Joint Waste Development Plan Document for Greater Manchester – Needs Assessment update Report

Greater Manchester Geological Unit (GMGU)

Date March 2010

Report Produced for:
GMGU

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Executive Summary

The Association of Greater Manchester Authorities (AGMA) is in the process of developing a Joint Waste Development Plan Document (JWDPD). The JWDPD is a Development Plan Document (DPD), which will form a key component of each of the Local Development Frameworks (LDFs) being prepared by the 10 Greater Manchester Local Authorities. Consultation on the 'Preferred Option' report ran for 8 weeks from Friday 13th November 2009 to Friday 8th January 2010. The Report set out the preferred policy direction to guide waste management and also the preferred sites for the waste facilities. These policy directions have been developed from the responses received during the 'Issues and Options' consultation, the results of the sustainability appraisal and with consideration of the national, regional and local planning policy context.

The feedback on the Preferred Option report is being used to inform the next stage of the Waste Plan, known as the Publication Draft DPD.

Urban Mines have been commissioned by the Greater Manchester Geological Unit (GMGU) to update the evidence base supporting the DPD via an updated waste needs assessment model. This update is based on the needs assessment model originally developed in December 2007 and focuses on "Scenario 2 - Maximise recycling and recovery", which was subsequently adopted by members of the Greater Manchester Joint Waste Planning Committee for the identification of future waste capacity requirements.

Presentations were made to the Greater Manchester Joint Waste Planning Committee to help inform the update of this Needs Assessment.

The principal aim of this project was to update the model with the latest waste data and information so as to translate the projected need into facility options to inform waste management requirements for the planning period 2010-2031 using the adopted scenario 2.

Assembling Baseline Data

The principal waste streams modeled include:

- Commercial and Industrial (C&I) waste (at sector level)
- Construction, Demolition & Excavation (CD&E) (including mines & quarries) waste
- Municipal solid waste (MSW)
- Hazardous waste
- Agricultural waste
- Low level radioactive waste

The model has been updated to take account of the latest available data covering all these waste streams, alongside modification of the results format to provide a break down of waste arisings presented for each of the major waste streams; C&I, CD&E, MSW and hazardous waste.

Prime sources of data were: the 2009 Northwest survey of C&I waste arisings completed for the Environment Agency and the Northwest Regional Technical Advisory Body (NW RTAB); the Municipal Waste Management Strategies of Greater Manchester and Wigan Waste Disposal Authorities; the 2008 Environment Agency interrogator for both municipal and hazardous waste; Lancashire survey covering CD&E waste and the Environment Agency was contacted directly for data on radioactive waste and clinical waste. The small quantities of low level radioactive waste are currently adequately provided for and no increase is projected, consequently this waste stream is not presented in the model.

Estimates of agricultural waste are based on the 2003 Environment Agency data and forecast using the Greater Manchester Forecasting Model (GMFM) on number of employees. The quantities are low; approximately 315,000 tonnes in 2009, having a 96% land recovery usage with approximately 3,000 tonnes used for energy recovery and 9,000 tonnes going to treatment plants in 2009.Agricultural waste figures are therefore contained within the modeling process.

Data on the import and export of waste to and from Greater Manchester has improved significantly since 2007 and the 2008 Environment Agency interrogator provides good information on imports and exports to and from Greater Manchester.

The updated capacity Access database received from GMGU, the updated version of the Greater Manchester Forecasting Model (GMFM) and up-to-date individual municipal strategy targets for Greater Manchester and Wigan WDA's were used to update the model structure so as to accommodate the greater detail of data available especially hazardous waste (as a sub-set to the main waste streams). The GMFM has played a key role in informing the modifiers for the economic and social factors and updated figures from the latest assessment have been incorporated into the model to extend the planning period to 2031.

Development of the needs assessment model

The needs assessment model was developed in 2007 to analyse the gap with respect to waste type and source. The model is described in detail in the previous report "Joint Waste Development Plan document for Greater Manchester – Needs Assessment Report (December 2007).

The model provides an understanding of waste management, in terms of who is producing the waste, the material streams and the waste management destinations. It also includes data on which materials have the potential for recycling or energy recovery by waste stream and sector. The model provides a forecast of future arisings and disposal scenarios with an aim of achieving sustainable waste management, towards the top of the waste hierarchy. This is important in practical terms as these elements of the modeling output show where specific changes in waste management practice will have to occur.

The Greater Manchester Forecasting Model (GMFM) has been the key to informing the modifiers for the economic and social factors and updated figures from the latest assessment (2009) have now been incorporated into the model to extend the planning period to 2031.

Scenarios

The initial modeling included scenarios, which illustrated the impacts of increasing recovery and recycling of C&I and CD&E waste on future capacity requirements against maintaining the status quo. Members of Greater Manchester council agreed to adopt Scenario 2.

Scenario 2: Maximise recycling and recovery
Under this scenario:

- Municipal Waste Management Strategy (MWMS) targets for recycling & diversion from landfill are achieved
- C&I and CD&E waste arisings are managed with the following targets:
    - 50% landfill diversion of CD&E waste arisings is achieved by 2012 (i.e. National Waste Strategy target achieved)
    - 100% of the recyclable C&I waste going to landfill is recycled, 50% of the possibly recyclable C&I waste is recycled and the remaining 25% is used for energy recovery by 2015

Table E1 shows the available capacity from 2010.

Table E1 Available capacity in 2010 (using 2009 latest figures)

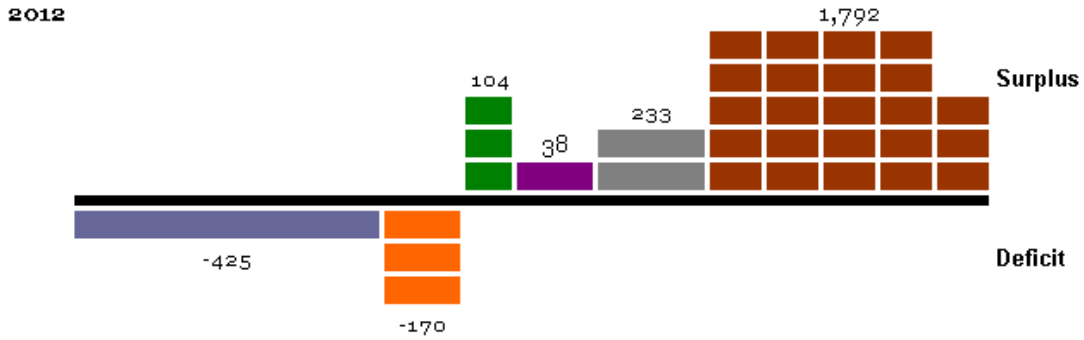
Waste Management type	No. operational sites	Current Throughput (1000t)	Current Capacity (1000t)	Void space 2009 (1000t)
Landfill (non-hazardous)	3	1282	1282	8770
Treatment Plant	22	216.141	1394.982	
Recycling	122	1191.446	2421.559	
IVC	3	0	129	
Windrow composting	1	1.482	4.999	
Green waste production	2	0	105	
Landfill (hazardous)	1	18	18	994
Landfill (C+D)	3	95	269.2	2091
Recycling (C+D)	27	0	2481.76	
Transfer Station	159	1779.572	8734.838	
Waste Water Treatment	4	113.693	862.5	

Translation of projected need into facility options

Figures E1, E2, E3 and E4 provide some indication of the number of new facilities that would be required in order to meet the gap for the waste plan interval year 2012, 2017, 2022 and 2027 respectively.

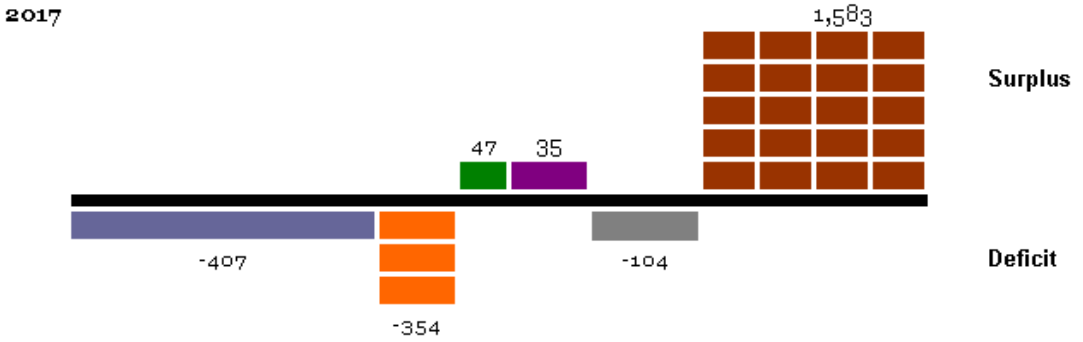
Each block represents 1 facility, while the width of the block represents the average capacity of the facility. It is not possible to model general recycling in block format since there is no specific average size of facility for recycling due to the variability in size ranging from 5,000 tonnes to 50,000 tonnes covering a range of recycling for materials from discarded equipment to textiles. In the plan period, however there is an overall surplus capacity for recycling in general. This cannot be displayed in the diagrams as there is no average capacity for facility types for recycling – they can vary from 5,000 capacity to 50,000 tonnes. Whilst there is an overall surplus of capacity for recycling there may in reality be shortfalls to deal with specific waste streams such as glass or textiles, due to the wide range of materials and their recycling/reprocessing requirements.

Figure E1 Projected facility requirement in 2012 based on the capacity gap modeled



Key to facility types	Average capacity (000s tonnes)
Landfill (non-hazardous)	500
Incineration with Energy Recovery	75 or 120
Composting	40
Landfill (hazardous)	120
Landfill (C+D)	170
Recycling (aggregates, C+D)	80

Figure E2 Projected facility requirement in 2017 based on the capacity gap modeled



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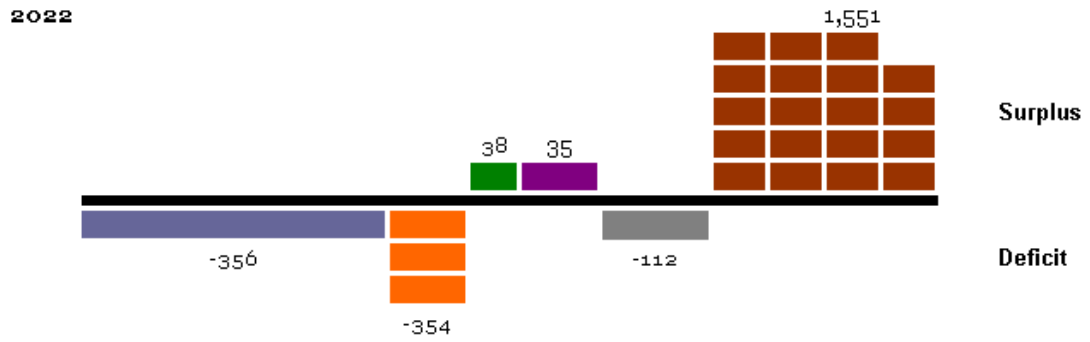
Landfill (hazardous)	120
Landfill (C+D)	170
Recycling (aggregates, C+D)	80

Figure E3 Projected facility requirement in 2022 based on the capacity gap modeled



Key to facility types	Average capacity (000s tonnes)
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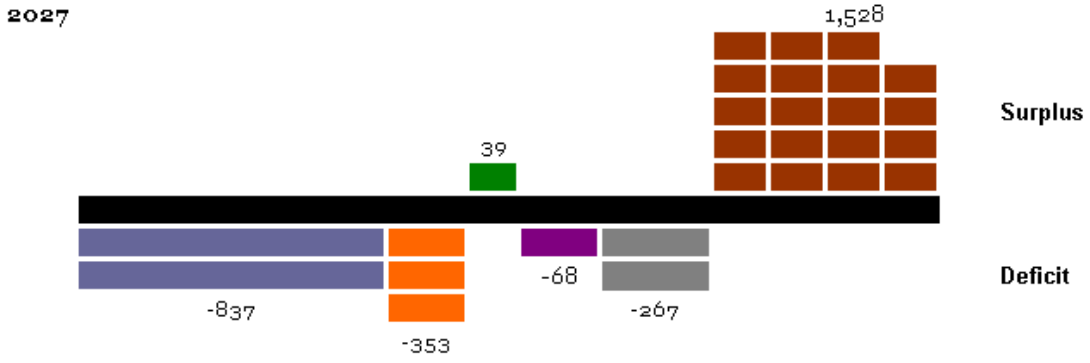
Figure E3 Projected facility requirement in 2027 based on the capacity gap modeled



Key to facility types	Average capacity (000s tonnes)
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Report Title:	Joint West Development Plan Document – Needs Assessment update
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File Reference:	T/consultancy/GMurbanvision/Report/DraftFinal
Prepared For:	GMGU
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Report Status:	Final Report

COMMERCIAL IN CONFIDENCE

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Urban Mines is Accredited under the Customer First Quality Assurance Standard (2010/12)

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1 Introduction

Urban Mines was commissioned by the Greater Manchester Geological Unit (GMGU), in June 2007, to undertake a needs assessment for input into the Joint Waste Development Plan Document (JWPD) for Greater Manchester. This was agreed by members of the Greater Manchester council and used as an evidence base in development of the Joint Waste Development Plan Document (JWDPD) in December 2007.

Following the surveying and publishing of waste arisings for the region and sub-region, legislation and policy changes and contractual updates, especially in regard to the Private Finance Initiative (PFI) covering municipal waste, Urban Mines have been asked to update the needs assessment model and review the capacity gap.

Definitions used in this report are defined in **Appendix 1.**

1.1 Project brief

The Association of Greater Manchester Authorities (AGMA) is in the process of developing a Joint Waste Development Plan Document (JWDPD). The JWDPD is a Development Plan Document (DPD), which will form a key component of each of the Local Development Frameworks (LDFs) being prepared by the ten Greater Manchester Local Authorities. Consultation on the Preferred Option report ran for 8 weeks, from Friday 13th November 2009 to Friday 8th January 2010. The Report set out the preferred policy direction to guide waste management and also the preferred sites for the waste facilities. These policy directions have been developed from the responses received during the 'Issues and Options' consultation, the results of the sustainability appraisal and with consideration of the national, regional and local planning policy context.

The feedback on the Preferred Option Report is being used to inform the next stage of the Waste Plan, known as the Publication Draft DPD.'

Urban Mines have been commissioned by the Greater Manchester Geological Unit (GMGU) to update the evidence base supporting the DPD via an updated waste needs assessment model. This update is based on the needs assessment model originally developed in December 2007 and focuses on "Scenario 2 - Maximise recycling and recovery", which was subsequently adopted by members of the Greater Manchester Joint Waste Planning Committee for the identification of future waste capacity requirements.'

The overall aim of the project is:
To undertake an update of the needs assessment for municipal, commercial and industrial, construction, demolition and excavation, hazardous and other waste streams, to be used to inform the development of the JWDPD and in particular the requirements for the new waste management facilities in Greater Manchester for the period 2010 – 2031.

1.2 The approach

1.2.1 Overview

The primary focus was to update the data input into the interim needs assessment to take account of legislative/policy changes (primarily the Waste Framework Directive) and to update the capacity information following the implementation of the Private Finance Initiative (PFI) development, other waste management infrastructure and information on the rate of landfill. The model structure has only been modified to allow the input of the updates and contain further detailed information, such as modeling individual municipal targets for both Greater Manchester and Wigan Waste Disposal Authorities (WDA's).

The final shape of the model and its fixed and variable assumptions have been determined and discussed with the Greater Manchester Joint Waste Planning Committee and GMGU officers. The model design was also developed to be user-friendly for internal use by GMGU and wider members of the AGMA based upon a simple Excel layering and structure.

1.2.2 Stage 1: Updating the baseline data

A simple Excel format for baseline data management enables the model to be updated as appropriate. Updated data and information on waste arisings is from the following sources:

- Commercial and industrial (C&I) – Northwest (NW) Survey completed March 2010 by Urban Mines
- Construction, demolition and excavation (CD&E) – the 2008 Environment Agency waste interrogator and C&D deposits at permitted sites
- Municipal solid waste (MSW) – Greater Manchester PFI progress and updates, 2008 Environment Agency waste interrogator, WasteDataFlow and Wigan WDA strategy update
- Hazardous waste – hazardous waste data for 2008 from the Environment Agency waste interrogator
- Agricultural waste – negligible change from 2007
- Mines & Quarries – data within the CD&E 2008 Environment Agency waste interrogator and C&D deposit information
- Low level radioactive data –Environment Agency update information

1.2.3 Resource capacity

The facilities database produced for the original needs assessment in 2007 has been updated by GMGU staff, adding any further planning permissions and starting dates as required. Some further modifications to this have been undertaken by Urban Mines especially on landfill capacity, using data on deposit information from the 2008 Environment Agency interrogator.

1.2.4 Stage 2: Legislation and policy updates forecast

The next stage of the update was to review the likely impacts of recent legislation since December 2007 and any further anticipated developments in national and regional legislation, policy, strategy and infrastructure. The aim was to identify impacts of any new legislation and reflect these changes in the updated model.

1.2.5 Stage 3: Update of the needs assessment model

The model has been updated using the latest Greater Manchester Forecasting Model (GMFM) forecasts and economic factors. The GMFM is an econometric model developed by Oxford Economic Forecasting, In November 2009, the GMFM itself was updated and information provided for the baseline position. This updated information has been used in the model.

The following act as modifiers within the model:

- Population and housing growth forecasts (AGMA data via GMGU)
- MSW historical arisings and future predictions (from the WDAs)
- Greater Manchester Forecasting Model (GMFM) results

1.3 Addressing key issues raised in the JWDPD Stage 1 issues and options report

Waste planning and waste management is evolving and changing at a rapid pace. Consequently planning for new waste management facilitation must reflect this dynamic situation. The updated needs assessment provides an analysis on waste arisings based on an applied methodology to ensure that in the future as much waste as possible is dealt with towards the top of the waste hierarchy. In particular, therefore, the needs assessment identifies opportunities for managing waste towards the top of the waste hierarchy. The modeling process has provided a means of identifying the factors which have the greatest potential for improving the sustainability of their waste management practices. The model supports the aims and strategic objectives under JWDPD Issues 1 and 2 (GM JWDP Stage One issues and options report, May 2007) and identifies the waste streams that need to be managed. The key products of the modeling process provide a mechanism for testing scenario 2 that may meet future waste management needs as required under JWDPD Issue 4.

The model identifies key sectors and materials that regard waste as a resource (JWDPD Issue 5) and enable identification of options for managing future waste and new developments (JWDPD Issue 6). The model includes predictions of landfill needs and in particular how this can be minimised through the adoption of more sustainable waste management practices in accordance with JWDPD Issue 7.

2 Model development: Updating baseline data

The prime object of this element of the update was to gather the best currently available baseline data and economic growth forecasts.

2.1 Waste arisings data

To update the assessment, there is a requirement to understand the latest current waste arisings generated by the principal waste producers and where data is available to understand the arisings from sub sectors by waste type and destination. This level of detail is essential in order to develop and model options for future waste management projections and exploit policy options on future provision. The output from this assessment is a consistent and updatable data set ready for input into model.

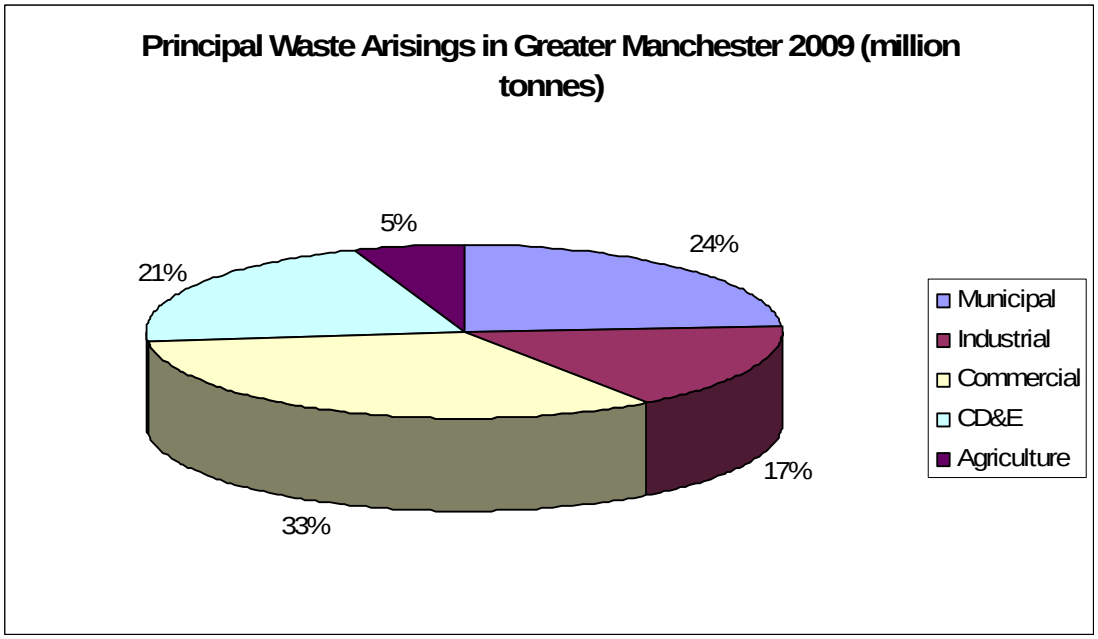
The principal waste streams are identified as:

- Commercial and industrial waste (9 sector levels)
- Construction, demolition & excavation (including mines and quarries waste)
- Hazardous waste [1]
- Municipal waste
- Agricultural waste
- Low level radioactive waste

The proportions of C&I, CD&E, municipal and agricultural waste generated within Greater Manchester is illustrated in **Figure 1.**

[1] Although separately identified Hazardous waste is a subset of commercial and industrial waste, construction and demolition waste and to a lesser degree municipal thus hazardous waste quantities are accounted for within these waste group totals

Figure 1 Proportions of C&I, CD&E, municipal and agricultural waste in Greater Manchester



2.1.1 Commercial and industrial waste

Originally, the prime data source used was the survey of C&I waste arisings completed for the NW RTAB 2007[2] together with historic trend data from previous surveys undertaken by the Environment Agency in 1998/9 and 2003. The NW RTAB 2007 C&I data has however been updated using the NW 2009 C&I survey. While considering options for future waste management needs, it is important to have a clear distinction between commercial waste and industrial waste arisings. The survey further provides estimates of arisings by 9 sectors and 9 waste material types. Also included in the survey were an estimate of the current management destination and an assessment of the potential to manage waste higher in the waste hierarchy. Data is classified by:

Sector

- 3 Commercial sectors
- 6 Industrial sectors

The commercial and industrial sectors included:

1. Food, drink and tobacco
2. Textiles/wood/paper/publishing
3. Power & Utilities
4. Chemical/non-metallic minerals manufacturing
5. Metal manufacturing
6. Machinery & equipment (other manufacturing)
7. Retail & wholesale
8. Other services

[2] The North West Regional Technical Advisory Body and the North West Regional Aggregates Working Party commissioned a survey of commercial and industrial wastes for the North West region of England, to provide regional, sub-regional and local information on the amounts of waste produced and managed (completed April 2007 by Urban Mines)

9. Public sector

Waste material types were classified under:

- Animal and vegetable wastes
- Chemical wastes
- Common sludges
- Discarded equipment
- Health care waste
- Metallic wastes
- Mineral wastes
- Mixed (ordinary) wastes
- Non metallic wastes

Waste Management destinations included:

- Landfill
- Energy recovery
- Incineration without energy recovery
- Transfer station
- Treatment plant
- Recycling
- Composting
- Waste water treatment
- Don't know

The waste and business sector categories are consistent with the European waste catalogue, Standard Industry Classification and methodologies used in the Environment Agency survey and reporting of waste management data. Waste management destinations are derived from producer knowledge of where their waste is taken. Inevitably this results in the need to include a category of "Don't Know" where the nature of onward waste management is unknown to the producer. Waste in this "Don't know" category is most likely to be sent to landfill and this assumption is made in the capacity gap calculation element of the model. Tables 1 and 2 show the estimated quantities of waste produced by sector, waste type, waste nature and destination from the 2009 NW C&I survey.

Table 1 Estimate of C&I arisings for Greater Manchester by sector and destination (figures in tonnes)

SIC Description	Composting	Don't know	Energy Recovery	Incineration without Energy Recovery	Land recovery	Landfill	Recycling	Transfer station	Treatment plant	Waste water treatment	Total
Food, drink and tobacco	0	3,111	869	1,010	48,623	15,872	119,776	9	13,744	0	203,013
Textiles/wood/paper/publishing	129	3,739	60	1,310	9,503	32,496	129,610	4,614	1,066	0	182,527
Power & Utilities	295	56	13	0	0	34,530	22,333	127	1	0	57,354
Chemical/non-metallic minerals manufacturing	4,337	7,939	1,276	4,916	3,909	67,246	86,072	3,638	15,473	0	194,805
Metal manufacturing	0	1,628	2,522	72	5	5,551	98,098	0	1,399	0	109,275
Machinery & equipment (other manufacturing)	0	2,928	134	165	120	36,442	158,507	3,436	1,428	2,074	205,234
Retail & wholesale	1,082	37,100	2,640	1,528		130,196	504,515	7,962	2,677	0	687,700
Other services	511	56,075	8,602	1,071		141,490	365,208	3,412	5,403	20,326	602,097
Public sector	293	20,381	5,749	26,267		85,986	101,863	22,736	11,729	0	275,006
Total	**6,647**	**132,956**	**21,865**	**36,339**	**62,160**	**549,809**	**1,585,981**	**45,934**	**52,920**	**22,400**	**2,517,010**

Table 2 Estimate of C&I waste arisings for Greater Manchester by sector and waste type (in tonnes)

SIC Description	Animal & vegetable wastes	Chemical wastes	Common sludges	Discarded equipment	Health care	Metallic wastes	Mineral wastes	Mixed (ordinary) wastes	Non-metallic wastes	Non-wastes	Total
Food, drink and tobacco	122,469	17,775	11,545	112	11	1,027	10,750	25,245	14,079	0	**203,013**
Textiles/wood/paper/publishing	0	3,899	9,251	48	35	7,436	258	29,341	131,999	260	**182,527**
Power & Utilities	0	4,393	0	183	1	2,831	34,240	12,725	2,981	0	**57,354**
Chemical/non-metallic minerals manufacturing	3,936	62,864	8,518	91	32	5,230	29,590	43,928	40,616	0	**194,805**
Metal manufacturing	3	6,381	0	33	11	57,850	11,783	25,125	8,088	0	**109,275**
Machinery & equipment (other manufacturing)	8	6,375	374	1,287	55	120,043	516	49,584	24,677	2,314	**205,234**
Retail & wholesale	12,148	6,969	45	12,864	355	16,167	2,714	196,605	439,834	0	**687,700**
Other services	63,536	31,457	10,680	1,844	8,659	25,110	4,357	235,439	221,016	0	**602,097**
Public sector	3,269	71		6,527	49,200	728	3,801	148,802	62,607	0	**275,006**
Total	**205,368**	**140,186**	**40,413**	**22,989**	**58,359**	**236,422**	**98,009**	**766,793**	**945,896**	**2,573**	**2,517,010**

2.1.2 Inert construction and demolition waste (C&D)

All data has been sourced from the 2008 Environment Agency interrogator. Table 3 below shows total inert C&D waste and how it is managed.

Table 3 Management of inert waste in Greater Manchester

Inert landfill	52,576
Non Hazardous Landfill	366,544
Restricted Use Landfill	29129
Total Landfill	**448,249**
Inert Transfer	739,987
MRF	43,117
Physical Treatment	49,725
CA Sites	18,343
Total C&D under management	**1,299,421**

The 2008 Environment Agency interrogator also gives information on inert waste exports as set out in Table 4 below.

Table 4 Inert waste exports (in tonnes)

	Exports	**Comment**
Cheshire	367,337	366,994 Manchester Ship Canal Dredging
Derbyshire	26,261	P Casey Landfill
Lancashire	22,515	Rigby Landfill
Merseyside	18,419	15,000 Cory Landfill, 3,200Transfer
South Yorkshire	5,160	Landfill
Total	72,698	C&D Exports

It can be interpreted from the 2008 Environment Agency interrogator that whilst there are exports from Greater Manchester that are not recorded, the absence of high levels of recorded "unknown origin" for inert deposits in adjacent sub-regions suggests that significantly high quantities of inert C&D waste is unlikely to be exported from Greater Manchester.

2.1.3 Municipal waste

Data sources used are the Greater Manchester Waste Disposal Authority Municipal Waste Management Strategy Review 2006/7 (GMWDA MWMS) and the Wigan Waste Disposal Authority Municipal Waste Management Strategy together with updated arisings data from 2008/9. Detailed analysis of GMWDA arisings and management methods are available from the GMWDA MWMS review 2007 baseline report including projections and sensitivity analysis. Comparable information for modeling purposes was also made available from Wigan's MWMS.

Following the award of contracts under the PFI procurement process, implementation is progressing as scheduled and, these additional capacities have also been built into the updated model.

Secondary products of waste treatment, in particular, the solid recover fuel (SRF) produced from the treatment of residual municipal waste have been estimated at 275,000 tonnes per annum. However, with the exception of this particular arising there is insufficient data available on the potential products of future treatment processes and therefore the model does not factor in secondary treatment products at this stage. Contractual arrangements have been announced with respect to the use of this municipal SRF material outside of Greater Manchester and therefore future capacity does not show as a gap.

2.1.4 Agricultural waste

The estimates have been made based on generic agricultural waste estimates and persons employed. With regard to agricultural waste in Greater Manchester, the quantities are relatively small; 300,000 tonnes, and remain unchanged for the update.

2.1.5 Low level radio active waste

Data sources used are supplied by the Environment Agency. At present we are awaiting update information post 2005.

With regard to disposal of low level radio active waste, it is understood that the disposal is either in-house or to external facilities of which some could be external to Greater Manchester. The quantities are very small and the waste very specialised, with set controls for its management that this it is not necessary to model low level radio active waste through the needs assessment model.

2.1.6 Import/export

Data on the import and export of waste to and from Greater Manchester is now much improved as a result of inclusion of the origin of waste deposited at permitted waste management sites in the Environment Agency interrogator database. Whilst this data is much improved, it is not yet complete and 24% of the waste managed at permitted sites has no origin recorded as seen in Table 5.

Table 5 Waste exports and imports in Greater Manchester

Waste managed in Greater Manchester (all methods)	Tonnes	Percentage
Total	**6,362,038**	
Total imported	1,184,552	19%
Total waste exported	1,519,049	23%
Origin not recorded	1,530,931	24%
Arising and managed within Greater Manchester	2,127,506	34%

The recording of the origin of waste is however very variable between different site types; for example, the origin of waste is recorded for less than 50% of waste deposited at metal recycling sites, origin recording at non hazardous landfills is only lacking for 2% of waste inputs and at inert landfills for 4% of waste.

Table 6 below shows that net exports of non hazardous waste to landfill was 716,000 tonnes in 2008 with 571,000 tonnes of this being municipal waste (see Appendix 1.2 Data sets)

Table 6 Non hazardous landfill exports 2008 – Data in 000s Tonnes

Cheshire	155
Warrington	85
Humberside	401
Lancashire	125
Merseyside	26
North Wales	44
Exports Total	**836**

Table 7 below shows that whilst 85% of household, industrial and commercial (HIC[3]) waste landfilled in Greater Manchester is recorded as originating in Greater Manchester, the figures are much lower for waste transfer, treatment and metal recycling. However, in the case of these latter facilities the picture is masked by poor origin recording.

Table 7 Household, industrial and commercial (HIC) waste in Greater Manchester

	HIC all waste	HIC landfill	HIC Transfer	HIC Treatment	HIC MRS
Greater Manchester	2,455	676	941	834	4
No Origin Recorded	814	15	385	395	20
Total 000s Tonnes	4,033	797	1,600	1,612	25
Imports to Greater Manchester (tonnes)	764,002	105,512	274,262	383,329	900
% Origin in Greater Manchester	61%	85%	59%	52%	17%
NW % Origin in NW Region	10%	0	3%	21%	0
% Total Imported	19%	13%	17%	24%	4%
% Origin not Recorded	20%	2%	24%	24%	79%

[3] Household ,Industrial and Commercial (HIC) is the classification used by the Environment agency that is equivalent to non hazardous and non inert waste

Excluding landfill, 659,000 tonnes was imported to Greater Manchester in 2008, however, the significant level at which origin recording is lacking at non landfill site types means that no definitive estimate can be given for imports and exports to these types of site. No precise figure can be given for imports and exports to these types of site. No precise figure can be obtained as to whether Greater Manchester is a net importer or exporter of non hazardous waste. However, given the closeness between known landfill exports at 716,000 tonnes and known non hazardous imports to non-landfill facilities, it appears probable that there is a reasonably small balance between imports and exports. In projecting forward, the predicted fall in landfill utilisation, not least in terms of exported municipal waste for landfill, suggests that in the longer term that the balance will be towards net imports for transfer, recycling and treatment.

All data set information covering arisings and sources are listed in full in Appendix 3.

2.2 Updating the existing and planned capacity

2.2.1 Overview

The prime data sources for understanding existing capacity remain the same:

- Waste Disposal Authority MWMS and planned capacity under PFI contract
- Environment Agency licensed site data 2008
- Capacity data by inert/non inert only – deposit data on waste categories (but limited)
- GMGU – data on planning status capacity and operational status

The data is organised as follows:

- Assign a consistent facility type to each site
- Determine site status
  - Operational
  - No longer operational
  - Not yet operational
  - Unknown
- Determine annual permitted capacity of each site (and expected/actual usage where possible)
- Determine annual throughput of each site
- Determine site lifetime
- Enter new PFI sites
- Establish any new capacity planned – what can the site take each year?
  - Data based upon Primary source E Permits totals – also WDA 2007/08 Landfill information, plus data provided from GMGU
- New current throughput – How much actually processed/landfilled etc?
  - Data based upon RATS 2008 (EA) & WDA 2007/08 data taking into account permit & planning restrictions

This process has therefore resulted in the production of an updated needs assessment model and provides capacity figures by waste management option on a year on year basis from 2010 to 2031. During the update, 34 changes were made to the capacity database and a further 21 sites were added to the capacity database, in conjunction with GMGU.

2.2.2 Landfill site data

Landfill sites that are suitable for non hazardous C&I waste together with municipal waste have historically formed the core element of disposal capacity. Landfill void estimates have been taken largely from returns to the Environment Agency from landfill operators of their remaining void space in 2008 supplemented by known additional planned capacity and the historic rate of usage of landfill capacity at each site. The void projection is therefore only at a best-estimate. There is also some uncertainty over the planning and permitting status of some sites, which may or may not eventually become available as fully authorised capacity. Simple projections of capacity and life expectancy based on inputs as nominal average relationships between input and void capacity must be treated with great caution as they are subject to wide variation.

It should be noted that deposits at non-hazardous landfill will include CD&E waste essential for landfill operation and engineering which may account for in the order of 20% of void capacity.

2.2.3 Hazardous landfill

One landfill site in Greater Manchester includes a cell for the disposal of hazardous asbestos waste that is included with the overall total for the site. Annual disposal of hazardous asbestos, contaminated construction, demolition and excavation waste is estimated at 18,000 tonnes.

2.2.4 Construction demolition and excavation waste landfills

Data in this section is sourced from the Environment Agency interrogator.

Table 8 Understanding C&D waste management in Greater Manchester (in tonnes)

Total inert landfill	448,249
Exported	72,698
Total landfilled C&D arisings from GM	**520,947**

Table 8 shows that C&D waste arisings exceeded 0.5 million tonnes in 2008 on the basis of landfilled quantities. Inert waste recorded at transfer and treatment facilities is approximately 0.85 million tonnes in total. However, inert waste deposited at landfills may therefore be double counted as arising if totals are simply added together and therefore it is necessary to review the fate of waste removed from waste transfer stations and treatment processes.

Table 9 Complete picture for CD&E waste management in Greater Manchester (in tonnes)

Fate of Inert waste removed from transfer station	Tonnes
Landfill	125,922
Recycling	125,302
Reprocessing	116,221
Fate of Inert waste removed from treatment plant	
Landfill	38,116
Recycling	52,373
Reprocessing	21,845
Total for landfill	**164,038**
Total to unknown or further transfer	**370,221**
Total for recycling and reprocessing	**315,741**

Table 9 shows that approximately 0.32 million tonnes of inert C&D waste is recycled or reprocessed, about 33% is recorded as recycled in Greater Manchester, however, the destination of most of this material is not recorded.

Of the 370,221 tonnes recorded as taken to further transfer for treatment or unknown destination, it is difficult to assess how much would be recycled or landfilled. If it is landfilled, then this total is already accounted for and if it is recycled, it should be added to the total.

Total C&D waste arisings accounted for through permitted facilities is therefore at least 0.82 million tonnes, which would rise to 1.2 million tonnes if the "unknown" fate of inert waste removed from transfer stations was recycled. However, a proportion of this "unknown" fate of inert waste removed from transfer stations is likely to be landfilled and therefore C&D waste arisings which are managed through permitted facilities are likely to be in the order of 1 million tonnes based on 2008 data. The recession through 2009 and inactivity in the construction industry in general is likely to have reduced this figure.

Products from waste recorded as transferred and treated may also be recycled or deposited in registered exempt sites. The registered exemptions in Greater Manchester include 83 sites for use of demolition/storage/excavation waste for which no deposit data is available. It is likely that most of these will be small in size and many completed or inactive operations. However, it is also likely that a significant amount of C&D waste is disposed of at these types of sites. Registered exemptions include:
27 Registered Composting Sites
27 Burning on land
21 Spreading waste on Land for reclamation/improvement
83 sites use of demolition/storage/excavation waste

Taking into account C&D waste, which goes wholly unrecorded through exempt operation, the actual total arisings based on 2008 data was probaby in the range **of 1 and 1.5 million tonnes. The figure of 1.250 million tonnes has therefore been used in the updated needs assessment model.** This estimate is close to that arrived at in the 2007 assessment of:

- Arisings in order of 1,400,000 tonnes pa
- Landfill in Greater Manchester 500,000 tonnes pa
- Exports for landfill 500,000 tonnes pa
- Disposals at Exempt sites 400,000 tonnes pa

2.2.5 Capacity Data Expressed in the Model

Utilising the latest available data and undertaking the data management improvements (as described in 2.2.1) the following capacity information was assembled and collated as shown in **Table 10**.

Table 10 Summary of waste management site capacity as per 2010 (based on 2009 information)

Waste Management type	No. operational sites	Current Throughput (1000t)	Current Capacity (1000t)	Void space 2009 (1000t)
Landfill (non-hazardous)	3	1282	1282	8770
Treatment Plant	22	216.141	1394.982	
Recycling	122	1191.446	2421.559	
IVC	3	0	129	
Windrow composting	1	1.482	4.999	
Green waste production	2	0	105	
Landfill (hazardous)	1	18	18	994
Landfill (C+D)	3	95	269.2	2091
Recycling (C+D)	27	0	2481.76	
Transfer Station	159	1779.572	8734.838	
Waste Water Treatment	4	113.693	862.5	

3 Stage 2: Legislation and policy forecasts

The National Waste Strategy for England was published in May 2007 and this draws together both National and European legislative, policy and strategic imperatives, targets and impacts. Details of legislation analysed for the model is contained in Appendix 4.

3.1 Reviewing legislative, policy and strategic impacts

The needs assessment takes into account the National Waste Strategy (NWS) and also the policies included in the Northwest Regional Spatial Strategy (NW RSS) and the updated Regional Waste Strategy (RWS). **Appendix 4** sets out the legislation, policy and strategy that have been considered such that they may have impacts on the modifiers applied to the model. In addition in **Appendix 4** the key impacts of the NWS in terms of objectives, targets and

proposed initiative are set out, including where appropriate any variance as included in the NW RSS and the updated RWS.

Table 11 Summarises the Potential Impacts of the NWS and its initiatives

Statutory Requirements	Potential Impacts
Proposed EU Directives	
Management of Waste From Extraction Industries Directorate Applies to mines & quarries waste, provisions directed at management of waste facilities	Will set minimum supplementary standards with a proposal that BAT (Best Available Technique) to be used
Proposed Framework for the Setting on Eco-design requirements for energy using products directive	Looks to set requirements for environmentally relevant product characteristics on life cycle basis.
Existing Legislation	
Waste Framework Directive • System for the coordinated management of waste within the community • Foundation for sustainable waste management • Defines waste and introduces the principles of the waste hierarchy, proximity principle and self sufficiency	Greater emphasis on the principles of applying the waste hierarchy. Highlights self sufficiency in terms of waste management Potential for a review of Annex II: will impact upon recovery and disposal operations defined in the annex
Landfill Directive • Prevent or reduce as far as possible negative effects on the environment from landfilling waste • Introduction of stringent technical requirements for waste and landfills	• Ban on specific wastes to landfill (2003 whole tyres, 2006 shredded tyres; 2002 liquid hazardous waste, plus other hazardous wastes • Pre-treatment (2004 hazardous waste, 2007 all other wastes) • Targets for reduction of biodegradable waste (2010, 2013, 2020) to landfill
Pre-treatment requirements – The Landfill Regulations 2002 require waste to be treated prior to disposal to landfill.	Encourages movement of waste up the waste hierarchy and away from landfill
Hazardous Waste Directive • Licensing requirements for handling and treatment of hazardous waste	• Extended range of hazardous waste materials listed beyond scope of UK Special Waste Regulations
Energy recovery of Waste Extended to cover co-incineration plants	Sets stricter limit values and technical requirements. New plants required to comply 2002, existing plants by Dec 2005
Packaging Waste Directive Legislation which applies to waste from consumer goods: • Packaging and packaging waste; • Disposal of spent batteries and accumulators;	Encourages waste reduction movement of waste up the waste hierarchy. Impacts on waste arisings and material type in commercial, industrial (C&I) and municipal wastes (MSW)

• Disposal of waste oil; • End-of-life vehicles; • Environmental problems of PVC; • Waste electrical and electronic equipment.	
Simplifying the regulatory system and making it more proportionate and risk based through: • waste protocols that clarify when waste ceases to be waste (and so not subject to regulation) • reforms of the permitting and exemption systems and the controls on handling, transfer and transport of waste, (with cost savings to business and regulator of, e.g. on permitting reforms, at least £90 million) – better communication with stakeholders • implementing actions which will reduce fly-tipping	May reduce costs in downstream recycling and reprocessing
Site Waste Management Plans a mandatory requirement for construction projects over a certain value (subject to consultation), and extend to other parts of the supply chain	Promotes minimisation and recycling of CD&E waste
Tax Incentives	**Potential Impacts**
Landfill tax escalator to reduce, re-use and recycle waste (from £24 now to £48 in 2010)	Sharp reduction in cost advantage of landfill and other waste management options
NWS Targets	**Potential Impacts**
New national target for the reduction of commercial and industrial waste going to landfill – levels of commercial and industrial waste landfilled are expected to fall by 20% by 2010 compared to 2004.	Target likely to be exceeded through reduction in total quantity of industrial waste arisings
Annual greenhouse gas emissions target: 2020: reduction of 10 million tonnes of CO2 equivalents	No quantitative projections yet available
A target to halve the amount of construction, demolition and excavation wastes going to landfill by 2012 as a result of waste reduction, re-use and recycling.	CD&E Surveys indicate that most CD&E waste going to landfill is from the large number smaller scale operators in building demolition and renovation. Impact of quasi landfill in exempt sites is not addressed
Government Departments to reduce their total waste arisings by 25% by 2020	The public sector as a whole shows low levels of recycling – this initiative would

relative to 2004/05 levels Departments to increase their recycling figures to 75% of their total waste arisings by 2020	have a significant impact if replicated across all of the public sector
NWS Initiatives	**Potential Impacts**
Key waste materials where diversion from landfill could realise significant further environmental benefits. The Government is taking action on paper, food, glass, aluminium, wood, plastic and textiles	Impact of waste reduction and recycling/reprocessing mainly in industrial sectors
Incentives for excellence in sustainable waste management through a zero waste places initiative to develop innovative and exemplary practice	Promotes waste hierarchy but no specific outcome
Taking forward voluntary agreements with the relevant producers in order to increase separate collection, recycling and recovery of potentially hazardous household wastes	Potential to increase requirement for hazardous waste handling and disposal facilities as this waste is removed from the residual waste stream
Defra is working to further improve the outcomes from the BREW programme	Any impact will be to reduce waste or move waste up the hierarchy
Encouragement for local authorities to take a 'wider' role in 'partnerships' to help local businesses reduce and recycle their waste with 'more integrated' management.	Potential for minimisation and recycling but local authorities do not generally have the resources to support the commercial sector.
The Sustainable Consumption and Production Action Plan for England's North West 2010 - 2012	A regional pathway towards zero waste (for landfill) Increase commercial waste recycling rates – 50% reduction of commercial and Industrial waste sent to landfill per business by 2012 (using 2006 baseline) A 50% reduction in C&D waste to landfill by 2012 (using 2006 baseline)
Proposals	**Potential Impacts**
Proposed consultation on further restrictions on the landfilling of biodegradable wastes and recyclable material.	This could significantly reduce the landfill option statutory limit to the types of non-hazardous wastes that can go to landfill, especially food waste
Producer responsibility proposals for statutory higher packaging recycling targets, the Government is seeking further voluntary action, but is prepared to regulate if this does not deliver - introducing measures to: • reduce excess packaging, for example	Impacts should be to reduce packaging waste and increase recycling in Commercial, Industrial and Municipal sectors

by setting optimal packaging standards for a product class; • support development of a joint protocol to ensure that local government and industry both identify the best systems for cost effective collection of packaging waste • extend WRAP's Courtauld Commitment to non-food retailers to increase the total commitments by retailers to reductions in packaging, food and other post-consumer waste;	

4 Stage 3 Update of the needs assessment model

4.1 Model Structure

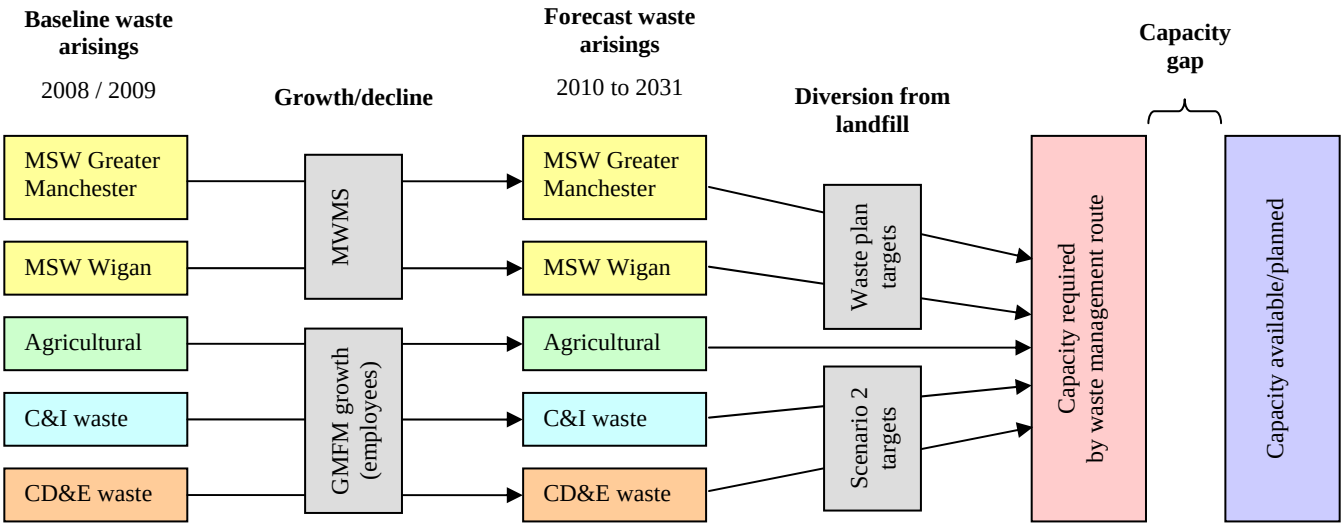
Figure 2 shows the basic structure of the Excel based model. The basic forecast model component utilises data from the Greater Manchester Forecast Model (GMFM) in the form of the forecast number of households and employees by sector through to 2031. These inputs are then used to forecast waste arisings using further data from Local Authorities (MSW data) and other survey data (the recent 2009 North West surveys on commercial and industrial and construction, demolition, and extraction arisings). For commercial and industrial forecasts, the number of employees per sector (from GMFM) was combined with the arisings per employee of that sector (from the 2009 C&I survey) to provide an estimate of forecast arisings for each sector for each year until 2031.

The modeling process

The model was originally developed in 3 stages and all 3 stages have been updated in this review for scenario 2:

- Stage 1 Assembling and updating the baseline data
- Stage 2 Reviewing legislative, policy and strategic impacts
- Stage 3 Development of the needs assessment model

Figure 2 The modeling process



*****MWMS – Municipal Waste Management Strategy**

Using household waste arisings for 2008 and the number of households from the GMFM, the waste per household was determined and projected for each year from 2009 until 2031. The model allows this figure to reduce over time by assumption. Municipal non-household waste is initially assumed to grow from its 2009 base by 1% per annum until 2010 from which point it remains static.

To achieve the 2020 and 2030 municipal waste targets, a reduction per annum in waste generated per household of 0.2% and 0.8% is required for Greater Manchester and 0.5% and 0.7% for Wigan respectively.

For C&I arisings, waste arisings per employee were calculated using waste totals from the 2009 Northwest survey and employee data from the GMFM. Over time there are 2 main forces at work that may affect this figure. One would expect that as companies get more efficient, less waste per employee would be produced. However, one might also expect companies to be more productive with respect to output. Given the lack of empirical evidence as to the relative strength of these effects it was decided to leave the waste per employee figure as fixed through time.

Total waste arisings by source were then converted to waste by substance oriented classification. This categorisation splits waste arisings for MSW and C&I into nine waste streams using MSW waste composition data and the C&I survey.

Using MSW BVPI data and the C&I survey, waste arisings by SOC are then split into first destination. Hence the model moves from source to type to destination. It is this final element, SOC by destination, that is then compared to the capacity data to calculate the capacity gap.

There are 2 facets of waste management which cannot be fully factored into the model at this stage due to lack of baseline information. Transfer operations are important to the logistics of both public and private sector waste management and will form a necessary step in the collection and transport of waste. However, there is insufficient information available to allocate specific waste arisings and their primary management options (recycling, treatment or disposal) to the requirement for specific transfer capacity. There would appear to be a significant current surplus capacity. The second issue is that of the products of waste treatment processes. There is currently insufficient information on the products of existing treatment processes to gain a clear understanding of the treatment products and their disposal requirements. With the exception of information from the MWMS and PFI developments there is also no current basis for estimating treatment products from future treatment or recyclate processing, in particular as these products and further management requirements may be expected to be highly materials specific.

4.2 Reviewing the modifiers and running scenario 2

In the 2007 model a number of scenarios were run to provide examples of key issues as identified in the earlier work during the model development.

It was agreed that Scenario 2 was to be adopted: Maximised recycling and recovery of C&I and CD&E Wastes. This assumes that:

- Municipal Waste Management Strategy (MWMS) targets for recycling & diversion from landfill are achieved
- C&I and CD&E waste arisings are managed as follows:
    - 50% landfill diversion of CD&E waste arisings is achieved by 2012 (i.e. National Waste Strategy target achieved)
    - 100% of the recyclable C&I waste going to landfill is recycled, 50% of the possibly recyclable C&I waste is recycled and 25% remaining used for energy recovery by 2015

4.3 Validating the model

As it stands the model produces intuitively correct results in that the gaps change in the way that would be expected. This report outlines some of the areas where the model can be improved or extended. These include:

- First and secondary destinations
- More accurate descriptions of how C&I waste varies as productivity changes and jobs increase/decrease
- More accurate and detailed data on CD&E waste arisings

The robustness of the model can be improved through availability of more up-to-date data to meet the areas highlighted above and as it is applied for Greater Manchester.

5 Stage 4 Analysis of Results

5.1 Scenario 2. Baseline: Maximise Recycling and Recovery

5.1.1 Scenario 2 Capacity requirements

The projected annual requirements for waste management (by method of treatment) for Greater Manchester under Scenario 2 are shown in Table 12 below for 2012, when the plan period starts to the end of the plan period in 2027. In conjunction with the targets, moving waste up the waste hierarchy, this shows a reduction in the number of facility requirement for landfill and an increase in the need for recycling, composting and treatment and energy recovery facilities in comparison with the previous model.

Table 12 Projected total annual waste management requirements by management method (000 tonnes)

		Scenario 2 (Maximum Recycling & Recovery)
Waste Management	**2012**	**2027**
Landfill (non-hazardous)	1,257	837
Incineration	290	473
Treatment plant	159	168
Recycling	2,217	2,364
Composting	155	200
Landfill (hazardous)	65	68
Landfill (C+D)	237	267
Recycling (aggregates, C+D)	989	1,114
Total Arisings	**5,370**	**5,491**

In reviewing the baseline position for 2009, we can forecast whether Greater Manchester will achieve the target set for 2010 that is:

- 75% of the recyclable material and 25% of the possibly recyclable material diverted from landfill and 50% of the remaining material used for energy recovery by 2010 for C&I waste arisings

Table 13 shows that this target was actually achieved in 2009 covering, i.e. 75% recyclable and 25% possibly recyclable C&I waste diverted from landfill. That target required 347,000 tonnes of C&I waste to be diverted from landfill and recycled. However, in 2009, 431,000 tonnes were in fact diverted and recycled.

Table 13 Analysis of Targets taken from the Model for Scenario 2

Forecast from 2006 against 2009 actuals	2009 from previous model	Actuals 2009	2010 from previous model	2010 forecast from 2009 C+I survey	Actual Tonnes diverted	75% of Recyclable + 25% Possibly	75% of Recyclable + 35.4% Possibly
Landfill (non-hazardous)	1208	768	1203	755	-431	-347	-431
Energy recovery	81	62	80	61			
Treatment plant	262	55	261	54			
Recycling	1211	1853	1203	1806	431	347	431
Composting	15	7	15	7			
Landfill (hazardous)	0	18	0	18			
Not used: Waste water treatment	6	28	6	28			
Not used: Land Recovery	40	62	38	60			
	2822	**2854**	**2806**	**2789**	**0**	**0**	**0**

There is still some work required to meet the second part of the target, that is, 50% of the remaining material – thereby 25% to be used for energy recovery. It is apparent from the 2 C&I surveys between 2007 and 2009 that there has been a lack of progress in diverting from landfill to energy recovery, as the amount between the 2 years has reduced. From the original model in 2007, the target at that time for 50% of the remaining material to energy recovery amounted to 503,000 tonnes. In looking at the updated model the tonnage to energy recovery is only 62,000 tonnes. It is apparent that this target is clearly not going to be achieved by 2010 and there is a long way to go to make up to achieve this for 2015.

Table 14 shows the annual capacity gap for Scenario 2 (Maximum recycling and recovery) from 2010 to 2031. It shows where there is a surplus in capacity and where there is a deficit (negative numbers).

Table 14 Annual Capacity Gap (capacity minus waste arisings) under Scenario 2 (Maximum Recycling and Recovery) Data in 1000's tones. Highlighted in blue

Scenario 2 (Maximum recycling and recovery): Annual capacity gap																							
000s Tonnes																							
Capacity Gap	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**
Landfill (non-hazardous)	260	53	-138	-425	-316	-209	-449	-428	-407	-384	-361	-357	-356	-356	-356	-838	-837	-837	-837	-836	-836	-836	-835
Energy recovery	-173	-53	-112	-170	-230	-291	-351	-353	-354	-354	-354	-354	-354	-354	-354	-353	-353	-353	-353	-352	-352	-352	-352
Treatment plant	1301	1331	1286	1236	1240	1244	1248	1238	1229	1221	1212	1223	1223	1224	1225	1225	1226	1226	1227	1228	1228	1229	1229
Recycling	127	143	552	507	456	402	349	338	329	325	321	316	322	328	335	341	348	354	360	366	371	375	381
Composting	223	125	115	104	94	84	53	50	47	44	41	38	38	38	39	39	39	39	39	39	39	39	39
Landfill (hazardous)	39	40	38	38	37	36	36	35	35	35	35	35	35	35	35	-68	-68	-68	-68	-68	-68	-68	-68
Landfill (C+D)	219	252	294	233	229	225	-98	-101	-104	-106	-107	-109	-110	-112	-113	-264	-265	-266	-267	-268	-269	-270	-271
Recycling (aggregates, C+D)	2005	1956	1872	1792	1776	1720	1606	1593	1583	1576	1570	1564	1557	1551	1546	1541	1536	1532	1528	1524	1519	1515	1511
Total	**4001**	**3847**	**3907**	**3315**	**3286**	**3211**	**2394**	**2372**	**2359**	**2356**	**2356**	**2356**	**2355**	**2355**	**2356**	**1622**	**1624**	**1627**	**1629**	**1631**	**1632**	**1632**	**1634**

The table illustrates the following deficiencies in capacity:

- From 2011 every year onwards there is a gap (deficit) for non-hazardous landfill
- From 2009/10 to 2031 there is a gap (deficit) for energy recovery capacity
- There are surplus capacity for treatment, recycling, composting and recycling of aggregates for the whole of the plan period – in reality there may be some shortfalls for individual waste streams (metals, textiles etc)
- From 2024 there is a gap (deficit) with regard to hazardous landfill which then continues to 2031
- From 2015 there is a gap (deficit) with regard to landfill covering construction and demolition materials.

An important aspect of the model is its ability to allow waste arisings to be analysed by material types and projected destinations. This is important in practical terms as these elements of the modeling output show where specific changes in waste management practice will have to occur if the aim of managing waste more sustainably is to be achieved.

5.1.2 Estimated capacity gap for scenario 2

Table 15 below illustrates capacity status for waste management in Greater Manchester for the 5 year intervals of the waste plan, i.e. 2012, 2017, 2022 and 2027. 2009 has been included as the baseline year. This shows:

- Additional annual capacity will be required in 2012, 2017, 2022 and 2027 in order to fill the gap for energy recovery.
- Additional capacity is required for non-hazardous landfill and for landfill construction and demolition waste in 2012, 2017, 2022 and 2027.
- Further hazardous landfill capacity is not required until 2024..

Table 15 Capacity gaps as at 2009, 2010, 2015, 2020 and 2030 under Scenario 2 (in '000s tonnes)

Waste Management	2009	2012	2017	2022	2027
Landfill (non-hazardous)	no net gap	-425	-407	-356	-837
Energy Recovery	-173	-170	-354	-354	-353
Treatment plant	no net gap	no net gap	no net gap	no net gap	no net gap
Recycling	no net gap	no net gap	no net gap	no net gap	no net gap
Composting	no net gap	no net gap	no net gap	no net gap	no net gap
Landfill (hazardous)	no net gap	no net gap	no net gap	no net gap	-68
Landfill (C+D)	no net gap	no net gap	-104	-112	-267
Recycling (aggregates, C+D)	no net gap	no net gap	no net gap	no net gap	no net gap

****Gaps (deficits are highlighted in yellow).

Irrespective of the 5 year indications above, the plan will need to ensure that capcity is met when a gap arises. In addition to this, the waste plan will be required to initiate the required waste developments to ensure that facilities are on stream in time to meet the capacity gaps, approximately 5 years in advance of a deficit to ensure the facility is planned and built.

Figures 3 and 4 illustrate the capacity gap for landfill non-hazardous and landfill construction and demolition waste respectively.

Figure 3 Non-hazardous landfill capacity 2009-2031

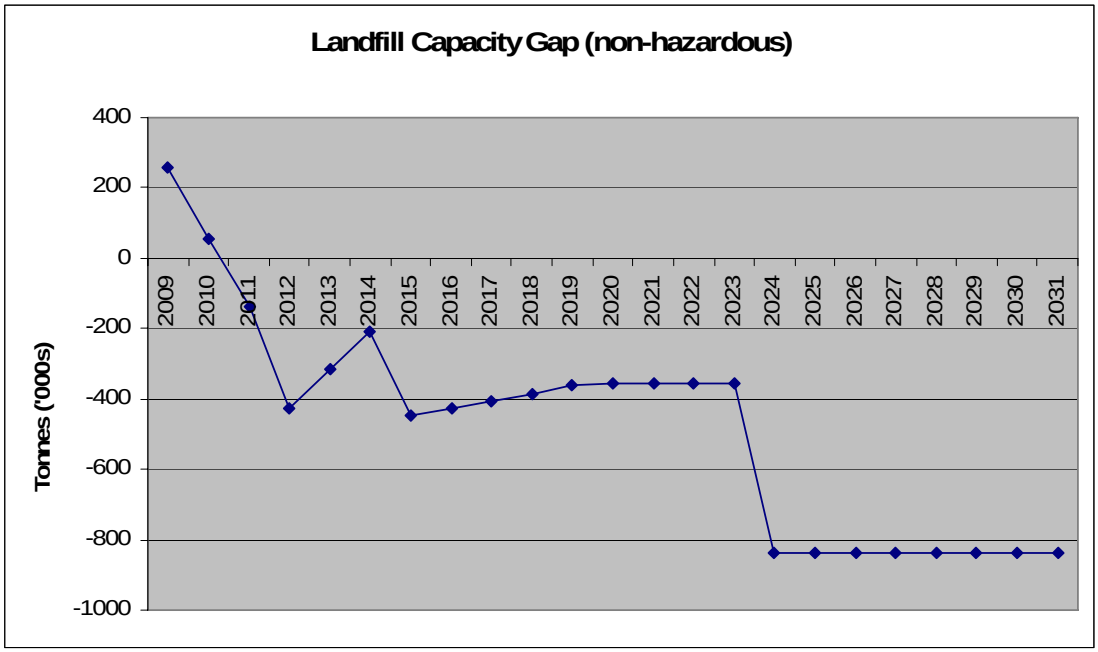
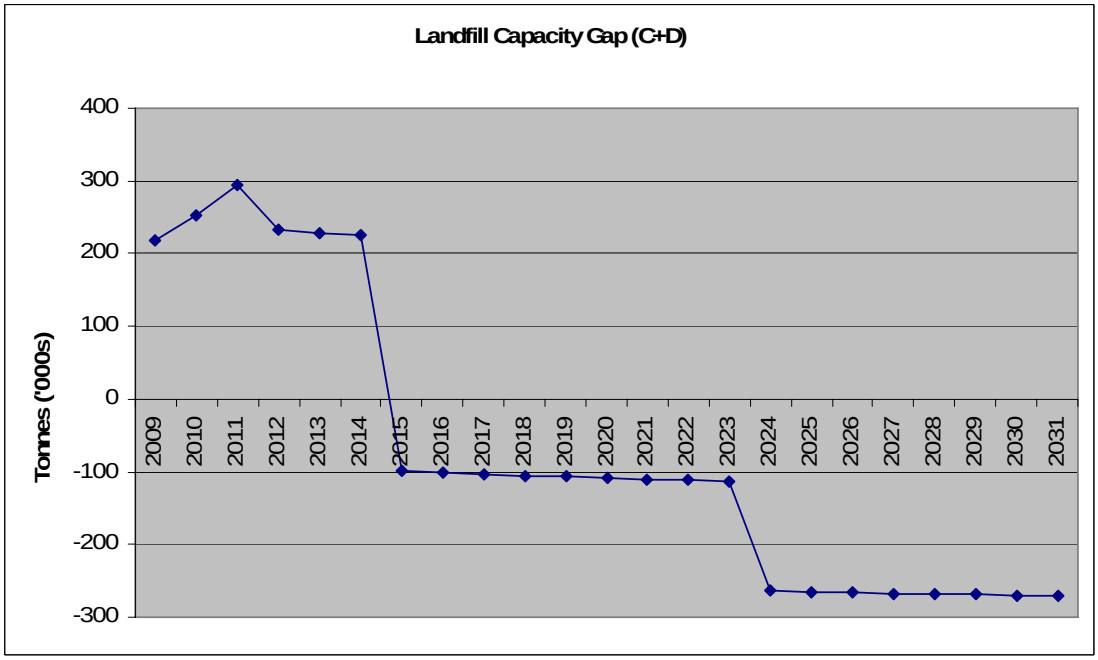


Figure 4 C&D landfill capacity gap (2009-2031)



5.2 Translation of Projected need into Facility Options

Figure 5 shows the facility requirement as forecast in the 2007 model for scenario 2. This is compared with the facility requirement forecast for 2015 in the updated model shown in figure 6.

Figure 5 Projected facility requirement in 2015 based on the capacity gap modeled in 2007

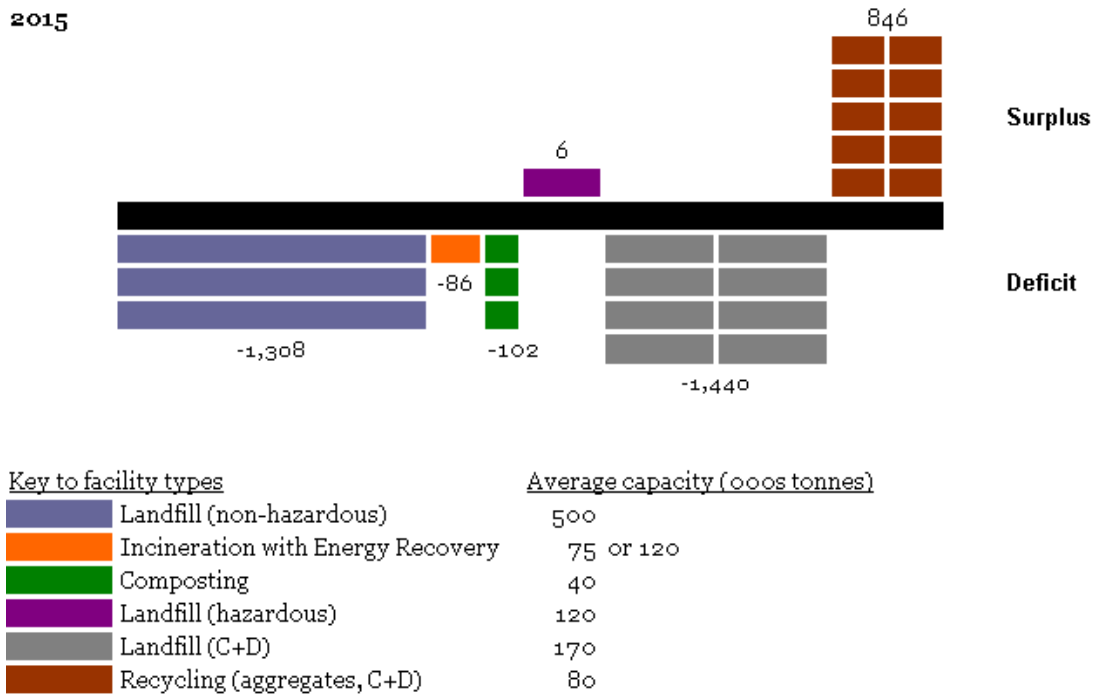
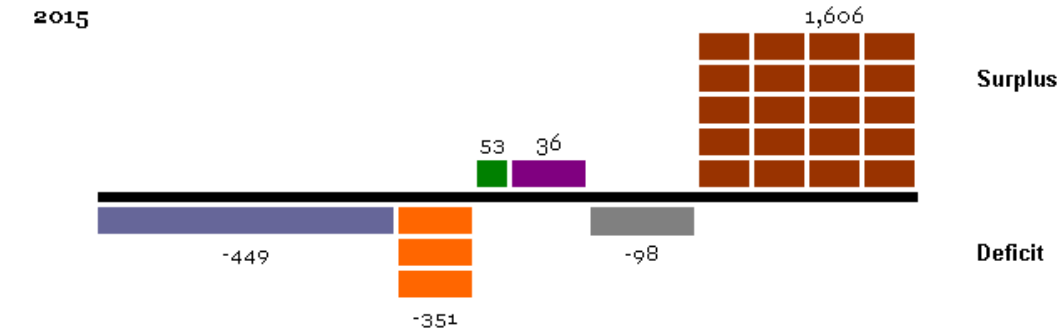


Figure 6 Projected facility requirement in 2015 based on the capacity gap modeled



Key to facility types	Average capacity (0000s tonnes)
Landfill (non-hazardous)	500
Incineration with Energy Recovery	75 or 120
Composting	40
Landfill (hazardous)	120
Landfill (C+D)	170
Recycling (aggregates, C+D)	80

Each block represents 1 facility, while the width of the block indicates the capacity of the facility (based upon average capacity of each facility type). Facility requirement for recycling has not been represented as there is no due to the large variation in capacity size of recycling plants, ranging between 5000 tonnes to greater than 50,000 tonnes.

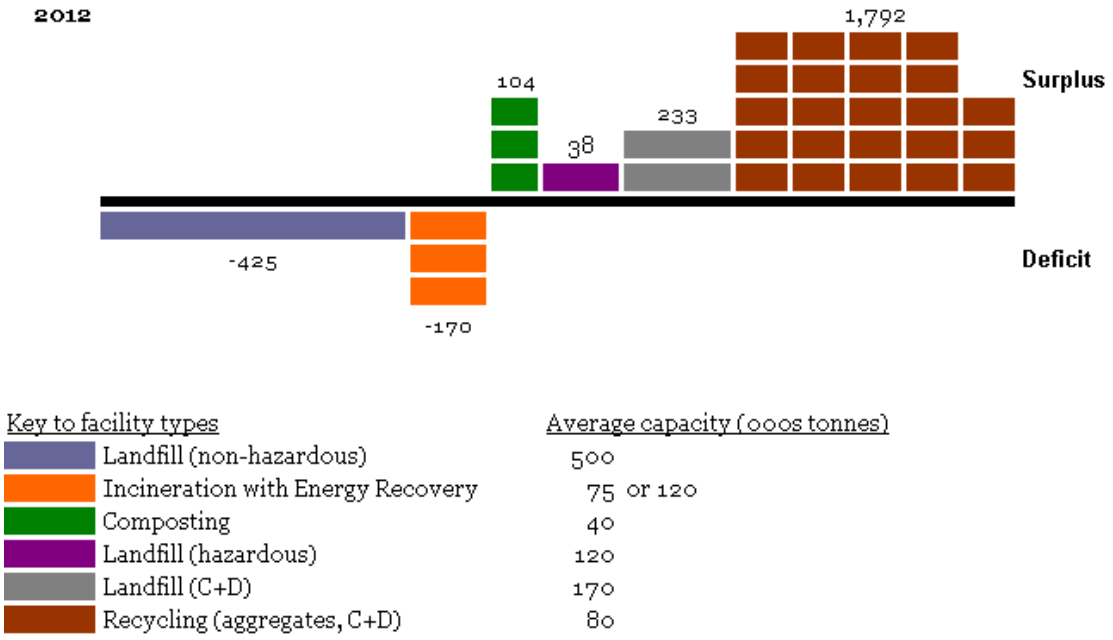
The model shows that there is a surplus of recycling capacity when dealt with as a whole, in reality if we are to distinguish between discarded equipment recycling with textile recycling or recycling for mixed ordinary waste these may required totally different treatment methodologies and specific plant. The modeled scenarios indicate surplus capacity at 2015 for recycling (C&D) and no new facilities are shown as required. However, materials specific capacity can be expected to be required for recycling. This is because we are not able to break down the sub-categories of recycling capacity to relate it to the arisings information (as this is not expressed by recycling process). There is no detail on capacity information for individual waste streams of paper, card, glass, plastics, ELV etc, so that the only information is for total recycling capacity. If there is a surplus gap this could also be taken up by imports – unfortunately at this point in time there is no way of knowing for certain. The table therefore shows an indicative surplus capacity for these waste management facilities with this note of warning attached.

A comparison of the 2007 forecast and the current forecast for 2015 facility deficit and surplus shows that landfill facility requirement as forecast in the 2007 model has reduced from 3 facilities (see figure 5) to 1 facility (see figure 6). Recycling surplus has increased from 10 facilities in the 2007 forecast to 20 facilities, while landfill facility requirement for C&D waste has reduced from 8 facilities in the previous model to 1 facility. Facility requirement for energy recovery has increased from 1 facility from the previous model to 3

facilities in the current model. In the previous model a deficit in facilities for composting in 2015 was forecast, however in the current model, there is a surplus of 1 facility.

Figures 7, 8, 9 and 10 provide some indication of the number of facilities required to fill the gaps in the waste plan interval years 2012, 2017, 2022 and 2027 respectively, using scenario 2. This is produced for illustration purposes based upon the average capacity for each facility type.

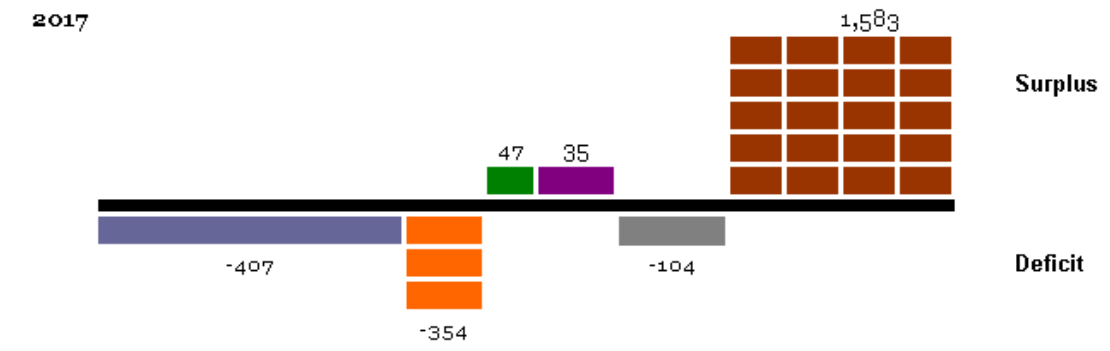
Figure 7 Projected facility requirement in 2012 based on the capacity gap modeled



Each block represents 1 facility, while the width of the block indicates the capacity of the facility (based upon average capacity of each facility type).

Figure 7 shows the indicative number of additional facilities (surplus and deficit) in 2012.

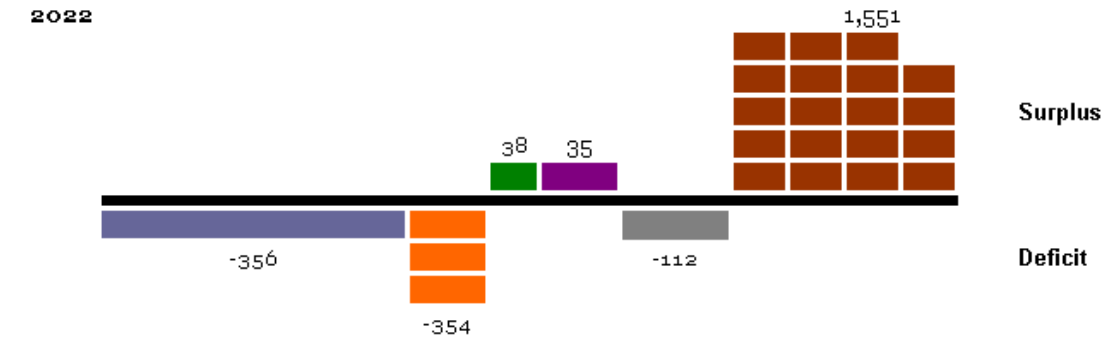
Figure 8 Projected facility requirement in 2017 based on the capacity gap modeled



Key to facility types	Average capacity (000s tonnes)
Landfill (non-hazardous)	500
Incineration with Energy Recovery	75 or 120
Composting	40
Landfill (hazardous)	120
Landfill (C+D)	170
Recycling (aggregates, C+D)	80

Each block represents 1 facility, while the width of the block indicates the capacity of the facility (based upon average capacity of each facility type).

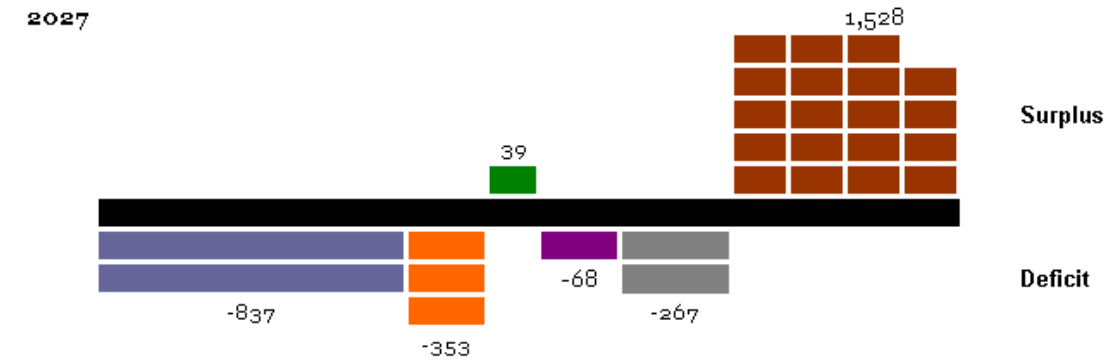
Figure 9 Projected facility requirement in 2022 based on the capacity gap modeled



Key to facility types	Average capacity (000s tonnes)
Landfill (non-hazardous)	500
Incineration with Energy Recovery	75 or 120
Composting	40
Landfill (hazardous)	120
Landfill (C+D)	170
Recycling (aggregates, C+D)	80

Each block represents 1 facility, while the width of the block indicates the capacity of the facility (based upon average capacity of each facility type).

Figure 10 Projected facility requirement in 2027 based on the capacity gap modeled



Key to facility types	Average capacity (000s tonnes)
Landfill (non-hazardous)	500
Incineration with Energy Recovery	75 or 120
Composting	40
Landfill (hazardous)	120
Landfill (C+D)	170
Recycling (aggregates, C+D)	80

Each block represents 1 facility, while the width of the block indicates the capacity of the facility (based upon average capacity of each facility type).

6 Conclusions

Conclusions – Baseline Data

The most up to date available data has been used to update the model drawing on the basic sources available. There is obviously not available a perfect data set, however the model is robustly constructed and has been updated using the latest published data available.

Conclusions – Low Level Radio Active and Agricultural Waste Data

Low level radio active waste is at very low levels in Greater Manchester, requires specialist management and as such is self contained and is not represented consequently in the modeling process.

Agricultural wastes are at fairly low quantities; 300,000 tonnes having a 96% land recovery usage with <10% going to treatment and <3,000 tonnes going for energy recovery. Agriculture waste figures are contained within the

modeling process but have not undergone extensive update since the original model in 2007, as no new update information is available.

Conclusions – Modifiers used in the model

Updates on Legislation and policy forecasts have been factored into the Modifiers based upon the national waste strategy, the updated NW RWS, the Regional Spatial Strategy and the Municipal Waste Management Strategies for Greater Manchester and Wigan. These factors have been important in defining the assumptions underpinning scenario 2 developed for model. An important product of the model is that it also allows waste arisings to be analysed by material types and projected destinations.

Conclusions – GMFM Model

The GMFM model has been the key to informing the modifiers for the economic and social factors. Baseline models have been used in this report following recent update in November 2009.

Conclusions – The Needs Assessment Model

The model has updated to continue the level of detail and consistency first created in 2007. The model provides an understanding of waste management, in terms of who is producing the waste, the material streams and the waste management destinations. The model also includes data on which materials have the potential for recycling or energy recovery by waste stream and producing sector. Together with the modifiers used provide a forecasting of future arisings and disposal scenarios if the aim of managing waste more sustainably and towards the top of the waste hierarchy is to be achieved. This is important in practical terms as these elements of the modeling output show where specific changes in waste management practice will have to occur. Further reports for the model can be run which will show which commercial and industrial sectors are generating those wastes which could be more productively managed.

Conclusions – Scenario 2

This scenario was adopted in 2007 to commit to maximising recycling and recovery of C&I wastes and CD &E waste arisings from the Greater Manchester sub-region. The targets set for 2010 with regard to C&I were by 2010 75% recyclable 25% possibly recyclable. The analysis of the model shows that these targets have been met in 2009 and so should easily be met for 2010. The target set for 2010 of 50% of the remaining material to be used for energy recovery has not been met. It would appear that this target will be unlikely to be met for 2010 and that there requires significant change in waste management for this to be achieved. This target has been continued for 2015.

Maximising recycling and recovery results in some significant differences in the capacity requirements for different waste management methods. There appears to be surplus capacity for composting and recycling (C&D) and general recycling capacity for the whole plan period. There is a deficit and gap in capacity for the whole plan period for landfill (non-hazardous), energy recovery and landfill (C&D),

Conclusions – Scenario 2

The Implementation of the Municipal PFI will be a major contribution to meeting targets for managing predicted waste arisings for scenario 2.

There is a current reliance on landfill exports from Greater Manchester

Landfill requirement is predicted to significantly reduce

In the medium to longer term, it is probable that Greater Manchester will be a net importer of waste for treatment.

There are still opportunities to look at to meet the energy recovery targets for 2015 if provision is to be made within Greater Manchester.

Appendix 1 Definitions

AGMA	Association of Greater Manchester Authorities
BREW	Business Resource Efficiency and Waste Programme
BVPI	Best Value Performance Indicator
C&D(E)	Construction & Demolition (Excavation)
C&I	Commercial & Industrial
DCLG	Department of Communities and Local Government
E Permits	Environmental Permits
EA	Environment Agency
GM	Greater Manchester
GMFM	Greater Manchester Forecasting Model
GMGU	Greater Manchester Geological Unit
GMWDA	Greater Manchester Waste Disposal Authority
HWRC	Household Waste Recycling Centres
JWDPD	Joint Waste Development Plan Document
JWPC	Joint Waste Planning Committee
MRF	Materials Recycling Facility
MSW	Municipal Solid Waste
MWMS	Municipal Waste Management Strategy
Non-Haz	Non-Hazardous
NW RSS	North West Regional Spatial Strategy
NW RTAB	North West Regional Technical Advisory Body
NW RWS	North West Regional Waste Strategy
NWS	National Waste Strategy
PFI	Private Finance Initiative
PVC	Polyvinyl Chloride
RATS	Regis Attached Tonnage System
SIC	Standard Industrial classification
SOC	Substance Orientated Classification
SRF	Solid Recover Fuel
WDA	Waste Disposal Authority
WRAP	Waste and Resources Action Programme

Appendix 2 The GMFM model

The GMFM is an econometric model developed by Oxford Economic Forecasting.

It has been used to forecast hundreds of variables pertaining to the regional economy and its sub-regions. The OEF regional model is part of an integrated suite of models that feed 'top-down' on a geographical basis. The core of the structure is a model of the world economy covering 24 countries with further attention being paid to another 20 emerging market economies.

Country models are interlinked via trade, prices, exchange rates and interest rates and the UK, along with the US, Japan Germany, France, Italy, Canada and China, all defined among the primary county group. Countries have a natural growth rate that is the result of interaction between population and both productivity growth/output cycle around the growth trend.

On the demand side, a series of traditional behavioural functions are employed for consumption and investment with exports dependent on world demand and the real exchange rate and imports determined by (real) domestic demand and competitiveness (Technical evaluation of economic models, PION Economics April 2006).

Outputs from the OEF UK macro model are used as inputs for the UK industry model which covers some 59 sectors. The OEF regional model sits directly beneath the UK macro and industry sector models. Conventional time-series econometrics are employed to estimate behavioural relationships and forecasts are scaled back to match OEF UK sector totals.

The baseline scenario has the Greater Manchester performing in relation to the global and national economy.

An Accelerated Growth Scenario detaches the Greater Manchester economy by allowing it to grow faster than anticipated from global and national trends.

Appendix 3
Data list – Arisings information

1. Data sources and information

1.1 Needs Assessment - Background documents –Web-links and Reference Documents

Information on radioactive waste
http://www.nda.gov.uk/strategy/waste/index.cfm

A Waste Strategy for the North West – The Challenge Ahead: The Banks Foundation, April 2004
http://rpg.nwra.gov.uk/documents/index.php?group_id=72&expand=6

Regional Planning Guidance 13
http://rpg.nwra.gov.uk/planning/rpg_for_the_nw.php

Submission Draft RSS for the North West
http://rpg.nwra.gov.uk/planning/spatial.php

Regional Waste Strategy for the North West: NWRA, Sept 2004
http://rpg.nwra.gov.uk/waste/regional_waste_strategy.php

Regional Economic Strategy for the North West 2006 and the RES baseline Report November 2006
http://www.nwda.co.uk/publications/strategy/regional-economic-strategy-200.aspx

The Environment Agency Data for year 2004/05
http://www.environment-agency.gov.uk/subjects/waste/1031954/315439/1434288/

DCLG report by Symonds on CDEW ' Survey of Arisings and Use of Construction and Demolition and Excavation Waste as Aggregate in England in 2003' and updated 2006 report which this becomes available
http://www.communities.gov.uk/pub/123/p1508123.htm

Environment Agency Strategic Waste Management Assessment Data for NW Region

Greater Manchester Economic Development Plan Future Scenarios for Employment Change in the Greater Manchester Economy 2002 to 2015

APPENDICES

Greater Manchester Economic Development Plan 2002 - 2015

Manchester Enterprises - Demand for Employment Land in Greater Manchester Final Report 30th May 2006

2003 Population Projections (source GMGU)

JWDPD – Interim Needs Assessment (ERM, 2007)

JWDPD – Stage 1 Issues and Options Report, May 2007

Manchester City Region Spatial Strategy, September 2006

2006 'City Region' Forecasts April/May 2006 Oxford Economic Forecasting Regional Forecasts Limited

Greater Manchester Joint Waste Development Plan Document: Project Plan June 2006

NW Regional Economic Strategy, 2006

Regional Waste Strategy for the North West, September 2004 and Update 2010

REWARD NORTH WEST Building evidence to inform regional commercial & industrial waste policy - A report to the Environment Agency 12th October 2004

Municipal Solid Waste Management Strategy Wigan Metropolitan Borough Council October 2006

Greater Manchester Waste disposal authority Municipal Waste Management Strategy Review 2006-07

NW Region Commercial & Industrial waste Surveys 2006 & 2009

Environment Agency Waste Interrogators 2006, 2007& 2008

Environment Agency Hazardous Waste Interrogator 2008

1.2 Data Sets

1.2.1 Hazardous Waste Data

Hazardous waste

Hazardous Waste Data 2008 from Hazardous Waste Interrogator

GM is a net importer of Hazardous Waste

	Energy recovery	Incineration without energy recovery	Landfill	Recycling / reuse	Rejected	Transfer (D)	Transfer (R)	Treatment	
Arising Outside NW and Deposited in GM	42	3,022	9,703	13,820	158	3,869	6,711	36,200	
Arising in NW and deposited in GM	90	3,770	3,229	3,615	424	1,317	2,126	50,458	
Arisings and deposited in GM	87	7,946	5,907	6,128	26	2,853	7,390	3,006	
Total deposits	**219**	**14,738**	**18,839**	**23,563**	**608**	**8,039**	**16,227**	**89,664**	**1**
Exports from GM Outside NW Region	944	793	20,763	15,738	24	9,328	8,508	4,882	
Exports from GM to NW region	19	570	11,606	6,184	5	1,862	10,024	9,076	
Total Exports	**963**	**1,363**	**32,369**	**21,922**	**29**	**11,190**	**18,532**	**13,958**	**1**
Net Importer/Exporter	*-744*	*13,375*	*-13,530*	*1,641*	*579*	*-3,151*	*-2,305*	*75,706*	

Healthcare accounts for 100% incineration without energy recovery in GM

99% of hazardous waste landfilled in GM C&D with Asbestos

Hazardous Waste Landfill Exports

83% landfill exports are C&D with Asbestos
14% Waste/water treatment Industry

Hazardous waste managed in Greater Manchester

38% of waste treated in **Greater Manchester** (90,000 tonnes) is not specified by character the rest includes the following diverse waste types;

Waste/Water Treatment and Water Industry
Organic Chemical Processes
Not Otherwise Specified
Shaping/Treatment of Metals and Plastics
MFSU Paints, Varnish, Adhesive and Inks
Photographic Industry
Oil and Oil/Water Mixtures
Not Otherwise Specified
Inorganic Chemical Processes

Organic Chemical Processes
MFSU Paints, Varnish, Adhesive and Inks
Mining and Minerals
Metal Treatment and Coating Processes

The main hazardous waste classed as managed under recycling in Greater Manchester (23,600 tonnes) included;

Oil and Oil/Water Mixtures
Municipal and Similar Commercial Wastes
Photographic Industry
Not Otherwise Specified
Municipal and Similar Commercial Wastes
MFSU Paints, Varnish, Adhesive and Inks
Packaging, Cloths, Filter Materials
Waste/Water Treatment and Water Industry

Arising & deposited in Greater Manchester

Agricultural and Food Production	1
Leather and Textile Production	14
Inorganic Chemical Processes	245
Organic Chemical Processes	430
MFSU Paints, Varnish, Adhesive and Inks	1,724
Photographic Industry	225
Thermal Process Waste (inorganic)	12
Metal Treatment and Coating Processes	443
Shaping/Treatment of Metals and Plastics	136
Oil and Oil/Water Mixtures	3,080
Solvents	39
Packaging, Cloths, Filter Materials	348
Not Otherwise Specified	3,928
C&D Waste and Asbestos	6,062
Healthcare	9,121
Waste/Water Treatment and Water Industry	158
Municipal and Similar Commercial Wastes	7,379
	33,343

Hazardous waste Exported

Material exported for recycling was mainly:
Approx 50% is not specified
30% Oil Waste mixtures

Arising in GM & Exported

Mining and Minerals	50
Agricultural and Food Production	27
Wood and Paper Production	1
Leather and Textile Production	57
Petrol, Gas and Coal Refining/Treatment	78
Inorganic Chemical Processes	852
Organic Chemical Processes	2,546
MFSU Paints, Varnish, Adhesive and Inks	5,579
Photographic Industry	422
Thermal Process Waste (inorganic)	166
Metal Treatment and Coating Processes	2,059
Shaping/Treatment of Metals and Plastics	969
Oil and Oil/Water Mixtures	18,059
Solvents	570
Packaging, Cloths, Filter Materials	1,889
Not Otherwise Specified	19,272
C&D Waste and Asbestos	41,287
Healthcare	10,310
Waste/Water Treatment and Water Industry	10,610
Municipal and Similar Commercial Wastes	14,690
	129,493

Hazardous Waste Data – Waste Deposited - from EA Interrogator 2008 000s Tonnes

Sub region Origin	All Hazardous	Landfilled Hazardous	Hazardous Transferred	Hazardous Treated	Hazardous at Metal Recycling Sites
Buckinghamshire	0	0	0	0	0
Cheshire	16	0	10	5	0
Cumbria	0	0	0	0	0
Derbyshire	1	0	0	0	0
Greater Manchester	25	5	9	3	8
Lancashire	36	2	2	27	5
Lincolnshire	0	0	0	0	0
Merseyside	1	1	0	0	0
No Origin Recorded	110	0	8	86	16
Outside UK	1	0	0	1	0
South Yorkshire	2	0	0	2	0
Staffordshire	7	7	1	0	0
Wales	1	0	0	1	0
West Yorkshire	1	0	0	0	0
Yorkshire & Humber	2	2	0	0	0
Totals as 000s tonnes	203	18	30	127	28

Imports to Greater Manchester (tonnes)	68,084	12,806	13,298	37,466	4,514
% Origin in Greater Manchester	%	29%	29%	2%	12%
NW % Origin in NW Region	0	0	0	0	0
% Imported	34%	71%	45%	30%	16%
% Origin not Recorded	54%	0	27%	68%	54%

There is a variance of 31,000 tonnes between recorded data from deposits at permitted facilities in Greater Manchester and data from the Hazardous waste movement records; Landfill totals are similar; it is possible that the main variance lies in hazardous waste reported at metal recycling sites.

1.2.2 Municipal Waste Key Data and Targets

Municipal Waste Arisings 000s Tonnes		2006/7		2008/9	
		GMWDA	Wigan	GMWDA	Wigan
Composted		103	14	103*	14
Recycled		206	21	246*	29
Recycled &Composted		309	35	349	43
Residual	TRF	121	0	102	0
	Landfilled	903	149	703**	111
Commercial + Other		184	51	51	2
Household		1148	133	1104	151
Municipal		1332	184	1204	171
KG/Hd		513	523	474	494

* Estimated

**MSW landfilled outside of NW region 2008 401,282 tonnes in Humberside

Targets

Waste Growth	2010	2015	2020	2030
GMWDA	1%	0.5%	0	0
Wigan	1%	0.5%	0	0
Regional	1%	2014 0%		
National				

Recycling/Composting	2010	2015	2020	2030
GMWDA	33%	47%	50%	50%
Wigan	30%	33%	50%	?
Regional	35%	45%	55%	
National	40%	45%	50%	

Recover of value	2010	2015	2020
GMWDA	44% (120,000 Tpa TRF)	75% (120,000 Tpa TRF)	76% (120,000 Tpa TRF)
Wigan	45%	67%	
Regional	45%	67%	
National	53%	67%	75%

BMW Allowances and BMW Landfilled 2007/8

Authority	BMW landfilled in 2007/08 (000tonnes)	BMW Surplus Allowance 2007/08
Greater Manchester Waste Disposal Authority	582	136
Wigan Council	101	7

BMW Allowances and BMW Landfilled 2008/9

Local authority	BMW landfilled 2008/9 (000s Tonnes)	Surplus allowances 2008/9 (000s Tonnes)
Wigan	85	10
Greater Manchester	505	141

	Wigan Metropolitan Borough Council	Greater Manchester Waste Disposal Authority
Target 2005-06	127,850	820,739
Landfilled 2005-06	**132,379**	**620,044**
Target 2006-07	119,710	776,832
Landfilled 2006-07	**110,037**	**613,434**
Target 2010	79,008	557,297
Target 2013	52,625	371,200
Target 2020	36,823	259,740

Municipal Waste Landfill 2008/9

Location of Landfill (data in 000sTonnes)	GMWDA	Wigan	Total in GM
Greater Manchester	122	111	232
NW	178		Total Exported
			571
Humberside	393		

Landfill	2010	2015	2020
GMWDA LATS + inert* (MWMS)	819,000	499,000 (340,000)	381,000 (333,000)
Wigan LATS+ inert (MWMS)	116,188 (209,225)	70,750 (228,745)	250,000 (56,798)

LATS allowances are estimated on the basis of the total weight of municipal waste containing 68% of biologically active waste, thus actual waste managed = LATS allowance plus Inert

Residual Kg/Hd popn	2020 NWS target	2020
GMWDA	225	(180)
Wigan	225	?

1.2.3 Regional and National Targets

Objectives and targets
The Government's key objectives are to:
• decouple waste growth (in all sectors) from economic growth and put more emphasis on waste prevention and re-use;
• meet and exceed the Landfill Directive diversion targets for biodegradable municipal waste in 2010, 2013 and 2020;
• increase diversion from landfill of non-municipal waste and secure better integration of treatment for municipal and non-municipal waste;
• secure the investment in infrastructure needed to divert waste from landfill and for the management of hazardous waste; and
• get the most environmental benefit from that investment, through increased recycling of resources and recovery of energy from residual waste using a mix of technologies.

A greater focus on waste prevention will be recognised through a new target to reduce the amount of household waste not re-used, recycled or composted from over 22.2 million tonnes in 2000 by 29% to 15.8 million tonnes in 2010 with an aspiration to reduce it to 12.2 million tonnes in 2020 – a reduction of 45%. This is equivalent to a fall of 50% per person (from 450 kg per person in 2000 to 225 kg in 2020).

Higher national targets than in 2000 have been set for:
recycling and composting of household waste –

at least 40% by 2010, 45% by 2015 and 50% by 2020; and
recovery of municipal waste – 53% by 2010, 67% by 2015 and 75% by 2020.

Commercial and Industrial

The Government will shortly be setting a new national target for the reduction of commercial and industrial waste going to landfill. On the basis of the policies set out in Waste Strategy for England 2007, levels of commercial and industrial waste landfilled are expected to fall by 20% by 2010 compared to 2004.

The Government is considering, in conjunction with the construction industry, a target to halve the amount of construction, demolition and excavation wastes going to landfill by 2012 as a result of waste reduction, re-use and recycling.

1.3 Base Data and Information Sources

Waste Arisings data				
Sector/Sub Sector	**Waste Type/ Management Method** (Current)	**Latest data**	**Source**	**Data Trend**
Municipal		2006/7 GMWDA 2005/6 Wigan	**GMWDA Wigan WDA EFRA published statistics**	**2001-2008/9**
Household	Recyclates			
Percentage of household waste arisings sent for recycling (-26.85% 308453 GMWDA) tonnes	Green/Kitchen (compostable)			
	Residual			
HWRCs	Recyclates			
	Green(compostable)			
	Residual			
Non Household	Residual – (landfill)			
Commercial	Residual – (Landfill)			
Kg of household waste collected per head of population				
Percentage of change from previous year in Kg of household waste collected per head of population				
Commercial		**2009**	**NW C&I Survey**	**1999 – 2009 4 datasets**
Public Sector	Detailed in C&I Survey 2006 9 waste categories 9 Management Methods			
Retail & Wholesale				
Other Services				
Industrial				
Food, drink and tobacco				
Textiles/wood/paper/publishing				
Power & Utilities				
Chemical/non-metallic minerals manufacturing				
Metal manufacturing				
Machinery & equipment (other manufacturing)				

Hazardous waste	Old Special Waste data Includes some import/export data	**2008 Hazardous Waste Interrogator**	**Environment Agency**	**No trend for new Regulations**
Sector/Sub Sector	**Waste Type/ Management Method** (Current)	**Latest data**	**Source**	**Data Trend**
Waste Facility type		**2008**	**Environment Agency Waste Interrogator 2008** **(Deposits at permitted sites)**	**No**
Inert Landfill	251,896			
Non Hazardous Landfill	366,544			
RU Landfill	29129			
Total Landfill	**647,569**			
Inert Transfer	739,987			
MRF	43117			
Physical Treatment	49725			
CA Sites	18343			
Total under management	1,498,741			
Inert Waste Exports				
Cheshire	367,337*			
Derbyshire	26,261			
Lancashire	22,515			
Merseyside	18,419			
South Yorkshire	5,160			
Total Exports	72,698			
	*366,994 MSC Dredging			
Agricultural Waste		2003		
Low Level Radio Active			EA	
Waste Management Capacity Data	**Source**	**Latest data**	**Trends**	
Landfill	GMGU	2008	No	
	EA	end 2005	No	
	EA	2005	2001/5	
treatment	EA	2008		
MRS	EA	2008		
Transfer sites	EA	2008		

Deposits Imports and Exports - All Waste Management

(Data Extracted from the Environment Agency Interrogator 2008)

Waste Managed in Greater Manchester All Methods	Tonnes	Percentage
Total	**6,362,038**	
Total Imported	1,184,552	19%
Total Waste Exported	1,519,049	23%
Origin Not Recorded	1,530,931	24%

All Waste Managed/Deposited in Greater Manchester with Origin >than 1000 tonnes in 2008

	000s Tonnes
Buckinghamshire	1
Cheshire	70
Cumbria	2
Derbyshire	20
Greater Manchester	3,647
Lancashire	425
Lincolnshire	1
Merseyside	123
North London Waste Authority	1
North Wales	3
North West Region but no sub-region identified	461
Northern Ireland	5
Origin Not Recorded	1,531
Outside UK	2
Scotland	2
Shropshire	1
South Yorkshire	5
Staffordshire	7
Wales	3
Warwickshire	1
West Midlands	1
West Yorkshire	45
Yorkshire & Humber	4
Total from sub region over 1,000 tonnes	6,362
Imports tonnes	1,185
% Origin in Greater Manchester	57%
NW % Origin in NW Region	16%
% Imported to GM sub region	17%
% Imported from Outside NW region	1%
% Origin not Recorded	24%

- Less than 4000 tonnes was recorded as arising in the remaining UK sub-regions.

- Most of the waste with no recorded origin was in transfer, treatment and metal recycling. It is likely that much of the waste with no origin recorded arose locally within GM or within the adjacent NW region.

Only 2% of non hazardous landfill had no recorded origin and only 4% of inert landfill had no recorded origin.

Non Hazardous Waste (HIC) Imports (All Data from EA Interrogator 2008)

Non Hazardous (Household Industrial & Commercial) Waste Managed/Deposited in Greater Manchester with Origin Greater than 1000 tonnes per annum

	HIC all waste	HIC landfill	HIC Transfer	HIC Treatment	HIC MRS
Buckinghamshire	1	0	0	1	0
Cheshire	49	30	2	17	0
Derbyshire	14	5	0	9	0
Greater Manchester	2,455	676	941	834	4
Lancashire	232	6	217	8	0
Merseyside	20	19	0	0	1
North London Waste Authority	1	0	1	0	0
North Wales	2	0	1	0	0
North West	386	0	49	337	0
Northern Ireland	5	4	0	0	0
No Origin Recorded	814	15	385	395	20
Outside UK	1	0	0	1	0
Scotland	2	0	0	1	0
South Yorkshire	3	0	1	2	0
Wales	2	0	0	2	0
Warwickshire	1	0	0	1	0
West Midlands	1	1	0	0	0
West Yorkshire	40	39	0	1	0
Yorkshire & Humber	2	2	0	0	0
Total 000s Tonnes	4,033	797	1,600	1,612	25
Imports to Greater Manchester (tonnes)	764,002	105,512	274,262	383,329	900
% Origin in	61%	85%	59%	52%	17%

Greater Manchester					
NW % Origin in NW Region	10%	0	3%	21%	0
% Imported	19%	13%	17%	24%	4%
% Origin not Recorded	20%	2%	24%	24%	79%

Non Hazardous Landfill Exports - Data in Tonnes		
Cheshire	155,141	
Warrington	84,695	
Humberside	401,282	
Lancashire	125,260	
Merseyside	25,752	
N Wales	43,811	
Exports Total	**835,940**	
Transfer Total	1,589	
Treatment	40,402	27,440 at MRF

Municipal Waste Landfill GM Deposits & Exports

000sTonnes	GMWDA	Wigan	Total in GM
GM	122	111	232
NW	178		Total Exported
			571
Humberside	393		

Deposit data summaries from EA interrogator 2006-2008

Transfer	Waste Type	**2006**	**2007**	**2008**
Inert Transfer Facilities	Inert	21,655	53,404	35,261
	HlC	760	1,830	1,823
	Hazardous waste	0	497	451
	Total	**24,421**	**57,738**	**39,543**
Non Hazardous Transfer Facilities	Inert	487,475	275,862	565,042
	HlC	1,246,590	1,522,812	1,406,069
	Hazardous waste	438	4,830	6,386
	Total	**1,734,503**	**1,803,504**	**1,977,497**
Hazardous Transfer Facilities	Inert	29,224	73,138	89,626
	HlC	188,530	203,554	134,866
	Hazardous waste	19,407	19,762	18,399
	Clinical	2,409	2,420	1,811
	Total	239,570	298,874	244,702
Civic amenity sites	Inert	21,006	20,329	20,446
	Household	282,950	306,448	268,898
	Hazardous waste	1,608	2,164	3,525
	Total	**305,564**	**328,941**	**292,869**

Treatment				
Site Type				
	inert	8,467	13,405	25,457
	HIC	180,320	189,182	448,926
	Haz	9,076	952	462
Material recovery	**Total**	**197,863**	**203,539**	**474,845**
	Inert	97,332	57,190	49,958
	HIC	339,540	396,601	274,125
	Haz	2,996	11,597	24,851
Physical	**Total**	**439,868**	**465,388**	**348,934**
	Inert	910	900	780
	HIC	58,795	87,623	100,150
	Haz	140,786	49,983	59,357
Physio-chemical	**Total**	**200,491**	**138,506**	**160,287**
Composting	Inert	0	0	0
	HIC	3,523	3,724	3,573
	Total	**0**	**0**	
	Inert	**0**	**0**	**0**
	HIC	0	0	0
	Haz	0	0	0
	HIC at WWTW	204,794	350,181	814,039
	Haz at WWTW		54,616	41,923
Biological	**Total**	204794	404,797	855962
	Treatment Total			
Metal Recycling Site				
Site Type				
	Inert	112	51	1,450
	HIC	37,514	1,006	863
ELV	Haz	24,964	13,856	5,078
	Inert	1,189	2,450	1,724
	HIC	10,817	9,077	7,758
Car Breakers	Haz	3,665	3,846	6,198
	Inert	66,691	53,260	162,617
	HIC	451,078	181,548	455,457
Metal Recycling	Haz	6,480	2,304	17,183
Total				
	Inert	1,301	2,501	3,174
	HIC	48,331	10,083	8,621
Car Breakers/ELV	Haz	28,629	17,702	11,276
Landfill Deposit Data				
Site Type				
	Total	**0**	**0**	**0**
	Inert/CD&E	1,079,070	596,839	365,436
	HIC	541,174	719,892	782,846
	Hazardous**	14,925	13,359	18,007
Non-Inert	**Total**	**1,635,169**	**1,330,090**	**1,166,289**
Inert	Inert/CD&E	478,568	244,101	240,888
	HIC	0	65,703	26,039

	Totals	478,568	309,804	266,927
Restricted-user	Inert/CD&E	5,095	156,619	29,129
	HIC	3,348	3,347	0
	Hazardous	0	0	0
	Total	8,443	159,966	29,129
	Total Landfill	2,122,180	1,799,860	1,462,345

Inert Waste (Including Metal recycling) Managed/Deposited in Greater Manchester with Origin (Greater than 1000 tonnes) in 2008

	Inert all waste	Inert landfill	Inert Transfer	Inert Treatment	Inert MRS
Cheshire	5	1	4	0	0
Cumbria	1	1	0	0	0
Derbyshire	5	5	0	0	0
Greater Manchester	1,162	366	434	61	302
Lancashire	157	141	16	0	0
Lincolnshire	0	0	0	0	0
Merseyside	101	101	0	0	0
North Wales	2	0	2	0	0
North West	75	0	36	39	0
No Origin Recorded	600	26	266	5	304
West Yorkshire	4	4	0	0	0
Total 000s Tonnes	2,115	648	758	104	605
Imports to Greater Manchester (tonnes)	352,466	254,917	58,455	39,093	0
% Origin in Greater Manchester	55%	57%	57%	58%	50%
NW % Origin in NW Region	4%	0	5%	37%	0
% Imported	17%	39%	8	37	0
% Origin not Recorded	28	4	35	4	50

Analysis of Construction and Demolition Waste (C&D) (All Data from EA Interrogator 2008)

Inert Waste Management in Greater Manchester

Inert landfill	52,576
Non Hazardous Landfill	366,544
RU Landfill	29129
Total Landfill	448,249
Inert Transfer	739,987
MRF	43,117
Physical Treatment	49,725
CA Sites	18,343
Total C&D under management	1,299,421

Inert Waste Exports		Comment
Cheshire	367,337	366,994 MSC Dredging
Derbyshire	26,261	P Casey Landfill
Lancashire	22,515	Rigby Landfill
Merseyside	18,419	15,000 Cory Landfill, 3,200Transfer
South Yorks	5,160	Landfill
	72,698	C&D Exports

Whilst it remains the case that there will be exports from Greater Manchester the absence of high levels of recorded unknown origin for inert deposits in adjacent sub-regions suggests that significantly high quantities of inert C&D waste are unlikely to be exported from Greater Manchester.

Total inert landfill	448,249
Exported	72,698
Total landfilled C&D arisings from GM	**520,947**

C&D waste arisings exceeded 0.5 million tonnes in 2008 on the basis of landfilled quantities. Inert waste recorded at transfer and treatment facilities is approximately 0.85 million tonnes in total. However, inert waste deposited at landfills may therefore be double counted as arising if totals are simply added together and therefore it is necessary to review the fate of waste removed from waste transfer stations and treatment processes.

Fate of Inert waste removed from transfer station	Tonnes
Landfill	125,922
Recycling	125,302
Reprocessing	116,221
Fate of Inert waste removed from treatment plant	
Landfill	38,116
Recycling	52,373

Reprocessing	21,845
Total for landfill	**164,038**
Total to unknown or further transfer	**370,221**
Total for recycling and reprocessing	**315,741**

Data on waste removed from transfer stations indicates some 0.32 million tonnes of inert C&D waste is recycled or reprocessed all of which about 33% is recoded as recycled in Greater Manchester, however, the destination of most of this material is not recorded.

Of the 370,221 tonnes recorded as taken to further transfer of treatment or unknown destination it is difficult to assess how much would be recycled or landfilled. If landfilled this total is already accounted for, but if recycled it should be added to the total.

Total C&D arisings accounted for through permitted facilities is therefore at least 0.82 million tonnes which would rise to 1.2 million tonnes if the "unknown" fate of inert waste removed from transfer stations was recycling. However, a proportion of this unknown" fate of inert waste removed from transfer stations id likely to be landfilled and therefore C&D waste arisings which are managed through permitted facilities are likely to be in the order of 1m tonnes based on 2008 data. The recession through 2009 and inactivity in the construction industrial in general is likely to have reduced this figure.

Products from waste recorded as transferred and treated may also be recycled or deposited in registered exempt sites. The registered exemptions in Greater Manchester include 83 sites for use of demolition/storage/excavation waste for which no deposit data is available. It is likely that most of these will be small in size and many completed or inactive operations.
However, it is also likely that a significant amount of C&D waste is disposed of at these types of site.

Taking into account C&D waste which goes wholly unrecorded through exempt operation the actual arisings total based on 2008 data was possibly in the range of 1 and 1.5 million tonnes.

Registered Exemptions
27 Registered Composting Sites
27 Burning on land
21 Spreading waste on Land for reclamation/improvement
83 sites use of demolition/storage/excavation waste

Appendix 4 Legislation review

1. Key developments for municipal waste

1.1. Waste Minimisation

The objective of the NWS 2007 mirrors the EU Waste Framework policy aim to decouple waste growth (in all sectors) from economic growth. This has no direct mathematical relationship with the model but is clearly a policy influence on a wide range of waste legislation proposals and other practical initiatives.

1.2. Recycling

Higher national targets than in 2000 have been set for:

- recycling and composting of household waste – at least 40% by 2010, 45% by 2015 and 50% by 2020; and

The North West Regional Strategy sets the following recycling/composting targets for household waste across the North West:

recycle and/or compost 35% of household waste by 2010
recycle and/or compost 45% of household waste by 2015 (SU)
recycle and/or compost 55% of household waste by 2020

- recovery of municipal waste – 53% by 2010, 67% by 2015 and 75% by 2020.

The North West region's targets in respect of recovering value from municipal waste are the same as those promoted nationally:
(including recycling targets)
recover value from 45% of MSW by 2010
recover value from 67% of MSW by 2015.

- Household residual waste

A greater focus on waste prevention will be recognised through a new target to reduce the amount of household waste not re-used, recycled or composted from over 22.2 million tonnes in 2000 by 29% to 15.8 million tonnes in 2010 with an aspiration to reduce it to 12.2 million tonnes in 2020 – a reduction of 45%. This is equivalent to a fall of 50% per person (from 450 kg per person in 2000 to 225 kg in 2020).

2010: 29% reduction

2015: 35% reduction
2020: 45% reduction from 2000 levels

The Government will review the targets for 2015 and 2020 in the light of progress to 2010 and future forecasts, to see if they can be even more ambitious.

2 NWS key developments and proposals for Commercial, Industrial and other waste producing sectors

2.1 Statutory requirements

- Pre-treatment requirements - The Landfill Regulations 2002 require waste to be treated prior to disposal to landfill. Initially, it was only applied to new sites and hazardous waste, but from 30 October 2007, it will apply to all waste and all landfill sites. For non-hazardous waste, it will be satisfied through a reduction in the weight of waste going to landfill through a process. In general, this will be satisfied by recycling a proportion of the original waste.

- Simplifying the regulatory system and making it more proportionate and risk based through:
  waste protocols that clarify when waste ceases to be waste (and so not subject to regulation)
  reforms of the permitting and exemption systems and the controls on handling, transfer and transport of waste, (with cost savings to business and regulator of, e.g. on permitting reforms, at least £90 million) – better communication with stakeholders
  Implementing actions which will reduce fly-tipping

- Site Waste Management Plans a mandatory requirement for construction projects over a certain value (subject to consultation), and extend to other parts of the supply chain the recent agreement with the manufacturers on recycling of plasterboard, as part of reducing waste and increasing re-use and recycling by the construction sector.

2.2 Incentives

- Greater financial incentives to businesses (landfill tax escalator) to reduce, re-use and recycle waste (from £24 now to £48 in 2010)

- New national target for the reduction of commercial and industrial waste going to landfill - levels of commercial and industrial waste landfilled are expected to fall by 20% by 2010 compared to 2004.

- Annual greenhouse gas emissions target: 2020: reduction of 10 million tonnes of CO2 equivalents

- A target to halve the amount of construction, demolition and excavation wastes going to landfill by 2012 as a result of waste reduction, re-use and recycling.

- Government Departments to reduce their total waste arisings by 5% by 2010 relative to 2004/05 levels
- Departments to reduce their total waste arisings by 25% by 2020 relative to 2004/05 levels
- Departments to increase their recycling figures to 40% of their total waste arisings by 2010
- Departments to increase their recycling figures to 75% of their total waste arisings by 2020

2.3 NWS Initiatives

- Key waste materials where diversion from landfill could realise significant further environmental benefits. The Government is taking action on paper, food, glass, aluminum, wood, plastic and textiles

- Incentives for excellence in sustainable waste management through a zero waste places initiative to develop innovative and exemplary practice;

- Making greater use of third sector expertise, particularly to prevent waste, raise awareness, segregate waste at source, and increase re-use and recycling of waste through capacity-building support;

- Taking forward voluntary agreements with the relevant producers in order to increase separate collection, recycling and recovery of potentially hazardous household wastes

- Developing a joint industry, regulator and skills council training plan to improve levels of competency within the waste sector and a strategy to address any skill shortages or gaps

- Defra is working to further improve the outcomes from the BREW programme

- Emphasis on minimisation, especially in manufacture, and existing Producer Responsibility may be toughened and new Regulations coming in, such as in packaging.

- Encouragement for local authorities to take a 'wider' role in 'partnerships' to help local businesses reduce and recycle their waste with 'more integrated' management. However, local authorities do not generally have the resources to support the commercial sector.

2.4 NWS policy proposals

- Proposed consultation on further restrictions on the landfilling of biodegradable wastes and recyclable material. This could have implications on both businesses and waste management operators if there are statutory limit to the types of non-hazardous wastes that can go to landfill, especially food waste.

- Producer responsibility proposals for statutory higher packaging recycling targets, the Government is seeking further voluntary action, but is prepared to regulate if this does not deliver - introducing measures to:
    - reduce excess packaging, for example by setting optimal packaging standards for a product class;
    - support development of a joint protocol to ensure that local government and industry both identify the best systems for cost effective collection of packaging waste
    - extend WRAP's Courtauld Commitment to non-food retailers to increase the total commitments by retailers to reductions in packaging, food and other post-consumer waste;

Appendix 5 Model assumptions

1.1 Assumptions for MSW

Household waste (tonnes per household) - single point forecast falling 0.5% per annum from 2006 level.

Variability: At the last project meeting it was suggested that variability in the tonnes per household would follow the 0.5% annual fall but that this could vary +/- 10% each year. Initially I took this to mean the tonnes per household could vary by +/- 10% i.e. if the 2007 figure of tonnes per household was 1.2, the model would examine variability between 1.32 and 1.08 tonnes per household. The annual reduction of 0.5% means that by 2025 means that the central estimate of tonnes per household is around 1.1 with a range of 1.21 to 0.99.

An alternative approach is to simply place the variability on the rate of reduction. For example, we can assume that the 0.5% is the most likely outcome but the possible range around this is, say, for a maximum fall of 0.75% but also a potential for growth in waste per household of 0.5%.

Non-household waste – The historic actuals will be used for the forecasts. It was agreed that non-household growth would be modeled as growing by 1% per annum through to 2010 with zero growth thereafter. No variability was considered although this would be simple to add.

With respect to recycling and landfill targets, these are assumed to be achieved on time.

1.2 Assumptions for C&I waste

Four data points exist for C&I waste arisings: the two Environment Agency surveys in 1998 2003 and the Urban Mines survey for the North West in 2006 and 2009. The surveys focused predominantly on waste arisings per company. However, the output of the GMFM model is for number of employees by Standard Industrial Classification sector only, not the number of businesses. Therefore, the waste arisings per employee from the 2009 survey was used as the parameter to gross up by the number of employees in the relevant sector. Thereby the model reflects the economic underpinnings of the GMFM methodology.

The variability in waste per employee is factored in by analysis of the 2009 survey data that shows the range of waste per employee for al the companies in each sector. This allows the forecast model to reflect the highly variable nature of waste arisings between different companies.

1.3 Assumptions for CD&E waste

It was agreed that growth in CD&E waste would mirror that of the economy. Initially we have taken growth to reflect that in the GMFM which has an output for growth in gross value added. This is shown in the chart overleaf with GVA growth from 1982 to 2021. The forecast is for GVA to grow around 2.5% from 2007 onwards.
on the import export some further explanation is needed about the conclusions and the modelling as we now have a good figure for total landfill exports and it appears that as landfill (in particular municipal) is projected to fall away that in the medium to long term GM could be a net importer