfield?

Kerbside Recycling

Chesterfield is gradually converting household waste collections to an alternate week collection. A green bin for garden waste and cardboard is collected one week and a grey bin for residual waste is collected on the alternate week. This system is complemented by fortnightly collection of the following materials; newspapers, magazines, junk mail, directories and catalogues; using a blue bag. Glass bottles and jars, tins, cans and aerosols in a blue box and textiles and shoes in separate sack.

Key Objectives and timescales

To meet and exceed statutory recycling and composting targets. To give all residents of Chesterfield the opportunity to recycle from home including those living in multi occupancy properties currently not provided for. To install a further 10-12 mini bring sites at multi occupancy locations to complete the provision throughout the Borough by March 2007.
To increase the number of properties on the alternate weekly collection by 6000-10000 in Summer 2006 making a total of 32000-36000 borough wide. To extend this collection to cover all suitable properties in the Borough by March 2008.
To actively support the county compost scheme aiming to provide a local in vessel composter which will allow the inclusion of food and vegetable waste in the green bin collections by Summer 2007.

Progress as at March 2006

26,000 properties are on the alternate weekly collection, this has been a rolling expansion from September 2001. All suitable properties approx. 44000 are included in the fortnightly collection of dry recyclables. 16 mini bring sites have been installed to provide facilities for those properties not included in the kerbside collection. The estimated recycling and composting rate for 2005/6 of 26.2% will exceed the government target of 24% .

Recycling Banks

There is an extensive network of bring recycling sites throughout the Borough where some or all of the following materials can be recycled**:** newspapers, magazines, junk mail, directories and catalogues; glass bottles and jars, tins, cans and aerosols; textiles and shoes; plastic bottles**.** These are being enhanced by the introduction of the mini sites, outlined above. 31 local schools have a container for paper recycling.

Key Objectives and timescales

To provide local and accessible sites for all residents to support the kerbside collection. To re assess the number of sites and the materials currently collected taking into account public demand and funding available.

Progress as at March 2006

Currently 78 bring sites all collecting newspaper etc. 72 where glass can also be recycled, 70 where tins and cans may also be recycled, 13 where textiles and shoes may be taken and 16 where plastic bottles can be recycled.

Marketing and Communications Plan

Key Objectives including timescale

To raise awareness through a variety of media including; one series of radio adverts in 2006/7, a minimum of six articles/ competitions in Our Town in 2006/7, a minimum of four roadshows using the Chesterfield Borough Council "World Wagon" , a minimum of two leaflets delivered to every household promoting all waste management issues using the easily recognisable blue box and green bin logos/ characters. To engage with local schools through national initiatives and competitions eg Eco Schools and Yellow Woods Challenge.

8.4.2 What partnership projects are Chesterfield involved in?

Yellow pages recycling

Yellow Pages are collected from school

Touchstone furniture recycling project

Touchstone provide a recycling service fro used furniture in the north Derbyshire area

North Derbyshire *Composting Project*

See details under Derbyshire County Council's partnership projects.

Home composter discount scheme

See details under Derbyshire County Council's partnership projects.

Real Nappy scheme – 'Time for a Change'

See details under Derbyshire County Council's partnership projects.

County-wide Waste Analysis project funded by DEFRA

See details under Derbyshire County Council's partnership projects.

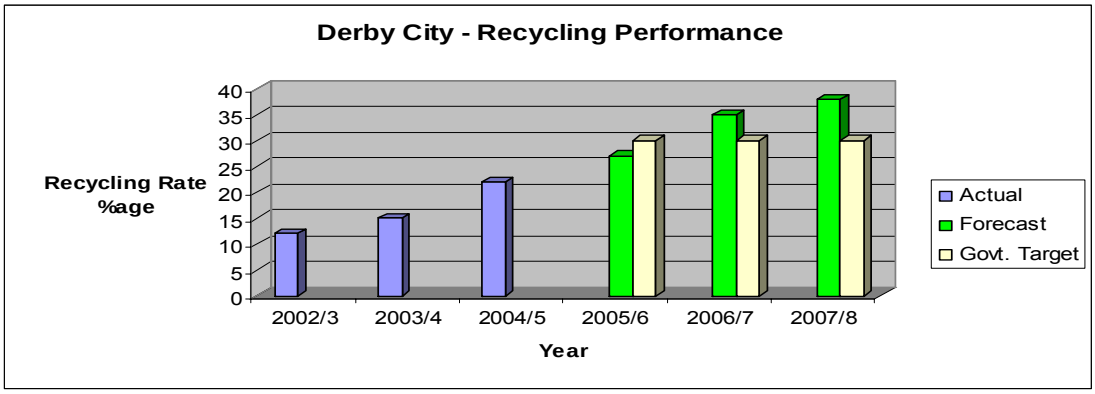
Trashtown Mystery, Primary school touring theatre show

See details under Derbyshire County Council's partnership projects.

Waste Exhibition Vehicle

See details under Derbyshire County Council's partnership projects.

8.5 Derby City Council



Recycling Facts (Bring sites and kerbside collections only)
In 2004/05 Derby residents recycled 6434 tonnes of newspapers and magazines, 908.71 tonnes of cardboard, 259 tonnes of cans, 2286 tonnes glass jars and bottles, 396 tonnes of plastic bottles, 325 tonnes of textiles, 40 tonnes of shoes, 41 tonnes of books and CD's and over 5204 tonnes of compostable waste

8.5.1 What's happening now and in the future in Derby?

Kerbside Recycling

Derby is converting most of it's collections to an alternate weekly waste collection system. Residual waste is collected on one week whilst on alternate week residents present paper, textiles, cans, glass, plastic bottles and compostable garden waste for collection.

Key Objectives including timeframe

To work towards the statutory recycling and composting target of 30% in 2005/6 and continue rolling out the kerbside recycling scheme to most parts of the city in 2006/7 and 2007/8.

Progress as at March 2006

52,000 households (50%) have been converted onto this scheme during the last three years. Derby forecast its 2005/6 recycling rate to be 28.5%. The scheme will continue to be expanded to other parts of the city in 2006-8 and expect to reach a recycling rate of between 38-45% when fully implemented.

Recycling Banks

These are continually being expanded and improved.

Key Objectives including timeframe

To provide over 86 effective and efficient sites in the city during 2006/7.
To provide a wide range of banks including paper, cardboard, glass, cans/tins, textiles, plastic bottles, oil, books, shoes at as many sites as is practically possible.
To further increase provision in 2007/8 depending on the successes of the kerbside scheme and public demand.
Progress as at March 2006

84 sites are operational and all the materials listed above can be recycled in the city. See Derby.gov.uk for full information on the types of banks and their locations.

Household Waste Recycling Centre at Raynesway

Key Objectives including timeframe

To provide a high quality facility for Derby's householders that recycles at least 30% of all wastes brought to the site.
To provide recycling facilities for, cardboard, glass, plastic bottles, cans, green waste, newspapers and magazines, textiles, scrap metal, wood, electric and electronic equipment, batteries, white and bulky goods, paint, oil, rubble, soil and disposal facilities for cement bound asbestos sheets and chemicals.

Progress as at March 2006

All materials listed above can be recycled at Raynesway and in 2004/5 54.5% was recycled and the forecast recycling rate for 2005/6 is 45% (Rate has decreased due to expansion of kerbside collections and introduction of hazardous waste regulations).

In-vessel Composting facility (IVC)

Key Objectives including timescale

An IVC facility will provide capacity for processing the kerbside collected garden and kitchen compostable wastes along with cardboard. This type of facility is necessary to comply with strict Government regulations relating to the composting of meat wastes and cardboard packaging from the home.

Progress as at March 2006

Planning permission has been granted and it is expected that the facility will be operational from summer 2006.
In addition to this facility it is understood that Biffa are intending to have a similar facility operational at Etwell near Derby in 2006 and the other partner authorities will be able to deliver kerbside collected compostable material to this facility. It is probable that the other partners will deliver to both facilities.

Materials Recycling Facility (MRF's)

Key Objectives including timescale

To establish one MRF in 2006/7. The MRF will provide capability for processing large quantities of dry recyclables (paper, cans, glass, plastic bottles and textiles) that have been collected in a semi-mixed state by the City Council, and potentially by other partner authorities from the kerbside collection schemes.

Progress as at March 2006

Planning permission has been obtained for a MRF near Lichfield. A transfer station will continue to be used to receive the materials in Derby.

Marketing and Communications Plan

Key Objectives including timescale

A strong Marketing Plan will continue to accompany all of the above activities and ensure that high quality marketing materials are produced including flyers, leaflets, calendars, newsletters and regular press releases to promote many aspects of waste management.

Progress as at March 2006

This will be continually evolved in future years and linked to the national strategies to ensure that maximum effects to public attitude and behaviour can be made.

Schools activities

Waste management is promoted to all schools in the city via, competitions, activities, information about home composters etc. Eco schools is promoted to all schools in the city and 21 are working towards green flag status, and 3 have their green flag status. 17 schools now receive a recycling collection service, 14 receive a collection for paper, newspapers and magazines, 3 schools receive a collection of glass, plastic and cans and 1 school receives both collections. Two schools have community recycling banks in or adjacent to their grounds.

Progress as at March 2006

Schools will continually be encouraged to develop recycling and composting initiatives and practices.

8.5.2 What partnership projects are Derby involved in?

Home composter discount scheme

See details under Derbyshire County Council's partnership projects.

Real Nappy scheme – 'Time for a Change'

See details under Derbyshire County Council's partnership projects.

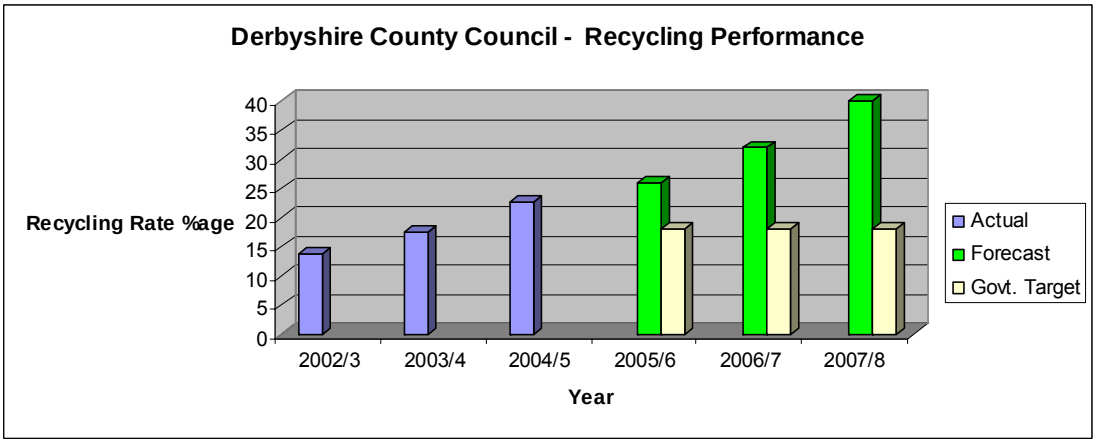
County-wide Waste Analysis project funded by DEFRA

See details under Derbyshire County Council's partnership projects.

Waste Exhibition Vehicle

See details under Derbyshire County Council's partnership projects.

8.6 Derbyshire County Council



8.6.1 What is happening now and in the future in Derbyshire?

Household Waste Recycling Centres

Key Objectives including timeframe

To establish up to 5 new centres across the county between 2005-8.
To provide high quality facilities for Derbyshire's householders that recycles in excess of 50% of all wastes brought to the site (based on BVPI calculations).
To provide recycling facilities for cardboard, glass, plastic bottles, cans, green waste, newspapers and magazines, textiles, scrap metal, wood, electric and electronic equipment, batteries, white and bulky goods, paint, oil, rubble, soil and disposal facilities for household hazardous waste.

Progress as of March 2006

A new site at Ashbourne was opened in January 2006. Progress on identifying land in Matlock is ongoing. A site at Bolsover has been identified and a planning application has been submitted. Planning for a site at Buxton has now been approved and the site should be opening in Spring 2007. A site in the Clay Cross area will be sought in 2006/7.

Eco-schools

Key Objectives including timeframe

To provide advice and support to schools in the County to encourage them to take part in the Eco Schools scheme, with the aim of assisting 20 schools to achieve Green Flag Eco Schools status by December 2005.
Whilst working to achieve this target we will work to encourage schools to compost their fruit waste and recycle other materials including paper.

Progress as at March 2006
120 schools (almost 1/3) of schools are registered as Eco Schools.
25 schools have achieved Eco Schools status.

Business waste recycling initiative

Key Objectives including timeframe

Efforts to identify funding and partners for developing this project are ongoing through 2006 with a view to developing an initiative that will encourage recycling and composting in business and industry. Encourage local companies to take advantage of and engage with the advice of the National Industrial Symbiosis Programme.

8.6.2 What partnership projects are Derbyshire involved in?

Marketing and Communications Plan

Key Objectives including timeframe

A County-wide Plan will be established and adopted by Spring 2006. It will be implemented in 2006/7 to maximise public awareness of the Waste Management agenda.

Progress as at March 2006

The Plan will be adopted in Spring 2006.

Waste Exhibition Vehicle (WEV)

Key Objectives including timeframe

Utilising a £90,000 DEFRA grant the Strategy partners use this dedicated vehicle at over 75 event days per year to raise the public's attitude and change behaviour to waste minimisation, recycling and composting. The partners provide financial support for the maintenance of the vehicle.

Progress as at March 2006
Following on from the 70 events in 2005 a full programme of events with the partner authorities is panned fro 2006.

North Derbyshire Composting Project

Through £2.9m of DEFRA funding the partners are in the process of establishing two In-vessel composting plants and collection infrastructure, including wheeled bins for the collection of green waste from over 120,000 properties in the north of the county within Chesterfield, Bolsover, North East Derbyshire and High Peak.. The In-vessel facilities will enable residents to place kitchen and garden compostable waste along with cardboard in their bins. The materials will produce high quality compost to meet PAS 100 and APEX standards enabling resale to the horticultural and agricultural industry.

Key Objectives including timeframe

To provide bins to 120,000 properties, appropriate collection infrastructure and two In-vessel composting plants at Buxton and Chesterfield by 2006/7.
The Buxton facilities will process up to 15000 tonnes and the Chesterfield facility will process up to 40,000 tonnes per annum.

Progress as at March 2006

Land at Grassmoor, Chesterfield has been acquired and planning permission is currently being sought. Planning permission has been approved for the Buxton facility. Both facilities should be operational by Spring 2007.

Countywide Home Composting Project

This is primarily a waste minimisation initiative and is discussed in more detail in Appendix 9 of this Strategy document.

'Time for a Change' Real Nappy Campaign

This is primarily a waste minimisation initiative and is discussed in more detail in Appendix 9 of this Strategy document.

Pursuing additional funding opportunities

Key Objectives including timeframe

To seek additional funding both internally and externally for waste management project and initiatives

Progress as at March 2006

Investigations are being made into WRAP's 2006 Behavioural Change fund and opportunities to secure funding for promoting business waste recycling.

County-wide Waste Analysis Project funded by DEFRA

Key Objectives including timescale

To provide quality data on individual domestic waste streams to enable officers to consider how well the various waste minimisation, recycling and composting schemes and initiatives are developing and what further work can be done to improve them.

Progress as at March 2006

Awaiting a final report from the consultants.

Trashtown Mystery, Primary school touring theatre show

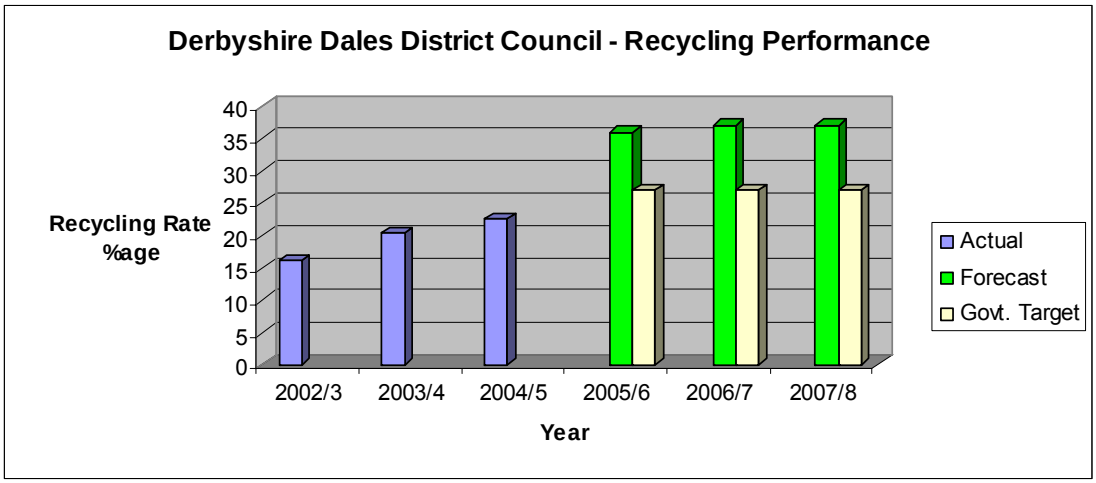
Key Objectives including timeframe

To deliver the above show through Speakeasy Theatre Productions utilising CRED funding.

Progress as at March 2006

Over 300 shows have been undertaken in schools throughout the county in 2005/6

8.7 Derbyshire Dales District Council



Recycling Facts (Bring sites and kerbside collections only)
In 2005/6 Derbyshire Dales residents recycled 2680 tonnes of newspapers and magazines, 314 tonnes of cardboard, 92 tonnes of cans and foil, 2636 tonnes of glass jars and bottles, 213 tonnes of plastic, 172 tonnes of textiles and shoes, 35 tonnes of books and over 5460 tonnes of compostable garden waste.

8.7.1 What's happening now and in the future in Derbyshire Dales?

Kerbside Recycling

Derbyshire Dales District Council provides a kerbside recycling collection for paper and glass using a Blue Box and clear bag system. The collection is made fortnightly. This recycling collection covers 96% of the District's properties. In addition over 80% of the district have the opportunity to have a garden waste 'Green' wheeled bin, also collected on a fortnightly basis.

Key Objectives including timeframe

- To meet the statutory recycling and/or composting target of 27% in 2005/6.
- To increase the composting rate from under 2% to over 16% by March 2006
- To reduce the waste delivered to landfill from 350kg per resident to under 300kg by March 2006.
- To increase the proportion of household waste that is recycled and/or composted to 37% by March 2007

Progress as at March 2006

During 2005 Derbyshire Dales District Council changed the refuse collection system across 80% of the district from back door sack collection of household refuse to edge of property collection using wheeled bins. Even those properties that have remained on a sack service have changed to edge of property collection. The move to collection in wheeled bins enabled the introduction of a garden waste, compostable collection and has resulted in a forecast composting rate for Derbyshire Dales District Council of 16% in 2005/6. The overall

household waste recycled and composted in 2005/6 is a forecast 36%. The waste delivered to landfill should be reduced to a forecast 284kg per resident.

Derbyshire Dales District Council have targeted an expansion of the Green bin collection system to include kitchen waste and cardboard for implementation by September 2006.

Recycling Banks

Key Objectives including timeframe

Derbyshire Dales District Council provide recycling sites across the district collecting a wide range of dry recyclables including paper, glass, cans, plastic, books, textiles and cardboard. The Council continue to maintain the current sites, monitor the facilities and provide as wide a range of facilities as is practically possible.

Progress as at March 2006

There are currently 100 recycling sites across the district. For a full list of locations and banks at each site please visit www.derbyshiredales.gov.uk. These sites continue to be monitored, reviewed and managed as necessary.

Marketing and Communications Plan

Key Objectives including timescale

To run a waste minimisation campaign by March 2006.

Progress as at March 2006

"Watch Your Waste": The campaign has been running since December 2005 and will run until Spring/Summer 2006. The main aim of the campaign is to enable residents to reduce and re-use more of their household waste, promote recycling and assist in meeting the targets outlined above. 'Waste free' Christmas messages, press releases and posters were issued across the district which included details on the Council's Christmas recycling schemes for collecting cards and Christmas trees. A new "Watch Your Waste" booklet has been produced bringing together District specific advice as well as general advice on reduce and re-use options (including the Mailing Preference Service, furniture re-use network, real nappies, home composting, bag-for-life schemes and how to 'shop smart' etc.). Promotion of the Blue Box recycling scheme and bring recycling sites is also included. The "Watch Your Waste" messages have also been issued on the council's website (www.derbyshiredales.gov.uk) and have featured in press releases, forthcoming council publications and a series of awareness raising road-shows across the district. This campaign has included the provision of an online advice section for businesses giving advice on their waste responsibilities, how to reduce business waste as well as featuring areas on energy and transport.

Schools Work: Derbyshire Dales District Council's Environmental Education Officer works alongside schools in the district promoting waste reduction and recycling messages. This can include providing advice, assemblies, conducting school waste audits, composting workshops or helping schools to set up recycling facilities. A project is ongoing with a district school creating a 'recycled' garden made from reclaimed and recycled items. There are around 68 schools in the district, approx. 31% are currently recycling paper with the District Council, approx. 28% are composting at school and approx. 22% are registered with the Eco-Schools scheme (at least 4 schools have achieved the top 'green flag' status).

The partnership projects detailed below have been promoted and supported at events across the district, feature on the Council's website and feature regularly in Council publications and press releases.

8.7.2 What partnership projects are Derbyshire Dales involved in?

Home composter discount scheme

See details under Derbyshire County Council's partnership projects. Prior to the commencement of this scheme Derbyshire Dales District Council operated its own Home Composter promotion from November 1999 until March 2005 and sold 13,870 compost bins to residents of the district.

Waste Exhibition Vehicle

See details under Derbyshire County Council's partnership projects.

Real Nappy scheme – 'Time for a Change'

See details under Derbyshire County Council's partnership projects.

County-wide Waste Analysis project funded by DEFRA

See details under Derbyshire County Council's partnership projects.

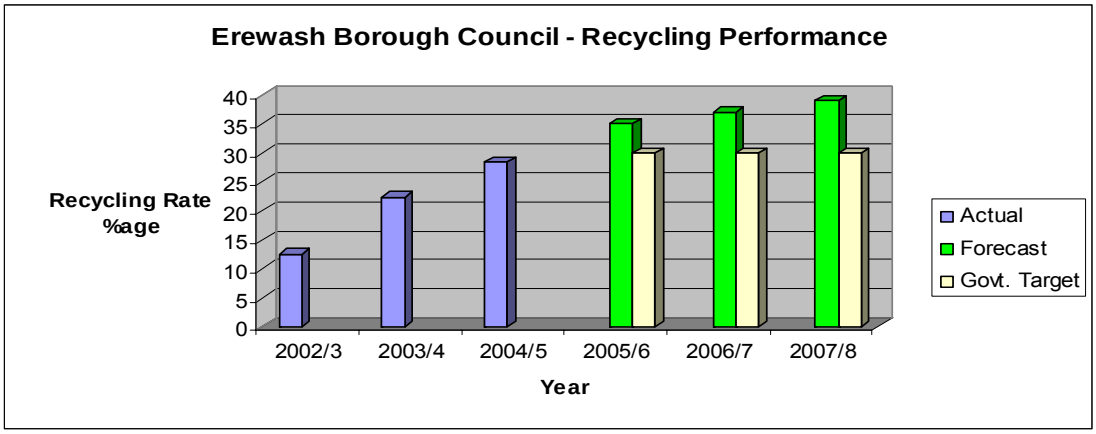
Trashtown Mystery, Primary school touring theatre show

See details under Derbyshire County Council's partnership projects.

Furniture Recycling

DDDC support the work of Encore, Touch Home and Heanor Salcare who all cover parts of the Derbyshire Dales District Council area.

8.8 Erewash Borough Council



8.8.1 What's happening now and in the future in Erewash?

Kerbside Recycling

Erewash Borough Council provides an alternate week waste collection system. Residual waste is collected on one week using a black wheeled bin. On the next week residents present paper, plastic bottles, mixed cans and glass for collection in green recycling bags or plastic carrier bags. Garden (green) waste is also collected alternate weekly during the recycling week using a brown bin collection service and is sent for composting. This green waste scheme operates during the months of March to November.

Key Objectives including timeframe

To meet the statutory recycling and composting target of 30% in 2005/6 and continue improving the kerbside recycling scheme. A trial collection scheme was carried out during the winter of 2005/06 to enable households to use their brown bin for the collection of paper, cans and plastic instead of green bags. The results of the trial will be feed into the decision making process aimed at considering the replacement of green recycling bags with wheeled bins.

Progress as at March 2006

98.56% (47,385) of properties in Erewash are served by the kerbside recycling scheme. Erewash forecast its 2005/6 recycling rate to be 35%.

Recycling Banks

Key Objectives including timeframe

To provide convenient facilities for residents to drop off their recyclable waste.

Progress as at March 2006

22 sites are operated collecting the following materials: glass bottles and jars, mixed paper and card, mixed cans, textiles, plastic bottles and shoes.

Marketing and Communications Plan

Key Objectives including timescale

Erewash Borough Council provides information on refuse and recycling via its official web site and the dedicated recycling website at www.recyclinginerewash.co.uk. Notification of any new scheme or change in service is included on these websites. Information is also disseminated using 'Viewpoint' magazine which residents receive on a quarterly basis. Households are also updated annually by means of a refuse and recycling information leaflet along with a bin sticker. This material is delivered to every home around November time.

8.8.2 What partnership projects are Erewash in?

Groundwork Erewash – 'What a waste!'

Erewash Borough Council is working with Groundwork Erewash to promote the green waste (brown bin) collection scheme. The aim is to increase participation in the scheme and to improve the quality of the material collected. Home composting will also be promoted. This project will also involve engagement with community groups and schools.

Home composter discount scheme

See details under Derbyshire County Council's partnership projects.

Real Nappy scheme – 'Time for a Change'

See details under Derbyshire County Council's partnership projects.

County-wide Waste Analysis project funded by DEFRA

See details under Derbyshire County Council's partnership projects.

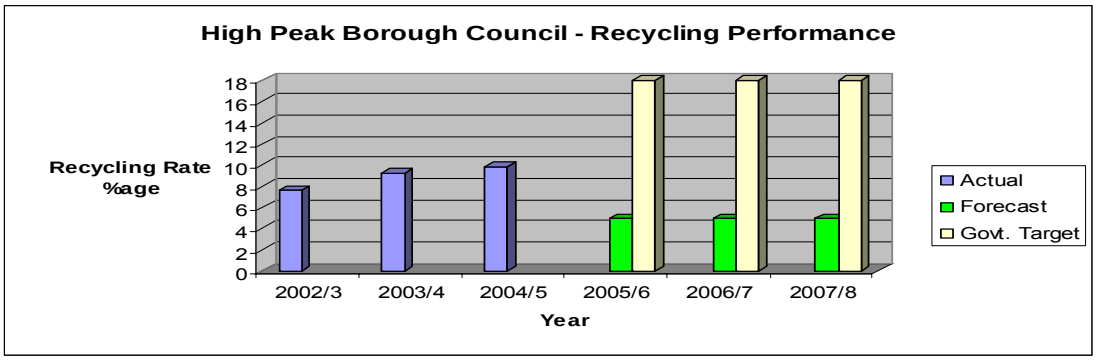
Trashtown Mystery, Primary school touring theatre show

See details under Derbyshire County Council's partnership projects.

Waste Exhibition Vehicle

See details under Derbyshire County Council's partnership projects.

8.9 High Peak Borough Council



8.9.1 What's happening now and in the future in High Peak

Kerbside Recycling

The kerbside recycling scheme has been rolled out to a further 1,500 properties in the Hope Valley equates to a kerbside percentage coverage of 96%. These residents use the 55l kerbside box to collect paper, cans, glass and textiles. Multiple Occupancy residents will receive the service this year. The new 'Binnovation' service will be introduced in the Glossopdale area in May with the remainder of the Borough to be added in 2007.

Key Objectives including timeframe

To meet the recycling/composting target of 18% in 2006/07. To introduce a pilot alternate week collection scheme of compostable waste to 13,000 properties in Glossopdale in May/June 2006/7. To expand this scheme to include the whole Borough (additional 25,000 properties) by Summer 2007. To actively support the county compost scheme aiming to provide a local in vessel composter which will allow the inclusion of food and vegetable waste in the green bin collections by Summer 2007.
To expand the kerbside box scheme to include further rural properties by summer 2007, increasing the existing 96% coverage.

Recycling Banks

To provide convenient facilities for residents to drop off their recyclable waste. To increase the provision of plastic recycling facilities, in response to customer feedback, and increase signage at sites by summer 2006.

There are 8 sites providing plastic banks, this will increase by two prior to the pilot scheme launch in Glossop. Improved signage in design and manufacture stage, suitable sites have been identified.

Marketing and Communications Plan

To successfully market the alternate week pilot scheme in Glossopdale through a teaser leaflet and information pack delivered to every home in April/May. To support this with radio adverts running for 1 month, roadshows, newspaper adverts and articles etc. Objective is to ensure maximum public understanding of the new scheme. These methods will be repeated for the expansion scheme in 2007.
To continue the current kerbside incentive scheme, where cash prizes are awarded for consistent recyclers. Prizes will be awarded in July 2006.

8.9.2 What partnership projects are High Peak involved in?

Touchstone furniture recycling project

Touchstone provide a recycling service for used furniture in the north Derbyshire area

North Derbyshire *Composting Project*

See details under Derbyshire County Council's partnership projects.

Home composter discount scheme

See details under Derbyshire County Council's partnership projects.

Real Nappy scheme – 'Time for a Change'

See details under Derbyshire County Council's partnership projects.

County-wide Waste Analysis project funded by DEFRA

See details under Derbyshire County Council's partnership projects.

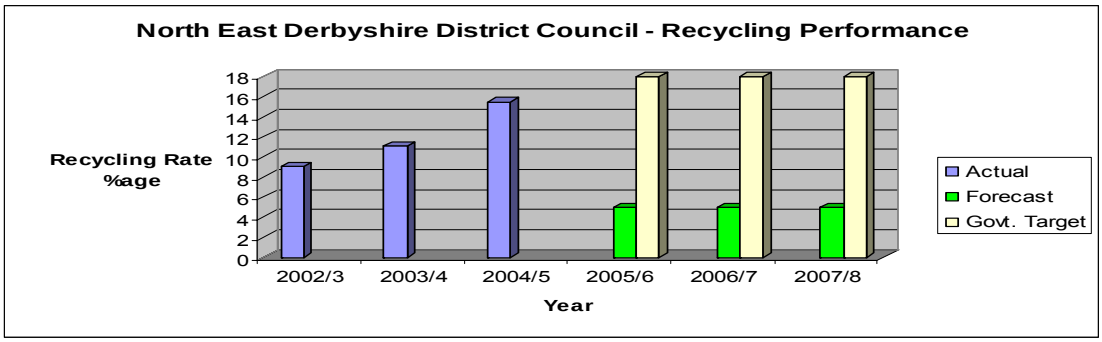
Trashtown Mystery, Primary school touring theatre show

See details under Derbyshire County Council's partnership projects.

Waste Exhibition Vehicle

See details under Derbyshire County Council's partnership projects.

8.10 North East Derbyshire District Council



Recycling Facts (Bring sites and kerbside collections only)
In 2005/6 NE Derbyshire DC residents generated an estimated 42220 Tons of Household Waste.
From this they recycled 1713 tonnes of Glass bottles & Jars, 2739 Tonnes of Paper, 371 tonnes of Cans, 25 Tonnes of Plastic Bottles. 3281 Tonnes of green waste was sent for Composting and 127 tonnes of Textiles were collected for reuse by the Salvation Army & Scope.
In addition the Council collected 65 tonnes of fridges for recycling and a further 382 tonnes was recycled from other Household waste collected.

8.10.1 What's happening now and in the future in North East Derbyshire

Kerbside Recycling

NE Derbyshire District Council is converting most of it's collections to an alternate weekly waste collection system. Residual (black bin) waste is collected alternately with green bins for green waste and cardboard. Properties on this system are also provided with a fortnightly 'Blue Box & Bag' kerbside recycling collection for paper, glass, cans & textiles.

Key Objectives including timeframe
To exceed the statutory recycling and composting target of 18% in 2005/6 and to complete rolling out the twin bin & kerbside recycling scheme to all properties in the district in 2006/7.

Progress as at March 2006
66% of NE Derbyshire's households (28,000) have been introduced to the alternate weekly twin bin scheme over the last 18 months. 96% of NE Derbyshire's households (41,300) are now able to take part in the 'Blue Box & Bag' kerbside recycling service.
NE Derbyshire District Council forecast its 2005/6 recycling / composting rate to be 20.3%. The Twin Bin & Blue Box schemes will continue to be expanded to the rest of the properties in the District in 2006/7. The Corporate Plan is to reach a recycling / composting rate of 57% by 2008/9.

Recycling Banks

Key Objectives including timeframe
To increase the number of recycling sites to 30 by the end of 2006/7.
To provide an increased and more uniform selection of facilities at each site.

Progress as at March 2006

24 sites are operational, mostly for Glass, Paper & Textiles. There are 3 sites for recycling Cans & 2 for recycling Plastic Bottles. See ne-derbyshire,gov.uk for full information on the types of banks and their locations.

Marketing and Communications Plan

Key Objectives including timescale
NE Derbyshire Council are preparing a Waste Minimisation plan to provide a planned structure to improve public support for waste minimisation and separation of their waste streams over the next 5 years.
A waste marketing strategy will ensure the NE Derbyshire Council waste minimisation strategy & the Derbyshire Waste Management Strategies are communicated to the public. This will start with increasing Public awareness and work gradually toward a more robust enforcement of waste separation.

Progress as at March 2006
The existing marketing is designed to work in partnership with the national 'Recycle Now' campaign. The existing 'Recycle for Schools' campaign and press releases etc. will continue until all the properties in NE Derbyshire have access to a twin bin and the Kerbside Recycling services. This is planned to be complete by the end of 2006/7. Following this an enhanced marketing campaign will commence as described above.

8.10.2 What partnership projects are North East Derbyshire involved in

Recycle For Schools
The 'Recycle for Schools' partnership is currently scheduled to run until at least March 2007. Schools help the council promote recycling to householders, and receive cash recycling awards to spend on music and sports equipment. Over 95% of schools have registered as partners.
£30,000 has been awarded in prizes over the last 18 Months. Residents pledge their recycling to a particular school & prizes are awarded using a points system based on the amounts recycled and the number of pledges. Recycling has improved noticeably where Schools have been especially active.

Touchstone furniture recycling project

Touchstone provide a recycling service for used furniture in the north Derbyshire area

North Derbyshire *Composting Project*

See details under Derbyshire County Council's partnership projects.

Home composter discount scheme

See details under Derbyshire County Council's partnership projects.

Real Nappy scheme – 'Time for a Change'

See details under Derbyshire County Council's partnership projects.

County-wide Waste Analysis project funded by DEFRA

See details under Derbyshire County Council's partnership projects.

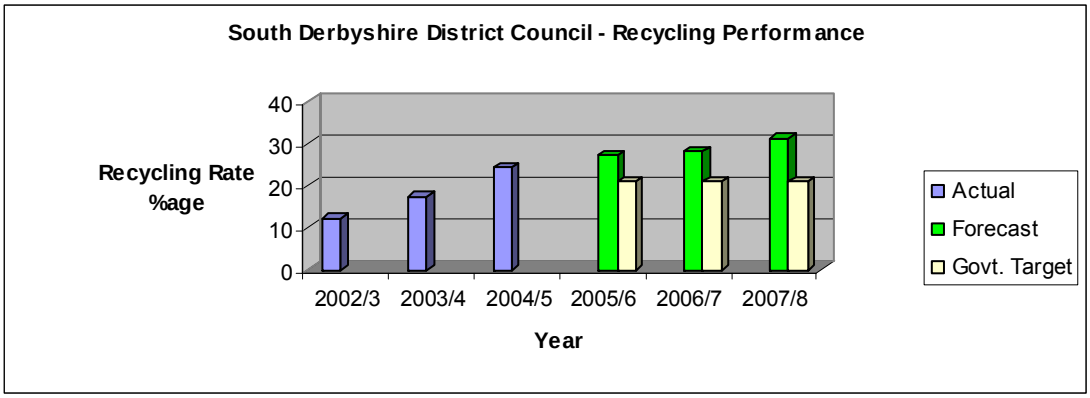
Trashtown Mystery, Primary school touring theatre show

See details under Derbyshire County Council's partnership projects.

Waste Exhibition Vehicle

See details under Derbyshire County Council's partnership projects.

8.11 South Derbyshire District Council



8.11.1 What's happening now and in the future in South Derbyshire

Kerbside Recycling

Building on the success of existing alternate weekly waste collections South Derbyshire intend to expand the 'brown bin' scheme for garden waste to remaining households. This will be preceded by the extension of the 'green box' dry recyclables kerbside collection service for glass, cans, textiles, foil and paper**.**

Key Objectives including timescale

The 'green box' dry recyclables service will be extended during the Summer of 2006 to a further 12,000 households. The 'brown bin' composting scheme will be extended across the District between September 2006 and September 2009.

Progress as at March 2006

18,000 (50%) households participate in the 'brown bin' alternate weekly waste collection scheme. 25,000 (66%) households are served by the 'green box' dry recyclables scheme. 11,000 (32%) participate in a paper only kerbside recycling collection.

Recycling Banks

The network of recycling banks will be expanded and improved as opportunities to do so become available.

Key Objectives including timeframe

To maintain the number of sites available and maximise the range of materials that may be recycled at recycling centres across the District through negotiation with partners.

Progress as at March 2006

Network of 80 recycling centres throughout the District for a variety of recyclables including glass bottles, cans, plastic bottles, paper, cardboard, and textiles. 13 sites provided in partnership with schools and voluntary groups. Details of recycling centres available on www.south-derbys.gov.uk

Marketing and Communications Plan

Key Objectives including timescale
The expansion of new kerbside recycling schemes for green waste and dry recyclables will be promoted with a campaign of leaflets, calendars, web pages and exhibitions.

Other promotional activities include Real Nappy Week, Composting, Big Recycle Week, Swadlincote Festival of Leisure and Outdoor events at the Hilton and Woodlands Fair and Foremark Reservoir.

8.11.2 What partnership projects are South Derbyshire involved in

In-vessel Composting facility (IVC)

Key Objectives including timescale
Working with Derby City Council to provide a composting scheme for garden and kitchen waste to address the issues arising from the Animal by Products regulations. South Derbyshire intend to annually contribute 800 tonnes of domestic waste to the procured IVC facility which is expected to be operational during 2006.

Progress as at March 2006
Planning permission has been granted and it is expected that the facility will be operational from summer 2006. An existing green waste composting facility operated by Biffa in Etwall is expected to develop to compost kitchen waste during 2006. Subject to this development and associated contractual arrangements South Derbyshire will look to include kitchen waste in existing 'brown bin' composting schemes.

Materials Recycling Facility (MRF's)

Key Objectives including timescale
Working alongside Derby City Council to investigate the effectiveness of co-mingled dry recyclables collections with a view to developing the existing 'green box' kerbside collection service.

Progress as at March 2006
Planning permission for a MRF in Derby is currently being sought.

Schools Activities

Key Objectives including timescale
To provide education initiatives for a number of schools to promote and encourage participation in waste minimisation and recycling activities through the use of school visits, plays, and the Cash for Trash recycling scheme. SDDC also support the Trashtown Mystery initiative, see entry under Derbyshire County Council.

Progress as at March 2006
Cash for Trash schools and voluntary groups recycling scheme reviewed and expanded.
Development of a Waste Minimisation and Recycling Education resource pack in partnership with Environmental Education Officers.

Home composter discount scheme

See details under Derbyshire County Council's partnership projects.

Real Nappy scheme – 'Time for a Change'

See details under Derbyshire County Council's partnership projects.

County-wide Waste Analysis project funded by DEFRA

See details under Derbyshire County Council's partnership projects.

Waste Exhibition Vehicle

See details under Derbyshire County Council's partnership projects.

APPENDIX 9: MARKETING PLAN

Objectives Of The Marketing Plan.

To gain the large scale and long-term changes in public attitude and behaviour that will result in:

- reduced levels of waste production by householders;
- increased re use of waste
- increased commitment to recycling by the public and an increase in actual recycling rates;
- Increased home composting of suitable biodegradable waste;

Role of the Action Plan.

The Action Plan element of this Marketing Plan documents the Partner's Actions that will be used to meet the objectives

Many of the campaigning and promotional options identified in the 2006-2007 attached Action Plan have already been undertaken at district and county wide level for a number of years. This Plan seeks to build on and learn from the experiences of the past and develop a more integrated county wide approach to waste marketing and promotional work.

Principles Underpinning the Marketing Plan

Several key principles will drive and inform the communications and marketing work that takes place across the county.

1. Use of a Marketing Brand

Where practicable, the partners will adopt a consistent county - wide campaign brand. The Give Rubbish a New Lease Of Life brand and iconography has already been approved by WRAP and this has been used as an example of good practice on their web site. Guidelines on the use of this brand have also been issued. It is thought that the more extensive use of this brand on promotional and marketing materials produced in the county will reinforce the consistency of the campaign message and result in greater consolidation of the message in the target audiences mind.

2. Developing media relations

The Partners will continue to cultivate the relationship with local journalists with newspapers, radio and television stations etc and the encouragement of their buy into campaigns and marketing initiatives.

3. Partnership working with all stakeholders

The Partners will assess and promote the role that key stakeholders can play in encouraging waste minimisation, reuse and activity throughout the County. We will Identify areas where additional partnership based marketing of organisations could result in reciprocal benefit to both parties. Examples might include promotion of furniture reuse schemes, bring back schemes run by charities or the role of the Mailing Preference Service. Potential for working in partnership will be explored where the uptake by the public of any of the stakeholders services can result in diversion of waste from landfill.

4. Identification of the target audience

For each strand of communications work planned, the mix of communications work used will be aimed effectively at the target audience. Frequently, the target audience will be the entire public and in this case, the use of broad based communications tools such as leaflets, advertising and posters will be appropriate. Sometimes however, more targeted methods will be necessary to tailor messages to specific audiences. To market Real Nappies for example, direct mail campaigns which target parents to be and new parents will be appropriate.

Other target audience characteristics for consideration when planning marketing activities will include the age, affluence, access to gardens, types of dwelling and the urban density of the audiences living area. The Action Plan element of the marketing plan outlines a set of communication tools and tactics that will cover most niche and target audiences.

Action Plan

This Action Plan below details how campaign initiatives will be undertaken. A wide array of marketing activities will be run in 2006 - 2007 and the Action Plan gives summary details on what will be happening, when, where, how and which staff it will involve.

2006/7 ACTION PLAN

	Activity and primary objective	When	Council Who	Audience	Marketing channels
1	**Kerbside collection schemes**				
	Promote and launch of new schemes	TBC	WCA and WDAs with County support if needed.	Specific households	Press Releases, possible road shows in target areas, explanatory literature, use of web site advertising, media interviews and may be door stepping.
	Milestones and new developments – Highlight achievements inform and promote the benefits of the new developments to the public.	As appropriate	WCAs and WDA with support from DCC if required	Public receiving service. If good news story, as wider section of the public as possible.	Press Releases, media publicity, leaflet drops in affected areas, possible road show awareness raising days, the use of web site resources. When strong promotion is required the need for high profile launch days.
2	**Waste Exhibition Vehicle Activity**				
	Primary objective to encourage waste minimisation by the public and increased participation in reuse, composting and recycling Behaviour. Aim for attendance at approx 100 annual events annually around the county	Ongoing	DB + DCC team and WCA/ WDA officers	The general public and specific target audiences for certain events. Develop use of WEV for schools	Press releases, DCC web site events listing, word of mouth and through attendance at events. Tie the use of the WEV to significant national or local developments like BIG recycle week or new alternate weekly introductions. Attendance at Eco-Schools conference, encourage the increased use of WEV at schools.
3	**Household Waste Recycling Centres**				
	Milestones and new developments. For example, the acceptance of new waste streams on site.	As appropriate	DCC with support from WCA and WDA when needed	All the general public.	Press Releases, DCC and WCA web sites, possible radio interview. Information on the site itself and the yearly update to Household Waste Recycling Centres leaflet.
	Launch of new site at Ashbourne	TBC	HB + WCA officers and members	General public in the Ashbourne area.	Press releases and editorial, event at site possibly with WEV, web reports, photo opportunities at launch created by on site activities possibly involving school.
	Development of proposed sites. Monitor the progress of these sites and organise launches once open and licensed.	Ongoing	DCC with support from WCAs if appropriate	Public in the relevant areas.	Highlight the new facilities when confidence high over opening date and specifics of the site operations, layout and waste streams accepted etc.
4	**Eco schools Campaign**				
	Increase the number of Eco Schools and the number progressing toward more advanced Eco School flag	Ongoing	HA leading with support from DCC	Existing Eco Schools and	Rolling programme of school visits, Eco School meetings, assemblies, school waste audits. Eco school newsletter,

	awards.		team, WCA and WDA officers.	potential new entrants to the scheme.	input to relevant projects for example artwork/grounds development. Publicity via Extra Net and continual monitoring of school progress toward flag awards.
	Eco schools Conference – To promote and inspire existing Eco Schools. Activities also involve many partners and can attract new schools.	June 23	HA/ PR with DCC team and WCA/ WDA officers if appropriate.	Existing, progressing and potentially new Eco Schools	Press release (specifically targeting radio) and flyers to schools, DCC web and Extra Net, periodic newsletters, through Eco Schools meetings and word of mouth.
5	**Home Composting Project**	Ongoing	HB leads with DCC team, WCAs, WDA and WRAP.	All public and schools.	Events, direct marketing, press releases, competitions, school involvement, leaflets, booklets, home composting advisor, seasonal pushes, radio campaigns and Master Composter events.
	Compost Awareness Week	5th / 12th May	HB leads with team + WCA/WDA support	All public	High profile events, use of WEV, press releases, radio Interviews and editorials if possible.
6	**The Real Nappy Project**				
	Increased use of real nappies as measured by successful applications to the cash back scheme	Ongoing	SA + DCC team WCAs WDA and WRAP.	'Parents to be' and new parents	Press releases to all media, Bus adverts in June 06, Baby Days, Nappucinos. Use booklets / leaflets to promote the scheme, advertise on DCC + WCA web sites and via other promotional events e.g. those using the Waste Exhibition Vehicle (WEV)
	Real Nappy week – High Profile awareness raising			'' ''	High Profile events; some using WEV, Baby Days, press releases, possible radio interviews and use of DCC and District web sites to promote and then report on the week.
	Milestones and new developments	As appropriate	SA	'' ''	Use of most effective media channels to generate maximum publicity of scheme achievements to hit the target audience.
7	**The Big Recycle**	5th/12th June	DCC/WCA and WDA	All public	High profile events. 3 options possible, radio competitions, waste audits, or promotional days. Also press releases, radio interviews, web use and link with the national campaign.
8	**Furniture reuse schemes**	Ongoing	DCC/WCAs and WDAs	All public	Highlight and promote their services also use WEV events to do this, source and promote their literature. Press releases, radio interviews and use our own literature to raise profile of reuse schemes. Possible joint awareness raising for the Big Recycle.
9	**Promotion Of Charities**	Ongoing	DCC/ WCA and WDA	All public	Highlight and key into their activities, take opportunities to promote their services. Source their own literature and use at events. Also promote via our own literature, press releases, and radio interviews. Possible joint awareness raising day as apart of Big Recycle. Identify seasonal options for raising profiles e.g. The Woodlands Trust Christmas Card Recycling.

10	**Mail Preference Service**	Ongoing	DCC/WCAS and WDA.	All public	Promote at events and via WEV also make reference to service in our own literature, press releases– radio interviews etc.
11	**Other Partnership Work**	Ongoing	DCC/WCAs and WDA	All public or specific audience as appropriate	Identify other key partners and if in both parties interests to promote their waste management services then do so using practicable methods and within available resources
12	**Behavioural Change Fund**.	Applications in April 2006.	DCC WCAs and WDA	Target specific audiences to boost public participation rates.	Attend seminars and workshops to explore potential relevance of the fund. Submit funding applications on individual or partnership basis where practicable and has potential for significant returns.

APPENDIX 10: WASTES OF SPECIAL IMPORTANCE

10.1 Introduction

Municipal wastes include a number of wastes for which there is specific legislation. There are current or proposed EC Directives or Regulations for a range of wastes and those of most immediate concern are considered in this section.

The Waste Strategy for England and Wales promotes measures for the separate collection of household hazardous wastes, to improve the management of resources and reduce the hazardousness of residual municipal waste. The strategy advocates the improvement of household hazardous waste collection facilities, particularly at civic amenity sites.

On 16th July 2005 the Hazardous Waste (England and Wales) Regulations and the List of Wastes (England) Regulations come into force replacing the Special Waste Regulations. The Special Waste Regulations 1996 transposed the requirements of the European Hazardous Waste Directive (91/689/EEC) which sets out requirements for the controlled management of hazardous (special) waste. The Regulations set out procedures to be followed when disposing of, carrying and receiving hazardous waste.

Hazardous wastes can cause the significant environmental damage or pose a danger to human health if not managed appropriately. Many everyday products such as fluorescent tubes, TVs, computer monitors and some paints and batteries are now classed as hazardous waste. The full list of hazardous wastes are listed in the List of Wastes (England) Regulations 2005 and marked with an asterisk.

Hazardous wastes from domestic sources are classified as Hazardous Household Wastes (HHWs). The Regulations require that councils offer separate collection systems for hazardous household waste. Most Councils provide facilities for the separate collection of HHW at Household Waste Recycling Centres. A few Councils in the UK also offer limited services for kerbside collection of hazardous items, such as batteries.

10.2 Waste Types

10.2.1 Automotive Vehicles

The End of Life Vehicles Directive [2000/53/EC] was transposed into UK legislation, in November 2003 as the End of Life Vehicle Regulations 2003.

The End of Life Vehicles Directive passed into European law in October 2000 and was due to be transposed into national law in all Member States by 21st April 2002. This was delayed (as in most other Member States), the UK is currently in the process of introducing the remaining provisions relating to producer responsibility Articles of the Directive (5 and 7) and these are due to be transposed through the End of Life Vehicles (Producer Responsibility) Regulations 2005.

Articles 5 and 7 require that:

- Owners must be able to have their complete ELVs accepted by the collection systems free of charge, even when they have a negative value, from 1st January 2007 at the latest;
- Producers (vehicle manufacturers or professional importers) must pay 'all or a significant part' of the costs of take back and treatment for complete ELVs;
- Rising targets for re-use, recycling and recovery must be achieved by economic operators by January 2006 and 2015.

At present, in the UK, around 2 million vehicles a year reach the end of their lives. Between 74 and 80% of the weight of a typical ELV is re-used or recycled.

10.2.2 Domestic refrigerators and freezers

From 1st January 2002, local authorities have had to ensure that all ozone depleting substances (ODS) are removed from domestic refrigerators and are collected for destruction. This is set out in the Ozone Depleting Substances Regulations [EC 2037/2000] and includes ODS used as blowing agents in the insulation foam as well as for refrigerant.

Article 11 of the Regulations controls the export of Ozone Depleting Substances or products containing them. The effect of this is to prevent the export of appliances containing chlorofluorocarbons (CFCs) and from 1st January 2004 to prevent the export of appliances containing hydrochlorofluorocarbons (HCFCs) to any State not party to the Montreal Protocol.

Article 16 of the Regulations requires that from 1st January 2002 domestic fridges and freezers must be treated to recover, prior to destruction, all Ozone Depleting Substances (including CFCs and HCFCs) contained in the refrigerant or foam.

Article 17 of the Regulations requires that all 'precautionary measures practicable' be taken to prevent and minimise leakages of Ozone Depleting Substances to the environment. If local authorities intend degassing appliances as the first stage in

their compliance with the Regulations, then they must ensure that all the ODS refrigerants are removed in a manner that prevents their leakage to the environment. Storage facilities for waste fridges and freezers should:

- be secure, with adequate measures taken to prevent unauthorised access to appliances containing ODS;
- have flat, solid surfaces for the stacking of the fridges;
- have proper drainage and facilities for cleaning fridges.

It is also recommended that:

- The appliances must be managed to reduce the risk to those handling them from harmful or infectious materials, i.e. they should have food and shelving removed and should be washed out prior to storage. Fridge doors should either be removed or taped up.
- store fridges upright and not more than 2 units high;
- store the panels of dismantled fridges (they must be degassed prior to dismantling) to prevent damage to the insulation foam from sharp objects, abrasion or crushing.

Any facility for management of fridges may need to be licensed under the Waste Management Licensing Regulations 1994. The Council will need to consult the Environment Agency to ensure that proper licensing procedures are followed.

10.2.3 Waste Electrical and Electronic Equipment (WEEE)

The Waste Electrical and Electronic Equipment (Producer Responsibility) Regulations ("the WEEE Regulations") implement provisions of the European Parliament and Council Directive on Waste Electrical and Electronic Equipment (2002/96/EC) ("the WEEE Directive").

The WEEE Directive aims to prevent WEEE arising, to encourage reuse, recycling and recovery of WEEE and to improve the environmental performance of all operators involved in the lifecycle of electrical and electronic equipment, especially those dealing with WEEE. The Directive sets requirements relating to criteria for the collection, treatment, recycling and recovery of WEEE. It makes producers responsible for financing most of these activities; retailers/distributors also have responsibilities in terms of the take-back of WEEE and the provision of certain information. Private householders are to be able to return complete WEEE without charge.

The DTI announced on 10 August 2005 that the main producer responsibility and retailer take-back obligations under the WEEE Directive will now come into force in the UK from June 2006. It is expected that producer registration will take place in January and February 2006.

In addition to this measure on electrical and electronic wastes (and the previously discussed ODS Regulations) there is another important EC Directive applying to certain electrical goods. This is the Directive on the disposal of polychlorinated biphenyls (PCBs) and polychlorinated terphenyls (PCTs) [96/59/EC].

A requirement of the Directive is that components containing less than 5 litres of PCBs be removed from electrical equipment and separately disposed of, where reasonably practicable. Components containing PCBs may be found in the following equipment: refrigerators, washing machines, cookers, microwave ovens, dishwashers and fluorescent light fittings.

Assessing whether or not electrical equipment may include capacitors containing PCBs is not easy. It is recommended that capacitors manufactured before 1986 be assumed to contain PCBs, unless there is information to the contrary.

10.2.4 Batteries

The Batteries and Accumulators Directive [91/157/EEC] was introduced to reduce the levels of specified heavy metals in batteries. The European Commission amended this with [98/101EC], which is implemented in Great Britain by The Batteries and Accumulators (Containing Dangerous Substances) (Amendment) Regulations 2000. These Regulations prohibit the marketing of batteries containing more than 0.0005% mercury by weight. Button cells are excluded from this requirement and may contain up to 2% mercury by weight.

The scope of the draft Directive covers all batteries irrespective of their shape, weight, composition or use. However batteries and accumulators used for military applications and for the protection of EU Member States are exempted. The proposal aims to contribute to a high level of environmental protection and to contribute to the proper functioning of the internal market.

The requirements of the draft Directive include:

- A collection target of 25% of average annual sales for spent portable batteries to be achieved by member states within four years of the Directive being

transposed into national legislation, rising to 45% eight years after the date of transposition;

- Free of charge collection schemes for spent portable batteries to be established within one year of the Directive being transposed by Member States with at least 90% recycling. Within three years of the Directive being transposed by Member States, 55% by average weight of the materials contained in portable batteries must be recycled (except for nickel cadmium batteries where 100% of the cadmium and 75% of the other materials must be recycled); and
- Prohibition by Member States of the disposal of industrial and automotive batteries in landfill or by incineration.

10.2.5 Tyres

From July 2003, inline with the requirements of the Landfill Directive, whole tyres were banned from disposal in landfill and from July 2006 shredded tyres will also be prohibited

The UK currently disposes of 50 million tyres a year. Around two thirds of these are already recovered but the remainder go to landfill. The ELV Directive will ensure that many more are recovered and recycled.

Waste tyres can be used as fuel for cement kilns or granulated and used as carpet underlay or sports and playground surfaces. Processes that break down the tyre in to its constituent parts (carbon black, gas, oil and steel) for reuse are currently being researched.

Advice to householders wishing to dispose of tyres should be that tyres are returned to the dealer providing their new tyres. There may be a nominal disposal charge added to the cost of the new tyre.

10.2.6 Asbestos

Whilst asbestos waste from the household is special waste, small quantities from households can be delivered by residents to a Household Waste Recycling Centre. Larger quantities must be disposed of using a suitably licensed disposal contractor.

10.2.7 Household Chemicals

A large number of household chemicals, mainly garden pesticides and herbicides have recently been withdrawn from sale and their use is now prohibited. Householders are required to dispose of any such chemicals in an appropriate manner and this will undoubtedly mean that these chemicals will be brought to HWRC sites for disposal.

10.3 Action Plan for Managing Wastes of Special Importance

To ensure that difficult wastes arising in Derbyshire are dealt with in a sustainable manner, the Councils will:

1. Ensure that all Hazardous Waste under their control will be dealt with in accordance with current legislation and best practice.
2. Ensure that HWRC sites are equipped with adequate facilities for receipt and storage of difficult wastes.
3. Offer guidance to householders on suitable ways of managing and disposing of difficult wastes.
4. Consider alternative options for management of waste electronic equipment, for example.

    - Community based recycling/repair projects.
    - Take-back schemes with commercial organisations.
    - Separate collections of WEEE from households.

7. Consider opportunities for separate collection of batteries for example battery bins in strategic buildings for use by staff and visitors
8. Ensure that all Council departments identify hazardous materials involved in service delivery and implement plans for appropriate management of these substances

APPENDIX 11: MARKET DEVELOPMENT

11.1 Market Development

11.1.1 Introduction

The following Section of this report examines issues linked to the development of markets for recyclate and compost (or biologically treated/stabilised organic wastes). All waste management options, incorporating increased recycling and composting performance, will generate additional quantities of recyclate and compost. Success in meeting the recycling and composting targets will depend on being able to secure, and maintain, sufficient reprocessing capacity for the recyclate generated and markets for the compost. The following sub-sections of this report examine the likely quantities of material that will be generated and provides a market analysis for each material type, together with options for developing markets and securing the necessary reprocessing capacity.

11.1.2 Total Recyclate Tonnages

Based on the current waste management strategy scaled up to meet relevant targets estimates of recyclable material tonnages in 2005/6 have been made. (See Table A11.1).

Table A11.1 Predicted Recyclate Tonnages for 2005/06

Recyclate	TPA
Paper	48,283
Glass	16,991
Steel	5,812
Plastic	3,653
Textiles	4,732

It should be noted that the estimates provided in Tables A11.1 are based on current municipal waste compositional data and do not take into consideration likely changes in packaging material preferences or effects of waste minimisation schemes and material take back schemes implemented.

11.1.3 Discussion

Glass

The glass tonnages are based on mixed coloured glass. Colour separation of glass is preferred as different glass colours cannot be mixed in the glass manufacturing process. Clear glass is particularly sensitive such that the green and amber content in clear cullet must be less than 2%. Additional glass tonnages could be collected by targeting commercial glass generators such as pubs, clubs and restaurants.

Whilst the above estimates are concerned with container glass only, recycling of plate glass (for example window glass) and spent fluorescent tubes, offers further opportunities to increase glass collection tonnages although at considerable additional expense due to the complexity of the processing equipment.

Plastics

At present there are limited market opportunities for mixed plastics not just in Derbyshire, but across the UK as a whole. However, many Local Authorities do not sort plastic bottles into individual polymer types choosing instead to bale mixed plastic bottles and take advantage of a buoyant export market for this material. The UK plastic bottle recycling sector is set up to reprocess pre-segregated bottles (HDPE & PET) only and cannot process mixed bottles economically - unless they have little or no contamination and are baled to a low density. Polyethylene terapthalate (PET) and high density polyethylene (HDPE) represent approximately 25% by weight of total plastic waste in the municipal waste stream. The remaining 75% of the plastic waste stream is made up of PVC, low-density polyethylene, polypropylene, polystyrene and resin composites and is not generally suitable for recycling due to the range of polymer types and higher levels of contamination. However, this material could have value as a feedstock to mixed plastic processing facilities.

A range of alternative, and innovative, uses for mixed plastic waste are currently being researched in the UK which may in the future offer further market opportunities for mixed plastic waste. However, at present the councils are generally only able to collect rigid plastic bottles.

Timber

No detailed estimate has been made of the potential quantity of timber that could be generated for each of the options, however it is clear that timber is present in the municipal waste stream and that it could be recovered for recycling. A number of

wood recyclers already operate in the UK reprocessing wood into a range of products including compost, recreational coverings, chipboard and furniture. Only certain wood types are acceptable as feedstocks to these reprocessors and most exclude treated and/or painted wood.

Timber will enter the municipal waste stream as unwanted furniture either through HWRC sites or from dedicated bulky household waste collections. In many areas of the UK furniture recycling projects have been set up to recover good quality furniture for renovation and repair prior to resale to the domestic market (often low-income householders). These schemes also offer opportunity for refurbishment and reuse of large electrical appliances.

Details about markets for metals and paper are covered at 10.3.

11.2 Initiatives for Market Development

11.2.1 Recycling Consortia or Partnerships

Recyclate markets are notoriously unpredictable and can suffer wide fluctuations in price often to the financial detriment of effective Local Authority recycling schemes. One effective solution to this problem is to create a 'Recycling Consortium' or 'Recycling Marketing Partnership' whereby a group of Local Authorities act together to negotiate recycling Contracts with material reprocessors. The potential benefits of a consortium or partnership approach are:

- Ability to command a long term guaranteed outlet for materials.
- Ability to command higher prices and/or fixed prices over a longer time period.
- Ability to withstand market fluctuations.
- Potential for the reprocessor to invest in collection/ reprocessing infrastructure locally (i.e. within the geographic area covered by the Local Authorities).
- Ability to enter into profit sharing arrangements.
- Sharing of risks.

Examples of Recycling Consortia operate in Buckinghamshire for glass and Hampshire (Project Integra) for a range of materials. Recently the 'Midlands Recycling Consortium' has been established to allow local authorities and other public sector organisations based in the Midlands to collectively tender contracts for the sale of collected recyclable material and for the collection of such material from bring banks.

Recycling Consortia could be introduced into the East Midlands potentially for glass, paper and compostables, however success will depend on buy-in from all or most of the Local Authorities. The principal elements of a successful partnership will include:

- Development of a 'Memorandum of Understanding' identifying the remit of the Consortium and its extent of powers.
- Lead Authority (agreed by all partners) to act as negotiator and Contract Administrator.
- Issuing 'Expressions of Interest' to reprocessors.
- Negotiating with potential reprocessors (contract term, price, infrastructure provision, etc).
- Development of final contract specification and documents.
- Each Authority to agree to minimum guaranteed tonnages and minimum quality standards.
- Potential profit sharing element with reprocessors.

Considerable time and effort will need to be invested by the Lead Authority, particularly in the early stages of Contract negotiation, although this could be undertaken by a third party acting on behalf of the Consortium.

11.2.2 Purchasing Consortia

Many public body purchasing consortia now operate throughout the UK, offering the opportunity for Members to develop and coordinate their green procurement strategies towards increasing sustainable procurement, and enhancing the purchase and use of recycled content products.

By promoting "buy recycled", purchasing consortia can help to:

- Stimulate markets for recycled products, including local recycled goods.
- Offer competitive price advantages.
- Close the recycling loop, whereby recycled products are bought from reprocessors dealing with the collected recyclate.

Opportunities for partnership working, facilitated by a purchasing consortium include:

- Waste derived compost for grounds and highway landscaping.
- Wood/Bark chippings for recreational areas.
- Road & building aggregate containing glass recyclate.
- Recycled paper products.
- Recycled IT supplies.
- Fibre glass insulation, for example as special offers to householders as part of HECA and energy efficiency programmes.

As with recycling consortia, a 'Memorandum of Understanding' should be established between all partners.

11.2.3 Establishment of Local Reprocessing Capacity

The 'proximity principle' applied to waste indicates that waste should be dealt with as close to its point of origin in order to maximise the environmental benefits associated with recycling. This goal can be achieved by developing local recycling and reprocessing infrastructure. One of the key constraints to development of local reprocessing capacity is the availability and quantities of recyclate and the size/maturity of the local market for reprocessed materials or goods. Possible local markets, which would also benefit from a partnership approach, include:

- Shredded cardboard/paper for animal bedding.
- Wood/ Bark Chippings for landscaping and horticultural uses.
- Waste glass as road aggregate or other construction use.

- Waste glass for decorative uses.
- Mixed plastic products, e.g. outdoor furniture, fencing posts, drainage products, etc.

11.2.4 Composting

Within the Authority and the Region, compost will be generated from two main sources:

- Green Waste Composting at Household Waste Recycling Sites, or other open windrow type facilities.
- In-vessel derived compost.

There is likely to be little economic or environmental benefit gained from processing of green waste through a centralised Regional facility, consequently green waste separated at HWRCs or through kerbside collection is most effectively managed by individual Authorities at localised facilities.

However, markets for higher value green compost could be encouraged through provision of a shared access compost 'finishing' plant to remove contaminants, blend materials with municipal solid waste derived compost and manufacture and package 'value added' compost products.

Other putrescible waste, together with some paper and cardboard, will need to be treated via in-vessel composting plants. Here, economies of scale may be gained from operating one large Regional (or possibly 2 or 3, sub-Regional) facilities rather than small individual facilities sited within each Authority.

It is therefore strongly recommended that the Authorities within the East Midlands investigate a partnership approach.

11.3 Waste Resources Action Programme (WRAP)

The Waste and Resources Action Programme (WRAP) has been established by Government with the aim of promoting sustainable waste management, creating a stable and efficient market for recycled materials and products, and removing barriers to waste minimisation, re-use and recycling. Four principal material streams have been identified for specific focus by WRAP, as detailed below:

- *Paper and Glass* – which offer the best potential for tonnage gains; and
- *Plastics and Wood* – which provide an opportunity to develop markets where current recycling levels are low but have potential for significant increases.

Generic programmes within WRAP are also addressing the recycling and waste minimisation of other materials including organic composting, tyres and waste oils. A

recycling rate across all streams of 15% is proposed over the three year programme. Specific initiatives for each of the principal material streams are summarised below.

Specific paper related initiatives include:

- recycling targets for a wide range of products and recovered grades with the aim of stimulating a significant increase in newsprint reprocessing capacity (180,000 tonne annual increase);
- analyse fibre requirements across the whole UK paper industry to identify areas where more recovered paper could be used;
- investigate price stabilisation mechanisms used in other countries and establish whether they could be introduced in the UK; and
- aim to benchmark the use of recovered material in the graphics, printing and writing sectors, with a proposed 100% increase in market shares. To support this demand, WRAP will aim to stimulate a significant increase in recycled fibre (RCF) plant capacity.

For glass, specific WRAP initiatives include a review of key standards, specifications and testing procedures in the most promising areas for using recovered glass, backed by a research and business programme. Particular attention will be focused on education to support the diversion of glass from municipal and commercial waste streams, principally with the use of bottle banks. WRAP is encouraging an increase in the availability of bottle banks to reach a ratio of 1 per 400 households. Anticipated targets for 2003/2004 include an increase in recycling of municipal glass by 35% (770,000 tonnes) a year; absorption of 100,000 tonnes a year into new technologies (shot blasting, aquaculture & glass fibre insulation); diversion of 200,000 tonnes a year of green/mixed colour glass into the construction industry for aggregate; and an increase flat glass collection for recycling by 20%.

For plastics, WRAP aim to deliver a research and development programme to develop plastics recycling technology and support composite product development; raising awareness and understanding of the range and quality of recycled plastic products already available; encouraging product design to support efficient recycling; and introducing standards for plastic recyclates, including uses for plastic film. Anticipated targets for 2003/2004 include an increase in mixed plastic reprocessing for industrial products by 20,000 tonnes, to significantly increase plastic bottle recycling and to identify one new technology to produce composite products using resins with wood or rubber.

For wood, although forestry management plays a major part in the renewal of timber, recovery and recycling, WRAP aim to stimulate demand for recycled wood products, including composites with plastics through marketing and education. A national re-

grading scheme for the use of reclaimed timber is also proposed with encouragement to increase investment in the panel board industry to utilise greater amounts of recycled wood. Anticipated targets for the end of 2004 aim to double wood packaging recovery and increase recycling/reuse of construction/demolition wood by 40% (100,000 tonnes).

11.3.1 Paper

Much of the paper recovered by Local Authorities goes to one of three mills in the UK (Aylesford, Bridgwater and Shotton), which produce paper for newsprint. There is, therefore, little capacity remaining to take additional recyclate at existing mills. The need for additional capacity has been recognised, and WRAP has recently provided financial support for the development of new paper processing capacity. There are alternatives to using paper for newsprint production, including mouldings, insulating boards, acoustic boards and animal bedding. Whilst these uses can often utilise lower quality recovered paper, they also demand lower market rates for the material.

Currently some recovered paper is being exported to the Far East. Export markets may provide a further option, and may make financial sense, but this must be balanced against environmental considerations.

11.3.2 Glass

The principal issue for glass recycling markets is the imbalance between the different colours of glass. A large proportion of glass collected for recycling is green, but there is relatively little green glass actually produced in the UK. This has led to the exploration of new markets abroad or options for using recycled material for developing products other than glass.

As for paper, glass has a number of alternative uses other than reprocessing for glass. However, many of these alternatives offer lower prices for recovered material. WRAP are currently investigating other “high volume” and “higher value” uses for glass recyclate, such as a road aggregate component and water filtration medium, amongst others.

11.3.3 Plastics

Markets for conventional recycling of plastic are fairly limited, with most of the capacity taken up by plastics wastes from industry. However, niche markets are being developed such as in the production of garden furniture.

The recycling of plastics has been a major challenge for all developed countries, largely due to problems in developing reprocessing technology and variation in material quality. This is a key area for further research and development, and is likely to be a major focus for the work of WRAP over the next year or two.

11.3.4 Metals

There is currently plenty of capacity in the UK for recycling steel and aluminium. There are however, only a few major reprocessors, and this dictates travel distances. The prices paid for metals, particularly aluminium, remain consistently high and high energy savings from avoided extraction and processing of metal ores makes metals recycling environmentally and economically attractive.

11.3.5 Compost

The market for compost is potentially huge. The main constraint on compost production is the quality of the product and the price. The quality of product can vary depending on whether the material is being used as a soil conditioner, landfill cover or a commercial product for sale in garden centres. To date much of the material produced has been for the lower end of the market. Further work is required to develop suitable standards for higher quality end use, and much work is being undertaken by the Compost Association in this regard.

The production of compost will play an essential role in assisting Local Authorities to meet recycling targets throughout the UK. However, the development of compost production facilities must be matched with the development of markets for the materials generated. Failure to do this will inevitably result in material being sent to landfill.

The Animal By-Products (Amendment Order) 2001, and The Animal By-Products Regulations 2003/1482 places restrictions on the composting of kitchen waste. Food waste containing meat must be treated and disposed of using only prescribed processes, at specially licensed sites.

11.3.6 Prices

The volatility and generally depressed prices paid for materials recovered for recycling have been major barriers to the expansion of Local Authority recycling schemes. However, these issues of price are ultimately driven by demand. The key to reasonable and stable prices is to secure stable demand and supply. WRAP are currently encouraging Local Authorities to enter into material contracts with processors in an attempt to secure fixed prices and avoid the vagaries of the recyclate market, which can have marked impacts on recycling budgets.

APPENDIX 12: SYNOPSIS OF RELEVANT WASTE LEGISLATION

12.1 Summary of Environmental Protection Act 1990 (Part IV)

Section 87	**Offence of Leaving Litter** Criminal offence of dropping, throwing, leaving or depositing litter in a public place and causing defacement (litter is "any thing" and may include commercial waste). Summary offence only. Maximum fine £2,500. Prosecutions by police or local authority. Average fine £115 (97/98)
Section 88	**Fixed Penalty Fine for Littering** Same offence as in section 87. £75 fixed penalty fine. Ticket given 'on the spot', with 14 days to pay. Issued by "authorised officer" of litter authority. Not intended for 'dumping' of trade waste.
Section 89	**Duty to Keep Land and Highways Clear of Litter, etc**. Sets out the legal duty to clear litter and refuse (including dog faeces) from relevant land and highways, placed upon local authorities, educational institutions, designated statutory undertakers and other duty bodies. The Code of Practice on Litter and Refuse introduced herein. This section does not contain any legal remedy. If the duty body fails, section 91 and 92 can be used. The Code can be obtained from the Government's website (www.detr.gov.uk) or from HMSO (ISBN 011 753479 X) £17.99
Section 90	**Litter Control Areas** Principal Litter Authorities can designate as Litter Control Areas certain types of littered land to which the public has access. Includes car parks, cinemas, motorway service stations and camping sites. (Full description under SI 1991 No 633 and SI 1997 No 1325). There has to be detriment to the amenity of the area. Persons affected have 21 days to appeal. No legal remedy with this section, but sections 91 and 92 can subsequently be used.
Section 91	**Summary Proceedings by Persons Aggrieved by Litter** Enables members of the public to apply to Magistrate's Court for a Litter Abatement Order to get an area that is

	under the control of a duty body cleared of litter and refuse. Non-compliance can lead to a fine up to £2,500.
Section 92	**Summary Proceedings by Litter Authorities** Principal Litter Authorities can serve a Litter Abatement Notice against owners or occupiers of certain types of relevant land (including land designated as Litter Control Area) that is defaced by litter, or if defacement is likely to recur.
Sections 93 and 94	**Street Litter Control Notices** Principal Litter Authorities can require owners or occupiers of certain types of commercial premises to prevent or remove accumulations of litter or refuse in streets and adjacent open land, where litter is related to their activities.
Section 99	**Powers in Relation to Abandoned Shopping Trolleys** Principal Litter Authorities can retrieve trolleys and charge for their return, or dispose of them.

12.2 Summary of Environmental Protection Act 1990 (Part II)

Section 33	**Prohibition on unauthorised or harmful deposit, treatment or disposal, etc. of waste** Foundation of waste licensing system; prohibits the deposit, treatment, keeping or disposal of controlled waste in or on land or whilst in transit, except under and in accordance with a waste management licence.
Section 34	**Duty of Care, etc. as respects waste** Places responsibility on any person producing or having control of waste; cannot rid themselves of that responsibility by transferring the waste to someone else.
Section 45	**Collection of controlled waste** Waste collection authorities must collect household waste, and do so free of charge. They can collect commercial waste if requested and make a charge. Any waste collected belongs to the authority. Also states types of household waste for which a charge may be made e.g. garden waste and clinical waste.
Section 46	**Receptacles for household waste** The waste collection authority can say how and where household refuse should be placed for collection. Non-compliance is an offence. Authorities may also make a charge for collections.
Section 47	**Receptacles for commercial or industrial waste** The waste collection authority can supply waste bins; it can require the premises owner to provide bins if their waste is likely to cause a nuisance. Non-compliance is an offence.
Section 48	**Duties of waste collection authorities regarding disposal** The waste collection authority will deliver all waste in accordance with the directions of the waste disposal authority. Waste can be retained for recycling.
Section 55	**Powers for recycling waste** Waste disposal and waste collection authorities can recycle waste, or sell it.
Section 59	**Powers to require removal of waste unlawfully deposited** Waste collection and waste regulation authorities can deal with fly-tipped controlled waste by serving a notice on the occupier of the land to remove the waste. In the event of

	non-compliance the authority can recover the costs of doing so from the recipient of the notice.
Section 60	**Interference with waste sites and receptacles for waste** Without consent no one may sort through or disturb waste in bins or waste deposited by the waste collection authority.

These summaries are advisory and intended only as a synopsis of the law on litter and waste. It must not be relied upon to cover all the legal issues involved. The full texts must be consulted and legal advice sought before instigating action based on the above.

Further Information on the *Environmental Protection Act 1990:*

http://www.opsi.gov.uk/acts/acts1990/Ukpga_19900043_en_1.htm

12.3 Environment Act 1995

Apart from the requirement to produce a National Waste Strategy, this Act was largely concerned with changes to the legal and institutional arrangements for waste management. Some important points include:

- the establishment and empowering of the Environment Agency to take on the role of Competent Authority under **EU** Directive 91/156/EEC on waste. The Environment Agency is a central authority replacing the National Rivers Authority, Her Majesty's Inspectorate of Pollution, Waste Regulation Authorities and sections of the Department of the Environment
- the introduction of the principal of **BPEO** for each waste stream
- the prioritisation of selected waste streams such as tyres and construction wastes
- the introduction of the Producer Responsibility Obligations Section 93 (Packaging Waste) Regulations
- the repealing of **waste disposal plans** set up by local waste authorities under the 1990 Environmental Protection Act.

Further Information on the *Environment Act 1995*:

http://www.opsi.gov.uk/acts/acts1995/Ukpga_19950025_en_1.htm

12.4 Clean Neighbourhoods and Environment Act 2005

This Act extends existing legislation in some cases and introduces new offences in others in order to improve the quality of the local environment. The act provides local authorities and the Environment Agency additional powers to deal with fly-tipped waste; litter; nuisance alleys; fly posting and graffiti; abandoned and nuisance vehicles; dogs; noise; nuisance from artificial lighting and insect; and other issues affecting the local environment. The key areas of importance for waste management include:

Fly-tipped waste:

- removing the defence of acting under employer's instructions;
- increasing the penalties; and
- enabling the recover of costs by the local authority or Environment Agency.

Power to issue fixed penalty notices:

- to businesses that fail to produce a waste transfer notice;
- to waste carriers that fail to produce registration details or evidence that they do not require registration; and
- for waste left out on the street.

Litter:

- making it an offence to drop litter anywhere, including private land, rivers, ponds and lakes;
- strengthening of powers to require local businesses to clear up litter they generate;
- enabling local authorities to restrict distribution of flyers, hand outs and pamphlets that may end up as waste; and
- confirming that cigarette butts and discarded chewing gum are litter.

Further information on the *Clean Neighbourhoods and Environment Act 2005*:

http://www.opsi.gov.uk/ACTS/acts2005/20050016.htm

12.5 Controlled Waste Regulations 1992 (SI 1992 No 588)

These regulations provide legal definitions of the controlled wastes (household, commercial and industrial wastes). The regulations also state that certain types of litter and refuse are to be treated as controlled waste. Exemptions from the requirement for licensing under the Environmental Protection Act 1990 are specified.

Further Information on the *Controlled waste Regulations 1992:*

http://www.opsi.gov.uk/si/si1992/Uksi_19920588_en_1.htm

12.6 Landfill Directive (99/31/EC)

The Landfill Directive was brought into force in the UK on the 15th June 2002 as the Landfill (England and Wales) Regulations 2002 and since then has been introduced bit by bit to give UK industry time to adapt. The Landfill Directive is seen as providing the principal legal framework influencing MSW management and strategy development in the UK. The Directive seeks to prevent or reduce negative environmental effects from the landfilling of waste by introducing uniform standards throughout the European Union. The main regulatory provisions of the Directive stipulate:

- Classes of landfill;
- Requirements for obtaining a permit for operating a landfill;
- Waste acceptance procedures;
- Control and monitoring procedures for operating a landfill; and
- Closure procedures.

The first requirement of the Regulations was for all landfill operators to submit a conditioning plan by 26th July 2002, which reclassified the site as inert, hazardous or non-hazardous. This is one of the key provisions of the Directive as previously UK landfills had either been inert or practiced co-disposal of hazardous and non-hazardous material. Co-disposal was banned in 2004.

The most significant part of the Directive is Article 5 which proposes a strict timetable for reductions in landfilling biodegradable municipal waste. These are onerous requirements and have been the principal influence on the formulation of *'Waste Strategy 2000'*. The EC Landfill Directive sets mandatory targets which, for the UK, require the following (the targets include the 4 year extensions granted to the UK.):

- *By 2010 to reduce BMW landfilled to 75% (by weight) of that produced in 1995*
- *By 2013 to reduce BMW landfilled to 50% (by weight) of that produced in 1995*
- *By 2020 to reduce BMW landfilled to 35% (by weight) of that produced in 1995.*

Further Information on the *Landfill Directive (99/31/EC):*

http://europa.eu.int/eur-lex/lex/LexUriServ/LexUriServ.do?uri=CELEX:31999L0031:EN:HTML

12.7 Waste and Emissions Trading Act (WET) 2003

On the 10th November 2003, Parliament gave its final seal of approval to the Waste and Emissions Trading Bill. This will implement Articles 5(1) and 5(2) of the EC Landfill Directive in the UK. This new legislation will lead to waste disposal authorities trading allowances for the amount of biodegradable waste they can send to landfill each year. The Act is the first stage of introducing the landfill allowances trading scheme (LATS), which will be the Government's key measure in meeting landfill reduction targets as required by the Landfill Directive.

By allowing Local Authorities to trade landfill space, it is hoped that some flexibility will be provided while the total UK landfill rate is guaranteed to meet European targets of 75% of 1995 waste levels by 2010, 50% by 2013 and 35% by 2020. Opposition parties had warned that the WET bill could lead to an increase in the amount of waste going to incinerators in the UK as Local Authorities urgently seek to divert material away from landfill.

LATS has two functions in the UK:

- Landfill allowances will be allocated to each waste disposal authority (WDA), at a level that will enable England to meet its targets, as a contribution to the UK targets under the landfill directive; and
- Trading mechanism will allow these targets to be met in the most cost effective manner through the trading, banking and borrowing of allowances.

The LATS scheme formally commenced on 1st April 2005 and Waste Disposal Authorities have now been allocated landfill allowances for each year up to 2020. The WDA can bank unused allowances for use in later years or use a proportion of their future allowance in advance (borrowing). The Allowances convey the right for a WDA to landfill a certain amount of BMW in a specified scheme year.

Authorities will be fined £150 for every tonne they landfill beyond the limit set by the allowances they hold.

Further Information on the *Waste and Emissions Trading Act 2003:*

http://www.opsi.gov.uk/acts/acts2003/20030033.htm

12.8 The Waste Minimisation Act 1998

The Waste Minimisation Act, introduced in the UK in November 1998, encourages local authorities to promote incentives for reduction strategies for household waste, allowing local authorities to:

"do or arrange for the doing of, anything which in its opinion is necessary or expedient for the purpose of minimising the quantities of controlled waste, or controlled waste of any description, generated in its area".

The intention behind the Act, which was promoted by the Women's Environmental Network, was to clear up any legislative uncertainty about whether councils could actually carry out initiatives to reduce the amount of waste (as opposed to recycle it).

The Act does not place any obligation on authorities to carry out such initiatives, nor does it allow councils to impose any requirements on businesses or householders in their area. Existing legislation does however allow authorities to determine both the form of collection and the receptacle from which rubbish is collected.

Authorities may wish to consider what simple measures they could take. These can be straightforward such as:

- Raising awareness about how to stop direct mail (for example through the Mailing Preference Service). The Government is also working on a direct mail and promotions initiative which will also look at reduction;
- Promoting the use of refill schemes and encouraging the use of organic box schemes, farm shops, farmers markets, ordinary markets and smaller markets which all help to reduce packaging;
- Publicising local community schemes that recycle/reuse furniture and household goods, bicycles, computers and tools;
- Working with those who have consumer information obligations under the Packaging Regulations (e.g. large retailers and schemes on behalf of retailers) to develop information on reduction, reuse and recycling for consumers

Further Information on *The Waste Minimisation Act 1998*:

http://www.opsi.gov.uk/acts/acts1998/19980044.htm

12.9 Household Waste Recycling Act, 2003

The Household Waste Recycling Act 2003 was the result of a private members bill introduced to parliament by Joan Ruddock, the MP for Lewisham and Deptford, in December 2002. Backed by pressure group Friends of the Earth, and originally know as the "doorstep recycling bill" and later the "municipal waste recycling bill".

The Household Waste Recycling Act 2003 makes it the legal responsibility of English waste collection authorities to collect at least two types of recyclable waste separate from general refuse from December 31, 2010. There are get-out clauses for authorities where the cost of complying with the law would be unreasonably high or comparable alternative arrangements are available. The aim of the Act is to increase the recycling rate of household waste, which in 2002/03 was 14.5% and by 2015 the Government wants to be 33%.

In July 2004, the Government issued clarifying guidance on how waste collection authorities should implement the Act. This draft guidance stated that "the decision on what should be counted as one material within the Act is based upon how the material is processed during recycling and the final use of the product". Thus cardboard and paper represent two types of recyclable waste, while green, amber and clear glass only count as one type of recyclable waste.

The guidance added that "the municipal collection of home-produced compost can not count as a material under the Act". But garden waste collected free of charge will count as a material. Also, "the use of materials recycling facilities to separate unsorted household waste is not an acceptable alternative to the separate collection of recyclables".

Finally, it said that the exceptions that would allow councils to get out of collecting two materials were "narrowly drawn". The guidance added: "Waste collection authorities should bear in mind that any decision to rely on the exceptions could be challenged in the courts."

Further Information on the *Household waste recycling Act 2003:*

http://www.opsi.gov.uk/acts/acts2003/20030029.htm

12.10 Animal By-Products Regulations (ABPR) 2003

The new EU Animal By-Products Regulation (enforced in the UK since 1 July 2003) affects all those who deal with animal by-products, including the waste disposal industry, the animal feed industry, slaughterhouse operators, farmers, food

manufacturing premises, catering outlets, zoos and hunt kennels. The main aim of the Animal By-Products Regulation is to reduce the risk of the transmission of disease to humans and animals. This aim is achieved by new rules for the collection, transport, storage, handling, processing and use or disposal of animal by products. It is also achieved by the placing on the market, export and transit of animal by-products.

The ABPR divides animal by-products into three categories and stipulates the means of disposal for each category.

Category 1 is the highest risk category and includes materials infected or suspected of being infected by BSE. Permitted disposal methods include incineration or rendering in an appropriate plant

Category 2 is also high risk material, and includes diseased animals and animals which are not slaughtered for human consumption. Permitted disposal methods include incineration or rendering in an appropriate plant.

Category 3 is essentially material which is fit for human consumption and includes parts of slaughtered animals, blood, raw milk, fish caught in the open sea, and shells. Permitted disposal methods include incineration, treatment in an approved biogas or composting plant and (in case of material of fish origin) ensiling or composting in accordance with specified procedures.

The animal by-products which will generally be subject to the controls of the ABPR include:

- Animal carcasses, parts of animal carcasses (including blood, shells, feathers, hides, skins, hooves, horns, wool, hair and fur) and products of animal origin which are not intended for human consumption;
- Manure and gut contents;
- Former foodstuffs of animal origin which are no longer intended for human consumption; and
- Catering waste which comes from international transport is destined for animal consumption or which is intended for use in a biogas plant or for composting.

The ABPR does not generally apply to:

- Raw pet food;
- Liquid milk and colostrums disposed of or used on the farm of origin;
- Entire bodies or parts of wild animals not suspected of bring infected with communicable diseases;
- Ova, embryos and semen intended for breeding purposes; and transit by sea or air.

Further Information on *Animal by-products Regulations 2003:*

http://www.netregs.gov.uk/netregs/275207/587394/?version=1&lang=_e

12.11 IPPC Directive (96/61/EC)

The Integrated Pollution Prevention and Control (IPPC) Directive established in August 2000, requires a range of prescribed processes (including many waste management processes) to obtain an authorisation (permit) from the licensing authorities within the Member States. Without the permit, they are not allowed to operate. These permits are based on the concept of Best Available Techniques (BAT – as defined by the Directive) for the prevention, or where not possible, reduction of pollution.

The permits must consider the environmental performance of the installation, assessing emissions to air, water and land, generation of waste, use of raw materials, energy efficiency, noise, prevention of accidents, risk management etc. As from October 1999, the Directive applies to all new installations, as well as existing installations that intend to carry out changes which may have a significant effect on human health or the environment. Other installations have been granted a further 8 year period of grace.

Waste management processes will also need to satisfy the principles of 'Best Practicable Environmental Option' (BPEO) which, in addition to controlling emissions, specifically requires cross-media pollution considerations (for example, ensuring process residues, when finally discharged, do not result in the transfer of harmful pollutants).

Further Information on the *IPPC Directive (96/61/EC):*

http://europa.eu.int/eur-lex/lex/LexUriServ/LexUriServ.do?uri=CELEX:31996L0061:EN:HTML

12.12 Packaging Waste Directive (94/62/EC)

The Packaging Waste Directive is implemented in England and Wales by i) the Producer Responsibility Obligations (Packaging Waste) Regulations 1997 (as amended) and ii) the Packaging (Essential Requirements) Regulations 1998. Any business handling more than 50 tonnes of packaging and with a financial turnover of more than £2 million is obligated under the Packaging Regulations if, it is involved in manufacturing raw materials for packaging; converting materials into packaging; filling packaging; selling packaging to the final user; or, importing packaging or packaging materials into the UK.

The Packaging (Essential Requirements) Regulations 1998 require that packaging (which eventually may become waste) must:

- Be kept to a minimum subject to health and safety;
- Contain minimal noxious or hazardous substances;
- Be recoverable through either material recycling, incineration with energy recovery, and/or composting; and
- Be designed to specified product design standards.

The Producer Responsibility Obligations require qualifying organisations to:

- Register with the EA or SEPA, providing them with packaging information[21];
- Take reasonable steps to recover and recycle packaging waste; and
- Provide evidence, usually in the form of Packaging Recovery Notes (PRNs) that the necessary recovery and recycling has been carried out.

The packaging recovery targets are given in terms of tonnes as well as a percentage. Therefore, the targets can be met by reducing the overall amount of packaging produced in the first place. Packaging recovery targets are revised every 5 years, with the latest version coming into force on the 1st January 2004. The targets for 2004-2008 are shown in Table 13.1.

Table 13.1 UK Packaging Business Recovery and Recycling Targets 2004-2008

Material	2004		2005		2006		2007		2008	
	%	mtpa	%	mtpa	%	mtpa	%	mtpa	%	mtpa
Paper	65	3.215	66	3.218	68	3.219	69	3.219	70	3.219
Glass	49	2.040	55	2.040	61	2.040	66	2.040	71	2.040
Aluminium	26	0.128	28	0.128	30.5	0.128	33	0.128	35.5	0.128
Steel	52.5	0.601	55	0.601	58	0.596	60	0.592	61.5	0.587

[21] Registration for an individual producer is currently £768 if registering with the EA, or £558 if joining a scheme

Plastic	21.5	1.660	22	1.850	22.5	1.900	23	1.960	23.5	2.020
Wood	18	0.982	19	1.030	20	1.030	20.5	1.030	21	1.030
Overall recovery	63	8.650	65	8.890	67	8.940	69	8.990	70	9.050
Minimum (%)recovery by materials recycling (excluding energy recovery)	94	-	94	-	94	-	95	-	95	-

(nb - mtpa, million tonnes per annum)

Producers may join a compliance scheme that can arrange for the reprocessing of packaging waste. The reprocessor will supply the customer with a Packaging Recovery Note (PRN) or Packaging Export recovery Note (PERN) as proof of compliance with the regulatory target. There are approximately 14 compliance schemes in the UK, which play an important part in achieving the overall EU packaging targets. To issue PRNs the compliance scheme must be approved by the Secretary of State and meet competition standards and must be accredited with the EA.

An estimated £400 million is needed to fund the necessary infrastructure to meet the 94/2 Directive 2008 packaging waste recycling targets. According to some the deadline is feasible, but the only way the target will be met is through 'doorstep collections for every household in the country, if not for every local authority[22]', although it is hoped that companies will reduce the amount of packaging produced in the first place.

Further Information on the Packaging Waste Directive 1994 as amended 2004:

http://europa.eu.int/eur-lex/pri/en/oj/dat/2004/l_047/l_04720040218en00260031.pdf

Producer Responsibility Obligations (2005):

http://www.opsi.gov.uk/si/si2005/20050717.htm

Packaging Essential Requirements Regulations (2004):

http://www.opsi.gov.uk/si/si2004/20041188.htm

[22] quote from Labour MEP David Bowe

12.13 Waste Electrical and Electronic Equipment (WEEE) Directive (2002/96/EC)

WEEE (Waste Electrical and Electronic Equipment) legislation requires that producers take responsibility for treating and recycling their electrical products when they become waste. There are various criteria that have to be met, the removal of banned substances is one aspect. The implementation of the WEEE directive has been delayed until June 2006, though the need to mark electrical products that fall under the legislation with the recycling symbol, (A crossed-out wheely bin) will apply from the date that the directive is adopted into UK law.

The DTI announced on 10 August 2005 that the main producer responsibility and retailer take-back obligations under the WEEE Directive will now come into force in the UK from June 2006. It is expected that producer registration will take place in January and February 2006. Prior to this announcement, these requirements were all intended to come into force in January 2006.

According to the DTI, the postponement of six months has been made in the light of preparations needed for the European-set legislation. The DTI claimed that the WEEE Directive "breaks new ground for many of those involved."

One of the main reasons for the delay is to allow the retailers, led by the British Retail Consortium, to establish an adequate network of facilities for separate collection of WEEE for householders to use.

This Directive will affect those organisations involved in manufacturing, selling, distributing, recycling or treating electrical and electronic equipment (including household appliances, IT and telecommunications equipment, audiovisual equipment, lighting equipment, electrical and electronic tools, toys, leisure and sports equipment, medical devices and automatic dispensers.

The Directive aims to reduce the waste arising from electrical and electronic equipment as well as improve the environmental performance of all those involved in the life cycle of electrical and electronic equipment. The Directive covers WEEE used by consumers and for professional purposes.

The responsibility for meeting the requirements of the WEEE Directive falls directly on the producer. Specific initiatives include:

- Prevention of waste, through minimising the use of dangerous substances, improved design, manufacture and coding;
- Collection and treatment by establishing collection systems, including free take back systems, and selective treatment of equipment;
- Recovery and re-use systems to be established, including specific targets for different categories of WEEE, ranging from 70-80%; and
- Strengthen producer responsibility requirements.

By June 2006:

- Private householders will be able to return their WEEE to collection facilities free of charge;
- Producers (manufacturers, sellers, distributors) will be responsible for financing the collection, treatment, recovery and disposal of WEEE from private households deposited at these collection facilities; and
- Producers will be responsible for financing the collection, treatment, recovery and disposal of WEEE from products placed on the market after 13th August 2005. However, it may be possible for all or part of these costs to be recovered from users other than private householders.

By December 2006, producers will be required to achieve a series of demanding recycling and recovery targets for different categories of appliance and the UK must have reached an average WEEE collection rate of four kilograms for each private householder annually.

It is estimated that approximately 900,000 tonnes of WEEE is produced annually within the UK, with large household appliances (fridges, washing machines and cookers) producing 43% of the waste and computer hardware producing 39%.

Further Information on the *WEEE Directive (2002/62/EC):*

http://europa.eu.int/eur-lex/pri/en/oj/dat/2003/l_037/l_03720030213en00240038.pdf

12.14 Batteries Directive (Proposal)

The proposed directive will, unlike existing community legislation on batteries, apply to all types of batteries regardless of their chemical composition. The previous Directives only applied to a an estimated 7% of all portable batteries placed on the EU market annually with a certain Mercury, Lead and Cadmium content, and the legislation failed to provide a framework for battery collection and recycling. The scope of the draft Directive covers all batteries irrespective of their shape, weight, composition or use. However batteries and accumulators used for military applications and for the protection of EU Member States are exempted. The proposal aims to contribute to a high level of environmental protection and to contribute to the proper functioning of the internal market.

In 2002, nearly 46% of all portable batteries sold in the EU went to final disposal, with significant environmental concerns linked to the materials they contain, especially mercury, cadmium and lead. Batteries containing any of these three materials are classified as hazardous. Mercury is highly toxic especially to the developing nervous system, cadmium is a toxic and carcinogenic substance and lead above certain concentrations is toxic to humans.

The requirements of the draft Directive include:

- A collection target of 25% of average annual sales for spent portable batteries to be achieved by member states within four years of the Directive being transposed into national legislation, rising to 45% eight years after the date of transposition;
- Free of charge collection schemes for spent portable batteries to be established within one year of the Directive being transposed by Member States with at least 90% recycling. Within three years of the Directive being transposed by Member States, 55% by average weight of the materials contained in portable batteries must be recycled (except for nickel cadmium batteries where 100% of the cadmium and 75% of the other materials must be recycled); and
- Prohibition by Member States of the disposal of industrial and automotive batteries in landfill or by incineration.

The proposal originally specified a collection target of spent portable batteries of 160g per head of population (about three to four batteries) per year to be met 4 years after the 2007 Directive becomes law, together with a subsidiary requirement

for 80% of nickel-cadmium rechargeable batteries to be collected. However 160g is higher than the per capita battery consumption in some smaller EU Member States such as Estonia. The target has therefore been changed to percentage of annual sales. This type of target is more appropriate since it also accounts for waste minimisation – if fewer batteries are consumed then fewer need to be recycled. The collection scheme is likely to be funded by manufacturers. On 13th May 2004 the Government published a consultation paper seeking the views of stakeholder on the proposal for a new Batteries Directive to inform its negotiating position. The consultation closed on the 5th August 2004, with a Draft Directive published during March 2005.

Further information on the *Proposed Batteries Directive*:

http://www.defra.gov.uk/environment/waste/topics/batteries/

12.15 The Restriction of Hazardous Substances in Electrical and Electronic Equipment (ROHS) Directive (2002/95/EC)

This Directive will affect manufacturers, sellers, distributors and recyclers of electrical and electronic equipment containing lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls or polybrominated diphenyl ethers. The Directive aims to protect human health and the environment by restricting the use of certain hazardous substances in new equipment and is designed to complement the WEEE Directive.

From the 1st July 2006 new electrical and electronic equipment will not contain lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls or polybrominated diphenyl ethers. The Annex to the Directive lists certain applications that are exempt from the requirements of the Directive including mercury in certain types of fluorescent lamps, lead in the glass of cathode ray tubes, electronic components and fluorescent tubes, lead in ceramic parts and hexavalent chromium as an anti-corrosion of the carbon steel cooling system in absorption refrigerators. Item 10 of the Annex, as published, states that the Commission shall evaluate 'as a matter of priority in order to establish as soon as possible whether these items are to be amended accordingly'. On the basis of the provision of Article 5(1)(b) the Commission has received from Member States and Industry additional requests for applications to be exempted from the requirements of the Directive.

On 30th July 2004 the Government published a final consultation (including draft implementing legislation and non-statutory guidance) which ran until the 29th October 2004. The Government had expected to bring the Directive into effect through UK Law later in the year. Before the 13th February 2005 the European Commission reviewed the terms of the Directive to take into account any new scientific evidence.

Further information on *RoHS (2002/95/EC):*

http://europa.eu.int/eur-lex/pri/en/oj/dat/2003/l_037/l_03720030213en00190023.pdf

12.16 Hazardous Waste Regulations 2005

There are four sets of Regulations applicable to England and Wales that came fully into force on 16 July 2005:
The Hazardous Waste (England and Wales Regulations) 2005 and the Hazardous Waste (Wales) Regulations 2005 (together referred to as Hazardous Waste Regulations),
The List of Waste (England) Regulations 2005 and the List of Waste (Wales) Regulations 2005 (together referred to as List of Waste Regulations)

These pieces of legislation:
• Implement a definition of hazardous waste into domestic legislation.
• Require producers of hazardous waste to notify their premises (with some exceptions);
• End the requirement to pre-notify wastes to the Environment Agency, as previously required under the revoked Special Waste Regulations
• Ensure safe management of hazardous wastes;
• Provide cradle-to-grave documentation for the movement of hazardous waste;
• Require consignees to keep thorough records of hazardous waste and provide the Environment Agency with quarterly disposal and recovery information.

From 16 July 2005 all treated hazardous waste accepted into hazardous or special cells' of a non-hazardous landfill site must comply with the full Waste Acceptance Criteria (WAC), as required by the Landfill Regulations 2002.

The EC Hazardous Waste Directive (91/689/EEC) provides the framework for the control of hazardous waste identified as displaying highly flammable, irritant, harmful, toxic, carcinogenic or corrosive properties. This Directive affects everyone who produces, transports, stores or disposes of waste. The aim of the Directive is to provide a precise and uniform definition of hazardous waste which will apply across the European Union.

In 1994 a catalogue of wastes was produced known as the European Waste Catalogue. This catalogue was updated in 2002. In the UK the Hazardous Waste Directive was originally implemented through the Special Waste Regulations 1996, as amended. It is important to note that the Hazardous Waste Directive is directly referred to in some currently in force UK environmental legislation i.e. The Landfill Regulations and the Pollution Prevention and Control Regulations. Household wastes that have hazardous properties, such as bleach, paints, garden chemicals and some batteries are currently excluded from the Directive. The European Commission (EC) is therefore intending to introduce a separate Directive dealing specifically with household hazardous waste.

It should be noted that where hazardous household waste material is collected separately, this will need to be managed as hazardous waste.

Further Information on the *Hazardous Waste Regulations 2005:*

http://www.opsi.gov.uk/si/si2005/20050894.htm

12.17 The End of Life Vehicles Directive (2000/53/EC)

The End of Life Vehicles (ELVs) Directive (2000/53/EC) passed into European law in October 2000. It is concerned with cars, vans and certain three-wheeled vehicles. The main requirements are for Member States to ensure that producers limit the use of certain hazardous substances in the manufacture of new vehicles and automotive components whilst promoting the recyclability of their vehicles. It must also be ensured that ELVs are subject to de-pollution prior to dismantling, recycling or disposal. The Directive also covers treatment facilities and requires that they operate at higher environmental standards and have permits if they want to deal with non de-polluted ELVs. The Directive also sets certain recovery and recycling targets, namely by 2006, 85% recovery and 80% recycling by weight, and by 2015, 95% recovery and 85% recycling by weight. The Directive contains a provision that by 2007, producers pay 'all or a significant part' of the costs of treating negative or nil value ELVs at treatment facilities.

Lower targets of 75% reuse and recovery and 70% for reuse and recycling will be acceptable between 2006-2014 for vehicles produced before 1st January 1980.

The Directive was supposed to be transposed into national law in all member states by 21st April 2002. The UK and most other Member States missed this deadline. The End of Life Vehicles Regulations 2003 (SI No. 2635) came into effect on the 3rd November 2003. These Regulations transposed Articles 2, 3(1) to (5), 4(2); Annex

II, 5(3), 5(4) with respect of vehicles put on the market on or after the 1st July 2002, 6(1) to 6(4). And Annex I, 8 and 9(2). These provisions generally concern permitting, de-pollution and Certificate of Destruction arrangements. They also implement the restrictions on the use of heavy metals in new cars along with provisions on coding of plastic and rubber components.

Further Information on the *End of Life Vehicles Directive:*

http://europa.eu.int/scadplus/leg/en/lvb/l21225.htm

12.18 Waste Incineration Directive (2000/76/EC)

The Waste Incineration Directive adopted by the EC on 4 December 2000 aims to prevent, or where not practicable to reduce as far as possible, negative effects on the environment caused by the incineration and co-incineration of waste. In particular, it aims to reduce pollution caused by emissions into the air, soil, surface water and groundwater, potentially posing a risk to human health. Stringent operational conditions and technical requirements are being implemented, introducing far stricter provisions than those defined in the existing Municipal Waste Incineration Directives (89/369/EEC and 89/429/EEC) and Hazardous Waste Incineration Directive (94/67/EC).

The Waste Incineration Directive came into force for all existing UK incinerators from December 2002, and will apply to new incinerators from December 2005. It covers all waste incineration and co-incineration plants.[20]

The Directive is being implemented through the Pollution Prevention and Control regime. The Directive will eventually cover some 2,600 incinerators, around 70% of which are waste oil burners in vehicle service garages. It is worth noting that legislation is not concerned with the place that incineration has in waste management strategies, but with ensuring that incinerators are regulated to a high standard.

Further information on the *Waste Incineration Directive:*

http://www.netregs.gov.uk/netregs/275207/1108823/?version=1&lang=_e

[20] There are exemptions for vegetable waste, radioactive waste and animal carcasses (the latter is covered by the 1774/2002 EC Animal by-products Regulation)

12.19 Towards a Thematic Strategy for Soil Protection

In response to concerns about the degradation of soils, the EU Commission has outlined the first steps in a Strategy to protect soils with the publication of a Communication "Towards a Thematic Strategy for Soil Protection" and urges, inter alia, the Commission to draw up a Directive on compost, stressing the need to intensify research in this field so as to boost the potential for its recovery of soil lacking in organic matter and bring together waste management and soil protection.

Further Information on '*Towards a Thematic Strategy for Soil Protection':*

http://europa.eu.int/comm/environment/soil/index.htm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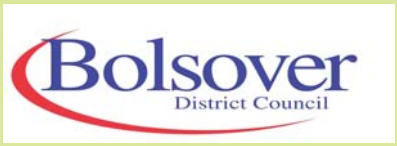
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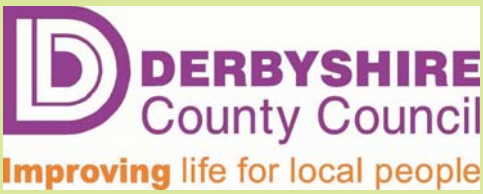
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