

Residual Municipal Waste Tonnage Forecast for the Waste Core Strategy

Submitted on behalf of the Waste Disposal Authority

February 2012

1. During the Examination in Public the Inspector asked the County Council, as the Waste Disposal Authority (WDA), to consider what upper tonnage limit of forecasted residual waste tonnage should guide policies of the Waste Core Strategy (WCS), in particular Policy WCS4. In responding to the Inspector's request, the WDA would wish to bring to his attention that there is a need to provide sufficient flexibility to allow for the fact that the residual waste treatment contract (and associated facilities) is being procured on a contract that will run beyond the WCS plan period, to 2040. Compliant with PPS12, the WDA understands that the WCS should provide a robust and flexible policy framework which supports the delivery of essential sustainable waste management infrastructure and is effective in addressing changing circumstances during and beyond the plan period. The facility being procured during the plan period is predicated on providing sufficient capacity to deal with residual Municipal Waste arising in Gloucestershire over a period up to 2040.
2. In its response the WDA has taken note of the scenarios presented by the Inspector and considered these along with the WDA's original waste forecast modelling. Table 1 sets out the original waste flow modelling data which is known as the "core model", and the Inspector's requested scenarios. The key assumptions are listed alongside.

Table 1: Residual waste forecast modelling scenarios presented at the inquiry – tonnages and assumptions shown for 2028 and 2040.

Scenario	2028 (Tonnes of Residual Waste)	2040 (Tonnes of Residual Waste)	Key Assumptions
WCS ("core model")	143,000	154,372	60% recycling by 2020. Growth at household level from 2020/21.
Inspector requested Additional Modelling A (Appendix A)	99,558	109,548	70% recycling from 2014/15.
Inspector requested Additional Modelling B (Appendix B)	126,818	139,543	60% recycling by 2020. Growth at household level from 2010/11.
Inspector requested Additional Modelling C (Appendix C)	94,498	105,041	70% recycling from 2014/15. Growth at household level from 2010/11.

3. Although it is useful to consider a range of forecasting models underpinned by ambitious targets/assumptions, the WDA requires a realistic and flexible approach to forecasting to ensure the effectiveness of the WCS. In order to derive a realistic residual waste forecast the WDA has taken into account modelling based on more conservative scenarios both for growth and recycling. It is noted that achieving a 70% recycling rate by 2014/15, although desirable is unrealistic given the current infrastructure and partnership arrangements.
4. Whilst 60% recycling by 2020 remains the aim of the WDA, the WDA has also reviewed the risks that it may not achieve either the 60% level of recycling as set out in the Joint Municipal

Waste Management Strategy or that waste growth is not restricted to the level of increase in population (de-coupling of the waste from economic growth). The key factors affecting this are:

- Charges introduced for garden waste collections which may reduce the tonnage available for recycling,
- The reduction of the weight of packaging material by industry which is reducing the tonnage available for recycling,
- The two urban areas of Cheltenham and Gloucester may struggle to achieve high levels of recycling, for example due to the high number of multiple occupancy dwellings'
- The development of the waste partnership which could take longer than expected so that the benefits are not realised as previously anticipated,
- The de-coupling of waste from economic growth does not take place, this is assumed to be total after 2020, which may only be partial or worse, resulting in growth rates that are higher than the level of population increase.

5. The results of additional waste forecast modelling is shown below in Table 2:

Table 2: Further residual waste forecast modelling scenarios – tonnages and assumptions shown for 2028 and 2040

Scenario	2028 (Tonnes of Residual Waste)	2040 (Tonnes of Residual Waste)	Assumptions
Medium Recycling (Appendix D)	153,875	169,514	Growth at 0.8% from 2019/20. 55% recycling from 2017/18.
Medium to High Recycling (Appendix E)	111,983	122,795	Growth at 1.3% all years. 60% recycling by 2019/20 and 70% recycling by 2029/30.
High Recycling (Appendix F)	107,945	111,974	Growth at 0.8% from 2020/21. 60% recycling from 2019/20 and 70% recycling by 2029/30.

6. It can be seen from Table 2 above that depending on the assumptions made for recycling performance and waste growth, the waste tonnages in 2028 vary between 108,000 tonnes and 154,000 tonnes. By 2040, this reaches between 112,000 tonnes and 170,000 tonnes.
7. In order to check the reasonableness of the range of tonnages the WDA has subjected the "core model" to statistical modelling using Monte Carlo analysis¹. The variables were set at between 0.8% and 3%² for waste growth, and between 50% and 70% for recycling levels. The results are shown below for the 5%, 50% and 80% confidence levels. Whilst the WDA accepts that such an analysis is subjective it gives an indication of the likely range of tonnages and acts as a form of sense check. The output is summarised below and the frequency chart is shown as Appendix G.

¹ A Monte Carlo analysis is a computerised statistical tool that runs thousands of iterations of key variables to show the effect of changes in these variables and produces a distribution.

² The upper limit of 3% for growth represents population growth (0.8%) and long term economic growth (2.2%). It thus represents what is known as a "no de-coupling scenario".

Table 3. Tonnages with associated confidence levels

Confidence Level/Year	5%	50%	80%
2028	130,000	144,901	152,315
2040	145,669	162,387	170,837

8. In setting the upper limit of tonnage the WDA is conscious that it needs to accommodate a reasonable worst case of Medium Recycling (Appendix D).
9. In addition we would ask the Inspector to consider the fact that the WDA has a legal obligation to dispose of waste delivered by its District Councils and so it needs to make provision for waste disposal for the future and beyond the plan period. In particular it is currently in procurement for residual waste treatment capacity which is likely to be in place from 2015 until 2040. As such this proposed facility will treat waste during and significantly beyond the plan period. PPS12 provides explicit advice regarding flexibility and considering a long term planning horizon in development plans, in paragraph 4.46 which states that: *"A strategy is unlikely to be effective if it cannot deal with changing circumstances. Core strategies should look over a long time frame - 15 years usually but more if necessary...Plans should be able to show how they will handle contingencies; it may not always be possible to have maximum certainty about the deliverability of the strategy....Authorities should not necessarily rely on a review of the plan as a means of handling uncertainty."*
10. In summary and responding to the Inspector's request, the WDA has revisited WCS4 and is in proposing an upper limit of 170,000 tonnes of residual waste per annum rounded from the 169,514 tonnes (Appendix D). The WDA considers that this amount is required to allow for sufficient flexibility and an effective policy framework during the plan period and beyond.

Appendix A ³ : Table 3I: Yearly MSW Facility Requirements (Figures updated following WCS Public Examination).								
<i>Achieving a recycling rate of 70% by 2015</i>								
1	2	3	4	5	6	7	8	9
Year	Arising Estimate	Average Annual Growth rate	Composting/AD	Recycling	Residual Treatment	Transfer (see Section 8)	Landfill	
		%	All		Based on 70% recycling and composting (by 2015)		Residual after treatment	LATS targets
2000/01	268,504	12.17%	6,123	30,106	-	50,438	232,275	-
2001/02	268,320	-0.07%	7,312	31,100	-	50,404	229,907	-
2002/03	283,493	5.66%	12,395	35,296	-	53,254	235,802	-
2003/04	291,978	2.99%	17,456	46,007	-	55,201	228,515	-
2004/05	309,486	6.00%	22,774	58,300	-	58,295	228,413	-
2005/06	312,118	0.85%	32,276	66,590	-	48,154	213,252	-
2006/07	324,143	3.85%	41,602	67,572	-	47,057	214,969	158,634
2007/08	322,796	-0.42%	43,683	77,116	-	46,000	201,997	150,100
2008/09	307,269	-4.81%	50,703	80,139	-	49,040	176,429	138,721
2009/10	293,815	-4.38%	49,244	75,548	-	62,943	169,023	124,497
2010/11	292,816	-0.34%	55,329	75,323	-	64,879	162,164	107,428
2011/12	297,116	1.47%	63,147	80,225	-	65,355	153,744	95,471
2012/13	301,914	1.61%	65,137	83,089	-	65,844	153,688	83,513
2013/14	306,793	1.62%	66,793	85,625	-	66,348	154,375	71,555
2014/15	311,753	1.62%	99,721	119,341	85,650	46,346	7,041	68,486
2015/16	316,794	1.62%	100,594	121,161	87,872	47,520	7,167	65,416
2016/17	321,918	1.62%	101,676	123,667	88,828	48,288	7,747	62,347
2017/18	327,127	1.62%	103,168	125,821	90,430	49,069	7,708	59,277
2018/19	332,422	1.62%	103,633	129,063	92,052	49,863	7,674	56,208
2019/20	337,805	1.62%	103,445	133,019	93,566	50,671	7,775	53,139
2020/21	340,533	0.81%	104,253	134,121	94,312	51,080	7,847	50,069
2021/22	343,258	0.80%	105,059	135,222	95,060	51,489	7,917	-
2022/23	345,984	0.79%	105,865	136,324	95,808	51,898	7,987	-
2023/24	348,709	0.79%	106,670	137,426	96,558	52,307	8,055	-
2024/25	351,435	0.78%	107,476	138,529	97,306	52,715	8,124	-
2025/26	354,161	0.78%	108,281	139,631	98,056	53,125	8,193	-
2026/27	356,886	0.77%	109,086	140,735	98,806	53,533	8,259	-
2027/28	359,612	0.76%	109,890	141,838	99,558	53,942	8,326	-

³ **Disclaimer**

You should note that this table/information has been provided by Mr B Cook in his capacity as Inspector for the Examination in Public of Gloucestershire's Waste Core Strategy. It does not represent the views of Gloucestershire County Council and has not been produced by subjecting the assumptions to a detailed analysis through the County Councils waste flow model. Gloucestershire County Council does not warrant the accuracy or completeness of this information and does not accept any liability ensuing from any inaccuracy in, or omission from, the information.

2028/29	362,489	0.8%	110,769	142,973	100,354	54,374	8,393	
2029/30	365,389	0.8%	111,655	144,116	101,157	54,809	8,460	
2030/31	368,312	0.8%	112,549	145,269	101,967	55,247	8,527	
2031/32	371,258	0.8%	113,449	146,432	102,782	55,689	8,596	
2032/33	374,228	0.8%	114,356	147,603	103,605	56,134	8,664	
2033/34	377,222	0.8%	115,271	148,784	104,433	56,584	8,734	
2034/35	380,240	0.8%	116,194	149,974	105,269	57,036	8,804	
2035/36	383,282	0.8%	117,123	151,174	106,111	57,493	8,874	
2036/37	386,348	0.8%	118,060	152,383	106,960	57,952	8,945	
2037/38	389,439	0.8%	119,005	153,602	107,816	58,416	9,017	
2038/39	392,555	0.8%	119,957	154,831	108,678	58,883	9,089	
2039/40	395,695	0.8%	120,916	156,070	109,548	59,354	9,161	

Appendix B⁴: Table 3I: Yearly MSW Facility Requirements (Figures updated following WCS Public Examination).

Increase in waste tonnage arisings due to the increase in household numbers.

1	2	3	4	5	6	7	8	9
Year	Arising Estimate	Average Annual Growth rate	Composting/AD	Recycling	Residual Treatment	Transfer (see Section 8)	Landfill	
		%	All		Based on 60% recycling and composting (by 2020)		Residual after treatment	LATS targets
2000/01	268,504	12.17%	6,123	30,106	-	50,438	232,275	-
2001/02	268,320	-0.07%	7,312	31,100	-	50,404	229,907	-
2002/03	283,493	5.66%	12,395	35,296	-	53,254	235,802	-
2003/04	291,978	2.99%	17,456	46,007	-	55,201	228,515	-
2004/05	309,486	6.00%	22,774	58,300	-	58,295	228,413	-
2005/06	312,118	0.85%	32,276	66,590	-	48,154	213,252	-
2006/07	324,143	3.85%	41,602	67,572	-	47,057	214,969	158,634
2007/08	322,796	-0.42%	43,683	77,116	-	46,000	201,997	150,100
2008/09	307,269	-4.81%	50,703	80,139	-	49,040	176,429	138,721
2009/10	293,815	-4.38%	49,244	75,548	-	62,943	169,023	124,497
2010/11	296,665	0.97%	55,329	75,323	-	64,879	162,164	107,428
2011/12	295,627	0.96%	63,147	80,225	-	65,355	152,255	95,471
2012/13	298,317	0.91%	65,137	83,089	-	65,844	150,091	83,513
2013/14	301,241	0.98%	66,793	85,625	-	66,348	148,823	71,555
2014/15	304,374	1.04%	68,546	88,166	140,621	73,831	7,041	68,486
2015/16	307,509	1.03%	75,030	95,597	129,715	68,441	7,167	65,416
2016/17	310,861	1.09%	76,590	98,581	127,943	67,845	7,747	62,347
2017/18	314,000	1.01%	78,883	101,536	125,873	66,791	7,708	59,277
2018/19	317,234	1.03%	80,659	106,089	122,812	65,243	7,674	56,208
2019/20	320,597	1.06%	82,728	112,302	117,792	62,784	7,775	53,139
2020/21	323,611	0.94%	83,409	113,277	119,078	63,462	7,847	50,069
2021/22	326,620	0.93%	84,089	114,252	120,362	64,140	7,917	-
2022/23	330,082	1.06%	84,769	115,228	122,098	65,043	7,987	-
2023/24	332,327	0.68%	85,449	116,205	122,618	65,337	8,055	-
2024/25	335,119	0.84%	86,129	117,182	123,684	65,904	8,124	-
2025/26	337,934	0.84%	86,809	118,159	124,773	66,483	8,193	-

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2026/27	340,637	0.80%	87,489	119,138	125,751	67,005	8,259	-
2027/28	343,430	0.82%	88,169	120,117	126,818	67,572	8,326	-
2028/29	346,178	0.8%	88,874	121,078	127,833	68,113	8,393	
2029/30	348,947	0.8%	89,585	122,047	128,855	68,658	8,460	
2030/31	351,739	0.8%	90,302	123,023	129,886	69,207	8,527	
2031/32	354,553	0.8%	91,024	124,007	130,925	69,761	8,596	
2032/33	357,389	0.8%	91,753	124,999	131,973	70,319	8,664	
2033/34	360,248	0.8%	92,487	125,999	133,029	70,881	8,734	
2034/35	363,130	0.8%	93,227	127,007	134,093	71,448	8,804	
2035/36	366,035	0.8%	93,972	128,023	135,166	72,020	8,874	
2036/37	368,963	0.8%	94,724	129,047	136,247	72,596	8,945	
2037/38	371,915	0.8%	95,482	130,080	137,337	73,177	9,017	
2038/39	374,891	0.8%	96,246	131,120	138,436	73,762	9,089	
2039/40	377,890	0.8%	97,016	132,169	139,543	74,352	9,161	

Appendix C⁵: Table 3I: Yearly MSW Facility Requirements (Figures updated following WCS Public Examination).

Increase in waste tonnages due to the increase in household numbers and 70% recycling by 2015

1	2	3	4	5	6	7	8	9	
Year	Arising Estimate	Average Annual Growth rate	Composting/AD	Recycling	Residual Treatment	Transfer (see Section 8)	Landfill		
		%	All		Based on 70% recycling and composting (by 2015)		Residual after treatment	LATS targets	
2000/01	268,504	12.17%	6,123	30,106	-	50,438	232,275	-	
2001/02	268,320	-0.07%	7,312	31,100	-	50,404	229,907	-	
2002/03	283,493	5.66%	12,395	35,296	-	53,254	235,802	-	
2003/04	291,978	2.99%	17,456	46,007	-	55,201	228,515	-	
2004/05	309,486	6.00%	22,774	58,300	-	58,295	228,413	-	
2005/06	312,118	0.85%	32,276	66,590	-	48,154	213,252	-	
2006/07	324,143	3.85%	41,602	67,572	-	47,057	214,969	158,634	
2007/08	322,796	-0.42%	43,683	77,116	-	46,000	201,997	150,100	
2008/09	307,269	-4.81%	50,703	80,139	-	49,040	176,429	138,721	
2009/10	293,815	-4.38%	49,244	75,548	-	62,943	169,023	124,497	
2010/11	296,665	0.97%	55,329	75,323	-	64,879	162,164	107,428	
2011/12	295,627	0.96%	63,147	80,225	-	65,355	152,255	95,471	
2012/13	298,317	0.91%	65,137	83,089	-	65,844	150,091	83,513	
2013/14	301,241	0.98%	66,793	85,625	-	66,348	148,823	71,555	
2014/15	304,374	1.04%	98,333	114,910	84,090	47,087	7,041	68,486	
2015/16	307,509	1.03%	98,974	116,466	84,902	47,572	7,167	65,416	
2016/17	310,861	1.09%	99,453	118,336	85,325	48,090	7,747	62,347	
2017/18	314,000	1.01%	100,237	119,751	86,304	48,576	7,708	59,277	
2018/19	317,234	1.03%	99,998	122,256	87,306	49,076	7,674	56,208	
2019/20	320,597	1.06%	99,120	125,489	88,213	49,596	7,775	53,139	
2020/21	323,611	0.94%	100,044	126,677	89,043	50,063	7,847	50,069	
2021/22	326,620	0.93%	100,963	127,864	89,877	50,528	7,917	-	
2022/23	330,082	1.06%	102,048	129,207	90,840	51,064	7,987	-	
2023/24	332,327	0.68%	102,697	130,131	91,444	51,411	8,055	-	
2024/25	335,119	0.84%	103,540	131,243	92,212	51,843	8,124	-	
2025/26	337,934	0.84%	104,392	132,364	92,985	52,278	8,193	-	

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2026/27	340,637	0.80%	105,203	133,447	93,729	52,697	8,259	-
2027/28	343,430	0.82%	106,046	134,561	94,498	53,129	8,326	-
2028/29	346,178	0.80%	105,188	137,136	95,527	51,927	8,326	-
2029/30	348,947	0.80%	106,158	138,106	96,358	52,342	8,326	-
2030/31	351,739	0.80%	107,135	139,083	97,196	52,761	8,326	-
2031/32	354,553	0.80%	108,119	140,067	98,040	53,183	8,326	-
2032/33	357,389	0.80%	109,112	141,060	98,891	53,608	8,326	-
2033/34	360,248	0.80%	110,113	142,061	99,748	54,037	8,326	-
2034/35	363,130	0.80%	111,122	143,070	100,613	54,470	8,326	-
2035/36	366,035	0.80%	112,138	144,086	101,485	54,905	8,326	-
2036/37	368,963	0.80%	113,163	145,111	102,363	55,345	8,326	-
2037/38	371,915	0.80%	114,196	146,144	103,249	55,787	8,326	-
2038/39	374,891	0.80%	115,238	147,186	104,141	56,234	8,326	-
2039/40	377,890	0.80%	116,287	148,235	105,041	56,683	8,326	-

Appendix D: Table 3I: Yearly MSW Facility Requirements (Updated assuming 55% recycling – growth at 0.8% from 2020).

1	2	3	4	5	6	7	8	9
Year	Arising Estimate	Average Annual Growth rate	Composting/AD	Recycling	Residual Treatment	Transfer (see Section 8)	Landfill	
		%	All		Based on 55% recycling and composting (by 2018)		Residual after treatment	LATS targets
2000/01	268,504	12.2%	6,123	30,106	-	50,438	232,275	-
2001/02	268,320	-0.1%	7,312	31,100	-	50,404	229,907	-
2002/03	283,493	5.7%	12,395	35,296	-	53,254	235,802	-
2003/04	291,978	3.0%	17,456	46,007	-	55,201	228,515	-
2004/05	309,486	6.0%	22,774	58,300	-	58,295	228,413	-
2005/06	312,118	0.9%	32,276	66,590	-	48,154	213,252	-
2006/07	324,143	3.9%	41,602	67,572	-	47,057	214,969	158,634
2007/08	322,796	-0.4%	43,683	77,116	-	46,000	201,997	150,100
2008/09	307,269	-4.8%	50,703	80,139	-	49,040	176,429	138,721
2009/10	293,815	-4.4%	49,244	75,548	-	62,943	169,023	124,497
2010/11	292,816	-0.3%	55,329	75,323	0	64,879	162,164	107,428
2011/12	297,200	1.5%	56,294	76,360	0	65,355	164,547	95,471
2012/13	301,914	1.6%	58,710	81,839	0	65,844	161,365	83,513
2013/14	306,704	1.6%	60,811	85,870	0	66,348	160,023	71,555
2014/15	311,572	1.6%	62,233	88,348	154,044	77,521	6,946	68,486
2015/16	316,519	1.6%	66,981	92,103	150,337	73,084	7,098	65,416
2016/17	321,546	1.6%	68,066	94,635	151,592	73,374	7,252	62,347
2017/18	326,654	1.6%	69,627	98,428	151,190	73,354	7,409	59,277
2018/19	331,845	1.6%	70,755	100,069	153,453	74,795	7,568	56,208
2019/20	334,450	0.8%	71,446	101,919	153,436	76,006	7,648	53,139
2020/21	337,076	0.8%	72,434	103,487	153,425	76,620	7,729	50,069
2021/22	339,722	0.8%	73,014	104,383	154,516	77,233	7,810	-
2022/23	342,390	0.8%	74,131	106,465	153,902	77,846	7,892	-
2023/24	345,080	0.8%	75,151	107,890	154,065	78,460	7,974	-
2024/25	347,791	0.8%	75,926	109,031	154,776	79,073	8,057	-
2025/26	350,523	0.8%	76,708	110,340	155,334	79,686	8,141	-
2026/27	353,278	0.8%	77,675	111,739	155,638	80,299	8,226	-
2027/28	356,054	0.8%	78,981	114,887	153,875	80,913	8,311	-
2028/29	358,853	0.8%	79,613	115,806	155,036	81,560	8,397	-
2029/30	361,674	0.8%	80,250	116,786	156,155	82,212	8,483	-
2030/31	364,517	0.8%	80,892	117,720	157,335	82,870	8,571	-
2031/32	367,384	0.8%	81,539	118,662	158,524	83,533	8,658	-
2032/33	370,273	0.8%	82,192	119,611	159,723	84,201	8,747	-
2033/34	373,186	0.8%	82,849	120,568	160,932	84,875	8,836	-

2034/35	376,121	0.8%	83,512	121,532	162,150	85,554	8,927	-
2035/36	379,081	0.8%	84,180	122,468	163,415	86,238	9,017	-
2036/37	382,063	0.8%	84,782	123,377	164,795	86,928	9,109	-
2037/38	385,070	0.8%	85,460	124,018	166,391	87,624	9,201	-
2038/39	388,101	0.8%	86,144	124,604	168,059	88,325	9,294	-
2039/40	391,156	0.8%	86,759	125,495	169,514	89,031	9,388	-

Appendix E: Table 3I (Growth at 1.3% all years and 60% recycling by 2020, 70% recycling by 2030).

1	2	3	4	5	6	7	8	9
Year	Arising Estimate	Average Annual Growth rate	Composting/AD	Recycling	Residual Treatment	Transfer (see Section 8)	Landfill	
		%	All		Based on 60% recycling and composting (by 2020) and 70% by 2030		Residual after treatment	LATS targets
2000/01	268,504	12.2%	6,123	30,106	-	50,438	232,275	-
2001/02	268,320	-0.1%	7,312	31,100	-	50,404	229,907	-
2002/03	283,493	5.7%	12,395	35,296	-	53,254	235,802	-
2003/04	291,978	3.0%	17,456	46,007	-	55,201	228,515	-
2004/05	309,486	6.0%	22,774	58,300	-	58,295	228,413	-
2005/06	312,118	0.9%	32,276	66,590	-	48,154	213,252	-
2006/07	324,143	3.9%	41,602	67,572	-	47,057	214,969	158,634
2007/08	322,796	-0.4%	43,683	77,116	-	46,000	201,997	150,100
2008/09	307,269	-4.8%	50,703	80,139	-	49,040	176,429	138,721
2009/10	293,815	-4.4%	49,244	75,548	-	62,943	169,023	124,497
2010/11	292,816	-0.3%	55,329	75,323	0	64,879	162,164	107,428
2011/12	290,498	-0.8%	62,496	79,142	0	65,355	148,860	95,471
2012/13	292,674	0.7%	63,962	81,201	0	65,844	147,511	83,513
2013/14	295,416	0.9%	65,166	82,814	0	66,348	147,436	71,555
2014/15	298,740	1.1%	66,576	84,619	136,865	77,521	10,680	68,486
2015/16	302,383	1.3%	72,524	91,214	127,962	73,084	10,683	65,416
2016/17	306,075	1.3%	73,793	93,520	128,077	73,374	10,685	62,347
2017/18	309,814	1.3%	75,242	95,313	128,572	73,354	10,688	59,277
2018/19	313,601	1.3%	76,664	98,572	127,676	74,795	10,690	56,208
2019/20	317,438	1.3%	78,351	102,793	125,602	76,006	10,692	53,139
2020/21	321,325	1.3%	81,909	107,489	121,233	76,620	10,695	50,069
2021/22	325,263	1.3%	84,876	111,402	118,286	77,233	10,698	-
2022/23	329,251	1.3%	86,555	115,207	116,789	77,846	10,700	-
2023/24	333,291	1.3%	87,681	117,194	117,714	78,460	10,703	-
2024/25	337,384	1.3%	89,124	119,575	117,980	79,073	10,705	-
2025/26	341,531	1.3%	92,105	124,507	114,211	79,686	10,708	-
2026/27	345,731	1.3%	93,302	126,601	115,117	80,299	10,711	-
2027/28	349,985	1.3%	96,267	131,022	111,983	80,913	10,713	-
2028/29	354,295	1.3%	97,838	135,284	110,457	81,560	10,716	-
2029/30	358,661	1.3%	100,184	138,243	109,515	82,212	10,719	-
2030/31	363,084	1.3%	101,487	140,105	110,770	82,870	10,722	-
2031/32	367,564	1.3%	102,806	141,993	112,040	83,533	10,725	-
2032/33	372,103	1.3%	104,143	143,905	113,327	84,201	10,728	-
2033/34	376,700	1.3%	105,496	145,843	114,630	84,875	10,731	-
2034/35	381,357	1.3%	106,868	147,807	115,948	85,554	10,734	-
2035/36	386,075	1.3%	108,257	149,797	117,284	86,238	10,737	-

2036/37	390,854	1.3%	109,664	151,814	118,636	86,928	10,740	-
2037/38	395,695	1.3%	111,090	153,857	120,005	87,624	10,743	-
2038/39	400,600	1.3%	112,534	155,928	121,392	88,325	10,746	-
2039/40	405,567	1.3%	113,997	158,026	122,795	89,031	10,749	-

Appendix F: Table 3I: Yearly MSW Facility Requirements (Updated assuming 60% recycling by 2020 and 70% recycling by 2030 and run on to 2040) (Figures provided by Gloucestershire County Council's Waste Management Team).

1	2	3	4	5	6	7	8	9
Year	Arising Estimate	Average Annual Growth rate	Composting/AD	Recycling	Residual Treatment	Transfer (see Section 8)	Landfill	
		%	All		Based on 60% recycling and composting (by 2020) and 70% by 2030		Residual after treatment	LATS targets
2000/01	268,504	12.2%	6,123	30,106	-	50,438	232,275	-
2001/02	268,320	-0.1%	7,312	31,100	-	50,404	229,907	-
2002/03	283,493	5.7%	12,395	35,296	-	53,254	235,802	-
2003/04	291,978	3.0%	17,456	46,007	-	55,201	228,515	-
2004/05	309,486	6.0%	22,774	58,300	-	58,295	228,413	-
2005/06	312,118	0.9%	32,276	66,590	-	48,154	213,252	-
2006/07	324,143	3.9%	41,602	67,572	-	47,057	214,969	158,634
2007/08	322,796	-0.4%	43,683	77,116	-	46,000	201,997	150,100
2008/09	307,269	-4.8%	50,703	80,139	-	49,040	176,429	138,721
2009/10	293,815	-4.4%	49,244	75,548	-	62,943	169,023	124,497
2010/11	292,816	-0.3%	55,329	75,323	0	64,879	162,164	107,428
2011/12	290,498	-0.8%	62,496	79,142	0	65,355	148,860	95,471
2012/13	292,674	0.7%	63,962	81,201	0	65,844	147,511	83,513
2013/14	295,416	0.9%	65,166	82,814	0	66,348	147,436	71,555
2014/15	298,740	1.1%	66,576	84,619	136,865	77,521	10,680	68,486
2015/16	302,383	1.2%	72,524	91,214	127,962	73,084	10,683	65,416
2016/17	306,075	1.2%	73,793	93,520	128,077	73,374	10,685	62,347
2017/18	309,814	1.2%	75,242	95,313	128,572	73,354	10,688	59,277
2018/19	313,601	1.2%	76,664	98,572	127,676	74,795	10,690	56,208
2019/20	317,438	1.2%	78,351	102,793	125,602	76,006	10,692	53,139
2020/21	319,830	0.8%	81,504	106,958	120,674	76,620	10,694	50,069
2021/22	322,241	0.8%	84,040	110,305	117,200	77,233	10,696	-
2022/23	324,672	0.8%	85,280	113,509	115,185	77,846	10,697	-
2023/24	327,121	0.8%	85,962	114,897	115,563	78,460	10,699	-
2024/25	329,591	0.8%	86,946	116,653	115,291	79,073	10,700	-
2025/26	332,080	0.8%	89,410	120,865	111,103	79,686	10,702	-
2026/27	334,589	0.8%	90,126	122,291	111,469	80,299	10,704	-
2027/28	337,118	0.8%	92,531	125,936	107,945	80,913	10,705	-
2028/29	339,667	0.8%	93,577	129,392	105,992	81,560	10,707	-
2029/30	342,237	0.8%	95,348	131,569	104,612	82,212	10,708	-
2030/31	344,827	0.8%	96,111	132,683	105,323	82,870	10,710	-
2031/32	347,438	0.8%	96,879	133,807	106,040	83,533	10,712	-
2032/33	350,070	0.8%	97,654	134,940	106,762	84,201	10,713	-
2033/34	352,723	0.8%	98,436	136,082	107,490	84,875	10,715	-

2034/35	355,397	0.8%	99,223	137,234	108,223	85,554	10,717	-
2035/36	358,093	0.8%	100,017	138,395	108,962	86,238	10,719	-
2036/37	360,810	0.8%	100,817	139,566	109,706	86,928	10,720	-
2037/38	363,549	0.8%	101,624	140,746	110,457	87,624	10,722	-
2038/39	366,310	0.8%	102,437	141,936	111,213	88,325	10,724	-
2039/40	369,093	0.8%	103,256	143,136	111,974	89,031	10,726	-

Appendix G: Results of Monte Carlo simulation; Cumulative Frequency Charts

