

Wiltshire & Swindon Waste Development Forum

Meeting 2: The Future for Landfill in Wiltshire and Swindon

Topic Paper 4: Existing landfill capacity, consumption and the growing problem

Introduction

The purpose of this Topic Paper is to consider the role of landfill as a waste management option in Wiltshire and Swindon, the existing landfill resources in Wiltshire and Swindon and the future requirements for ongoing landfill provision for the period up to 2021. To help with an understanding of some of the more technical terms and definitions used in the Topic Paper, a glossary of Key Terms has been provided in **Appendix 1**.

The general consensus nationally on the management of waste and the application of the waste management hierarchy is that our continued reliance on landfill as the primary means by which we manage our waste must cease, and, for many, not a moment too soon. Landfill has been viewed by many as an inefficient means of managing the waste society creates, and one that is simply a waste of resources and a significant source of methane gas, the most powerful of greenhouse gasses.

The media informs us that, as we must move away from relying on landfill, we as a society really ought to be making more of opportunities to recycle, compost and recover waste resources, where minimisation and re-use haven't already removed such materials from the treadmill of waste management. Targets set in local, regional, national and EU policy documents confirm that this sea-change approach to waste management is not just an assumed preference but is fast becoming a mandatory requirement.

However, in the flurry of activity and debate that has given rise to this rapid change in thought over waste management methods, one issue is often overlooked, or, worse, often forgotten when reference is made to drivers such as the landfill directive targets, and that issue is time.

There are few if any who would seek to disagree with the intentions of recent waste management policy changes. These will undoubtedly provide further opportunities for the waste industry to introduce new, or improve existing processes to manage waste in ever more innovative ways. This innovation in waste management practices will be fundamental in securing the diversion of waste resources from disposal. But, to achieve such change and 'waste diversification' all involved in the process of bringing new methods of waste management to fruition require the time necessary to prove and develop new alternatives.

Unfortunately, this is time that pays no heed to the fact that, new policies and facilities or not, society at large has not yet changed its habits as a hyper-consumptive, throw away creature of habit, which not only resists change but can loudly object to it, often on a political level.

This is not to say that changes will not take place – gradually people's waste habits will and do alter as new services are provided and old ones restricted. However, it is important to remember that this is a process which will need time to achieve the desired result of increased and maximised diversion of waste from landfill.

And then there are the rules of engagement. During planning, construction and operation, waste management facilities are required to meet the tests of many legitimate, but complex, legislative processes – planning, environmental impact assessment, waste licensing or IPPC, not to mention the threat of vehement public opposition, public inquiries or high court proceedings.

Delivering the waste management facilities that will reduce reliance upon landfill is not quite as straight forward as delivering the policies and targets that requires such facilities in the first place. Again, time is a crucial factor, along with foresight and financial commitment necessary to apply for and eventually receive the required consents for the development of important new waste management facilities. This process itself can often represent a long haul.

This Topic Paper aims to ensure that the issue of timing, with regards to the lack of alternatives to landfill actually being in place, is not overlooked. If progress is to be made towards addressing the requirements of landfill diversion policies then interim provisions will need to be made to ensure that ongoing residual (or non-diverted) wastes can continue to be managed safely and responsibly in appropriate disposal facilities.

This is a key objective both for the policies and proposals to be included in the new Waste Development Documents (WDDs), and for the deliberations of the Waste Development Forum.

Landfill Resource

Waste management facilities are now classified by their suitability to manage particular wastes. These wastes are divided into three classes, each of which have management, pollution control and land use planning issues that are particular to that class:

- Hazardous wastes
- Non-hazardous waste
- Inert wastes

Within these classes, waste from any number of sources may be grouped with a need to be managed in a particular manner reflecting the nature and composition of that waste material.

For example, hazardous wastes are present throughout the waste production spectrum. Households throw away batteries and fluorescent tube lighting, both of which are classed as hazardous. Industry and commerce produces quantities of hazardous waste as part of many manufacturing processes. And construction and demolition processes often encounter hazardous materials such as asbestos and contaminated soils that must be managed as hazardous wastes.

This pattern is also apparent in both the non-hazardous and inert waste classes, which again can include materials derived from any number of municipal (including household), agricultural, business and construction sources. **Appendix 1** provides further clarification on these technical terms.

During the preparation of the Adopted Waste Local Plan (WLP) two issues became clear regarding the remaining available landfill resources in the County and the Borough:

1. there was adequate remaining reserves of permitted, or permitted and licensed landfill capacity to service forecast waste disposal needs in Wiltshire and Swindon (with the exception of hazardous waste); and
2. these adequate reserves were finite, and likely to be consumed shortly after the WLP time horizon of 2011

As a result of these points, the WLP is currently restrictive in its approach towards the provision of new landfill capacity, and it is this approach that requires re-examination in the light of new, longer term forecasts. Topic Paper 3 provides a detailed explanation of the policy and practice surrounding providing for landfill in Wiltshire and Swindon, including extracts from Chapter 9 of the WLP that set out the current policy context in the adopted WLP (Topic Paper 3, Appendix 1).

Tables 1 – 3 below illustrate these points by showing the remaining landfill capacity resource available, recent rates of deposits of waste into these voids, and an indicative continued consumption of these voids. With regards to ongoing consumption as shown by Table 3, the rate at which voidspace is consumed has been calculated by establishing the average rate of disposal of each waste stream over the period 1999 – 2021. This has then been calculated by type of waste classification against which a comparison is made with the remaining estimated voidspace for those classes of waste.

Table 1 illustrates a gradual, and in some cases rapid, consumption of landfill voidspace capacity in Wiltshire and Swindon between 1999 – 2005. Broken down by waste classification, it is clear that without exception the landfill voidspace resource that was available in 1999 has been halved in the space of 6 years. Of key concern, despite the seemingly large remaining reserves, is the remaining landfill capacity for non-hazardous wastes, such as municipal wastes (MSW), and industrial and commercial (I&C) wastes.

Table 1 Landfill Capacity Wiltshire & Swindon 1999 – 2005 (m³)

Landfill in W&S	No. of sites	Capacity cubic metres / no. of sites		
		Hazardous	Non-Hazardous	Inerts
As at 1999	32	Circ. 100,000 / 1	Circ. > 13,000,000 / 10	Circ. > 6,000,000 / 21
As at 2000	30	Circ. 65,000 / 1	9,600,000 / 11	Circ. 6,000,000 / 18
As at 2003	28	Circ. 50,000 / 1	8,900,000 / 11	Circ. 3,500,000 / 16
As at 2005	24	Circ. < 50,000 / 1	6,576,000 / 6	2,670,000 / 17
% reduction 1999 - 2005	25%	> 50%	49%	56%

Source:

Disposal capacity/ no. of sites based on WCC/SBC landfill facilities survey April 2003 (amended June 2005)

Current estimates suggest a remaining void of 6.5 Mm³ in Wiltshire and Swindon for the disposal of non-hazardous wastes. These deposits will include all local municipal waste residues, along with a high, but unspecified proportion of Wiltshire and Swindon I&C waste arisings.

The total deposits of non-hazardous wastes in Wiltshire and Swindon landfills also include, and are likely to continue to include, wastes imported into the area from municipal and industrial and commercial sources outside Wiltshire and Swindon. Whilst the Adopted WLP (Policy 2) has taken a clear stance on the issue of need for the provision of facilities for the management of waste imported in the County of the Borough, there remains a very limited scope under planning laws to reduce or control imports of waste.

Also of concern is diminishing supply of voidspace for the disposal of hazardous wastes, which is expected to run out imminently. Although this issue will be addressed in more detail in a later Forum meeting, it is clear that any attempts to tackle the issue of how we should provide for future landfill voidspace cannot afford to overlook the shortage of disposal capacity for wastes that are hazardous.

Disposals to Landfill

Disposals data for landfills in Wiltshire and Swindon is derived from Environment Agency data. The tonnages provided include not only wastes that were produced in Wiltshire and Swindon (for example all County and Borough municipal waste is landfilled locally) but also imports of non-hazardous wastes from municipal, commercial and industrial sources.

As can be seen from Table 2, the pattern of waste disposal for the period of time shown is very variable. Whilst individual sites may take consistent inputs from the same sources/customers, when deposits into all landfill sites are aggregated together the true pattern of disposal shows fluctuations in every waste stream. Also of great significance is the fact that no single waste stream has shown, in disposal terms, any consistent sign of reduction in the overall quantities of that waste landfilled. The only clear pattern is that year on year between 1999 and 2004 the total amount of waste landfilled continued to increase, rising from a total of 972,000 tonnes in 1999 to 1,392,000 tonnes in 2005, a 43% increase over this period.

Table 2 Disposal of Waste to Landfill Wiltshire & Swindon 1999 – 2004 (000's tonnes)

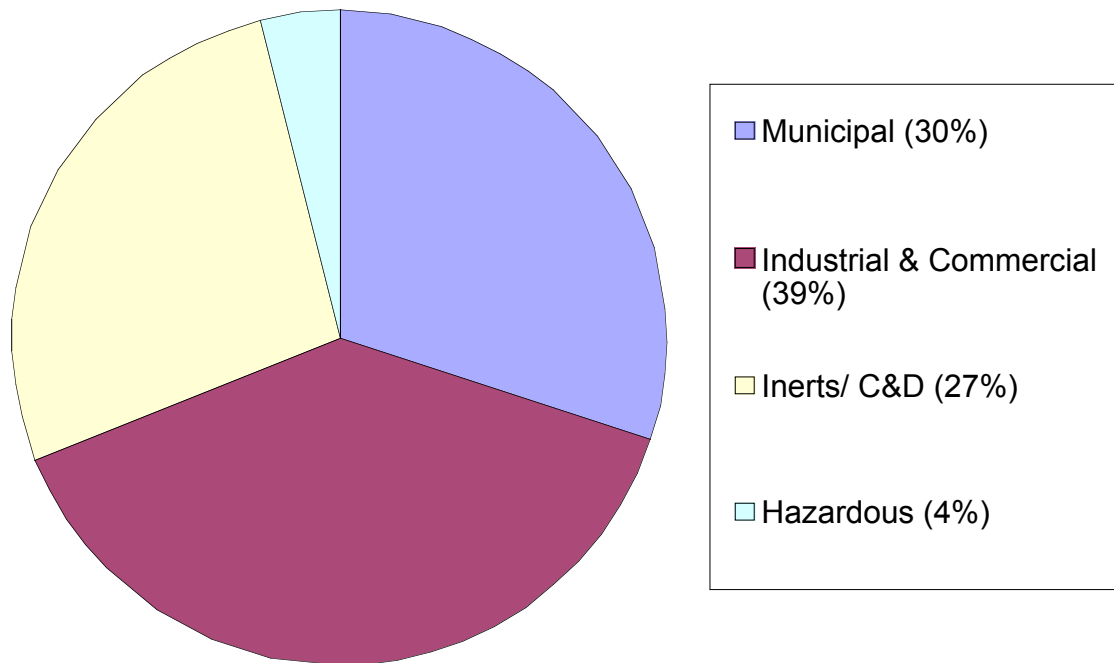
Waste Type	1999	2000	2001	2002	2003	2004	Total for period	Average
Hazardous	7	49	47	74	77	48	302	50
Non – Hazardous								
(MSW)	(278)	(298)	(319)	(274)	(320)	(672)	2,161	360
(I&C)	(374)	(485)	(537)	(732)	(457)	(257)	2,842	474
All Non-Haz	652	783	856	1,006	777	929	5,003	834
Inerts/ C&D	313	248	193	274	507	415	1,950	325
Total	972	1,080	1,096	1,354	1,361	1,392	7,255	1,209

Source:

Environment Agency South West returns 1999 – 2004 (for 1999 – 2001 see also Adopted WLP Table 3.2 in Chapter 3)
Aggregation by waste type by WCC/SBC – Figures include imports of waste into Wiltshire and Swindon

Based on the average of all disposal between 1999 – 2004 it can be seen that the composition of disposals for this period is made up as follows:

Figure 1 **Composition of Waste Disposal to Landfill Wiltshire & Swindon 1999 - 2004**



Source: WCC/SBC

Consumption of Remaining Landfill Capacity

The Adopted WLP includes data outlining the likely rate of consumption of remaining landfill capacity by waste type between 2003/2004 and 2010/2011 (WLP Tables 3.8, 3.9 and 3.10).

This Topic paper seeks to update these predictions using recent data and forecasts provided to the Waste Planning Authorities by the Environment Agency and the Councils' own waste management teams.

Tables 3 and 4 develop this data to illustrate the expected tonnages of waste that will be disposed of to landfill in the period 2005 – 2021, the annual rate at which this may occur and the implications for the consumption of the available remaining voidspace identified above in Table 1.

Table 4 also provides an estimate of the combined lifespan of all available voidspace and helps to set a timeframe by which waste requiring disposal due to the absence of alternative treatment capacity will have outstripped the landfill capacity required to manage it.

It is important to note that the remaining capacity information for non-hazardous wastes includes approximately 1,800,000 m³ of voidspace that is yet to be issued an IPPC permit by the Environment Agency. Failure of these sites to obtain such permits for this capacity

will significantly reduce the ability to manage non-hazardous residual wastes forecast to be managed in Wiltshire and Swindon.

Growth Rates for Wastes

The issue of growth rates for waste streams is notoriously subjective. Opinions on this issue fluctuate as quickly as the data for successive years waste arisings provide us with differing trends. Whilst it is possible to remodel growth rates repeatedly there is also benefit to sticking with a given growth rate, or range, to forecast future waste management requirements, although it is also important to monitor actual trends.

At this stage, the Adopted WLP includes growth rates for municipal wastes that have been set following the Public Local Inquiry by the Inquiry Inspector. These cover the period to 2011 and have been added to by recent studies undertaken by WCC and the South West Regional Assembly to model a potential reduction in the growth of municipal wastes from 2011 onwards.

The following annual growth rates have therefore been used to inform calculations in Table 3 regarding future municipal waste arising in Wiltshire and Swindon that will require disposal to landfill:

2005 – 2012	4% growth (Wiltshire); 3% growth (Swindon)	(based on WLP)
2013	3% growth (Wiltshire); 2% growth (Swindon))
2014	2% growth (Wiltshire); 1% growth (Swindon)) based on SW Regional
2015	1% growth (Wiltshire and Swindon)) waste strategy forecast
2016 – 2021	0% growth (Wiltshire and Swindon))

A detailed breakdown of Wiltshire's forecast MSW arisings, treatment requirements and disposal capacity allowances are set out in **Appendix 2**. This forecast takes into account the need to divert waste from landfill to avoid penalties imposed under the Landfill Allowance Trading Scheme (LATS), as outlined at Meeting 1 of the Waste Development Forum.

For other waste streams there exists a lack of waste arisings data from which to confidently model past trends and potential future arisings. Consequently, the WLP adopted an approach of 'flat rate growth' for other wastes, i.e. the average requirements for the management of these wastes would be repeated year on year.

This approach does not satisfy some key questions, for example:

- what if arisings and disposals of a particular waste stream begin to decrease?;
- what if additional types of waste are added to a particular waste stream, such as hazardous waste, swelling the amount of materials to be dealt with?

Consequently, in preparing the new WDDs, the WPAs will seek to address these issues to provide more clarity to the forecast growth rates for other, non-municipal waste streams.

In the absence of alternatives at this point however, the flat rate of growth will continue to be used for illustrative purposes, and will be applied to I&C wastes; inerts/ construction and demolition wastes (C&D); and hazardous wastes.

Forecast Future Landfill Requirements

Table 3 Estimated Quantity of Waste to be Landfilled 2005 - 2021

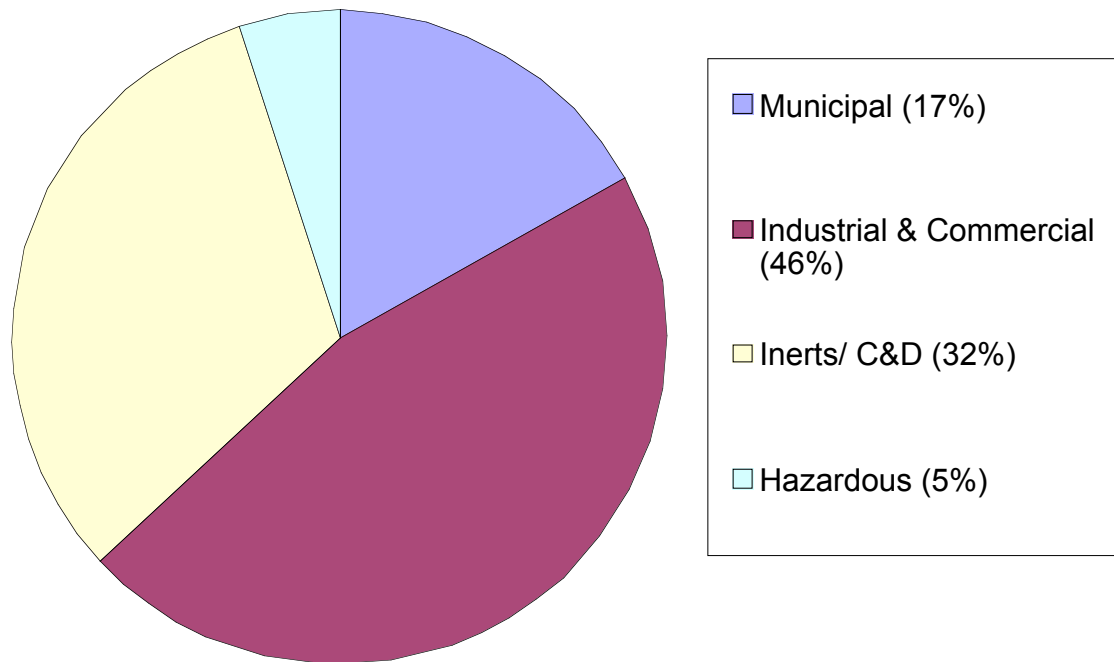
Waste Type	Waste to be managed by landfill 2005 – 2021 (i.e. 16 years) (tonnes)	Volume (m ³) of voidspace to manage tonnage (see Explanation)	Potential annual (average) consumption rate (m ³ per annum) (volume divided by time period)	Explanation
<i>Wiltshire MSW (4% growth rate to 2011, decreasing thereafter – see previous page and Appendix 2)</i>	1,761,000	2,200,000	137,500	<i>LATS; volume calculated as 0.8t / cu.m</i>
<i>Swindon MSW (3% growth rate to 2011, decreasing thereafter – see previous page)</i>	1,006,000	1,260,000	78,750	<i>WLP/ BVPI/ NWS 2000; volume calculated as 0.8t / cu.m</i>
<i>I&C</i>	7,584,000	9,480,000	592,500	<i>Flat rate of growth based on average annual deposits 1999 – 2004 (e.g. 16 x 474,000 tonnes = t); volume calculated as 0.8t / cu.m</i>
All non-hazardous	10,351,000	12,940,000	808,750	<i>Wiltshire MSW, Swindon MSW and I&C waste to be managed by landfill combined</i>
Inerts/ C&D	5,200,000	5,200,000	325,000	<i>Flat rate of growth based on average annual deposits 1999 – 2004 (e.g. 16 x 325,000 t = 5,200,000 t); volume calculated as 1.0t / cu.m</i>
Hazardous	800,000	560,000	35,000	<i>Flat rate of growth based on average annual deposits 1999 – 2004 (e.g. 16 x 50,000 t = 800,000 t); volume calculated as 1.4t / cu.m</i>
Total	16,351,000	18,700,000	1,168,750	

Source: WCC/SBC

At this stage it is possible to make a comparison of the composition of the waste to be disposed between 2005 – 2021 and that disposed of between 1999 – 2004 (as shown above in Figure 1). Previously, MSW contributed 30% of disposals recorded and I&C wastes 39%,

The key difference highlighted below in Figure 2 is that the proportion of waste forecast to be disposed of between 2005 - 2021 that is made up by MSW has reduced from 30% to 17%. However, the proportion of I&C waste, as forecast to be disposed of to landfill between 2005 – 2021, has now increased from 39% to 46%.

Figure 2 **Composition of Forecast Waste Disposal to Landfill Wiltshire & Swindon 2005 - 2021**



Source: WCC/SBC

One of the key facts highlighted above in Table 3 and Figure 2 is that, even after meeting all of the diversion requirements set out under the LATS to achieve the targets set by the EU Landfill Directive, Wiltshire and Swindon are still expected to produce a combined total of 2,767,000 tonnes of MSW between 2005 and 2021 that will be disposed of to landfill, consuming in the process approximately 3,500,000 m³ of landfill voidspace. This forecast excludes potential imports of MSW from other areas.

This is clearly a large figure, however it is often difficult to put such large numbers in context. To help, the following evaluation may give a better idea of the scale of the problem. If one waste haulage vehicle, for example the size of an articulated trailer towed by a lorry, carries on average 20 tonnes of waste, the tonnage of Wiltshire and Swindon MSW forecast for landfill disposal between 2005 – 2021 would fill 138,000 of these lorries. If parked bumper to bumper, these would lorries would stretch from Lands End to John O’Groats.

Whilst the data for ongoing disposals of I&C, inerts/ C&D waste, and hazardous wastes should be treated as indicative, the trend is clear: between 2005 and 2021 remaining landfill reserves for these wastes will be exhausted leaving a disposal capacity gap for the ongoing disposals of residuals from these waste streams.

Table 4 builds on the data presented so far to illustrate in capacity and date terms the implications of this ongoing requirement for landfill as progress is made towards diverting increasing quantities of waste from landfill.

In particular, a key area of concern is the imminent loss of any landfill resources to manage hazardous wastes, an issue that affects Wiltshire and Swindon and the wider south west region (this issue is the subject of Forum Meeting 3 to be held on 20th July

2005). However, this trend is likely to be accompanied by the exhaustion of all remaining landfill reserves by 2013 should the trends outlined in Table 3 take effect, including the loss of any capacity to manage safely residues from the municipal and I&C waste streams.

Other key concerns include:

- What if capacity with planning permission fails to obtain IPPC permitting for some or all of that capacity?
- What if capacity intended for one use (e.g. non-hazardous) only obtains IPPC authorisation to receive a more restricted input (e.g. inerts only)?

What is clear from Table 4 is that, unless all residual wastes are exported from 2013 onwards, or incrementally from 2005 onwards to conserve existing capacity, new landfill capacity will need to be factored in as part of the provision of safe and responsible waste management infrastructure for Wiltshire and Swindon.

Given that such controls over exports (with the exception of municipal waste) are not legally possible and, in the case of all wastes, are unlikely to be sustainable, Table 4 highlights the very real problem of a lack of landfill capacity that must be rationally addressed by the WDDs.

This is not to revert to an easy option and undermine the process of increased diversion from landfill. In the case of MSW this would be a very costly option, as the County and the Borough councils would incur enormous fines under LATS.

Instead, a rethink on the current approach to landfill in Wiltshire and Swindon is intended to ensure that the sustainability gains achieved from alternative recovery methods are not undermined by an unsustainable approach in policy and site allocation terms to the landfilling of residual wastes.

In addition, the problems facing Wiltshire and Swindon regarding dwindling supplies of voidspace and a lack of existing known new disposal capacity is commonplace across the south west and nationally.

As a result, to simply export residues may not necessarily be a readily available option.

Table 4 Consumption of remaining landfill capacity Wiltshire & Swindon 2005 - 2021

Waste Type	Waste to landfill 2005 – 2021 (m ³)	Remaining capacity 2005 - 2021	Shortfall at 2021	Estimated capacity expiry date
Non-hazardous	12,940,000	6,576,000 m ³	- 6,364,000	2013*
Inert	5,200,000	2,670,000 m ³	- 2,530,000	2013
Hazardous	560,000	< 15,000 m ³	- 545,000	2005
Total	18,700,000	9,261,000 m ³	- 9,439,000	2013

Sources/ Footnote:

Forecast waste to landfill: see Table 3

Remaining Capacity: WCC/SBC

* This figure assumes no further imports of MSW for disposal at landfill sites in Wiltshire & Swindon and that all permitted capacity awaiting licensing is available in full

With regards to the issue of some non-hazardous voidspace not benefiting from IPPC permitting, the impact of this capacity being lost would reduce the available remaining capacity for non-hazardous wastes between 2005 – 2021 from 6,576,000 m³ to approximately 4,800,000 m³.

In turn, this reduced capacity could be expected to be consumed by 2011, at which point there would be a shortfall in required capacity through to 2021 of over 8,000,000 m³ for non hazardous wastes.

Commentary – is the situation improving, or worsening?

As identified in Topic Paper 3, the situation regarding diversion of MSW from landfill is steadily beginning to improve, and the imposition of the Landfill Allowance Trading Scheme is set to drive this trend forward at a pace not seen in the UK before.

Diversion of waste from other sources, such as I&C and inerts/ C&D sources, is also known to be on the increase with increasing tonnages of materials being recycled or re-used rather than disposed of to landfill. Only wastes from hazardous sources have faced a clear crisis in disposal and wider management terms in recent times.

However, what is identified above in this Topic Paper is that these trends run parallel to a trend of increasing amounts of all wastes being disposed of to landfill, and no clear sign at present that this trend is due to stop or reverse.

Even accounting for required reduction in MSW sent to landfill the tonnages of non-hazardous waste alone impose a significant problem in terms of the management of residual wastes for which there is currently no alternative option.

This is effectively a key starting point – it is a draft forecast, certainly, but is one prepared now, and looking into a realistic future to be addressed by the new WDDs. New alternative capacity is not just desirable, it is absolutely essential, for all sources of waste arisings irrespective of classification. Reduction of arisings is even more important and must be worked to within the waste industry and wider society.

But, between such essentials being planned for and delivered and a real impact on diversion of waste from landfill taking place, there will be a significant tonnage of residual waste that requires management through a significant and suitable volume of landfill voidspace, and the new WDDs have a central role in ensuring that such provision, for all capacity, can be properly planned for.

For the medium term to 2021 at least, landfill is likely to have to play a continued, valuable and carefully planned role in the provision of a sustainable network of waste management facilities, in Wiltshire and Swindon, in the South west and nationally.

Forum Discussion

The following questions are suggested to stimulate the debate of the Forum:

Regarding the WLP strategy and policies to restrict future landfill provisions:

- Is the strategic approach to landfill and land-raise in the adopted WLP still appropriate for Wiltshire and Swindon over the period to 2021?

Should this restrictive approach be tightened?

Should it be loosened, either to address all potential requirements, including imports, or to address just those requirements likely to arise in Wiltshire and Swindon?

- How can Policies 19 to 21 of the adopted WLP be improved to provide a suitable policy framework for new landfill and land-raise proposals over the period to 2021?

Should the policies be tightened to only allow the provision of new landfill sites as a last option?

Should the policies be loosened to adopt a reactive policy based approach, centred around key forecast requirements for new landfill capacity?

Regarding the WLP approach to not identify any preferred area allocations for landfilling:

- Should preferred areas for new landfill capacity be identified for inclusion in the review of the WLP?
- Should the review of the WLP continue avoid allocating sites for the provision of new landfill capacity?

Appendix 1 Glossary of Key Terms and Definitions

Landfill Directive – EU Directive 1999/31/EC on the Landfill of Waste which sets the legislative framework for banning the disposal of certain wastes from landfill, for banning the practice of waste co-disposal, the re-classification of wastes, the diversion of biodegradable municipal waste from landfill, and the preparation of site conditioning plans for landfill sites.

Landfill regulations – regulations translating into UK law the requirements of the Landfill Directive

Landfill Allowance Trading Scheme – introduced by the Waste Emissions Trading Act 2003 LATS places a duty on local authorities to incrementally divert increasing quantities of municipal waste from landfill from 2005/06 to meet targets set by the Landfill Directive.

Landfill voidspace/ capacity/ void – The remaining capacity in active or committed landfill or landraise sites. In the Wiltshire and Swindon context this usually involves the infilling of voids created by minerals extraction with selected wastes. However, it can also involve the deposit of waste onto land developed solely for waste disposal.

Permitted landfill capacity – Landfill voidspace that has been granted planning permission but does not have the benefit of an Integrated Pollution Prevention Control (IPPC) permit from the Environment Agency, essential for the facility to begin operation as a waste management facility.

Permitted and licensed landfill capacity – Landfill voidspace that benefits from the grant of both planning permission and IPPC.

Waste Classification – system implemented by the Environment Agency in which all wastes from all waste sources are classified for the purpose of determining where and how those wastes can be managed. Based on the European Waste Classification codes, this is now broadly categorised in three classes:

- *Hazardous waste* – waste which, by virtue of its composition, carries the risk of death, injury or impairment of health, to humans or animals, the pollution of waters, or could have an unacceptable environmental impact if improperly handled, treated or disposed of.
- *Non-hazardous waste* – waste which is not classified as either hazardous or inert. Includes waste from a range of sources that will biodegrade over time through either treatment or under landfill conditions.
- *Inert waste* – waste which, when deposited into a waste disposal (or treatment) site does not undergo any significant physical, chemical or biological transformation.

Municipal Waste (MSW) – includes all wastes collected by the Borough and District Council Waste Collection Authorities or their agents such as all household waste, street litter, municipal parks and gardens waste, council office waste and some commercial and industrial wastes.

Industrial and Commercial (I&C) Waste – waste from any factory, from any premises occupied by an industry (excluding mines and quarries), or waste arising from premises which are used wholly or mainly for trade, business, sport, recreation or entertainment.

Construction and Demolition (C&D) Waste – waste arising from the demolition, construction, repair and maintenance of buildings, structures and infrastructure.

Growth rates – trend based data identifying the change year by year of a particular waste stream. Usually expressed as an average for any given number of years surveyed, and applied to provide forecasts of potential future waste arisings for the purpose of modelling waste management requirements over a specified future period.

Arisings – total tonnage of waste produced from a particular source.

Disposals – the proportion of waste arisings that are not recovered and diverted from landfill

Mm³ – Million Cubic Metres: abbreviation commonly used to express large volumes of waste and/ or voidspace as part of statistical modelling of waste management trends and requirements.

Conversion rates – a formulaic calculation used to calculate the volume of landfill voidspace that will be required to manage a given tonnage of a particular waste stream. The conversion rate will change with the density of the waste being considered.

Appendix 2 WCC Landfill Allowance Trading Scheme Allocations

	Year	Forecast Total Municipal Waste Tonnage ¹	Forecast Recycling Tonnage ²	LATS Allocation - Permitted Landfill Tonnage ³	Additional Recovery Tonnage required to avoid fines or trading	Cumulative Forecast Penalties on Landfill Tonnage ³ @ £150/tonne (£m) ⁴	
Waste Growth	2005/06	271,000	90,596	197,076	-16,672	0.0	
	2006/07	281,840	98,020	187,063	-3,243	0.0	
	2007/08	293,114	101,941	173,712	17,461	0.0	
	4% 2008/09	304,838	106,018	157,024	41,796	4.0	
	2009/10	317,032	110,259	136,997	69,775	11.1	
	2010/11	329,713	114,670	121,749	93,295	9.5	
	2011/12	342,901	119,256	106,499	117,147	21.5	
	3% 2012/13	353,188	122,834	91,250	139,104	35.7	
	2% 2013/14	360,252	125,291	87,335	147,626	15.1	
	1% 2014/15	363,855	126,544	83,422	153,889	30.8	
	0%	2015/16	363,855	126,544	76,566	160,745	47.2
		2016/17	363,855	126,544	75,593	161,719	63.6
		2017/18	363,855	126,544	71,679	165,632	80.5
		2018/19	363,855	126,544	67,765	169,546	97.8
		2019/20	363,855	126,544	63,850	173,461	115.5
2020/21		363,855	126,544	63,850	173,461	133.2	
Total						180.0	

Notes:

- ¹ Forecast increase at current rate (4% per annum) to 2010/11, thereafter falling to 0% increase in 2015/16.
- ² Based on existing recycling provision and commitments. Includes composting.
- ³ Assuming that 68% of Municipal Solid Waste (MSW) is biodegradable ie. 1 tonne of biodegradable waste represents 1.47 tonnes of mixed MSW.
- ⁴ This takes account of rolling forward credits, where applicable. Credits cannot be rolled across EU scheme years 2009/10, 2012/13, 2019/20.

	Year	Forecast Total Municipal Waste Tonnage ¹	Forecast Recycling Tonnage ²	LATS Allocation - Permitted Landfill Tonnage ³	Additional Recovery Tonnage required to avoid fines or trading	Cumulative Forecast Penalties on Landfill Tonnage ³ @ £150/tonne (£m) ⁴	
Waste Growth	2005/06	271,000	90,596	197,076	-16,672	0.0	
	2006/07	281,840	98,020	187,063	-3,243	0.0	
	2007/08	293,114	105,751	173,712	13,651	0.0	
	4% 2008/09	304,838	113,944	157,024	33,870	2.8	
	2009/10	317,032	122,623	136,997	57,411	8.7	
	2010/11	329,713	131,815	121,749	76,150	7.8	
	2011/12	342,901	140,859	106,499	95,544	17.5	
	3% 2012/13	353,188	148,970	91,250	112,969	29.0	
	2% 2013/14	360,252	155,912	87,335	117,005	11.9	
	1% 2014/15	363,855	161,474	83,422	118,959	24.1	
	0%	2015/16	363,855	165,476	76,566	121,813	36.5
		2016/17	363,855	169,478	75,593	118,784	48.6
		2017/18	363,855	173,481	71,679	118,695	60.7
		2018/19	363,855	177,483	67,765	118,607	72.8
		2019/20	363,855	181,927	63,850	118,077	84.9
2020/21		363,855	181,927	63,850	118,077	96.9	
Total						134.6	

Notes:

As above, but with recycling increasing incrementally to 40% by 2010/11 and 50% by 2019/20.