

**South East Regional Technical
Advisory Body for Waste (SERTAB)**

**Towards a Methodology for Apportionment
of London's Exported Waste**

**Alternative Apportionment Options:
Revision for EiP**

**Final Report
December 2006**

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Introduction

In 2005 Jacobs Babbie was commissioned by the South East England Regional Assembly (SEERA) to prepare a model for the apportionment of waste to be exported from London to the Waste Planning Authority areas in the South East. Details of the apportionment methodology and results are set out in the Jacobs Babbie report 'Towards a Methodology for the apportionment of London's Exported Waste, Final Report July 2005' (the 2005 Report). This report is intended to be read in conjunction with the 2005 Report and does not repeat the description of the apportionment process and the selection and weighting of criteria that is set out in detail in the 2005 Report.

The report was used to inform a proposed apportionment of exports of municipal solid waste and commercial and industrial waste from London in the draft South East Plan (Policy W3, March 2006). Following a range of comments on the 2005 apportionment report and the draft South East Plan, SERTAB (through SEERA) commissioned Jacobs Babbie to examine alternative apportionment options, primarily to take account of the main issues raised in the comments received. These issues, and the alternative apportionment options, were also discussed at special meetings of SERTAB on 14 August 2006 and 5 October 2006. **This report has been prepared to inform the debate at the forthcoming Examination in Public of the South East Plan (November 2006-March 2007) and its conclusions have not been endorsed by either SERTAB or the Assembly.**

Jacobs produced a report on the alternative apportionment options exercise in October 2006. This report includes further iterations of the alternative options, to take account of additional information on waste imports from London provided by Waste Planning Authorities, and to include a further alternative apportionment (2f) to remove greenbelt as a constraint that informs the environmental suitability criterion (Criterion 6).

This report summarises the alternative options modelled. These options are listed below.

- Option 1: Maintaining best estimates of current patterns of MSW and C&I waste movements to 2015 and 2025
- Option 2: Phased apportionment options. Phased apportionment involved maintaining current patterns of MSW and C&I waste movements to 2015, with alternative apportionment criteria weighting options from 2016. The 2016 date was assumed to be a realistic timeframe within which Waste Planning Authorities could plan for new landfill capacity through the waste development framework process, and would allow a sufficient lead-in time for the development of new landfills. 2016 is also contiguous with phased national waste recovery and recycling targets, which will influence landfill requirements.

The following post-2015 alternative options were modelled:

- a) Jacobs Babbie 2005 report base model
- b) 75% weighting to the proximity criterion and the remaining 25% weighting split between the remaining criteria, in accordance with the relative weightings of the 2005 base model
- c) Equal weighting given to each criterion
- d) Environmental constraints given a low weighting
- e) Proximity, sustainable transport and available landfill void weighted high
- f) Green Belt not included as a constraint affecting suitability for landfilling under Criterion 6 (Environmental Constraints)

Part 1 of this report outlines the assumptions used to determine current tonnages of municipal waste (MSW) and commercial and industrial waste (C&I) exported from London and landfilled in the South East of England.

Part 2 of this report identifies the quantities of waste to be apportioned, that is, the tonnages of waste forecast to require export from London for landfill in the South East over the period 2005 to 2025.

Part 3 of this report sets out a brief summary of the alternative apportionment options modelled and provides tabulated apportionment results for each option.

Part 4 of this report draws some broad conclusions on the outcome of the alternative options modelling exercise.

Part 1. Current Waste Exports from London to Landfill in the South East

Municipal Solid Waste

Data on tonnages of MSW exported from London and landfilled in South East England from 2001/02 to 2005/6 were gathered from different sources, including the South East Regional Waste Management Statement, the Greater London Authority (GLA) and South East England Waste Planning Authorities (WPAs). WPAs were also asked to provide up-dated information on any significant changes or available data for 2005/6 onwards. Table 1 below displays the best available data from published sources for the period 2005/6, and illustrates the position at this point in time.

Commercial and Industrial Waste

Data on tonnages of C&I waste exported from London and landfilled in the South East was more difficult to obtain. WPAs were able to provide little or no data on current tonnages exported. The MEL report, Updated Annex 1 of SEERA Waste Strategy¹, includes a spreadsheet calculating the C&I waste exported from London and landfilled in the South East. The 2005 data has been used in Table 1 below, again at this given point in time.

¹ Updated Annex 1 of SEERA Waste Strategy Illustrative Waste Management Capacity and Infrastructure Requirements for Waste Planning Authority Areas

Table 1 – Exports of waste from London to South East England (2005)

| | MSW | C&I |
|----------------------------------|----------------------|------------------|
| Berkshire | 0 ² | 76,275 |
| Buckinghamshire | 360,000 ³ | 609,846 |
| East Sussex & B&H | 0 ⁴ | 0 |
| Hampshire | 1231 ⁵ | 27,901 |
| Isle of Wight | 0 ⁶ | 0 |
| Kent and Medway | 0 ⁷ | 0 |
| Milton Keynes | 0 ⁸ | 0 |
| Oxfordshire | 200,000 ⁹ | 1,375 |
| Surrey | 50,000 ¹⁰ | 467,839 |
| West Sussex | 91,804 ¹¹ | 96,765 |
| Total | 683,018 | 1,280,000 |

Further clarification of current imports to landfill was received from a number of Waste Planning Authorities. West Sussex County Council informed the study that a contract to landfill waste from London in West Sussex ended on the 30th of September 2006. i.e. From the 1st of October 2006 onwards, no waste would be transported from London and landfilled in West Sussex. Kent County Council provided additional information on the tonnage of C&I waste landfill in the County in 2005 as did Surrey. Hampshire and Oxfordshire confirmed zero waste imports from London to landfill in 2005. Data provided by Berkshire County Council and Biffa Waste Services indicates that currently no waste from London is landfilled in Berkshire. Milton Keynes Council confirmed that, due to the imminent closure of a major landfill in Bedfordshire, waste from London was likely to be diverted to landfill in Milton Keynes in the near future. However, due to uncertainties over quantities, this could not be factored into the model at this point in time.

This version of the report also includes revised information on the tonnage of C&I waste currently exported from London to Buckinghamshire. This information was sourced from Buckinghamshire County Council and background information to studies by MEL/Golder Associates for SEERA.

Table 2 illustrates apportionment percentages based on best estimates of existing waste exports at the current time, taking account of published data (from Table 1) and additional information provided, as described above, by West Sussex, Kent, Surrey, Oxfordshire, Berkshire, Buckinghamshire and Hampshire county councils.

² Email received from Bryan Lyttle states that Berkshire haven't handled any MSW waste over the past few years

³ Email from Graham Liddiard on 15/09/2006 states these are estimated tonnages.

⁴ Email received from Tony Cook on 25/08/2006 states that there is no evidence of MSW being Landfilled in East Sussex at the present time

⁵ Email from Paul Prowting 29/08/2006

⁶ No information received from the Isle of Wight - Assume no waste from London

⁷ Email from John Prosser 20/09/2006

⁸ E-mail from Rebecca Trowse states that there is no waste from London being sent to Landfill in MK but this may change in the near future due to new bypass

⁹ Data received from David Lamb via e-mail on the 09/10/2006

¹⁰ Data received via e-mail from David Lamb on 16/08/2006

¹¹ Date received from Neil Border via e-mail 25/08/2006 also states that this contract ends in October 2006.

Table 2: Tonnage apportionment

| | MSW | C&I | Total | Apportionment |
|---------------------------------|----------------|----------------|----------------|----------------------|
| Berkshire | 0 | 0 | 0 | 0% |
| Buckinghamshire | 360,000 | 175,000 | 535,000 | 55.9% |
| East Sussex &B&H | 0 | 0 | 0 | 0.0% |
| Hampshire | 1,231 | 0 | 1,231 | 0.1% |
| Isle of Wight | 0 | 0 | 0 | 0.0% |
| Kent and Medway | 0 | 25,493 | 25,493 | 2.7% |
| Milton Keynes | 0 | 0 | 0 | 0.0% |
| Oxfordshire | 200,000 | 0 | 200,000 | 20.9% |
| Surrey | 50,000 | 145,000 | 195,000 | 20.4% |
| West Sussex | 0 | 0 | 0 | 0.0% |
| Total | 611,231 | 345,493 | 956,724 | 100% |

The apportionment percentages shown in Table 2 show the current split of waste exports from London between the Waste Planning Authority Areas in the South East. These are the percentages that will be used for the period to 2016 in all the alternative apportionment options.

Part 2. Future Waste Exported from London

The tonnage of waste to be apportioned between the ten WPAs was taken from ERM¹² data (Annex A, Table X) and RPG9 (Waste and Minerals) June 2006 (Table 3) and given in Table 3 below.

Table 3: London Waste imports

| | MSW | C&I | Total |
|-------------|------------|----------------|--------------|
| 2005 | 480,000 | 1,280,000 | 1,760,000 |
| 2010 | 460,000 | 1,110,000 | 1,570,000 |
| 2015 | 290,000 | 953,333 | 1,243,333 |
| 2020 | 130,000 | 790,000 | 920,000 |
| 2024 | - | 660,000 | 660,000 |

The data was interpolated to give the year on year tonnages. These tonnages are shown in Table 4 below:

Table 4: London Waste imports year on year

| | MSW | C&I | Total |
|-------------|------------|----------------|--------------|
| 2005 | 480,000 | 1,280,000 | 1,760,000 |
| 2006 | 476,000 | 1,246,000 | 1,722,000 |
| 2007 | 472,000 | 1,212,000 | 1,684,000 |
| 2008 | 468,000 | 1,178,000 | 1,646,000 |
| 2009 | 464,000 | 1,144,000 | 1,608,000 |
| 2010 | 460,000 | 1,110,000 | 1,570,000 |
| 2011 | 426,000 | 1,078,667 | 1,504,667 |
| 2012 | 392,000 | 1,047,333 | 1,439,333 |
| 2013 | 358,000 | 1,016,000 | 1,374,000 |
| 2014 | 324,000 | 984,666 | 1,308,666 |
| 2015 | 290,000 | 953,333 | 1,243,333 |
| 2016 | 258,000 | 920,666 | 1,178,666 |
| 2017 | 226,000 | 888,000 | 1,114,000 |
| 2018 | 194,000 | 855,333 | 1,049,333 |
| 2019 | 162,000 | 822,667 | 984,667 |
| 2020 | 130,000 | 790,000 | 920,000 |
| 2021 | 97,500 | 757,500 | 855,000 |
| 2022 | 65,000 | 725,000 | 790,000 |
| 2023 | 32,500 | 692,500 | 725,000 |
| 2024 | - | 660,000 | 660,000 |
| 2025 | | 627,500 | 627,500 |

In consultation with SEERA, it was agreed that the median tonnage for each 5 year period was multiplied by the length of the period, as shown below, to calculate tonnages of waste from London to be apportioned.

¹² Update of the 'Model for Future Waste Management Capacity Needs in the South East'

Forecasts for London Imports from 2006 to 2016

| Period | Median year | Tonnage in that year | | Tonnage |
|-------------|-------------|----------------------|-----------------------|--------------|
| 2006 - 2010 | 2008 | 1,646,000 | Multiplied by 5 years | = 8,230,000 |
| 2011 - 2015 | 2013 | 1,374,000 | Multiplied by 5 years | = 6,869,999 |
| | | | | = 15,099,999 |

Forecasts for London Imports from 2016 to 2025

| Period | Median year | Tonnage in that year | | Tonnage |
|-------------|-------------|----------------------|-----------------------|--------------|
| 2016 - 2020 | 2018 | 1,178,666 | Multiplied by 5 years | = 5,893,332 |
| 2021 - 2025 | 2023 | 855,000 | Multiplied by 5 years | = 4,275,000 |
| | | | | = 10,168,332 |

Part 3. Alternative Options

The alternative options modelled are summarised below.

- Option 1: Maintaining best estimates of current patterns of MSW and C&I waste movements to 2015 and 2025
- Option 2: Maintaining current patterns of MSW and C&I waste movements to 2015, with alternative apportionment criteria weighting options from 2016. The following post-2016 alternative options were modelled:
 - a) Jacobs Babbie 2005 report base model
 - b) 75% weighting to the proximity criterion and the remaining 25% weighting split between the remaining criteria, in accordance with the relative weightings of the 2005 base model
 - c) Equal weighting given to each criterion
 - d) Environmental constraints given a low weighting
 - e) Proximity, sustainable transport and available landfill void weighted high
 - f) Green Belt not included as a constraint affecting suitability for landfilling under Criterion 6 (Environmental Constraints)

Option 1

Option 1 maintains the current patterns of MSW and C&I waste exports to 2015 and 2025. Current waste exports are established in Part 1 above. Table 5 illustrates the Option 1 apportionment as cumulative tonnages for the periods 2006-2015 and 2016-2025.

Table 5: Apportionment Option 1

| WPAA | Current Apportionment | Model Apportionment | Period 2006-2015 | Period 2016-2025 |
|-------------------------|-----------------------|---------------------|-------------------|-------------------|
| Berkshire | 0.0% | 0.0% | - | - |
| Buckinghamshire | 55.9% | 55.9% | 8,443,923 | 5,686,134 |
| East Sussex & B&H | 0.0% | 0.0% | - | - |
| Hampshire | 0.1% | 0.1% | 19,429 | 13,083 |
| Isle of Wight | 0.0% | 0.0% | - | - |
| Kent and Medway | 2.7% | 2.7% | 402,349 | 270,942 |
| Milton Keynes | 0.0% | 0.0% | - | - |
| Oxfordshire | 20.9% | 20.9% | 3,156,607 | 2,125,657 |
| Surrey | 20.4% | 20.4% | 3,077,692 | 2,072,516 |
| West Sussex | 0.0% | 0.0% | - | - |
| Total for the SE | 100% | 100% | 15,099,999 | 10,168,332 |

Option 1 does not take into account the range of sustainable waste management factors that are considered in the other options. However, the ‘continue as usual’ option is very broadly similar to apportionment on the basis of surplus void space, as those Waste Planning Authority Areas (WPAAs) that currently take waste from London tend to be those that have the greatest capacity. Option 1 is also associated to an extent with the proximity principle and sustainable transport indicators, in that those WPAAs taking waste from London are those with established rail links (e.g. Buckinghamshire and Oxfordshire) or those that are closest to London (e.g. Surrey)

Option 2

Under all four variations of Option 2, the current patterns of MSW and C&I waste movements are maintained to 2015, after which alternative apportionment options are modelled.

Option 2a – Environmental and practical criteria weighted in accordance with 2005 base model:

From 2016 to 2025, the apportionment is the same as the Jacobs Babbie 2005 report base model. Table 6 shows the weightings used under this criterion.

Table 6: Weighting used for Criterion 2a

| Criteria Table | | Weighting | |
|----------------|---|-----------|-------|
| 1 | Identification of surplus void space. | Medium | 25.0% |
| 2&6 | Geology/groundwater suitability & Other environmental constraints | High | 37.5% |
| 3 | Proximity to London | Medium | 25.0% |
| 4 | Sustainable Transport | Low | 12.5% |
| Total | | 100% | |
| Fixed value | | 50.00% | |
| High | | 75% | 38% |
| Medium | | 50% | 25% |
| Low | | 25% | 13% |

Table 7 shows the apportionment percentages and estimated tonnages of waste to be apportioned under Option 2a.

Table 7: Apportionment Option 2a

| WPAA | Current Apportionment | Model Apportionment | Period 2006-2015 | Period 2016-2025 |
|-------------------------|-----------------------|---------------------|-------------------|-------------------|
| Berkshire | 0.0% | 8.5% | - | 865,590 |
| Buckinghamshire | 55.9% | 16.8% | 8,443,923 | 1,709,019 |
| East Sussex & B&H | 0.0% | 8.4% | - | 858,971 |
| Hampshire | 0.1% | 8.4% | 19,429 | 850,936 |
| Isle of Wight | 0.0% | 0.0% | - | - |
| Kent and Medway | 2.7% | 12.2% | 402,349 | 1,245,376 |
| Milton Keynes | 0.0% | 10.1% | - | 1,023,862 |
| Oxfordshire | 20.9% | 17.0% | 3,156,607 | 1,728,514 |
| Surrey | 20.4% | 8.4% | 3,077,692 | 854,935 |
| West Sussex | 0.0% | 10.1% | - | 1,031,130 |
| Total for the SE | 100% | 100% | 15,099,999 | 10,168,332 |

Table 6 illustrates the Option 2a 'base model' results. The apportionment for the period 2016-2025 reflects the consideration of a number of key sustainable waste management criteria, encompassing environmental and practical factors. The relative significance of these criteria in the model is determined by weighting each criteria in accordance with its perceived importance in determining suitability for landfilling, and taking account of the quality of available data and the robustness of the assumptions used to model the criteria. These weightings (Table 5) were developed in consultation with SERTAB representatives during the development of the apportionment model in 2005.

Option 2b – Proximity weighted 75%

From 2016 to 2025, the Jacobs Babbie 2005 report base model is adjusted to give the proximity (Criterion 3 only) criterion 75% weighting, and the remaining 25% weighting split between the remaining criteria, in accordance with the relative weightings of the 2005 base model. Table 8 shows the weightings used under this criterion.

Table 8: Weighting used for Criterion 2b

| Criteria Table | | Weighting | |
|----------------|---|-----------|--------|
| 1 | Identification of surplus void space. | Medium | 8.3% |
| 2&6 | Geology/groundwater suitability & Other environmental constraints | High | 12.5% |
| 3 | Proximity to London | Medium | 75.0% |
| 4 | Sustainable Transport | Low | 4.2% |
| Total | | | 100% |
| Fixed value | | | 16.67% |
| High | 75% | 13% | |
| Medium | 50% | 8% | |
| Low | 25% | 4% | |

Table 9 illustrates the apportionment percentages and estimated tonnages of waste to be apportioned under Criterion 2b.

Table 9: Apportionment Option 2b

| WPAA | Current Apportionment | Model Apportionment | Period 2006-2015 | Period 2016-2025 |
|-------------------------|-----------------------|---------------------|-------------------|-------------------|
| Berkshire | 0.0% | 11.2% | - | 1,141,977 |
| Buckinghamshire | 55.9% | 12.5% | 8,443,923 | 1,267,858 |
| East Sussex & B&H | 0.0% | 9.3% | - | 948,416 |
| Hampshire | 0.1% | 8.8% | 19,429 | 893,366 |
| Isle of Wight | 0.0% | 0.0% | - | - |
| Kent and Medway | 2.7% | 11.9% | 402,349 | 1,211,625 |
| Milton Keynes | 0.0% | 11.4% | - | 1,161,116 |
| Oxfordshire | 20.9% | 11.8% | 3,156,607 | 1,202,609 |
| Surrey | 20.4% | 13.0% | 3,077,692 | 1,322,520 |
| West Sussex | 0.0% | 10.0% | - | 1,018,845 |
| Total for the SE | 100% | 100% | 15,099,999 | 10,168,332 |

Option 2b gives the greatest emphasis on proximity. The proximity criterion was modelled on the basis of travel time from London by motorway and A-class roads, and density of these road types

in each WPAA. The results for the period 2016-2025 reflect this high weighting, when compared to option 2a, the base model. However, as illustrated in the 2005 report (Table 3), there is relatively little differentiation (only 4%) between the highest and lowest suitability indices for proximity principle. Therefore, whilst those WPAA's with the highest proximity suitability indices are generally attributed the highest apportionments, overall the apportionment is relatively even, with the largest changes being an approximately 450,000 tonne decrease in the Buckinghamshire apportionment, an approximately 500,000 tonne decrease in the Oxfordshire apportionment and an approximately 450,000 tonne increase in the Surrey apportionment.

A number of results do not intuitively follow a high proximity principle weighting, but can be explained by closer analysis. For example, the small increase in Hampshire's apportionment is likely to be due to the lower importance of available void space, for which Hampshire has a zero suitability index.

Further comparative analysis of Options 2a and 2b reveals decrease in the apportionment to both Buckinghamshire and Oxfordshire even though they had medium-high suitability indices for proximity principle. This is due to both these WPAA's having scored high on Criteria 1 and 2&6 as these criteria now have less a bearing on the overall results. There has also been a large increase in the apportionment to Surrey and Berkshire; this is due to both having scored highly on Criterion 3, proximity.

Option 2c – Equal weighting to each criterion

From 2016 to 2025 the apportionment uses the Jacobs Babbie 2005 report base model, adjusted to apply equal weighting to each criterion. Table 10 shows the weightings used under this criterion.

Table 10: Weighting used for Criterion 2c

| Criteria Table | | Weighting | |
|----------------|---|-----------|--------|
| 1 | Identification of surplus void space. | Medium | 25.0% |
| 2&6 | Geology/groundwater suitability & Other environmental constraints | Medium | 25.0% |
| 3 | Proximity to London | Medium | 25.0% |
| 4 | Sustainable Transport | Medium | 25.0% |
| Total | | | 100% |
| Fixed value | | | 50.00% |
| High | | 75% | 38% |
| Medium | | 50% | 25% |
| Low | | 25% | 13% |

Table 11 illustrates the results for Option 2c.

Table 11: Apportionment Option 2c

| WPAA | Current Apportionment | | Period 2006-2015 | Period 2016-2025 |
|-------------------------|-----------------------|---------------------|-------------------|-------------------|
| | Current Apportionment | Model Apportionment | 2015 | 2025 |
| Berkshire | 0.0% | 9.5% | - | 970,882 |
| Buckinghamshire | 55.9% | 17.6% | 8,443,923 | 1,790,312 |
| East Sussex & B&H | 0.0% | 8.1% | - | 824,424 |
| Hampshire | 0.1% | 7.8% | 19,429 | 789,780 |
| Isle of Wight | 0.0% | 0.0% | - | - |
| Kent and Medway | 2.7% | 11.8% | 402,349 | 1,200,913 |
| Milton Keynes | 0.0% | 10.6% | - | 1,075,026 |
| Oxfordshire | 20.9% | 16.7% | 3,156,607 | 1,695,632 |
| Surrey | 20.4% | 8.7% | 3,077,692 | 889,723 |
| West Sussex | 0.0% | 9.2% | - | 931,640 |
| Total for the SE | 100% | 100% | 15,099,999 | 10,168,332 |

Table 11 shows giving equal weighting to each criterion makes only a small difference to the model apportionment when compared to Option 2a. There has been a small increase (1% or less) to the apportionment given to Berkshire, Buckinghamshire and Surrey and a decrease (less than 1%) to all other WPAA's, equating to around a maximum of 100,000 tonnes increase/decrease in apportionment in any given WPAA over the 2016-2025 period.

Option 2d – Environmental constraints weighted low

For the 2016 to 2025 period, Option 2d uses the Jacobs Babbie 2005 base model, but with a low weighting applied to environmental constraints (criteria 2&6). Table 12 shows the weightings used under this criterion.

Table 12: Weighting used for Criterion 2d

| Criteria Table | | Weighting | |
|----------------|---|-----------|-------|
| 1 | Identification of surplus void space. | Medium | 33.3% |
| 2&6 | Geology/groundwater suitability & Other environmental constraints | Low | 16.7% |
| 3 | Proximity to London | Medium | 33.3% |
| 4 | Sustainable Transport | Low | 16.7% |
| Total | | 100% | |
| Fixed value | | 66.67% | |
| High | | 75% | 50% |
| Medium | | 50% | 33% |
| Low | | 25% | 17% |

Table 13 illustrates the results of Option 2d.

Table 13: Apportionment Option 2d

| WPAA | Current Apportionment | Model Apportionment | Period 2006-2015 | Period 2016-2025 |
|-------------------------|-----------------------|---------------------|-------------------|-------------------|
| Berkshire | 0.0% | 10.4% | - | 1,060,574 |
| Buckinghamshire | 55.9% | 16.6% | 8,443,923 | 1,688,989 |
| East Sussex & B&H | 0.0% | 8.6% | - | 875,610 |
| Hampshire | 0.1% | 6.7% | 19,429 | 684,099 |
| Isle of Wight | 0.0% | 0.0% | - | - |
| Kent and Medway | 2.7% | 10.7% | 402,349 | 1,091,846 |
| Milton Keynes | 0.0% | 12.6% | - | 1,276,223 |
| Oxfordshire | 20.9% | 15.0% | 3,156,607 | 1,525,781 |
| Surrey | 20.4% | 10.3% | 3,077,692 | 1,048,324 |
| West Sussex | 0.0% | 9.0% | - | 916,886 |
| Total for the SE | 100% | 100% | 15,099,999 | 10,168,332 |

Table 13 shows that lowering the weighting on the environmental constraints criteria increases the apportionment to Berkshire, East Sussex, Milton Keynes and Surrey when compared to Option 2a. These WPAA's had a low suitability index for this criteria, therefore lowering the weighting of this criteria from high to low has given less significance to environmental constraints and increased the overall apportionment for these WPAA's. Buckinghamshire, Hampshire, Kent and Medway, Oxfordshire, and West Sussex all had relatively high suitability indices under Criteria 2&6. This has had the counter-effect on overall results, i.e. a reduction in overall apportionment under this option.

The largest percentage changes from the base option (2a) in of the order of 2%, equating to around 200,000 tonnes per annum over the 2016-2025 period.

Option 2e – Proximity and sustainable transport and available void space weighted high

For the 2016 to 2025 period, Option 2e uses the Jacobs Babbie 2005 base model, but with a low weighting applied to environmental constraints and a high weighting applied to proximity, sustainable transport and Landfill void.

Table 14 shows the weightings used under this criterion.

Table 14: Weighting used for Criterion 2e

| Criteria Table | Weighting |
|---|------------|
| 1 Identification of surplus void space. | High 30.0% |
| 2&6 Geology/groundwater suitability & Other environmental constraints | Low 10.0% |
| 3 Proximity to London | High 30.0% |
| 4 Sustainable Transport | High 30.0% |
| Total | 100% |
| Fixed value | 40.00% |
| High | 75% 30% |
| Medium | 50% 20% |
| Low | 25% 10% |

Table 15 illustrates the results of Option 2e.

Table 15: Apportionment Option 2e

| WPAA | Current Apportionment | Model Apportionment | Period 2006-2015 | Period 2016-2025 |
|-------------------------|-----------------------|---------------------|-------------------|-------------------|
| Berkshire | 0.0% | 10.9% | - | 1,109,631 |
| Buckinghamshire | 55.9% | 17.7% | 8,443,923 | 1,795,253 |
| East Sussex & B&H | 0.0% | 8.1% | - | 827,193 |
| Hampshire | 0.1% | 6.7% | 19,429 | 677,090 |
| Isle of Wight | 0.0% | 0.0% | - | - |
| Kent and Medway | 2.7% | 10.8% | 402,349 | 1,099,674 |
| Milton Keynes | 0.0% | 12.2% | - | 1,236,867 |
| Oxfordshire | 20.9% | 15.4% | 3,156,607 | 1,567,330 |
| Surrey | 20.4% | 10.0% | 3,077,692 | 1,012,825 |
| West Sussex | 0.0% | 8.3% | - | 842,469 |
| Total for the SE | 100% | 100% | 15,099,999 | 10,168,332 |

Option 2e is effectively a variation of Option 2d, with low importance attached to the environmental and geological suitability criterion but presenting a more evenly balanced assessment of the other sustainable waste management criteria. Not surprisingly, the results are very similar to Option 2d.

A comparison between Option 2e (Table 15) and the base model results (Table 6) shows that the weighting under Option 2e will increase the apportionment to Berkshire, Buckinghamshire, Milton Keynes and Surrey. It will decrease the apportionment to East Sussex, Hampshire and Brighton and Hove, Kent and Medway, Oxfordshire and West Sussex.

The largest increases affect Berkshire and Milton Keynes (2.4% and 2.1% respectively), reflecting relatively high suitability indices for these WPAA's for Criteria 1, 3 and 4. These increases correlate to around 240,000 – 210,000 tonnes over the 2016-2025 period.

Option 2f – Criteria 2&6 (Geological and Environmental constraints) excluding Green Belt

From 2016 to 2025, the apportionment is the same as the Jacobs Babbie 2005 report base model. Table 16 shows the weightings used under this criterion.

Table 16: Weighting used for Criterion 2f

| | B | C | D | E |
|----|-----------------------|---|------------------|--------|
| 3 | Criteria Table | | Weighting | |
| 4 | 1 | Identification of surplus void space. | Medium | 25.0% |
| 5 | 2&6 | Geology/groundwater suitability & Other environmental constraints | High | 37.5% |
| 6 | 3 | Proximity to London | Medium | 25.0% |
| 7 | 4 | Sustainable Transport | Low | 12.5% |
| 8 | Total | | | 100% |
| 9 | Fixed value | | | 50.00% |
| 10 | High | 75% | 38% | |
| 11 | Medium | 50% | 25% | |
| 12 | Low | 25% | 13% | |

Table 17 illustrates the results of Option 2f.

Table 17: Apportionment Option 2f

| WPAA | Current Apportionment | Model Apportionment | Period 2006-2015 | Period 2016-2025 |
|----------------------------------|------------------------------|----------------------------|-------------------------|-------------------------|
| Berkshire | 0.0% | 8.6% | - | 870,479 |
| Buckinghamshire | 55.9% | 16.2% | 8,443,923 | 1,652,093 |
| East Sussex & B&H | 0.0% | 8.1% | - | 818,810 |
| Hampshire | 0.1% | 7.8% | 19,429 | 795,836 |
| Isle of Wight | 0.0% | 0.0% | - | - |
| Kent and Medway | 2.7% | 12.1% | 402,349 | 1,231,886 |
| Milton Keynes | 0.0% | 10.0% | - | 1,021,156 |
| Oxfordshire | 20.9% | 17.2% | 3,156,607 | 1,746,561 |
| Surrey | 20.4% | 10.6% | 3,077,692 | 1,075,550 |
| West Sussex | 0.0% | 9.4% | - | 955,959 |
| Total for the SE | 100% | 100% | 15,099,999 | 10,168,332 |

Option 2f is effectively a variation of Option 2a, with Green Belt removed from Criterion 6 (environmental suitability), i.e. Green Belt is not included as a factor in determining suitability for landfilling based on environmental constraints.

Kent, Surrey, Berkshire, Buckinghamshire and Oxfordshire are all affected by Green Belt designations, but Surrey has significantly greater proportion of its area designated than the other Counties.

A comparison between Option 2f (Table 17) and the base model results (Table 6) shows that the removal of Green Belt under Option 2f will increase the apportionment to Berkshire (0.1%), Oxfordshire (0.2%) and most significantly Surrey (2.2%). However, the apportionment for Kent and Buckinghamshire decreases by 0.1% and 0.6% respectively. The apportionments for the Counties not affected by Green Belt designations all fall slightly. These results are broadly what would be expected, taking account of the fact Surrey has by far the largest proportion designated Green Belt, that the multi-criteria basis of the apportionment model 'smoothes-out' the effects of only small variations in the values that underpin the criteria, and the impact of the coincidence of Green Belt and other designations.

The 2.2% apportionment increase for Surrey correlates to around 220,000 tonnes over the 2016-2025 period.

Part 4. Conclusions

It is possible to draw out some broad concluding observations from the results of the alternative options apportionment exercise.

Firstly, it is important that the original objective of the development of an apportionment model is not overlooked. The purpose of the apportionment model developed in 2005, was to enable the apportionment of waste from London, to landfill in South East England, in accordance with sustainable waste management principles, encompassing environmental and practical considerations.

The criteria developed to inform the model were intended to reflect the key principles of sustainable waste management, in the context of the available data and limitations to the timeframe and budget under which the project was delivered. These criteria, and the assumptions that were made in order to model them, were subjected to a consultation process under the auspices of the Regional Technical Advisory Body, SERTAB.

A key principle of all of the Option 2 alternatives was a phased approach to the implementation of apportionment. The phased approach recognises that, for practical reasons including the long lead-in times for new landfills, there would need to be a period during which current distribution of waste to landfill would continue. The inclusion of a phased approach in the apportionment model introduces a degree of realism to the results, which should have the effect of improving deliverability of apportioned landfill tonnages.

The alternative options modelling exercise has produced some interesting results, as described above. A key point to draw from the results is that the model is not very sensitive to changes to the weightings applied to each criterion. The alternatives modelled represent a broad range of options for the apportionment of London's waste. When the differences between the phased base model (Option 2a) and the other alternative options are examined, the most radical alternative (Option 2b), resulted in a maximum increase for an individual WPAA of around 4.5% over the 2016-2025 period, equating to around 450,000 tonnes. For the other options, the largest changes were limited to the order of 1 to 2%, or 100,000 to 200,000 tonnes over the 2016-2025 period.

Modern landfill sites generally require significant investment in engineered pollution control measures, and are consequently normally only viable at a significant scale of capacity. The degree of change revealed in the alternative options analysis, with a few possible exceptions in localised cases, is unlikely to affect the broad requirement for WPAA's to plan for a degree of new landfill capacity within their own areas, requiring the development of new landfill sites.

If the broad objective of achieving sustainable waste management is to be met, it is unlikely that continuation of historic patterns of export of waste from London will be acceptable, and some form of apportionment, based on sustainable waste management principles, will be required.

Whilst the criteria weightings of Option 2a were essentially ratified by SERTAB in 2005, the concerns raised subsequently by the WPAA's relating to the selection and weighting of criteria, supported by technical justification in many cases, must be taken into consideration. However, if sustainable development is the objective, it appears counter-intuitive to attach low weighting to environmental constraints when compared to the more practical capacity and proximity factors. Given the relative lack of sensitivity of the model, and the necessary limitations on undertaking detailed further modelling iterations, it seems likely that some form middle-ground apportionment should be adopted, suggesting that Option 2c is likely to be the most acceptable option.