

APPENDIX 10 - FINANCIAL ANALYSIS OF OPTIONS

10.1 INTRODUCTION

The following analyses have been undertaken in order to compare the capital, revenue and operating costs associated with each of the waste management options identified in Appendix 5 this report. It is recognised that cost issues alone will not be the only consideration when selecting the preferred option; a more detailed overall analysis of options is provided in Appendix 6.

Whilst every effort has been made to present information which is accurate and representative it should be noted that this is not considered sufficiently detailed at this stage to provide a definitive forecast of the overall capital expenditure and running costs associated with a specific installation. The analyses are, however, of sufficient detail to allow comparison of options.

The options to be considered are those presented in the Options Appraisal process (Appendix 5), namely:

- Option 0: Baseline recycling and composting levels (2002/03) with residual waste to landfill
- Option 1: Meet WAG targets, all biodegradable residuals to in-vessel composting, residuals to landfill.
- Option 2: Meet WAG targets, sufficient residuals to in-vessel composting to meet LFD targets, residuals to landfill
- Option 3: Meet WAG targets, all biodegradable residuals to Anaerobic Digestion, residuals to landfill
- Option 4: Meet WAG targets, sufficient residuals to Anaerobic Digestion to meet Landfill Directive targets, residuals to landfill
- Option 5: Meet WAG targets, all residuals to Mechanical Biological Treatment
- Option 6: Exceed WAG targets, all residuals to Mechanical Biological Treatment

10.2 ASSUMPTIONS

10.2.1 General Assumptions

In carrying out the economic analysis, the following assumptions have been made:

- Typical Capital and Operating costs have been drawn from the Waste Strategy Unit's recent publication "Waste not, Want not"
- No allowances have been made for funding of capital as this will very much depend on the procurement route adopted

10.2.2 Individual Components

All options include a selection the following collection, treatment and disposal components (this varies depending on the specific option being considered):

- Kerbside collection of dry recyclate (sorted recyclables and plastic box)
- Kerbside collection of organic materials (RCV type vehicle and plastic sacks)
- Kerbside collection of residual materials (RCV type vehicle and wheeled bin)
- New transfer station.
- New Materials Recycling Facility
- Additional 2 Civic Amenity sites as currently proposed
- Open windrowing of Green Waste
- In-vessel composting of Organic Waste
- Residual material sent to a new residual treatment facility, either EfW (gasification/pyrolysis), MBT or anaerobic digestion

The overall costs for each of the options are presented in Section 3. Individual cost components are presented in Section 4. It is noted that the Council may wish to treat all biodegradable waste (green and organic) in an in-vessel composting facility. Alternatively, rather than constructing a new green waste composting facility, green waste could be diverted to on-farm composting. The cost implications of each of these alternatives are discussed in Section 5.

10.3 OVERALL COSTS

10.3.1 Introduction

Table A10.1 indicates the cost of each of the options over the period 2003 to 2020 expressed as cost per tonne. The cost estimates are further broken down in Tables A10.2 to A10.7 on an individual year basis for options 1 to 6 which outline the capital costs for new facilities, the operational costs for the services and the income from recyclate.

Option	0	1	2	3	4	5	6
Cost per tonne (£/t)	£114.87	£98.04	£101.28	£101.37	£103.45	£108.30	£103.25

Table A10.1 – Headline Costs for Individual Waste Management Options

Based on the above economic analysis, the cheapest of the landfill directive compliant options over the period 2004 to 2021 is the option 1 (in-vessel composting) at a cost of £98.04 per tonne.

Table A10.2 – Cost Estimate for Option 1 (Meet WAG targets, all biodegradable residuals to in-vessel composting)

	Capital Cost (£)	Operational Cost (£)	Income (£)	Total Cost (£)	Cumm Cost	Tonnage
2005	9,130,000 ¹	8,797,694	99,499	17,828,195	17,828,195	85,135
2006	0	9,247,531	110,725	9,136,806	26,965,001	88,370
2007	0	9,586,846	189,460	9,397,386	36,362,386	91,728
2008	0	9,961,822	268,196	9,693,626	46,056,013	94,897
2009	0	10,276,459	346,932	9,929,527	55,985,540	97,847
2010	0	9,454,945	367,743	9,087,202	65,072,742	100,552
2011	0	9,629,993	379,244	9,250,749	74,323,491	102,983
2012	0	9,805,040	390,745	9,414,295	83,737,786	105,118
2013	0	9,980,088	402,246	9,577,842	93,315,628	106,933
2014	0	10,016,839	408,110	9,608,729	102,924,356	108,411
2015	0	10,053,590	413,974	9,639,616	112,563,972	109,534
2016	0	10,090,341	419,838	9,670,503	122,234,475	110,291
2017	0	10,127,091	425,702	9,701,390	131,935,864	110,672
2018	0	10,163,842	431,566	9,732,277	141,668,141	110,672
2019	0	10,200,593	437,429	9,763,164	151,431,305	110,672
2020	0	10,237,344	443,293	9,794,051	161,225,356	110,672
cumulative tonnage						1,644,488.35
Cost per tonne						£98.04

Note: Capital costs exclude collection vehicle costs. Cumulative costs do not account for inflation.

¹ Bulking Station (£300,000), MRF (£2,500,000), OW Composting facility (£990,000), IV Composting facility (£5,640,000)

Table A10.3 – Cost Estimate for Option 2 (Meet WAG targets, some biodegradable residuals to in-vessel composting)

	Capital Cost (£)	Operational Cost (£)	Income (£)	Total Cost (£)	Cumm Cost	Tonnage
2005	6,180,000 ¹	8,797,694	99,499	14,878,195	14,878,195	85,135
2006	0	9,247,531	110,725	9,136,806	24,015,001	88,370
2007	0	9,586,846	189,460	9,397,386	33,412,386	91,728
2008	0	9,961,822	268,196	9,693,626	43,106,013	94,897
2009	0	10,276,459	346,932	9,929,527	53,035,540	97,847
2010	2,390,000 ²	10,432,894	367,743	12,455,152	65,490,692	100,552
2011	0	10,465,380	379,244	10,086,136	75,576,827	102,983
2012	0	10,497,865	390,745	10,107,120	85,683,947	105,118
2013	0	10,530,350	402,246	10,128,104	95,812,051	106,933
2014	0	10,530,816	408,110	10,122,706	105,934,757	108,411
2015	0	10,531,282	413,974	10,117,308	116,052,066	109,534
2016	0	10,531,749	419,838	10,111,911	126,163,977	110,291
2017	0	10,532,215	425,702	10,106,513	136,270,490	110,672
2018	0	10,532,681	431,566	10,101,115	146,371,605	110,672
2019	0	10,533,147	437,429	10,095,718	156,467,323	110,672
2020	0	10,533,614	443,293	10,090,320	166,557,643	110,672
cumulative tonnage						1,644,488.35
cost per tonne						£101.28

Note: Capital costs exclude collection vehicle costs. Cumulative costs do not account for inflation.

¹ Kerbside organic collection vehicle (£97,000), Bulking Station (£300,000), MRF (£2,500,000), OW Composting facility (£990,000), IV Composting facility (£2,390,000)

² IV Composting facility (£2,390,000)

Table A10.4 – Cost Estimate for Option 3 (Meet WAG targets, all biodegradable residuals to Anaerobic Digestion)

	Capital Cost (£)	Operational Cost (£)	Income (£)	Total Cost (£)	Cumm Cost	Tonnage
2005	6,180,000 ¹	8,797,694	99,499	14,878,195	14,878,195	85,135
2006	0	9,247,531	110,725	9,136,806	24,015,001	88,370
2007	0	9,586,846	189,460	9,397,386	33,412,386	91,728
2008	0	9,961,822	268,196	9,693,626	43,106,013	94,897
2009	0	10,276,459	346,932	9,929,527	53,035,540	97,847
2010	3,900,000 ²	9,846,068	367,743	13,378,325	66,413,865	100,552
2011	0	10,027,987	379,244	9,648,743	76,062,608	102,983
2012	0	10,209,906	390,745	9,819,161	85,881,769	105,118
2013	0	10,391,825	402,246	9,989,579	95,871,348	106,933
2014	0	10,429,803	408,110	10,021,693	105,893,041	108,411
2015	0	10,467,781	413,974	10,053,807	115,946,848	109,534
2016	0	10,505,759	419,838	10,085,921	126,032,769	110,291
2017	0	10,543,737	425,702	10,118,035	136,150,803	110,672
2018	0	10,581,714	431,566	10,150,149	146,300,952	110,672
2019	0	10,619,692	437,429	10,182,263	156,483,215	110,672
2020	0	10,657,670	443,293	10,214,377	166,697,592	110,672
cumulative tonnage						1,644,488.35
cost per tonne						£101.37

Note: Capital costs exclude collection vehicle costs. Cummulative costs do not account for inflation.

¹ Kerbside organic collection vehicle (£97,000), Bulking Station (£300,000), MRF (£2,500,000), OW Composting facility (£990,000), IV Composting facility (£2,390,000)

² AD facility (£3,900,000)

Table A10.5 – Cost Estimate for Option 4 (Meet WAG targets, some biodegradable residuals to Anaerobic Digestion)

	Capital Cost (£)	Operational Cost (£)	Income (£)	Total Cost (£)	Cumm Cost	Tonnage
2005	6,180,000 ¹	8,797,694	99,499	14,878,195	14,878,195	85,135
2006	0	9,247,531	110,725	9,136,806	24,015,001	88,370
2007	0	9,586,846	189,460	9,397,386	33,412,386	91,728
2008	0	9,961,822	268,196	9,693,626	43,106,013	94,897
2009	0	10,276,459	346,932	9,929,527	53,035,540	97,847
2010	3,900,000 ²	10,510,765	367,743	14,043,023	67,078,563	100,552
2011	0	10,578,481	379,244	10,199,237	77,277,800	102,983
2012	0	10,646,197	390,745	10,255,452	87,533,252	105,118
2013	0	10,713,912	402,246	10,311,666	97,844,918	106,933
2014	0	10,722,961	408,110	10,314,851	108,159,769	108,411
2015	0	10,732,010	413,974	10,318,036	118,477,805	109,534
2016	0	10,741,059	419,838	10,321,221	128,799,027	110,291
2017	0	10,750,108	425,702	10,324,406	139,123,433	110,672
2018	0	10,759,157	431,566	10,327,591	149,451,024	110,672
2019	0	10,768,206	437,429	10,330,776	159,781,800	110,672
2020	0	10,777,254	443,293	10,333,961	170,115,761	110,672
cumulative tonnage						1,644,488.35
cost per tonne						£103.45

Note: Capital costs exclude collection vehicle costs. Cummulative costs do not account for inflation.

¹ Kerbside organic collection vehicle (£97,000), Bulking Station (£300,000), MRF (£2,500,000), OW Composting facility (£990,000), IV Composting facility (£2,390,000)

² AD facility (£3,900,000)

Table A10.6 – Cost Estimate for Option 5 (Meet WAG targets, all residuals to MBT)

Year	Capital Cost (£)	Operational Cost (£)	Income (£)	Total Cost (£)	Cumm Cost	Tonnage
2005	6,180,000 ¹	8,797,694	99,499	14,878,195	14,878,195	85,135
2006	0	9,247,531	110,725	9,136,806	24,015,001	88,370
2007	0	9,586,846	189,460	9,397,386	33,412,386	91,728
2008	0	9,961,822	268,196	9,693,626	43,106,013	94,897
2009	0	10,276,459	346,932	9,929,527	53,035,540	97,847
2010	8,000,000 ²	8,955,705	367,743	16,587,962	69,623,502	100,552
2011	0	9,645,035	379,244	9,265,791	78,889,293	102,983
2012	0	10,361,677	390,745	9,970,932	88,860,225	105,118
2013	0	11,106,845	402,246	10,704,599	99,564,825	106,933
2014	0	11,234,387	408,110	10,826,277	110,391,102	108,411
2015	0	11,365,193	413,974	10,951,219	121,342,321	109,534
2016	0	11,499,374	419,838	11,079,536	132,421,857	110,291
2017	0	11,637,045	425,702	11,211,344	143,633,200	110,672
2018	0	11,778,325	431,566	11,346,759	154,979,959	110,672
2019	0	11,923,335	437,429	11,485,905	166,465,865	110,672
2020	0	12,072,202	443,293	11,628,909	178,094,774	110,672
cumulative tonnage						1,644,488.35
cost per tonne						£108.30

Note: Capital costs exclude collection vehicle costs. Cumulative costs do not account for inflation.

¹ Kerbside organic collection vehicle (£97,000), Bulking Station (£300,000), MRF (£2,500,000), OW Composting facility (£990,000), IV Composting facility (£2,390,000)

² MBT facility (£8,000,000)

Table A10.7 – Cost Estimate for Option 6 (Exceed WAG Targets, all residuals to MBT)

Year	Capital Cost (£)	Operational Cost (£)	Income (£)	Total Cost (£)	Cumm Cost	Tonnage
2005	6,180,000 ¹	8,795,589	99,499	14,876,090	14,876,090	85,135
2006	0 ²	9,244,382	110,725	9,133,657	24,009,747	88,370
2007	0	9,605,177	189,460	9,415,716	33,425,463	91,728
2008	0	10,002,804	268,196	9,734,608	43,160,071	94,897
2009	0 ³	10,341,264	346,932	9,994,332	53,154,403	97,847
2010	8,000,000 ⁴	8,519,855	419,472	16,100,384	69,254,787	100,552
2011	0 ³	9,114,566	431,562	8,683,003	77,937,790	102,983
2012	0	9,732,037	443,653	9,288,383	87,226,174	105,118
2013	0	10,373,279	455,744	9,917,535	97,143,709	106,933
2014	0	10,486,746	459,678	10,027,068	107,170,777	108,411
2015	0 ⁵	10,602,933	463,612	10,139,321	117,310,098	109,534
2016	0	10,721,933	467,546	10,254,388	127,564,486	110,291
2017	0	10,843,842	471,480	10,372,362	137,936,848	110,672
2018	0	10,968,757	475,414	10,493,343	148,430,191	110,672
2019	0 ³	11,096,781	479,348	10,617,433	159,047,624	110,672
2020	0 ⁶	11,228,020	483,282	10,744,738	169,792,362	110,672
cumulative tonnage						1,644,488.35
cost per tonne						£103.25

Note: Capital costs exclude collection vehicle costs. Cumulative costs do not account for inflation.

¹ Kerbside organic collection vehicle (£97,000), Bulking Station (£300,000), MRF (£2,500,000), OW Composting facility (£990,000), IV Composting facility (£2,390,000)

² MBT facility (£8,000,000)

10.5 OVERVIEW

Within this section a detailed economic analysis of each of the proposed waste management options has been made. The analysis includes estimates of capital and operating costs for the period up to 2020. Based on the above economic analysis, the cheapest of the landfill directive compliant options over the period 2003 to 2020 is Option 1 at a cost of £98.04 per tonne.

At key strategic times, considerable capital investment will be required for new waste handling facilities and vehicles. It is unlikely that the Council will be able to afford this massive investment and will need to look at contractual arrangements with community and private sector organisations and continued support from WAG.

Additional costs will be incurred through compliance with specific legislation e.g.:

- Landfill Directive
- Ozone Depleting Substances Regulations
- End of Life Vehicles Directive
- Waste Electrical and Electronic Equipment Directive

The financial analysis presented in this section assumes compliance with all specific legislation.

An estimate of revenue from recyclate is given in Appendix 14, under the section on Market Development.

Costs of implementing waste minimisation initiatives are presented at Appendix 9.