



Options Appraisal for the MWMS

Solihull MBC

2010

Report Status: Final

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Introduction

Solihull Metropolitan Borough Council (Solihull MBC) is reviewing its Municipal Waste Management Strategy (MWMS). The existing Strategy was published in April 2004 and it is considered appropriate to review the documents every five years. The replacement draft Municipal Waste Management Strategy covers the period 2010 – 2020 and comprises a set of documents as illustrated in Figure 2.

This report is an appraisal of options, undertaken in a structured manner which included assessment of qualitative and quantitative criteria, and incorporated appropriate stakeholder engagement and consultation. This appraisal informed the selection of waste management options and initiatives that will be specified in the Solihull Municipal Waste Management Strategy. These options will subsequently form part of the municipal waste management service for the Borough.

How have the list of options been selected?

An initial review of waste management options was compiled by Enterprise¹, based on experience of initiatives used elsewhere and good practice and innovation in the municipal waste management sector. The list of waste management options was categorised according to the Waste Hierarchy (see figure 1) and was considered at a meeting held with waste management and communications officers from Solihull Metropolitan Borough Council on the 22nd April 2009. This meeting reviewed and amended the list of options, adding several options, notably around schools initiatives and in-house (i.e. Council waste) initiatives.

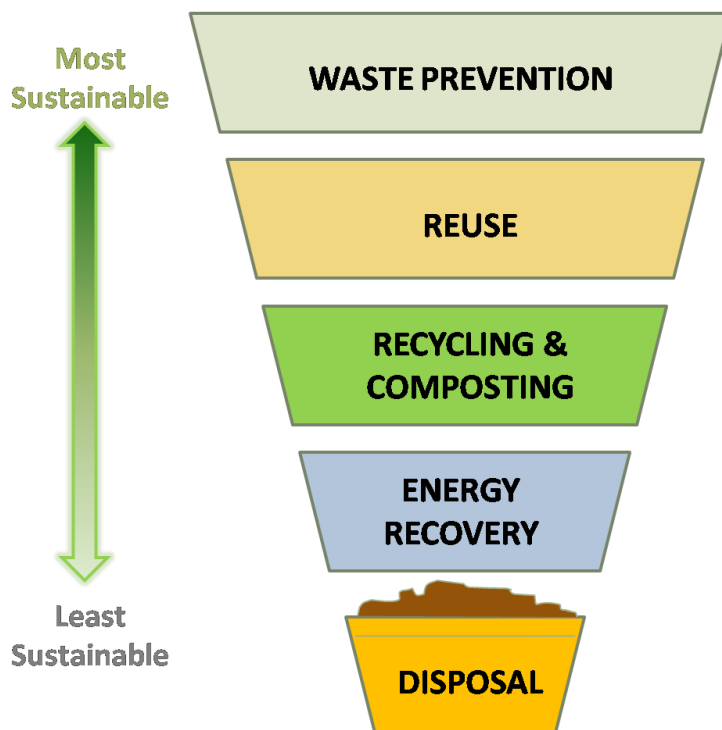


FIGURE 1 THE WASTE HIERARCHY

¹ Enterprise plc is the waste & recycling collection contractor for Solihull MBC

The amended list of options was issued to statutory consultees (e.g. the Environment Agency, English Heritage & Natural England) and was also circulated to the Solihull Partnership and internal stakeholders (e.g. planning officers, sustainable development officers). The final list of options is contained in this report and took account of comments received in the consultation exercise.

How has the process for choosing options been arrived at?

The selection of options is an important element of the MWMS process. There are two aspects to consideration of options for the MWMS: the Options Appraisal process as outlined in this report; and the SEA that is linked to this process². The SEA focuses on environmental issues (although wider criteria are included in the assessment), and key environmental outcomes from the Options Appraisal are utilised in the SEA. The Options Appraisal however includes more detailed consideration of cost, budgets, and operational and practical considerations as regards options implementation to facilitate decision making. The actual decision making criteria applied will also depend on the type of option considered (i.e. if it is a recycling option or a waste prevention option, etc).

A SEA is a statutory requirement for Strategies that can have a significant impact on the environment (e.g. a MWMS) and this is explained in legislation³. The SEA is a process whereby all objectives, targets and draft options within the draft Municipal Waste Management Strategy are assessed against a set of criteria known as Sustainability Criteria. This process is explained in detail in the draft Environmental Report, however in summary it involves defining key environmental, social and economic criteria relevant to Solihull, by considering the general context of the Borough and local, regional and national policy and legislation. These criteria are consulted upon with key bodies (The Environment Agency, English Heritage & Natural England) and form the basis for appraising the vision, objectives, targets and proposed options for delivery of the draft MWMS. This SEA is recorded in the draft Environmental Report accompanying this consultation. The objective of the SEA is to critically consider the sustainability of the proposed strategy (and options for delivery) and seek to mitigate any negative impacts and enhance positive impacts.

The SEA analysis is taken a stage further in this Options Appraisal document, which specifically considers each option for the delivery of the service against decision making criteria agreed at a Solihull Stakeholder Workshop. The Options appraisal focuses on alternative delivery options and scores them to enable a judgement to be made as to the priorities for the municipal waste management service over the short, medium and long term. It considers cost as well as environmental and quality issues. The detail of these aspects are included in this Options Appraisal report, and the results of the appraisal inform the Solihull Municipal Waste Management Strategy.

The structure of the Solihull Municipal Waste Management Strategy is shown in figure 2.

² Further details available from 'A Practice Guide for the Development of Municipal Waste Management Strategies, Defra 2005'

³ The Environmental Assessment of Programmes & Plans Regs, 2004



FIGURE 2 DOCUMENTS COMPRISING THE MUNICIPAL WASTE MANAGEMENT STRATEGY FOR SOLIHULL

Vision & Objectives of Municipal Waste Management Strategy

The Vision of the Municipal Waste Management Strategy (MWMS) defines the direction in which Solihull MBC are travelling and what its aims are, regarding waste management. The Objectives are more specific commitments and principles designed to achieve the vision. The remainder of the MWMS contains policies, targets and initiatives to support both the objectives and the vision.

Vision

Our vision is to manage Solihull’s municipal waste as a resource that can be utilised for environmental benefit through a service that contributes to a cleaner, greener Borough. To provide a high quality, inclusive service that encourages residents of Solihull to fully engage in the opportunities to reduce, reuse and recycle wastes to help reduce the carbon footprint of the Borough and to minimise the amount of residual waste left over. To recover energy and materials from the residual waste and minimise disposal to landfill. To work in partnership with other authorities, community groups and the private sector where there are demonstrable benefits in doing so. To deliver an efficient waste management service that represents best value and provides a sustainable and customer focussed operation.

Objective 1	Set in place initiatives to reduce the amount of waste arising in Solihull through prevention and reuse activity and continue to raise awareness to encourage behaviour change and participation in these schemes
Objective 2	Expand the range of materials collected for reuse and recycling across the Borough to ensure all households have the opportunity to make sustainable choices for the management of their wastes
Objective 3	Improve recycling services and engage with the residents of Solihull to fully participate in the recycle collections, with the aim of delivering a minimum target of 50%, but aspiring to higher household waste recycling rates, by 2020
Objective 4	Minimise the need for landfilling of wastes by continuing Solihull’s high performance in residual waste treatment beyond the life the existing Energy from Waste plant, with the aim of delivering no more than 15% of household waste to landfill by 2015 and a maximum of 10% by 2020
Objective 5	Seek to recover both energy and materials from residual waste in the most efficient manner, to conserve resources, gain maximum value and contribute to carbon reduction, renewable energy and recycling targets
Objective 6	Continue to support existing partnerships and actively explore new partnering arrangements with organisations that can support the vision and objectives of this Strategy
Objective 7	Use good practice methods in communication, education and enforcement to support the delivery of a cleaner, greener Borough for the benefit of all
Objective 8	Demonstrate continued improvement in the levels of carbon emissions of the municipal waste management service throughout the life of this Strategy, as a measure to tackle climate change
Objective 9	Provide a service that demonstrates best value for Solihull through seeking efficiencies wherever practicable, considering other waste streams in addition to municipal waste, managing risks appropriately and delivering a sustained high quality service
Objective 10	Solihull Metropolitan Borough Council to lead by example and improve the environmental performance of its offices, depots and staff activities through more sustainable use of resources and adopting practices that reduce carbon emissions

Solihull Waste Composition

A key component of the options appraisal is the composition of the waste being modelled. Solihull is due to undertake a waste composition analysis in 2010/11, therefore the options appraisal has used the default waste composition as identified in the Kerbside Analysis Tool (KAT) model which is the UK accepted standard for a generic waste composition. The KAT waste composition is summarised in Table 1.

Newspapers & magazines	16.60%
Other paper	3.10%
Corrugated card	1.90%
Non corrugated card	0.60%
Plastic film	2.70%
Plastic bottles	2.20%
Other plastic, dense	2.60%
Glass flint	4.60%
Glass brown	0.90%
Glass green	2.80%
Steel cans	2.20%
Aluminium cans	0.35%
Foil	0.05%
Textiles	2.80%
Soil and other organic	1.10%
Non compostable kitchen waste	10.10%
Compostable kitchen waste	9.90%
Garden waste	20.00%
Other	15.50%

TABLE 1 WASTE COMPOSITION FOR COLLECTION MODELLING

Analysis of Options

The options appraisal uses different criteria for each level of the Waste Hierarchy (see Figure 1, and page 5), and therefore each level of the Waste Hierarchy is considered separately in this report. In common with Government guidance the top levels of the hierarchy are considered first, and the remaining options analysed in descending order of the hierarchy. The Analysis is therefore presented in the following three sections:-

- Waste Prevention & Reuse
- Recycling & Composting
- Waste Treatment & Disposal

Waste Prevention & Reuse Options Appraisal

The options to be considered for the Waste Prevention & Reuse appraisal were developed through a structured process. The process is described below:-

1. A long list of potential waste prevention / reuse options was developed from experience and UK good practice
2. A meeting with Solihull Waste Management & Communications officers was held to consider the long list. This was amended in response to additional suggestions from the officers.
3. The list was included as a consultation aspect in 'internal' consultation exercises to the Solihull Partnership and Solihull MBC officers and councillors
4. The list was included as a consultation aspect for external consultation to Statutory Consultees as part of the SEA Scoping process
5. The list was amended and finalised in the light of comments received from the consultations and is appraised in this report.

The following options are appraised:-

Food Waste Prevention

Food waste has a disproportionately high environmental impact in many parts of the country because of the environmental effects, notably greenhouse gas emissions, from deposit into landfill. In the case of Solihull MBC the negative impacts of food waste disposal are reduced because of the incineration of residual waste, however there remain environmental burdens from the unnecessary generation of food that becomes waste. This could be avoided through better purchasing / cooking habits and through the transport and treatment of the food waste arising. Solihull MBC could raise the profile of this issue through local campaigning, generation and distribution of materials to encourage smarter shopping and meal planning, recipes for left-overs etc. Talks to interested groups could also be delivered and materials supported by the (national) 'Love Food, Hate Waste' programme.

Junk Mail Prevention

The Mail Preference Service (MPS) exists to facilitate removal of junk mail from delivery to those residents that register with the service. The profile of this service could be raised across the Borough

via promotional campaigns, leaflet drops etc. In addition, campaigns / materials can be developed to encourage prevention of free newspapers / magazines. Other unaddressed mail however will still be delivered unless the householder registers with the Royal Mail to be removed from such services. This could be an additional element of campaigns / promotions.

Home Composting / Digestion

Composting vegetable peelings / fruit and garden waste at home yields environmental benefits as transport is not required to collect either the waste material or the finished compost. The benefit of home composting, where an extensive garden waste collection service is present, is that the transport element is removed and a resource of compost is made available to the householder.

Digesters are enclosed units, part buried in the ground, that can also process meat and fish and other cooked wastes. This increases the potential diversion from the waste stream, but they are more difficult to install, and may not be appropriate for all property types.

Solihull MBC could promote the use of home composters / digesters and / or incentivise their uptake through offer of subsidised units.

Real Nappies

The support and promotion of using real (cloth, or 'reusable') nappies in preference to disposable nappies will reduce the waste arising from this source. Typically around 2 - 3% of household waste comprises disposable nappies⁴. There are a variety of measures that could be taken forward to promote the uptake of real nappies, including promotional campaigns, 'nappucino' mornings, incentives and subsidies for real nappy packs and support for nappy laundry services.

Support of Reuse / Refurbishment

A variety of examples of good practice exist in the UK as regards reuse of goods, including: reception points at Household Waste Recycling Centres (HWRCs) for the deposit of reusable electrical goods, furniture, toys, bicycles etc; separate collections of reusable goods from the household by third sector groups, and; sorting of council collected bulky waste collections by third sector groups with a view to refurbishment / reuse / resale of usable items.

SWAP days

Free exchange services for reusable goods can be facilitated through council or third sector run 'SWAP days' where a venue is provided and the event promoted to allow attendees to bring along goods for free and pick up other items of interest to them. Remaining goods could either be sorted by a third sector organisation or disposed of by Solihull MBC.

Freecycle

A local not for profit network known as Freecycle is a web based group (linked to a wider international grouping) to which members of the public can advertise free items of unwanted goods for collection. It provides a community service and helps avoid unnecessary waste of goods. The typical number of messages posted on the Solihull branch of the Freecycle network is 1500 – 1800 per month. Enhanced promotion by Solihull MBC could increase participation in this service and help reduce waste arisings.

⁴ A waste composition analysis of Solihull household waste will inform the proportions of different waste elements in 2010

Lobbying Government / Business

Solihull MBC could place a higher priority on lobbying Government and working with local retailers / producers on reducing the amount of waste through measures to reduce packaging, and encouraging reuse and partnerships to develop this area of resource management.

Kitchen Waste Disposal Units

The use of kitchen macerators / grinders, also known as waste disposal units could be explored with a view to processing food wastes through the waste water / sewerage system.

In-house Waste Prevention & Reuse

A key objective of the MWMS for Solihull MBC is to lead by example; the implementation of in-house waste prevention and reuse initiatives could be explored and delivered. This could include both the Council and its partners (public and private sector) and be delivered through sustainable procurement and waste reducing office practices (e.g. double sided printing, not printing materials unless necessary etc).

Schools Waste Prevention / Reuse

As part of wider behavioural and sustainable development education, emphasise the importance of waste prevention and reuse, supported by initiatives facilitated by Solihull MBC such as schools composting activities etc.

Smart Shopping

“Smart Shopping” is a generic term covering a range of waste prevention and reuse activities (including food waste prevention for example). Solihull MBC could continue its drive to promote smart shopping practices including provision of reusable bags, education on purchasing habits, and general good shopping practice.

The Criteria for Appraisal of Waste Prevention & Reuse Options

The evaluation criteria applied to the different options were developed initially in consultation with Solihull MBC officers and then subject to a stakeholder workshop held on the 8th June. Notes of the workshop are included in Appendix 1.

The appraisal process uses a 50:50 split between Cost : Environment / Quality criteria. This was subject to a sensitivity analysis of 60:40 and 40:60 to determine the impact of cost on the selection of options.

The stakeholder workshop included Solihull MBC officers, elected members and external organisations. The workshop considered and reviewed a draft list of evaluation criteria, to determine the Environment / Quality criteria to be applied in the evaluation. The attendees agreed a set of criteria and individually weighted (prioritised) the criteria. The weightings were then summed to provide and an average weighting according to the participants' priorities, as presented in Table 2.

Education / Awareness raising benefit	20.42%
Tonnage of waste Prevented	17.50%
Tonnes of Carbon Saved	17.50%
Tonnage of waste Reused	14.25%
Tonnage of biodegradable Municipal Waste (BMW) reduced	9.25%
Public Acceptability	8.50%
Community Benefits	4.67%
Impact on Wider Wastes	4.25%
Employment generated	3.67%
	100%

TABLE 2 WASTE PREVENTION & REUSE ENVIRONMENT / QUALITY EVALUATION CRITERIA

The key criteria agreed by the stakeholder group were considered to be the tonnages of waste avoided (through prevention and reuse), the amount of carbon saved and the education / awareness raising aspects of the initiatives. These four aspects amount to around 70% of the Environment / Quality assessment. 'Local' impacts such as community benefits, employment and public acceptability form a lower tier of priority but were nonetheless factors in the appraisal.

It was considered important to also allow for any potential bias introduced in the weighting of criteria simply because of the membership of those attending the stakeholder day. In this regard a third sensitivity analysis was conducted on the results whereby all the weightings were removed (i.e. all the Environment / Quality criteria has an equal importance) to observe the impact on the results

of the Options Appraisal. Each of the Sensitivity Analyses is included in the Results section of this report.

Analysis of Waste Prevention & Reuse Options

The following section considers each of the different waste prevention & reuse schemes against the appraisal criteria. For some initiatives limited data are available as, in general, waste prevention and reuse are one of the most difficult areas of waste management to quantify. However good practice data and case studies have been applied to support the appraisal process.

In addition a consultation of the public⁵ via a Citizens Panel survey provided supporting information for the assessment of public acceptability on waste prevention and reuse initiatives. The results are included in Appendix 2.

The methodology and assumptions used for each option are explained in the following text, and quantitative evaluation has been used where viable, those options less appropriate for quantitative or semi quantitative appraisal have been considered separately.

Quantitative & Semi Quantitative Options Appraisal

The following options were considered appropriate for appraisal in the context of determining an estimate of their numerical performance (in cost, carbon and tonnage terms). These means that these options are more readily compared because a numerical value can be assigned to its performance.

Food Waste Prevention

The 'Love Food, Hate Waste' campaign developed by the Waste & Resources Action Programme (WRAP) is a behavioural change campaign designed to reduce food waste through better purchasing, cooking and storage practices. The campaign defined a 'Committed Food Waste Reducer' in order to establish the impact of the campaign on waste tonnages. The definition of a 'Committed Food Waste Reducer' is determined via responses to a Questionnaire developed by WRAP.

A variety of methods have been used to support this campaign and three local authority case studies are available via the WRAP website.



If Solihull MBC adopted a high profile, Borough wide activity, utilising officer time, radio partnerships, advertising and roadshow activities (the highest impact approach), supported by WRAP communications materials (hard copy leaflets and 'localised' web site), we have assumed a

⁵ 750 residents were surveyed

2% increase in households that are committed food waste reducers. This is within the scope of the results observed in the case studies.

WRAP has deduced that a committed food waste reducer will divert 78kg / hh / year. Using the number of households in Solihull MBC (87,204) 136 tonnes of food waste per annum could be prevented, assuming the 2% target was delivered. If the average participant continued to use the practice for 5 years then a total of 680 tonnes of food and food waste would be avoided as the result of the campaign.

The case study example of Kent County Council adopting a similar promotional campaign was costed at £0.30p per household, excluding officer time. This would equate to £26,161 for Solihull, and this options appraisal also assumes the equivalent of 6 months full time dedicated officer support for the campaign. The financial cost / benefit balance is summarised in Table 4.

The carbon saving through such a promotion is difficult to quantify, not least because of the savings will depend on the nature of food types reduced (e.g. some foods are more carbon intensive to produce and will have more 'food miles' associated with them) and also the avoided waste management impacts will vary (depending on assumptions around home composting, food waste collection, treatment and disposal). Application of published data⁶ as part of this appraisal provides an estimate of ~2100 tonnes of CO₂ that could be saved through a food waste prevention scheme.

It is considered that the promotion of a behavioural change approach of a Food Waste Prevention campaign would have wider education and awareness raising benefits and was scored the highest in the qualitative evaluation of all the options in this regard. The Citizens Panel survey gave food waste prevention a low priority (the equal lowest overall). The full set of Quality /Environment scores are included in Table 3.

Junk Mail Prevention

The Mailing Preference Service (MPS) is a an opt in scheme allowing householders to register in order to remove their names / addresses from junk mail listings are therefore not receive named junk mail. Solihull MBC could raise the profile of this service through promotional campaigning. Assistance may also be provided through door stickers etc for reducing the unaddressed junk mail ('to the householder') and to avoid free newspapers.



⁶ GHG Balance of Prevention Actions, RDC for IBGE-Bruxelles Environnement, January 2007 estimate of 27kg of CO₂ equivalent saved per inhabitant, based on 8kg avoided. Applying the 72kg identified by WRAP increases this to 243kg CO₂ avoided per committed waste reducer (per household). Assuming 2% of households and continued practice for five years = 2119 tonnes of CO₂ equivalent. This figure is of low quality.

The diversion likely through such initiatives is 4 kg / hh participating per annum. Assuming that an intensive campaign in this area increases the number of households signed up by 5%, then an additional 17 tonnes of junk mail would be prevented per annum. If each household continues to use the scheme for an average of 5 years, then a total of ~87 tonnes of paper (and associated printing / distribution impacts etc) would be avoided, as a result of the campaign.

A range of costs are cited for different campaigns in this area, for example: in Hackney the costs were £0.53 for a door sticker and £0.98 for a pack to register for the MPS. In Merseyside costs of a campaign were £0.027 per card promoting the MPS, based on 110,000 printed (these were distributed via libraries and at events). In this options appraisal we have assumed the nominal equivalent of 1 leaflet per household at a cost of 4p each = £3488 for Solihull MBC. The financial cost / benefit balance is summarised in Table 4.

In terms of carbon saving, we have applied published data which cites that for every tonne of paper avoided, one tonne of carbon dioxide is avoided⁷. This may be an overestimate in the case of Solihull MBC due to the recovery of energy from the Energy from Waste (EfW) plant, however this plant is due to be replaced by an unspecified technology during the life of this strategy, and therefore the general assumption is applied in this case.

It is considered that this initiative would score well in terms of public acceptability, as the consultation response (Appendix 2) showed initiatives on Junk Mail to be the most favourable of all the options presented, in terms of public choice. The full set of Quality /Environment scores are included in table 3.

Home Composting / Digestion

The WRAP Waste Prevention Toolkit cites that an average of 150kg / hh / annum of organic waste is diverted from the waste stream by those using home composting effectively. This type of initiative is also associated with a 3.9% annual lapse rate per year i.e. those purchasing home composters but not using them or ceasing to use them.

In Solihull the number of households taking up home composters through the subsidised WRAP scheme has fallen recently. The subsidised scheme is also due to end during this financial year (2009/10), therefore Solihull MBC would need to register for any replacement scheme to ensure subsidised home composting units are made available to residents.

It is proposed that a high level composting target for Solihull would be to incentivise a further 500 households to take up the home composter offer through an intense promotional campaign and 'Master Composter' support. The latter involves training volunteers to support householders to home compost correctly, in order to obtain an optimum quality compost. This would also support the delivery of 150kg/hh/annum home composting rate promoted by WRAP.

⁷ GHG Balance of Prevention Actions, RDC for IBGE-Bruxelles Environnement, January 2007



The tonnage implications of successfully targeting an additional 500 households would be 75 tonnes diversion for the first year. Assuming a 3.9% lapse rate and a ten year life for the composters, a total diversion of 631 tonnes would result over the life of the MWMS.

In considering the costs of this initiative it has been assumed that the equivalent promotional cost of 1 leaflet per household (at 10p per leaflet) would be the material resource required (£8720), with one day of officer time per week. The financial cost / benefit balance is summarised in table 4.

The carbon implications would depend on the alternative waste management option, i.e. how much of the home composted waste is diverted from the residual waste stream (to EfW, and occasionally landfill) or from the green waste collection which is centrally composted. It has been nominally assumed that the process will be carbon neutral in the context of Solihull.

The utilisation of volunteers (Master Composter scheme) to support the home composting campaign has been acknowledged in the score attributed to the 'Employment' criterion in this appraisal. The Citizens Panel consultation on Waste Prevention & Reuse initiatives (Appendix 2) highlighted that the priority for home composting in Solihull was dominant in the 45-59 age range with 44% considering it a priority area. This is relative to 28% of 30-44 year olds, and less for lower age brackets. Initiatives could therefore be targeted with this demographic in mind.

The full set of Quality /Environment scores are included in Table 3.

Real Nappies

The number of births in Solihull MBC in 2008 was 2,171⁸. Solihull MBC has promoted the use of real nappies and issued starter packs to interested parents. Around 100 starter packs were issued in each of the years 2006/7 and 2007/8. During 2008/9 the scheme was changed with no further packs being issued. Around 4.6% of parents received nappy packs during the active promotion period. This is anticipated to save 63 tonnes of nappy waste over the time in which the babies were in nappies⁹. If 250 nappy packs were distributed then 157 tonnes of nappy waste would be avoided over the time in which the babies are in nappies.

⁸ Office of National Statistics 2009, Table 4, Live births by local authority area.

⁹ Using the WRAP Tonnage Calculator, assuming 100 households (babies) utilising the nappies with a 10% drop out rate per 6 months.

The cost / benefit balance assumes 250 packs issued. The promotional budget of £1000, for materials to support the campaign and officer support at 1 day per week is included in the resourcing estimate. In addition the incentive of £20 per nappy pack x 250 = £5000, is included. The financial cost / benefit balance is summarised in Table 4.

As regards carbon saving, the available research in this area¹⁰ indicates that carbon benefits are variable dependent upon how reusables are laundered. In some cases there may be limited carbon benefit versus disposables or even carbon detriment. Most analyses of this issue are based on landfilling the alternative (disposable) nappies, and the negative impacts of this activity. In the case of Solihull the residual waste treatment is combustion with energy recovery and therefore any carbon benefit of real nappies may be reduced further. We have therefore considered a zero carbon saving from the use of reusable nappies, although there are other environmental / social reasons for considering them.

The Citizens Panel survey (Appendix 2) highlighted an overall low level of support for real nappies relative to most other initiatives, this could be in part as the issue is not relevant to wide sectors of the population and therefore should be viewed in this light. There was however a notable variation highlighted in the survey between North Solihull, where ~27% of respondents prioritised the topic, to South and East Solihull where ~16% considered Real Nappies to be a priority issue.

The full set of Quality /Environment scores are included in Table 3.

Support of Reuse / Refurbishment

Expansion of reuse / refurbishment activity is an area that is largely reliant on third sector activity. The potential of reuse will depend on the level of viable development in Solihull. There is currently a referral service to a third sector organisation for usable items of bulky waste, however this is at the householder's discretion. There is likely to be potential for further expansion of bulky goods reuse or other refurbishment / reuse activity to be promoted in the Borough. The tonnage diversion through this route is considered in the context of case studies.

The adjacent authority of Warwickshire introduced bulky waste and other goods (bric – a - brac, bicycles, paint, tools etc) reuse delivered by charity organisations at their Household Waste Recycling Centres. This has proved successful and contracts are tendered for the management of the reuse centres by third sector organisations as a result. The initial investment requirement can be substantial however.

The tonnage diversion through this reuse scheme was of the order of 10 tonnes per month, or 120 tonnes per annum. For the purposes of Biodegradable Municipal Waste calculations we have assumed 68%¹¹ of the goods are biodegradable (e.g. wood, card, some textiles), the other 32% are non biodegradable (e.g. metals, plastic, glass).

¹⁰ An updated lifecycle assessment study for disposable and reusable nappies, Environment Agency, 2008

¹¹ This is the percentage of BMW ascribed to municipal waste in the Landfill Allowances and Trading Scheme (England) Regulations 2004

In the case of Warwickshire, the charity sells appropriate items through their shops and pay a minimum 'premises rent' to the Council of £5000 per annum. Disposal charges for items not used are free unless they exceeded 10 tonnes / month. Recyclables are also disposed of free of charge. The costs to Warwickshire are associated with officer time, training, supervision, tendering of contracts and any infrastructure (e.g. building) costs on sites.

For this strategic appraisal we have assumed an up-front cost of £10k in the absence of further information, and officer time of 1 day per week. The financial cost / benefit balance is summarised in Table 4.

The carbon saving for reuse is based on a factor derived from the GHG Balance of Prevention Actions, RDC for IBGE-Bruxelles Environnement, January 2007. Assuming 120 tonnes of additional diverted goods are reused (based on Warwickshire data), ~185 tonnes of CO₂ per year could be avoided.

There appears to be a relationship between age and willingness for reuse initiatives for redundant goods in the Borough. The younger age groups have a stronger preference for such services with 35% of the under 25s prioritising this type of initiative, and a steady decline in support in the higher age groups until the 60 – 84 age bracket where only 21% prioritised the initiative.

Reuse initiatives have the potential to bring employment and training in the areas of refurbishment and retail and therefore has the highest 'employment' score of all the options. It also scores well in terms of community benefits with the intention of providing low cost goods back into the community and (through the third sector partner) potentially helping disadvantaged households obtain goods and items at affordable cost, or free of charge. Refurbishment is also an excellent way of training marginalised people, e.g. excluded groups such as those with learning difficulties, ex-offenders, long term unemployed etc. The full set of Quality /Environment scores are included in table 3.

SWAP days

SWAP days target usable goods through the facilitation of free exchange events organised either by the Council or by third sector groups. The Council can provide support through a variety of methods e.g:-

- free of charge disposal of unwanted goods,
- provision of training packs to help third sector organisations develop and run SWAP days
- promotion of events
- staff time to support running of events
- paying for, or provision of, venues for events.

Current examples of this activity include Hackney and Merseyside local authorities. Hackney, through their Give or Take ('GoT days'), support third sector management and delivery of the events, with the Council providing the venues and promotion. The tonnage diverted is between 0.5 – 1 tonne per event. The cost is £1000 per event. Merseyside events diverted a similar tonnage at a cost of ~£500 per event.

For the purposes of this appraisal we have assumed 5 events per year at a cost of £750 each = £3750, with 24 days of officer time support. The financial cost / benefit balance is summarised in Table 4.

The carbon performance is based on a factor derived from the GHG Balance of Prevention Actions report¹². Assuming 5 x 0.75 tonnes of waste is reused = 3.75 tonnes, the carbon saving would be ~5.8 tonnes of CO₂ / annum.

For the purposes of Biodegradable Municipal Waste calculations we have assumed 68% of the goods are biodegradable (e.g. wood, card, some textiles), the other 32% are non biodegradable (e.g. metals, plastic, glass).

The schemes can provide valuable community benefits, although often need to be organised by a third sector partner to be viable in financial terms. There appears to be a relationship between age and willingness for reuse initiatives for redundant goods in the Borough. The younger age brackets have a stronger preference for such services with 35% of the under 25s prioritising this type of initiative, and a steady decline in support in the higher age brackets until the 60 – 84 age bracket where only 21% prioritised the initiative. The full set of Quality /Environment scores are included in Table 3.

Freecycle

Freecycle is a web based waste exchange network of individuals in an area that can post items for collection by other interested individuals. In addition, members of the network can place requests for items that they need. The typical number of messages posted on the Solihull Freecycle site is 1500 – 1800 items per month. Previous analyses have shown a typical weight of products to be ~17kg / item on average. Assuming a 15% increase in usage of the service as a response to promotion by Solihull MBC, then the waste diversion would be (1650 items x 15% =) 248 additional items per month. The tonnage diverted therefore would be (248 items x 12 months =) 2976 items. This equates to 50.6 tonnes¹³.

For the purposes of Biodegradable Municipal Waste calculations we have assumed 68% of the goods are biodegradable (e.g. wood, card, some textiles), the other 32% are non biodegradable (e.g. metals, plastic, glass).

The costs and resources required to support the Freecycle network are a nominal £500 for materials and 5 days officer time for activities such as: raising the profile on the SMBC website; articles in Your Solihull; promotional time at events; developing poster materials for the Solihull Waste Management stand.

The carbon performance, assuming 50.6 tonnes of waste reused and based on a factor derived from the GHG Balance of Prevention Actions¹⁴, would be 78 tonnes of CO₂ / annum.

¹² RDC for IBGE-Bruxelles Environnement, January 2007

¹³ this assumes that all the items on Freecycle would be thrown out if they are not given away on freecycle – although clearly this may not be the case as they may be stored, or given to other family members later etc.

¹⁴ RDC for IBGE-Bruxelles Environnement, January 2007

The Freecycle network can provide a strong community benefit for those actively involved in the network. There appears to be a relationship between age and willingness for reuse initiatives for redundant goods in the Borough. The younger age groups have a stronger preference for such services with 35% of the under 25s prioritising this type of initiative, and a steady decline in support in the higher age groups until the 60 – 84 age bracket where only 21% prioritised the initiative. The full set of Quality /Environment scores are included in Table 3.

Summary of Waste Prevention & Reuse Options – Environment / Quality Appraisal

The following table summarises the results of the Environment / Quality options appraisal against the agreed Solihull MBC evaluation criteria:-

Option	Tonnage Prevented ¹⁵	Tonnage Reused	Tonnage BMW reduced	Carbon Saving (tonnes of CO ₂ eq.)	Employment (1 = no benefit, 5 = strong potential for local employment)	Community Benefits (1 = no benefit, 5 = strong benefit)	Education / Awareness Raising (1 = no benefit, 5 = strong benefit)	Public Acceptability ¹⁶ (1 = unacceptable, 5 = welcome development)	Impact on Wider Wastes (1 = no benefit, 5 = strong benefit)
Food Waste Prevention	680	0	680	2119	1	2	4	2	2
Junk Mail Prevention	87	0	87	87	1	4	2	5	2
Home Composting / Digestion	0	631	631	0	3	3	3	3	1
Real Nappies	0	157	126 ¹⁷	0	2	2	3	2	1
Support of Reuse / Refurbishment	0	120	82 ¹⁸	185	5	5	3	3	1
SWAP days	0	3.75	2.6 ¹⁹	5.8	2	5	3	3	1
Freecycle	0	50.7	35 ²⁰	78	1	5	3	3	1

TABLE 3 ENVIRONMENT / QUALITY RESULTS

¹⁵ Tonnage prevented as a result of one years activity by Solihull MBC – tonnage may be cumulative, e.g. a home compost bin will be used over a period of years. The total diversion in tonnes is used for the first four columns of this table.

¹⁶ Informed by a Solihull Citizens Panel survey, June 2009, see Appendix 2

¹⁷ Assumes 80% of disposable nappies (plus contents) are biodegradable municipal waste (BMW). The balance being a small quantity of plastic waste

¹⁸ Assumes 68% BMW as per average MSW

¹⁹ Assumes 68% BMW as per average MSW

²⁰ Assumes 68% BMW as per average MSW

Summary of Waste Prevention / Reuse Options – Cost Appraisal

The following table summarises the results of the cost (including resource) balance, i.e. costs are offset against avoided disposal costs:-

Option	Cost of materials / scheme, £ per annum	Resources (days of officer time), per annum	Cost of Officer Time (at £120 / day), per annum	Disposal Saving ²¹ , £ / annum	Collection Saving ²² , £ / annum	LATS saving (at £5 / tonne allowance) per annum	Balance of Cost, £ / annum
Food Waste Prevention	£26,161	120	£14,400	£23,800	£3,400	£3,400	-£9,961
Junk Mail Prevention	£3,488	24	£2,880	£3,045	£435	£435	-£2,453
Home Composting / Digestion	£8,720	48	£5,760	£22,085	£3,155	£3,155	£13,915
Real Nappies	£6,000	48	£5,760	£5,495	£785	£630	-£4,850
Support of Reuse / Refurbishment	£10,000	48	£5,760	£4,200	£600	£410	-£10,550
SWAP days	£3,750	24	£2,880	£131	£19	£13	-£6,467
Freecycle	£500	5	£600	£1,775	£254	£175	£1,103

TABLE 4 COST APPRAISAL RESULTS

²¹ Assuming £35 / tonne disposal cost

²² Assumes a nominal £5 / tonne reduction in collection cost per tonne avoided. Collection costs are actually notably higher than this (~£40 / tonne), although savings are only realised if enough waste is avoided to remove a collection vehicle from the road, hence this nominal reduction accounted for here.

Ranking of Waste Prevention / Reuse Options

The following table summarises the results of the options appraisal against the agreed Solihull MBC evaluation criteria:-

Waste Prevention & Reuse Option	Environment / Quality Score (weighted)	Cost Score	Total Score (on 50:50 assessment, weighted)	Ranking (weighted) 1 = most preferred, 7 = least preferred	<i>Sensitivity at 60:40 (Quality to Cost) – Ranking (weighted)</i>	<i>Sensitivity at 40:60 (Quality to Cost) – Ranking (weighted)</i>	<i>Sensitivity with no weighting of Environment / Quality sub-criteria (Ranking) Unweighted</i>
Food Waste Prevention	74.92%	2.41%	38.66%	3	2	4	4
Junk Mail Prevention	31.57%	33.10%	32.33%	4	4	3	3
Home Composting / Digestion	50.38%	100.00%	75.19%	1	1	1	1
Real Nappies	29.44%	23.30%	26.37%	5	5	5	5
Support of Reuse / Refurbishment	36.23%	0.00%	18.12%	7	7	7	7
SWAP days	28.85%	16.69%	22.77%	6	6	6	6
Freecycle	30.21%	47.63%	38.92%	2	3	2	2

TABLE 5 RANKING & SENSITIVITY ANALYSIS

Qualitative Options Appraisal

The following options were appraised in a qualitative manner due to:

- the nature of the options either requiring extensive stakeholder engagement to determine the extent and viability of implementation (e.g. Kitchen Waste Disposer Units);
- the concepts lacking in robust data to support a quantitative analysis (e.g. SMART shopping), or;
- being smaller, more localised activities that would be unfairly compared against the other more extensive initiatives in the appraisal (e.g. in-house or schools waste prevention).

Kitchen Waste Disposal Units

The units, also known as kitchen grinders or macerators, will process any type of food waste. The potential amount of waste that could be diverted from the (solid) waste stream will be directly related to the numbers of properties / developments for which kitchen waste disposal units are available. Food waste represents ~19% of municipal waste and therefore there is the potential diversion of ~210kg / hh / year. This is not true prevention, indeed several examples under this appraisal are methods of moving waste that does arise, out of the local authority solid waste stream i.e. waste reduction, however this is a prevention activity as far as Government measures are concerned and hence are retained within this section.

In the case of Kitchen Waste Disposal Units there are a variety of issues and costs associated that influence the viability of this option. In particular several water companies have lobbied against this approach as it is a pollution transfer issue and that the infrastructure (for sewage transport and treatment) may be inadequate. It would be important therefore to engage with both the regulators and water companies before considering this option.

The environmental benefits of diversion via this route would depend on the alternative method of food waste management. The achievement of high recycling rates would be restricted by a major expansion in kitchen waste disposal units, as food waste recycling is one method of achieving the highest recycling rates. There could be implications for residual waste calorific value²³ (CV) if food waste were removed from the residual waste stream due to installation of kitchen grinders, as the extraction of around a fifth of the waste from the household bin which has a low CV of ~4Mj / kg (the food waste), will result in a higher CV of the remaining waste than would otherwise have been the case. The actual figure would depend on the other recycling activities taking place, however a CV of 11Mj / kg or higher would not be unfeasible. This can have implications for residual waste treatment.

It is recommended therefore that engagement with the Environment Agency, Water Companies, residual waste contractors and other relevant stakeholders should take place before considering any actions on this aspect. It is therefore excluded as an option at this stage. If proved feasible after further investigation, initial implementation could take place as a trial in a new housing development for example. It is unlikely that substantial uptake of kitchen waste disposal units would take place in existing housing without extensive subsidy.

²³ This may be considered as how combustible a waste is.

Smart Shopping

The promotion of alternative purchasing habits, known as Smart²⁴ Shopping is a general awareness raising approach that links with other specific waste prevention initiatives (e.g. food waste prevention, reuse of carrier bags, lobbying businesses). Specific messages could be promoted including, for example:-

- the benefits of drinking tap water (rather than purchasing bottles)
- reusing shopping bags / bags for life
- purchasing products with less packaging
- reusable alternatives rather than disposables (razors, rechargeable batteries etc)

The success in diversion terms will be dependent on the topic, the reach of the campaigns and the local availability of alternatives such as unpackaged fruit and vegetables. For example a focus on drinking tap water as an alternative to purchase of bottled water has the potential to reduce waste arisings by 2kg / person / year and save ~4kg of CO₂ per person per year²⁵. A focus on reusable bags can save around 1kg of waste / person / year and 2kg of CO₂.

As a potentially diverse campaign message, it is assumed that it is good practice to incorporate such messages alongside more targeted activity and no tonnages or costs have been set against this activity.

Schools Waste Prevention / Reuse

Activities that may be developed in schools in the Borough as part of educational and current environmental campaigns or as new activities could include a variety of messages described in this appraisal. Examples include SWAP days, provision of composters / digesters, behaviour change messages around food waste prevention and SMART shopping. It is important that where environmental messages are being conveyed to school audiences, waste prevention / reuse should also feature at some point, as it is an area that behavioural change of the individual and the family can influence for positive environmental effect.

As a potentially diverse campaign message it is assumed that it is good practice to incorporate such messages alongside more targeted activity and no tonnages or costs have been set against this activity. Solihull MBC has been proactive in engaging with schools to date and many of these messages would be an extension and support to existing activity.

Lobbying Government / Business

The lobbying of Government and Business on waste prevention issues (e.g. reduction in packaging, providing incentives for deposit/return schemes for bottles and jars etc) is an activity with an indeterminate tonnage diversion activity. It could however yield the highest diversion of any option on a national level and as such is an area that Solihull MBC could actively pursue through responses

²⁴ A term derived from the Acronym used in the USA 'Save Money And Reduce Trash', SMART, shopping

²⁵ WRAP Waste Prevention Toolkit, 2008

to consultations and representations to relevant bodies in addition to local / regional dialogue where appropriate.

It is assumed that it is good practice to continue to engage with the Government and stakeholders to contribute to the delivery of the vision and objectives of the Municipal Waste Management Strategy and develop more sustainable waste management.

In-house Waste Prevention & Reuse

An important element of waste management practice is 'leading by example'. This is an area Solihull MBC is keen to explore as part of the Municipal Waste Management Strategy development. Whilst not directly comparable in terms of scale or performance to the other initiatives in this options appraisal, by undertaking good waste prevention and reuse activity within the Council premises and day to day activities it will bring wider community leadership benefits and understanding of good practice in this area by council staff. Any aspects of waste prevention and reuse previously discussed in this options appraisal report could apply to Council offices / services and the resultant carbon / tonnage benefits would apply, albeit on a much smaller scale.

The delivery of this activity in-house would involve establishing the baseline activity (in terms of tonnes and nature of waste arising in the authority), identifying responsibilities, initiatives and targets to reduce these arisings. The process should be included in the Municipal Waste Management Strategy Action Plan. This could also form an element of a wider Environmental Management System such as ISO14001 or similar structured management system for managing and reducing environmental impacts.

Conclusions of Waste Prevention & Reuse Options Appraisal

The current practice of promoting home composting is justified through the options appraisal and should continue to be the lead activity adopted by Solihull MBC as regards waste prevention. This option scores most favourably in terms of the cost appraisal (due to the savings estimated by avoided collection and disposal), and is the second most favourable option in the Environment / Quality Evaluation. Supporting the promotion with 'Master Composter' volunteer advice to householders on correct home composting practice would increase the likely tonnage diversion and this aspect should be explored with the third sector.

Supporting the Freecycle network was ranked second most preferred in the options appraisal and Solihull MBC should make links with and explore options for promoting this network for the benefit of the community and to increase reuse in the Borough. It is notable that the younger members of society were more inclined to this type of initiative, from the consultation feedback likely to be at least partly attributable to the economic situation for younger people in the Borough.

Developing a food waste prevention campaign was ranked as the third most preferred initiative, although this was cost dependent (see sensitivity analysis, below). It is recommended that a food waste prevention campaign, allied to 'Love Food, Hate Waste', be developed in Solihull and also should be used to promote the take up of home composters. A dedicated resource in terms of staff time would be required and partnership with the Waste & Resources Action Programme is essential. Actions appropriate to the development of this campaign should be detailed in the Municipal Waste Management Strategy Action Plan, setting out responsibilities and timescales.

An accessible area of the Solihull MBC website should be developed for residents and businesses use, setting out information and links on other key waste prevention initiatives to both signpost and support the development of other key waste prevention and reuse activities. Examples should include:-

- Junk Mail – links to Mailing Preference Service and forms to avoid receipt of junk mail. Also to include downloadable / printable 'No free papers' labels / signs on the site
- Real Nappy services
- Love Food Hate Waste (see above)
- Freecycle (see above)
- Home Composting promotion (see above)
- Smart shopping (see below)

This website should also highlight the carbon saving / climate change benefits of the different options.

Other elements of the waste prevention and reuse options appraisal should also be considered by Solihull MBC in partnership with third sector organisations. It is notable that whilst reuse / refurbishment schemes were ranked the lowest overall, this was predominantly due to the assumption of high initial set up (infrastructure) costs. In the Environment / Quality appraisal this type of initiative was scored the 3rd most favourable. Therefore the opportunity for establishing

reuse schemes should be considered where funding is available, for example from government grants or capital development funds.

Of the initiatives considered in a quantitative discussion, the following is recommended:-

- Promotion of waste prevention and reuse messages should be contained within the schools education campaigns, and that the number of presentations to schools should be set as a target and reported against the annual action plan within the Municipal Waste Management Strategy. As identified in the Strategic Environmental Assessment (draft Environmental Report), the messages should make the link with climate change, energy and resource use.
- The Council should establish in-house waste prevention and reuse initiatives around a wider waste / environmental management system. This would include dedicated resource and the process stages required for a structured management system, including establishing the baseline, setting actions, targets and responsibilities, measuring progress against these, and implementing corrective actions / reviewing progress as identified. These actions should be included within the Municipal Waste Management Strategy Action Plan.
- Smart shopping measures relating to waste prevention and reuse, such as carrier bag reuse, purchasing goods with less packaging, drinking tap water not bottled, etc. should be incorporated on the Solihull MBC website, as shown above, and again the link made with climate change benefits and financial savings.
- Solihull MBC should lobby both Government and where appropriate other groups on waste prevention and reuse. This can include responding to consultations on key areas such as the Revised Waste Framework Directive, Thematic Strategies on Prevention & Recycling and specific issues such as deposit / return schemes for bottles.
- Solihull MBC should maintain a watching brief on the issue of kitchen waste disposer units and if appropriate examine the feasibility of a trial.

Sensitivity Analysis

The effect of applying the three sensitivity analyses on the results did influence the positioning of rankings 2, 3 and 4 in the appraisal. This is illustrated in Table 5. By increasing emphasis on the Environment / Quality aspect (60:40, Env/Quality : Cost), the Food Waste Prevention option improves relative to the Freecycle promotion and is ranked second (with Freecycle 3rd). No other changes to the rankings are observed.

Where cost is given higher priority (60:40 preference for Cost over Environment / Quality), then Junk Mail prevention gains a higher ranking (3rd) than Food Waste Prevention (which becomes 4th), this is due to the improved cost balance of the Junk Mail scheme.

Where all weightings on the Environment / Quality criteria are removed and they are all treated with equal importance (and using a 50:50 Cost: Environment/Quality split) the same rankings are observed as for the sensitivity above (where cost is given a 60:40 preference over Environment Quality).

Overall the sensitivity analysis showed no variation in the ranking of the most preferable option (home composting) or in the 5th, 6th, 7th ranked options. The variation is around food waste prevention, junk mail prevention and freecycle promotion. Under two sensitivity analyses, Junk Mail Prevention is preferred to Food waste prevention, however only in the sensitivity where all weightings are removed is it a significant preference in our view. The food waste prevention option also has the benefit of reinforcing the home composting campaign, and on balance therefore has been preferred in this analysis. Junk mail prevention should be promoted via an updated Solihull MBC website, and should be considered as a subsequent campaign area after the delivery of the Food Waste Prevention campaign, subject to the progress towards targets as identified below.

Waste Prevention Targets

As a consequence of a consultation response made by the Environment Agency as regards inclusion of a waste prevention target within the strategy, and in consultation with the Solihull Partnership, it was agreed to include a set of waste prevention targets within the MWMS. These targets are based on 'kg of household waste arising per person per year', and decline over time to reach a level of 475kg / person / year, from a current level of 499kg / person / year, as illustrated in the modelling for the MWMS Strategy document.

Recycling & Composting Options Appraisal

The options to be considered for the Recycling and Composting appraisal were developed through a structured process, described below:-

1. A long list of potential recycling / composting options was developed from experience and UK good practice in the context of delivery of the draft MWMS objectives
2. A meeting with Solihull Waste management & communications officers was held to consider the long list. This was amended in response to additional suggestions from the officers.
3. The list was included as a consultation aspect in 'internal' consultation exercises to the Solihull Partnership and Solihull MBC officers and councillors
4. The list was included as a consultation aspect for external consultation to Statutory Consultees as part of the SEA Scoping process
5. The list was amended in the light of comments received from the various consultations and is appraised in this report.

Solihull MBC is already implementing a comprehensive dry recyclables collection service (cans, glass, plastic bottles, card and paper), to support the existing garden waste collection. It is envisaged that these systems, once fully established, will increase the recycling rate of the Borough to ~ 42-44%.

The national recycling and composting target as set out in Waste Strategy for England 2007, and supported by the 2008 agreed amendments to the EU Waste Framework Directive, stipulate a 50% recycling / composting rate by 2020. This is not necessarily a requirement at a local level, however Solihull MBC has also agreed to deliver beyond this level of performance. The Options Appraisal therefore considers options to increase recycling performance from ~40s% to over 50% (and up to 60%).

The options appraised were as follows:-

Scenario	Description
Scenario 0 - Baseline	This is a modelled baseline, assuming the new kerbside dry recyclable collection (including plastic bottles, glass, cans) is implemented across the Borough. No further initiatives.
Scenario 1 – Enhanced Kerbside Recycling	This assumes the collection infrastructure of scenario 0 is maintained but active techniques for promotion, education and engagement with householders are used to optimise performance of the collection system (e.g. with greater number of householders participating in the recycling system) and therefore generating a higher recycling rate.
Scenario 2 – Additional materials collected for recycling from the kerbside	This is the same as scenario 0, however it includes an additional kerbside collection of materials that are uncommonly recycled at present, but for which may be viable for inclusion in the current or an additional collection system. These are: textiles, other plastic packaging (not bottles), aluminium foil, plastic film. A separate fortnightly collection of

Scenario	Description
	these materials is used for modelling purposes.
Scenario 3 – Additional Materials to expand bring site usage	The same kerbside recycling system as Scenario 0, however the recycling centres / bring sites are developed to include new materials e.g. textiles, other plastic packaging (not bottles), aluminium foil, plastic film. This could also include ‘on street’ recycling (e.g. recycling bins adjacent to litter bins).
Scenario 3 a – Improved recycling performance from HWRC	As Scenario 0, with improved recycling performance of the Household Waste Recycling Centre at Bickenhill.
Scenario 4 – Food waste & In Vessel Composting	As Scenario 0 with a separate weekly food waste collection implemented across the Borough using kitchen caddies and bins. The food waste is treated in a specialist In Vessel Composting facility.
Scenario 4a – Food waste & Anaerobic Digestion	As Scenario 4 with the food waste treated in an Anaerobic Digestion Facility
Scenario 5 – Additional recycling from the residual waste treatment process	As Scenario 0, with the addition of ‘black bag’ residual waste recycling through pre-treatment at the residual waste treatment facility (e.g. the extraction of metals from the residual waste).

TABLE 6 RECYCLING COMPOSTING SCENARIOS APPRAISED

In addition to these scenarios a qualitative discussion of other options was also considered in this appraisal, covering the following options:-

- Enforcement / education to ensure non household waste does not enter into the residual household waste stream
- Promote schools recycling initiatives and awareness raising as part of engaging with young persons
- Improve the Council’s and its Partner’s recycling through good environmental practice at offices, depots, and partners’ work places.

The Criteria for Appraisal of Recycling & Composting Options

The evaluation criteria applied for the different options were developed initially in consultation with Solihull MBC officers and then subject to a stakeholder workshop held on the 8th June. Notes of the workshop are included in Appendix 1.

The appraisal process uses a 50:50 split between Cost : Environment / Quality criteria. This was subject to a sensitivity analysis of 60:40 and 40:60 to determine the impact of cost on the selection of options.

The stakeholder workshop included Solihull MBC officers, elected members and external organisations. The workshop considered and reviewed a draft list of evaluation criteria, to determine the Environment / Quality criteria to be applied in the evaluation. The attendees agreed a set of criteria and individually weighted (prioritised) the criteria. The weightings were then summed to provide and an average weighting generated according to the participants' priorities, as presented in Table 7.

Public Acceptability	16.44%
Tonnage Recycled	14.61%
Tonnage of Carbon Saving	13.33%
Education / Awareness Raising Benefit	11.14%
Tonnage of Biodegradable Municipal Waste (BMW) recycled	9.77%
Local Environmental Issues	9.77%
Accessibility	9.32%
Deliverability	9.09%
Community Benefits	4.02%
Employment generated	2.51%
	100.00%

TABLE 7 RECYCLING & COMPOSTING ENVIRONMENT / QUALITY EVALUATION CRITERIA

The key criteria agreed by the stakeholder group were considered to be the Tonnes Recycled, the amount of Carbon Saved, Public Acceptability and the Education / Awareness Raising aspects of the initiatives. These four aspects amount to around 55% of the Environment / Quality assessment. A 'middle' tier of criteria included 'tonnage of Biodegradable Municipal Waste (BMW) recycled', 'Deliverability', 'Local environmental issues' (such as nuisance, odour etc) and 'Accessibility' (to residents). These criteria each received around 9% of the weighting. The remaining issues: 'Community benefits' and 'Employment' formed the lower tier of priority, but were still considered factors important in the appraisal.

It was considered important to take account of any potential bias introduced in the weighting of criteria simply because of the membership of those attending the stakeholder day. In this regard a third sensitivity analysis was conducted on the results whereby all the weightings were removed (i.e. all the Environment / Quality criteria has an equal importance) to observe the impact on the results of the Options Appraisal. Each of the Sensitivity Analyses is included in the Results section of this report.

After the options appraisal was complete and the draft Strategy (with public consultation) issued, a subsequent piece of research provided an updated estimate of waste composition in the Borough. This was used to inform targets for the final Strategy. The revised waste composition indicated that higher levels of recycling were possible than modelled in this appraisal, hence the higher targets contained within the Strategy.

Analysis of Recycling / Composting Options

The following section considers each of the recycling and composting options against the appraisal criteria. The recycling and composting scenarios for the Borough were evaluated in a quantitative and semi quantitative manner, using industry standard models.

Quantitative & Semi Quantitative Options Appraisal

The Kerbside Analysis Tool (KAT) was used to determine cost and recycling performance aspects of each scenario. This is based on key assumptions around participation in the recycling services and capture of specific materials by the recycling system in question. These assumptions are identified below. Biodegradable Municipal Waste (BMW) recycled is calculated using the tonnages of BMW recycled, as derived from the KAT modelling. The KAT model outputs are included in detail in Appendix 3.

The Waste and Resources Assessment Tool for the Environment (WRATE) was used to model environmental impacts, and to quantify carbon performance. The schematics of each collection system, mass flows and WRATE outputs are included in Appendix 4.

The garden waste collection performance was assumed to be constant for all scenarios, and the residual waste treated in the Coventry & Solihull Energy from Waste plant in all cases.

Recyclate income will vary due to economic circumstances, and the following assumptions have been used as regards each material within the kerbside collection systems:-

<i>Material</i>	<i>Lets Recycle Materials Prices July 2009, £ / t</i>	<i>Median</i>	<i>Transport cost per tonne²⁶</i>	Net Income per tonne
Mixed Glass	13-17	£15	£15	£0.0
Steel	20-40	£30	£15	£15.0
Aluminium	550	£550	£15	£535.0
Foil	60	£60	£15	£45.0
Mixed Plastic	100-150	£125	£15	£110.0
Plastic Film	50-90	£70	£15	£55.0
Mixed Papers	25-30	£28	£15	£12.5
News & Pams	70-75	£73	£15	£57.5
Card	37-45	£41	£15	£26.0
Textile	185-250	£218	£15	£202.5

TABLE 8 REVENUES FOR RECYCLATE

In terms of environmental impact, all distances for kerbside collection services have been calculated as per current collection performance using the Kerbside Analysis Tool (KAT). For additional

²⁶ In reality there will be variation around the transport costs related to the distance to the reprocessor / broker, the nature (density) of the material and how it has been compacted / baled. A general £15 / tonne assumption has been applied in all cases in the absence of specific information.

transport (e.g. for recyclate to the reprocessor), all distances have been assumed as 20km. The background energy mix²⁷ has been determined at 2010 levels.

Scenario 0 – Baseline performance

In order to provide a baseline comparison, a model was developed using a projection of the new kerbside recycling collection, the existing garden waste collection and the existing refuse collection service. This was modelled using data from the actual service where available, or industry standard defaults where data was unavailable.

The dry recycling collection performance is assumed to have a 60% set-out rate, a 70% participation rate, and an average capture rate of 75% for the paper / card and plastics collection and 64% for the glass, cans and plastic collection.

The actual split bodied Duo vehicle utilised for the recycling service, is unavailable as an option within either of the industry models for kerbside collection or environmental impact, and therefore a standard split bodied Refuse Collection Vehicle was used to approximate the actual vehicle. Partial compaction was used on both compartments.

A schematic of the collection system including an indication of the flow of wastes through the different aspects of the service is included in Appendix 4.

Scenario 1 – Enhanced Kerbside Dry Recycling

This scenario assumes extensive promotion, doorstepping and communications work to optimise the performance of the new recycling system to obtain the highest recycling yield and therefore good practice levels of performance. It is otherwise identical to Scenario 0.

The dry recycling collection performance is assumed to have a 70% set-out rate, a 80% participation rate, and an average capture rate of 85% for the paper / card and plastics collection and 74% for the glass, cans and plastic collection. As with Scenario 0, a split bodied RCV was used in the modelling.

A schematic of the collection system including an indication of the flow of wastes through the different aspects of the service is included in Appendix 4.

The appraisal considers this scenario will have the least deliverability issues of all the alternative scenarios, due to the use of existing infrastructure only. It also scores well in terms of local environmental issues, as again there is no notable additional local environmental impact. The full set of Quality /Environment issues and scores are included in Table 9.

Scenario 2 – Additional Materials Collected for Recycling

This scenario is the same as Scenario 0 with the inclusion of an additional kerbside collection of materials that are uncommonly recycled at present, but which may be viable for inclusion in the current or an additional future collection system. The recyclables modelled are: textiles, other plastic packaging (not bottles), aluminium foil and plastic film. A separate fortnightly collection of these

²⁷ The Energy mix (i.e. how much of our electricity is generated from coal, gas, renewable etc) is an important element in Life Cycle Assessment modelling

materials is applied, in a caged vehicle, for modelling purposes. The collection is targeted at all households in the Borough except multiple occupancy households / flats.

The dry recycling collection performance for these additional materials is assumed to have a 50% set-out rate, a 65% participation rate, and an average capture rate of 55%.

A schematic of the collection system including an indication of the flow of wastes through the different aspects of the service is included in Appendix 4.

The appraisal considers this scenario to have a relatively high score for employment due to the additional collection activity required. The full set of Quality /Environment criteria and scores are included in Table 9.

Scenario 3 – Enhanced Bring Sites

All scenarios assume a general reduction in bring site recycling as a result of the expansion of the kerbside collection of dry recyclables. This scenario assumes a 10% higher tonnage of recyclate from bring sites / recycling centres relative to all other scenarios, for example through provision of on-street recycling (where appropriate), targeted bring banks / recycling centres to complement kerbside recycling. The materials modelled are an increase in textiles, glass, aluminium, ferrous metal, paper recycling through such measures.

It is assumed that £100k of infrastructure investment is undertaken to improve the number and accessibility of bring sites, recycling centres and on street recycling facilities as part of this appraisal.

The appraisal considers that this scenario has a relatively high deliverability and relatively low employment score. The full set of Quality /Environment criteria and scores are included in Table 9.

Scenario 3a – Enhanced Household Waste Recycling Centre (HWRC) performance

The Household Waste Recycling Centre at Bickenhill currently recycles between a quarter and a third of the waste entering the facility. Current best practice in the UK is around 60% recycling rate for this type of facility. The Solihull HWRC is currently being refurbished and has been the subject of infrastructure improvements. This may improve recycling performance, in conjunction with operational improvements. This scenario considers further investment to provide an additional return in recycling improvement, based around a £100k capital investment and a 10% improvement in dry recyclables captured from the HWRC. The main additional recyclates captured are wood (almost half the additional recycling tonnage), and paper, ferrous metal, WEEE and glass improvements. With smaller additional tonnages of non ferrous metals and textiles recycled as part of the improved performance.

This scenario has a notable environmental benefit relative to other options, largely because the residual waste from this facility is predominantly sent to landfill, whereas in other scenarios the waste is sent to the Energy from Waste plant and the relative environmental benefits of recycling are therefore less pronounced, particularly for the biodegradable components.

The appraisal considers that this scenario has a relatively high deliverability and relatively low employment score. The Local Environmental issues are considered to be negligible as the scenario only involves minor improvements to the HWRC, and the Accessibility criteria is scored poorest due to the reliance on car ownership and / or proximity to the site in order to use the service. The full set of Quality /Environment criteria and scores are included in table 9.

Scenario 4 – Separate Food Waste Collection (to In Vessel Composting)

This scenario is the same as Scenario 0, with an additional dedicated weekly collection of food waste. The food waste collection is targeted at all households in the Borough except multiple occupancy households / flats. This includes provision of a kitchen caddy and a food waste bin to the households. The collection is modelled for Kerbside collection performance using a small (4.5m³) electric vehicle. An equivalent vehicle is not available in the Life Cycle Assessment (LCA) model (WRATE) and therefore a medium goods vehicle was modelled in terms of environmental impact, as this has a similar payload.

The food waste is sent to an In-vessel Composting facility based on the Linde technology, with the resultant compost generated to the PAS 100²⁸ standard and applied to land.

It is assumed in all LCA modelling that the compost use is adjacent to the plant generating the compost.

The food waste collection scenarios have the highest score for Employment due to the additional collection and treatment operation required. They are considered to have the lowest Deliverability and Public Acceptance scores however due to the potential for public reservation over an additional collection of food waste in an area with weekly refuse collections, and also the need for an additional waste treatment facility. The impact on Local Environment (e.g. air pollution, noise, odour etc) criteria has been scored the lowest for the food waste collections, due to the separation of food waste, additional collection vehicles / emissions and potential local impacts around the food waste treatment facility. The full set of Quality /Environment criteria and scores are included in Table 9.

Scenario 4a - Separate Food Waste Collection (to Anaerobic Digestion)

As Scenario 4, except the food waste is sent to an Anaerobic Digestion (AD) facility, based on the Greenfinch Biogen technology, generating electricity and heat from the resultant biogas.

The electricity and heat derived from the biogas are utilised displacing fossil fuels via a Combined Heat & Power (CHP) engine. The digestate produced by the process is applied as AD cake to the land, which can replace the need for chemical fertilizers.

The food waste collection scenarios have the highest score for Employment due to the additional collection and treatment operation required. They are considered to have the lowest Deliverability and Public Acceptance scores however due to the potential for public reservation over an additional collection of food waste in an area with weekly refuse collections, and also the need for an additional waste treatment facility. The impact on Local Environment (e.g. air pollution, noise, odour

²⁸ Publicly Available Specification (PAS) 100: Specification for Composted materials, 2005, BSI

etc) criteria has been scored the lowest for the food waste collections, due to the separation of food waste, additional collection vehicles emissions and potential local impacts around the food waste treatment facility. The full set of Quality /Environment criteria and scores are included in Table 9.

Scenario 5 Recyclables extracted from the residual waste at the residual waste treatment facility

This is the same as scenario 0, with an additional pre-treatment process designed to extract ferrous and non ferrous metals from the residual (e.g. 'black bag') waste going to the Energy from Waste plant.

This process is modelled to add an extra £20 / tonne gate fee²⁹ for the waste going through the facility.

This scenario scores the poorest out of the Community Benefits and Education / Awareness criteria, due to the lack of interface with the householder. Conversely it scores the highest in terms of Accessibility as all householders would be able to participate in the service. The full set of Quality /Environment scores are included in Table 9.

Qualitative Options Appraisal

The following further alternative recycling and composting options were considered as part of a qualitative appraisal. These initiatives are considered qualitatively as the tonnages would not compare with the other initiatives that target a wider number of householders.

Enforcement / education to ensure non household waste does not enter into the residual household waste stream

One method of improving recycling rates, notably from the Bickenhill Household Waste Recycling Centre (HWRC) could be to reduce the delivery of any non household waste at the site. Some measures are already in place for this, and it is unclear as to the amount of non household waste that may be entering the site, or indeed how much of this is already recycled. As such this has been maintained as a qualitative discussion rather than an initiative where tonnages have been estimated. This type of initiative may be more effective in terms of waste reduction rather than recycling and perhaps should be considered in conjunction with HWRC recycling targets (household and trade waste where accepted) and waste prevention targets.

Promote schools recycling initiatives and awareness raising as part of engaging with young persons

This initiative is discussed qualitatively as it is impossible to quantify the additional benefits spread by the potential advocacy undertaken by the young people e.g. spreading the message to adults in the household. Providing educational and recycling campaign messages is an area that Solihull has been successful at implementing in recent years, and should be continued as part of the behavioural change agenda.

²⁹ This would be a very basic front end separation system, costs could range up to £30 / tonne.

Improve the Council's and its Partners' recycling through good environmental practice at offices, depots, and partners' sites

This is an activity that is consistent with the MWM Strategy objective of 'leading from the front', and in-house recycling systems should be developed to encourage improved waste management performance.

Summary of Recycling & Composting Options – Environment / Quality Appraisal

The following table summarises the results of the Environment / Quality options appraisal against the agreed Solihull MBC evaluation criteria:-

	Tonnage Recycled	Tonnage BMW Recycled	Carbon Saving Tonnes CO ₂ Equiv.	Employment (1 = no benefit, 5 = strong potential for local employment)	Deliverability (1= notable risks, 5 = very low risks)	Community Benefits (1 = no benefit, 5 = strong benefits)	Education / Awareness (1 = no benefit, 5 = enhanced awareness / education)	Public Acceptability (1 = poor acceptability, 5 = welcome development)	Local Environmental Issues (1 = significant impact, 5 = negligible impact)	Accessibility (1 = not accessible by the majority of householders, 5 = inclusive to all)
Scenario 0 Baseline										
Scenario 1 Enhanced Dry Recycling	4226	2633	1366	3	5	2	4	3	5	4
Scenario 2 Additional Recyclate Materials	1865	292	2520	4	3	3	3	2	3	4
Scenario 3 Enhanced Bring	300	157	1376	2	4	3	2	3	4	3
Scenario 3a Enhanced HWRC	400	253	4055	2	4	3	2	3	5	2
Scenario 4 Food Waste to IVC	5375	5375	887	5	1	3	3	1	2	4
Scenario 4a Food Waste to AD	5375	5375	1695	5	1	3	3	1	2	4
Scenario 5 Residual Waste recyclate recovery	2644	0	758	2	2	1	1	3	3	5

TABLE 9 RESULTS OF ENVIRONMENT / QUALITY APPRAISAL

Summary of Recycling & Composting Cost Appraisal

The following table summarises the output of the cost appraisal, using the KAT model where appropriate. For further details see preceding text and Appendix 3.

Scenario	Additional Costs	Workings
Scenario 0 Baseline		
Scenario 1 Enhanced Dry Recycling	£436,020	<i>The annualised net additional recycling collection cost, plus £5 / hh equivalent expenditure on Communications (through door stepping etc), minus the avoided disposal cost.</i>
Scenario 2 Additional Recyclate Materials	£353,947	<i>The annualised net cost of the additional collection, plus £2 / hh on Communications, minus income from recyclate & avoided disposal costs</i>
Scenario 3 Enhanced Bring	£100,000	<i>Assumed capital / operational cost</i>
Scenario 3a Enhanced HWRC	£100,000	<i>Assumed capital cost</i>
Scenario 4 Food Waste to In Vessel Composting (IVC)	£928,409 [£1,009,034]	<i>Annualised net collection cost (including £45 / tonne food waste treatment gate fee) + £2 / hh Communications, minus avoided refuse collection costs and disposal costs The figure in [square brackets] is a sensitivity analysis of a £60 / tonne gate fee for food waste treatment.</i>
Scenario 4a Food Waste to Anaerobic Digestion (AD)	£928,409 [£1,009,034]	<i>Annualised net collection cost (including £45 / tonne food waste treatment gate fee) + £2 / hh Communications, minus avoided refuse collection costs and disposal costs The figure in [square brackets] is a sensitivity analysis of a £60 / tonne gate fee for food waste treatment.</i>
Scenario 5 Residual Waste Recyclate Recovery	£1,142,352	<i>Assumes an additional £20 / tonne processing gate fee for sorting black bag waste through a mechanical shredding and metals extraction process, minus income from recyclate extracted</i>

TABLE 10 RESULTS OF THE COST APPRAISAL

Ranking of Recycling / Composting Options

The following table summarises the results of the options appraisal and sensitivity analysis against the agreed Solihull MBC evaluation criteria:-

	Quality Score (weighted)	Cost Score	COMBINED SCORE 50% Cost; 50% Env	RANKING 1 = most preferred, 8 = least preferred	SENSITIVITY 1 60% QUALITY: 40% COST	SENSITIVITY 2 40% QUALITY: 60% COST	SENSITIVITY 3 50% QUALITY all sub-criteria equal weighting: 50% COST
					RANKING	RANKING	RANKING
Scenario 1 Enhanced Dry Recycling	0.788	0.62	70.34	3	2	3	3
Scenario 2 Additional Recyclate Materials	0.580	0.69	63.51	4	4	4	4
Scenario 3 Enhanced Bring	0.533	0.91	72.29	2	3	2	2
Scenario 3a Enhanced HWRC	0.627	0.91	76.96	1	1	1	1
Scenario 4 Food Waste to IVC	0.608	0.19	39.79	6	6	6	6
[High gate fee for Food Waste to IVC sensitivity]	0.608	0.12	36.26	7	7	7	7
Scenario 4a Food Waste to AD	0.635	0.19	41.11	5	5	5	5
Scenario 5 Residual Waste recyclate recovery	0.501	0.00	25.03	8	8	8	8

TABLE 11 RANKING & SENSITIVITY ANALYSIS OF RECYCLING OPTIONS

Conclusions of Recycling & Composting Options Appraisal

It can be seen from the preceding analysis that all scenarios involving improvement to existing infrastructure and services are preferred to those that involve new infrastructure or services. This is in general due to the notable costs of implementing new systems, and that it is recognised that there is both the scope and opportunity to gain better value through improved performance from existing systems in Solihull.

The current Solihull MBC activity of investing in improvements to the Household Waste Recycling Centre at Bickenhill is supported by this Options Appraisal as representing the first ranked priority. As the site has only recently (at the time of writing) undergone a programme of capital improvements, the impact on recycling performance of this investment is not known to date. The analysis considers further investment may be justified if this offers additional recycling performance, notably around wood waste. Recycling performance however is a factor of both operational practices and the infrastructure / layout of the site and therefore this is an area to explore in partnership with the site operator.

Part of the preference for improvement of the HWRC in the appraisal (Scenario 3a), when compared against other options, is the relatively low level of investment required (resulting in a good Cost score in the appraisal) and the use of landfill as a disposal option from the HWRC (with most of the waste inappropriate for incineration). Landfill yields extreme negative environmental impacts. This is particularly the case for biodegradable materials and hence the focus on wood recycling (or indeed energy recovery) to improve environmental performance.

Another measure that scored favourably (2nd) in the appraisal was enhancing bring site recycling capacity (Scenario 3a). This is set in the context of a general fall anticipated in the use of bring sites in response to the expansion of kerbside recycling collections, and therefore presents an opportunity to both rationalise and improve the effectiveness of the recycling centres / bring sites. A review of all sites post implementation of the kerbside recycling collection will enable identification of those sites and materials that are no longer required as kerbside services are available direct to the householder.

In addition, there will be opportunities to expand bring bank / recycling centres in areas not served by the kerbside collection (for reasons of housing type), and also to increase the collection of materials not catered for in the kerbside collections (e.g. tetrapaks, textiles, other plastics) to improve overall recycling levels and environmental performance. There is also the opportunity to develop 'on street' recycling³⁰ in areas conducive to capturing further recyclate from the street litter waste stream. Both of these aspects should be incorporated in the Municipal Waste Management Strategy Action Plan.

The third priority according to this analysis should be to optimise the performance of the new kerbside dry recycling system. This collection system (at the time of writing) is presently being rolled out across the Borough. After the initial implementation and associated communications activity for the new collection has taken place, there will be an opportunity to review the performance of the collection system. This is likely to be appropriate after one year of operation. In any collection system there will be areas of better and poorer performance and it will be important to understand

³⁰ E.g. recycling bins adjacent to litter bins to allow separate deposit of recyclables.

the areas and issues involved before seeking to improve the performance of the recycling system. Typical issues to be addressed will include households not participating in the collection, or householders placing incorrect materials in the recycling boxes. In some cases householders may be unclear as to which materials can be placed into containers. Once an understanding is gained of the areas to improve in the recycling collection, communications materials and methods should be employed to encourage and develop the highest recycling performance practicable from the collection. A proven effective method of optimising the performance of kerbside recycling collections is 'door stepping' i.e. the practice of sending staff trained in communications for face to face explanations of the recycling system, why it has been introduced and how to use the collection.

Optimising the new recycling collection system, as modelled, could generate a substantial amount (>4000 tonnes per annum) of additional recyclate and therefore would represent good value for money, under this analysis. The Municipal Waste Management Strategy Action Plan should include the process for optimising the performance of the new kerbside recycling collection service.

The fourth ranked option was to either add additional recyclable materials to the current collection scheme or develop a complementary kerbside collection system, for new materials. This area should be kept under review as markets and opportunities develop. Dialogue with adjacent local authorities, the Solihull collection contractor and the third sector in Solihull should be maintained to enable the potential environmental benefits of a broader kerbside collection service to be gained, where practicable.

Whilst the above methods can all make a notable contribution to raising the recycling levels of the Borough (in order to achieve the high 40s – low 50s% recycling rate), food waste will also need to be collected in order to deliver the (revised³¹) Strategy objective of achieving a 60% recycling rate. The food waste collections scored relatively poorly in the appraisal. The main reason for this was the high cost of the collection (~£1m additional cost³² per annum). The Environment / Quality aspect of the appraisal however was scored 2nd most favourable in the case of Scenario 4a (food waste sent to AD), and 4th in the case of Scenario 4 (food waste to IVC).

The high cost is an important consideration in terms of service delivery, particularly in light of the recent economic downturn, and it became clear during the course of the appraisal that whilst a food waste collection would be required to meet the highest targets in the draft Strategy, the costs need to be appropriately managed. As a consequence Solihull MBC consulted as to the best approach for managing this issue. This item was raised at the Solihull Partnership Governing Board meeting held on the 20th August 2009. The Board received a presentation on the development of the strategy and held a discussion around the issue of managing food waste, and strategic options for implementing the collection. The options considered were:-

1. Implement a separate food waste collection at the earliest opportunity (this would generate the highest cost but would deliver the high recycling performance in the shortest time).

³¹ After an updated waste composition and comments from the Scrutiny committee & public consultation

³² Expressed as an annualised cost, e.g. vehicles costed over ten years, bins over five etc. Therefore the initial set up costs would be notably higher than this figure, particularly in terms of capital outlay for vehicles / bins etc.

2. Seek to partner with adjacent local authorities and implement in accordance with mutual timescales, and sharing treatment infrastructure (to gain from economies of scale, thereby mitigating costs, although timescales of implementation are uncertain at this stage)
3. Review the issue of food waste collection at the next Municipal Waste Management (MWM) Strategy review point (~2014, i.e. defer the decision by which point the food waste treatment market is likely to be more mature)
4. Implement the food waste collection at the latest point that would still enable delivery of the Municipal Waste Management Strategy recycling objective

A debate was held around these options with Solihull MBC officers and the Solihull Partnership Governing Board. It was agreed that the approach should be to liaise with other local authorities (Option 2 above) and seek to partner for the procurement / use of treatment facilities, and develop the collection infrastructure along appropriate timescales in response. It was also identified that consideration of third party wastes (e.g. commercial and industrial organic wastes) could complement both the process and economies of scale, and this avenue should also be explored as part of the approach to delivering the food waste treatment. Where food waste treatment is to be considered, the appraisal found preference for Anaerobic Digestion as a treatment technology as opposed to In Vessel Composting. This was largely because of an improved carbon performance for AD.

Scenario 5, residual waste recycling, scored the poorest in both the Cost and Environment / Quality aspects of the appraisal, and as a consequence was ranked last. The costs incurred in pre-treating all the residual (black bag) waste in order to recover relatively modest amounts of recycle were key factors in this result. There is environmental merit in capturing further recycle from residual waste but it is not cost effective relative to other recycling measures.

The qualitative appraisal of options considered the importance of in-house recycling being developed for Solihull Council offices and depots, and continuing to develop good practice in educating school children on the benefits of recycling and composting. The link should be made between climate change, resource use and recycling / composting in education activity and communications messages on the Solihull MBC website and supporting the roll out of new recycling services.

The issue of non household waste entering the household waste stream may be investigated as appropriate, and enforcement measures tightened at the HWRC if the need is demonstrated. A consideration of wider wastes is undertaken in the Headline Strategy document of the MWMS.

Sensitivity Analysis

The effect of applying the three sensitivity analyses on the results had only a minor influence on the positioning of rankings within the appraisal. No change was observed from the agreed 50:50 ranking in either of the sensitivities 2 (40% Environment/Quality: 60% Cost) or 3 (50:50 Appraisal but with all the Environment / Quality criteria of equal weighting).

Where increasing emphasis on the Environment / Quality aspect (60:40, Environment/Quality : Cost), was considered, the 2nd and 3rd placed rankings switched places, with the placing of all other scenarios remaining the same. Therefore where Environment / Quality criteria gain in importance,

Enhanced Dry Recycling (Scenario 1) becomes a greater priority than the enhanced bring sites. This is primarily because of the far superior performance in terms of recyclate yield and carbon saving.

Waste Treatment & Disposal Options Appraisal

At the time of undertaking the Options Appraisal Solihull Metropolitan Borough Council was engaged in a joint procurement for residual waste treatment known as Project Transform. This procurement was in partnership with Warwickshire County Council and Coventry City Council. The procurement was underway, with options already appraised against environmental, social and economic criteria to inform the reference project as part of a bid for Private Finance Initiative (PFI) monies from Government. As a result there was no Options Appraisal for Residual Waste Treatment technologies in this context. Subsequent to this Appraisal, the Project Transform procurement was withdrawn as further research highlighted that the existing residual waste treatment process (the Coventry & Solihull EfW plant) was viable well beyond the life of this Strategy.

There is however scope to provide further guidance as to evaluation criteria for the procurement from a Solihull MWMS perspective, based on consultation and Strategic Environmental Assessment (SEA) of options. SEA uses a set of high level environmental (and wider, e.g. social) sustainability criteria to appraise waste strategy objectives, targets and options. These Sustainability criteria have been considered in the context of the residual waste treatment options as part of the draft Environmental Report, and include the results of a Life Cycle Assessment (LCA) study into the key environmental impacts of the different options to inform the SEA.

There will be no attempt to define a technology choice in the Municipal Waste Management Strategy as the current facility will be in operation beyond the life of this Strategy. Evaluation criteria have been established however (see below) to originally inform discussions for the PFI procurement, but are available should any unexpected new procurement of residual waste treatment capacity be required. In addition, the data from the Environmental Report will provide some guidance and mitigations as regards alternative treatment technologies.

The Criteria Considered for Waste Treatment & Disposal Options

The evaluation criteria agreed as important for residual waste treatment and disposal were developed initially in consultation with Solihull MBC officers and then subject to a stakeholder workshop held on the 8th June. Notes of the workshop are included in Appendix 1.

The workshop considered a 50:50 split between Cost : Environment / Quality criteria. In terms of the residual waste procurement, this will form a much more complex set of evaluation criteria and weightings, however the Environment / Quality criteria agreed at the workshop were fed in to the procurement process to support the decision making process as regards Solihull MBC.

The stakeholder workshop included Solihull MBC officers, elected members and external organisations. The workshop considered and reviewed a draft list of evaluation criteria, to determine key Environment / Quality criteria. The attendees agreed a set of criteria and individually weighted (prioritised) the criteria. The weightings were then summed and an average weighting provided, according to the consultees priorities, as presented in table 12.

Renewable Energy / Heat generated	14.61%
Tonnage Carbon emissions	14.41%
Tonnage of Landfill Diversion	12.61%
Deliverability	12.31%
Fit with Collection systems	10.71%
Public Acceptability	9.81%
Sustainable Construction /Design	9.51%
Local Environment & Health	7.51%
Biodegradable Municipal Waste (BMW) reduction	6.86%
Employment	1.65%
	100%

TABLE 12 TREATMENT & DISPOSAL EVALUATION CRITERIA

The key criteria agreed by the stakeholder group were considered to be the Renewable Heat / Energy derived and Carbon emissions, with Landfill Diversion and Deliverability considered almost as important. These four criteria amount to ~54% of the weighting, with the Fit with the Collection System, Public Acceptability and Sustainable Design / Construction forming a third tier of priority at ~9 – 10% of the weighting each. The Local Environment / Health criteria and the Amount of Biodegradable Municipal Waste reduction were of lower priority and the least important issue was considered to be Employment.

These criteria were incorporated into the procurement process to inform Solihull MBC's input into the evaluation process.

Appendix 1 Notes of the MWMS Options Appraisal Stakeholder Workshop

Notes of the Solihull Municipal Waste Management Strategy Stakeholder Workshop

8th June 2009

Attendees:

Alan Brown, SMBC

Cllr Wild, SMBC

Donna Palfrey, SMBC

John Shattock, GOWM

Cllr Windmill, SMBC

Jacqueline Jones, WMFS

Caroline Condon, SMBC

Carol Linfield, Solihull Partnership

Dave Martin, Enterprise

Steve Hawkins, SMBC

Jim Harte, SMBC

Maurice Barlow, SMBC

Apologies received from:

Friends of the Earth & WRAP

Facilitated by:

Paul Frith, Frith Resource Management Ltd. & John Lucas, John Lucas Ltd.

Notes

These are the notes from the Stakeholder Workshop for the Solihull Municipal Waste Management Strategy Development. It is important to note that no decisions as regards options were made on the day, but that the day informed the approach to selecting options.

Presentations on the Solihull waste service, its strategy and influences and the planning strategy developments, set the scene for the day.

The aim of the workshop was to establish and agree key criteria for decision making on the following waste strategy areas, grouped under sections of the Waste Hierarchy:-

- Waste Prevention & Reuse
- Waste Recycling & Composting
- Waste Treatment & Disposal

The criteria to be agreed would comprise the Environment / Quality element of the MWMS Options Appraisal. The other element of the Options Appraisal being Cost, and the relationship would be 50:50, Cost : Environment/Quality.

The delegates were provided with a suggested set of criteria for each level of the Waste Hierarchy identified above. These formed the basis for facilitated discussions in two break-out groups. The groups discussed whether to remove any of these criteria and / or add any new ones. In all cases the lists were amended to some degree. After the discussions were complete the two break-out groups

returned and agreed a common list of criteria for each level of the waste hierarchy. These are shown below, together with any explanatory points agreed on the day:-

Agreed Waste Prevention & Reuse Criteria

- Amount of Waste Prevented (tonnage)
- Amount of Waste Reused (tonnage)
- Amount of Biodegradable Municipal Waste (BMW) avoided (tonnage)
- Carbon Saving (kg of CO₂ equivalent)
- Employment Generated
- Community Benefits (e.g. services / benefits to community)
- Education / Awareness Raising Potential (all options will require some education / comms / awareness raising, however some are targeted around education and behaviour change whereas others are not)
- Public Acceptability
- Impact on Wider Wastes (e.g. commercial / industrial etc.)

Agreed Recycling & Composting Criteria

- Amount of waste recycled / composting (tonnage)
- Amount of Biodegradable Municipal Waste (BMW) avoided (tonnage)
- Carbon Saving (kg of CO₂ equivalent)
- Employment Generated
- Deliverability (in terms of infrastructure / planning / practical implementation issues)
- Community Benefits (e.g. services / benefits to community)
- Education / Awareness Raising Potential
- Public Acceptability
- Environmental Impact (local emissions / nuisance / odour etc)
- Accessibility (inclusive service that residents can access)

Agreed Waste Treatment & Disposal Criteria

- Amount of Landfill Diversion (tonnage)
- Amount of Biodegradable Municipal Waste (BMW) diverted (tonnage)
- Amount of Renewable Energy / Heat Generated (MWh)
- Deliverability (in terms of infrastructure, market risks, planning, appropriateness for Borough etc)
- Carbon Savings / Emissions (kg of CO₂ equivalent)
- Sustainable Construction / Design
- Strategic Fit with the Collection System
- Local Environment & Health Issues (nuisance, odour, local environment quality impacts, health impacts)
- Public Acceptability
- Employment

Following the agreement of criteria, each attendee was provided with a list of the criteria and assigned 100 points (or a percentage) to identify relative importance across the criteria. This was summed and divided by the total number of points allocated to provide an average weighting of the importance of each criteria within the Environment/Quality Appraisal. The criteria and weighting are shown in the following three tables and corresponding graphs.

Tonnage Prevented	17.50%
Tonnage Reuse	14.25%
Tonnage BMW reduced	9.25%
Carbon Saved	17.50%
Employment	3.67%
Community Benefits	4.67%
Education / Awareness	20.42%
Public Acceptability	8.50%
Impact on Wider Wastes	4.25%
	100.00%

Table A Waste Prevention & Reuse Criteria

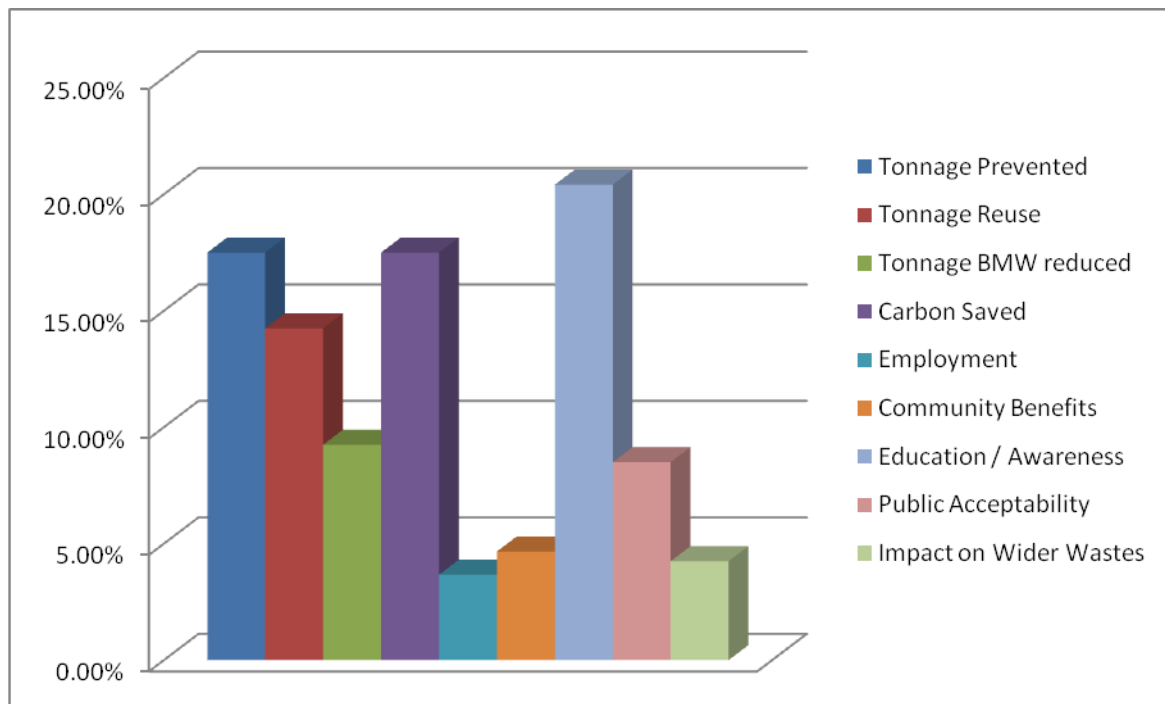


Figure A Illustration of the relative (average) importance of the Prevention & Reuse Criteria

Tonnage Recycled	14.61%
Tonnage BMW recycled	9.77%
Carbon Saving	13.33%

Employment	2.51%
Deliverability	9.09%
Community Benefits	4.02%
Education / Awareness	11.14%
Public Acceptability	16.44%
Environmental Issues	9.77%
Accessibility	9.32%
	100.00%

Table B Recycling & Composting Criteria

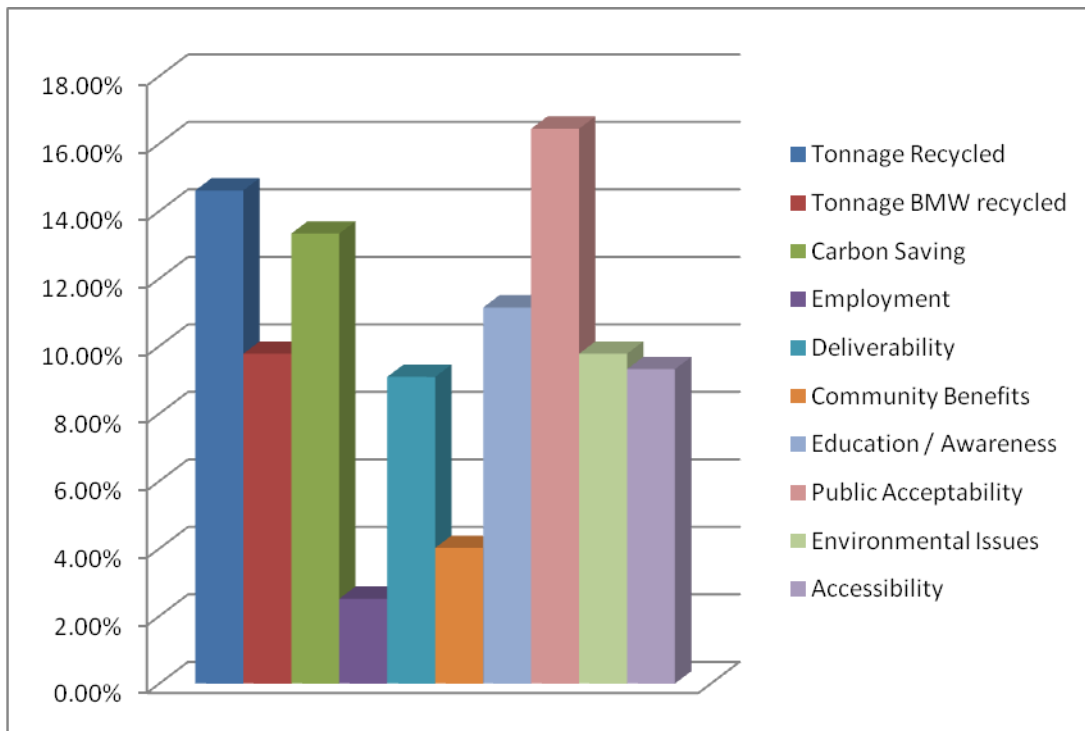


Figure B Illustration of the relative (average) importance of the Recycling & Composting Criteria

Landfill Diversion	12.61%
BMW reduction	6.86%
Renewable Energy / Heat	14.61%
Deliverability	12.31%
Carbon emissions	14.41%
Sustainable Construction /Design	9.51%
Fit with Collection	10.71%
Local Environment & Health	7.51%
Public Acceptability	9.81%
Employment	1.65%
	100.00%

Table C Waste Treatment & Disposal Criteria

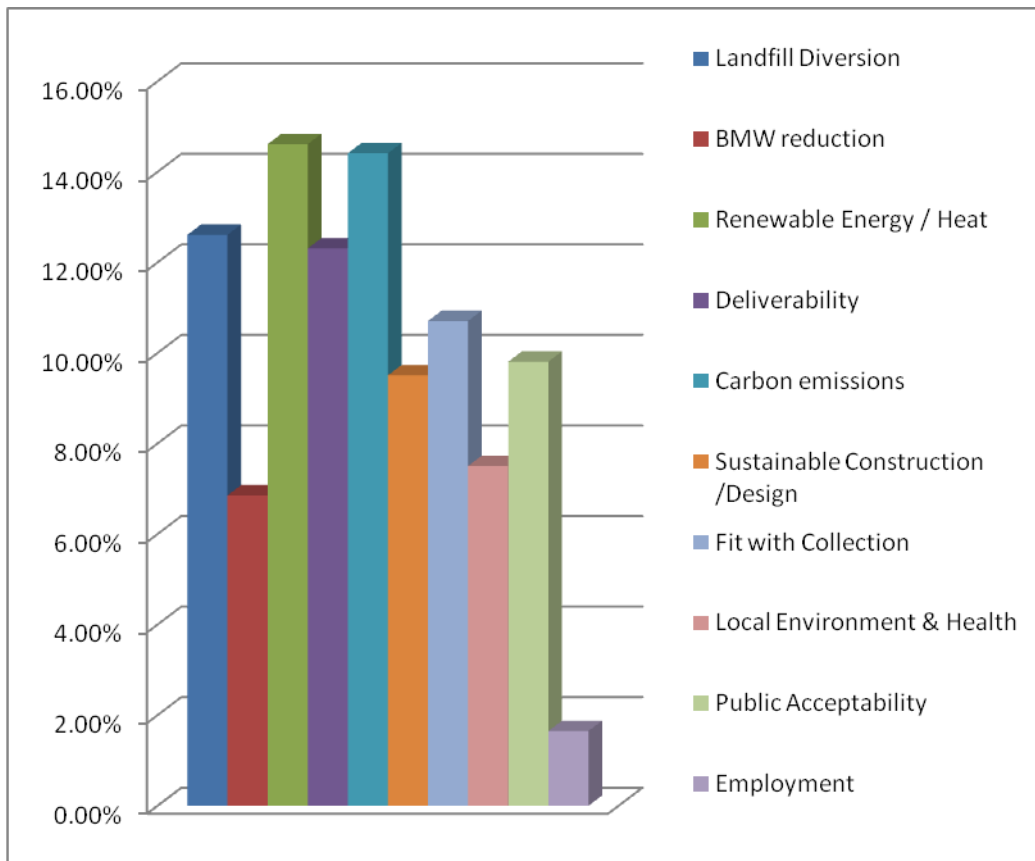


Figure C Illustration of the relative (average) importance of the Treatment & Disposal Criteria

The results of the workshop will be used as the basis for the Environment / Quality aspect of the Municipal Waste Management Strategy Options Appraisal. It will utilise data from the Strategic Environmental Assessment (SEA) for the relevant environmental elements. The options will be scored and ranked according to this appraisal. The Waste Treatment & Disposal options will not be scored / evaluated in the Options Appraisal³³, as they are subject to an active procurement process. However the results of this workshop (criteria and weightings) will be used to feed into the waste treatment & disposal procurement evaluation criteria as part of the Solihull contribution to the wider Evaluation Criteria discussion.

A sensitivity analysis will be conducted on the scores / rankings derived from the Options Appraisal (on waste prevention & reuse and recycling & composting), considering at least the following variations in criteria / weightings:-

1. A variation on the cost / environment & quality ratios, including 60:40 and 40:60 (in addition to the 50:50 basis for the appraisal), to determine the importance of price in the selection of preferred options
2. Removing all weighting from the Environment / Quality criteria (i.e. treating all the agreed criteria as equal weighting), to determine whether the weighting has a substantial effect on the rankings

Following this analysis, two further checks will be conducted on the results:-

1. An 'Affordability' check – the results of the Options appraisal will be considered against available budgets in the short / medium term
2. An 'Interface' check – to consider the impact of the different options at different levels of the hierarchy upon each other (i.e. to consider whether an option at one level of the hierarchy impacts upon an option in another level of the hierarchy).

In the discussion during the day various other points were raised that should also be noted in this report, as whilst they are not directly relevant to the Options Appraisal they are pertinent to the Municipal Waste Management Strategy:-

- Education & Awareness raising is a key objective of the MWMS and should be a fundamental element of delivery of new services and initiatives to ensure 'buy in'
- There is a need for society (in its widest sense) to take responsibility for its waste
- All initiatives and non technical documents should be written in plain English and also in a manner to engage all audiences (i.e. in relevant languages³⁴ / using diagrams)
- A more holistic approach should be taken with wider industry / waste streams where appropriate
- Flytipping and site selection issues (e.g. on floodplains), should also be considered in the Strategy / Core (Planning) Strategy as appropriate

³³ Although the main treatment & disposal options will be assessed at a strategic level as part of the SEA

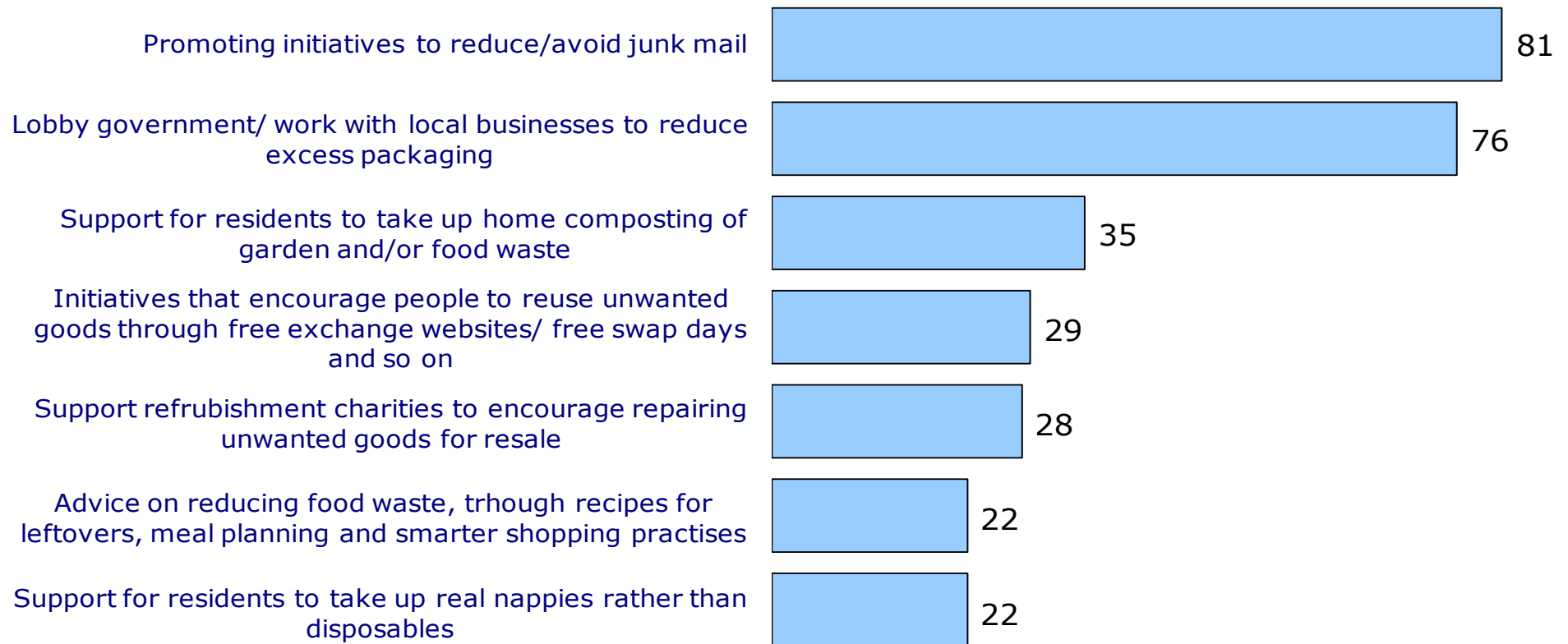
³⁴ Provided no contrary political stance is agreed on this issue

Appendix 2 Citizens Panel Survey results on Waste Prevention & Reuse options

B12. Reducing the amount of household waste that is generated is a priority for Solihull Council. From the following list of services, which are your three highest priorities ?

(prompted, code 3 options). Expressed as Percentages.

Base: All residents (750)



45-59 year olds significantly **more likely to state support for home composting** etc (44%) compared to 25-29 year olds (25%) and 30-44 year olds (28%)

60-84 year olds significantly **least likely** to want to see **initiatives that encourage re-use of unwanted goods/ exchange websites** (21%) compared to under 25s (35%), 30-44 year olds (34%) and 45-59 year olds (30%)

North Solihull residents significantly **least likely to want to look at reducing excess packaging** (68%) compared to West Solihull (77%) and South/East Solihull (83%) residents

North Solihull residents **more likely** to want support to **take up real nappies vs. disposable** (27%) compared to South/East Solihull residents (16%)

Appendix 3 KAT results – the Recycling & Composting Cost Model

			Scenario 0 Baseline (excl green)	Scenario 1 Optimised dry recycling	Scenario 2 as 0 + other recyclables	Scenario 4 Food waste + refuse only	Scenario 4 + high gate fee, food waste + refuse only
Type of collection	Kerbside	Collection A	Co-collected 2 dry recyclable streams	Co-collected 2 dry recyclable streams	Kerbside fully sorted (more than 2 streams)	Kerbside co- mingled or single stream	Kerbside co- mingled or single stream
		Collection B	Co-collected 2 dry recyclable streams	Co-collected 2 dry recyclable streams	Co-collected 2 dry recyclable streams	Co-collected 2 dry recyclable streams	Co-collected 2 dry recyclable streams
	Refuse		Refuse collection	Refuse collection	Refuse collection	Refuse collection	Refuse collection
Collection frequency	Kerbside	Collection A	every fortnight	every fortnight	every fortnight	once a week	once a week
		Collection B	every fortnight	every fortnight	every fortnight	every fortnight	every fortnight
	Refuse		once a week	once a week	once a week	once a week	once a week
Collection vehicle	Kerbside	Collection A	65%/35%, 21m3 total	65%/35%, 21m3 total	stillage, 15m3	electric, 4.5m3 (kitchen waste)	electric, 4.5m3 (kitchen waste)
		Collection B	65%/35%, 21m3 total	65%/35%, 21m3 total	65%/35%, 21m3 total	65%/35%, 21m3 total	65%/35%, 21m3 total
	Refuse		RCV, 20m3	RCV, 20m3	RCV, 20m3	RCV, 20m3	RCV, 20m3
Collection crew size including the driver	Kerbside	Collection A	0	0	3	2	2
		Collection B	6	5.5	3	3	3
	Refuse		4	4	4	4	4
Number of households served	Kerbside	Collection A	87,204	87,204	74,995	74,995	74,995
		Collection B	87,204	87,204	87,204	87,204	87,204
	Refuse		87,204	87,204	87,204	87,204	87,204
Percentage set-out	Kerbside	Collection A	60%	70%	50%	50%	50%
		Collection B	60%	70%	60%	60%	60%
	Refuse		95%	95%	95%	95%	95%
Percentage set-out (2nd stream in 2 stream)	Kerbside	Collection A	60%	70%	60%	60%	60%
		Collection B	60%	70%	60%	60%	60%

			Scenario 0 Baseline (excl green)	Scenario 1 Optimised dry recycling	Scenario 2 as 0 + other recyclables	Scenario 4 Food waste + refuse only	Scenario 4 + high gate fee, food waste + refuse only
	Refuse						
Average participation	Kerbside	Collection A	70%	80%	65%	65%	65%
		Collection B	70%	80%	70%	70%	70%
	Refuse						
Average capture	Kerbside	Collection A	75%	85%	55%	64%	64%
		Collection B	64%	74%	64%	64%	64%
	Refuse						
Tonnes collected excluding contamination	Kerbside	Collection A	9,552	12,374	1,865	5,379	5,379
		Collection B	4,371	5,775	4,371	4,371	4,371
	Refuse	Separately	46,229	41,991	44,364	40,854	40,854
		Collection A	0	0	0	0	0
		Collection B	0	0	0	0	0
Tonnes of biodegradable material collected	Kerbside	Collection A	9,150	11,783	292	5,379	5,379
		Collection B	0	0	0	0	0
Number of collection vehicles required	Kerbside	Collection A	5.2	5.7	4.3	11.8	11.8
		Collection B	4.2	5.3	4.2	4.2	4.2
	Refuse		9.1	9.6	9.6	9.0	9.0
Number of loads collected per vehicle per day	Kerbside	Collection A	1.1	1.3	0.9	1.5	1.5
		Collection B	2.0	2.2	2.0	2.0	2.0
	Refuse		1.9	1.6	1.7	1.7	1.7
Number of households passed by per vehicle per day	Kerbside	Collection A	1,682	1,542	1,751	1,270	1,270
		Collection B	2,084	1,643	2,084	2,084	2,084
	Refuse		1,910	1,824	1,824	1,939	1,939
Number of households collected from per vehicle per day	Kerbside	Collection A	1,009	1,079	875	635	635
		Collection B	1,251	1,150	1,251	1,251	1,251
	Refuse		1,815	1,732	1,732	1,842	1,842
Percentage of targeted materials collected	Kerbside	Collection A	52%	68%	36%	42%	42%
		Collection B	45%	59%	45%	45%	45%

			Scenario 0 Baseline (excl green)	Scenario 1 Optimised dry recycling	Scenario 2 as 0 + other recyclables	Scenario 4 Food waste + refuse only	Scenario 4 + high gate fee, food waste + refuse only
	Refuse						
Annual cost for collection containers	Kerbside	Collection A	£161,763	£161,763	£101,618	£142,266	£142,266
		Collection B	£161,763	£161,763	£161,763	£161,763	£161,763
	Refuse	£260,958	£260,958	£260,958	£260,958	£260,958	
Annual capital cost of collection vehicles	Kerbside	Collection A	£0	£0	£56,910	£113,820	£113,820
		Collection B	£409,323	£446,534	£186,056	£186,056	£186,056
	Refuse	£311,650	£311,650	£311,650	£280,485	£280,485	
Annual vehicle operating costs	Kerbside	Collection A	£0	£0	£307,391	£559,005	£559,005
		Collection B	£956,050	£1,047,975	£459,625	£459,625	£459,625
	Refuse	£1,067,250	£1,067,250	£1,067,250	£960,525	£960,525	
Annual overheads	Kerbside	Collection A	£0	£0	£30,739	£55,901	£55,901
		Collection B	£75,528	£82,790	£36,310	£36,310	£36,310
	Refuse	£84,313	£84,313	£84,313	£75,881	£75,881	
Annual gross collection cost	Kerbside	Collection A	£161,763	£161,763	£496,658	£870,991	£870,991
		Collection B	£1,602,664	£1,739,062	£843,755	£843,755	£843,755
	Refuse	£1,724,171	£1,724,171	£1,724,171	£1,577,849	£1,577,849	
Annual gross collection cost per tonne collected	Kerbside	Collection A	£17	£13	£261	£159	£159
		Collection B	£363	£298	£191	£191	£191
	Refuse	£37	£41	£39	£39	£39	
Annual gross collection cost per household served	Kerbside	Collection A	£2	£2	£7	£12	£12
		Collection B	£18	£20	£10	£10	£10
	Refuse	£20	£20	£20	£18	£18	
Annual gross collection cost per targeted tonne collected	Kerbside	Collection A	N/A	N/A	£266	£162	£162
		Collection B	N/A	N/A	N/A	N/A	N/A
	Refuse						
Annual gross collection cost per household participating	Kerbside	Collection A	N/A	N/A	£7	£12	£12
		Collection B	N/A	N/A	N/A	N/A	N/A
	Refuse						

			Scenario 0 Baseline (excl green)	Scenario 1 Optimised dry recycling	Scenario 2 as 0 + other recyclables	Scenario 4 Food waste + refuse only	Scenario 4 + high gate fee, food waste + refuse only
Other WCA costs	Kerbside	Collection A	£0	£0	£0	£242,034	£322,712
		Collection B					
	Refuse						
WCA income	Kerbside	Collection A	£295,806	£398,711	£352,252	£124,826	£124,826
		Collection B					
	Refuse						
WCA collection, transfer, MRF processing/composting net cost	Kerbside	Collection A	£0	£0	£0	£0	£0
		Collection B					
	Refuse						
WCA collection, transfer, MRF processing/composting net cost per tonne	Kerbside	Collection A	£43	£43	£36	£46	£47
		Collection B					
	Refuse						
WCA collection, transfer, MRF processing/composting net cost per household in WCA	Kerbside	Collection A	£37	36.99698762	31.10328306	£39	40.02662202
		Collection B					
	Refuse						

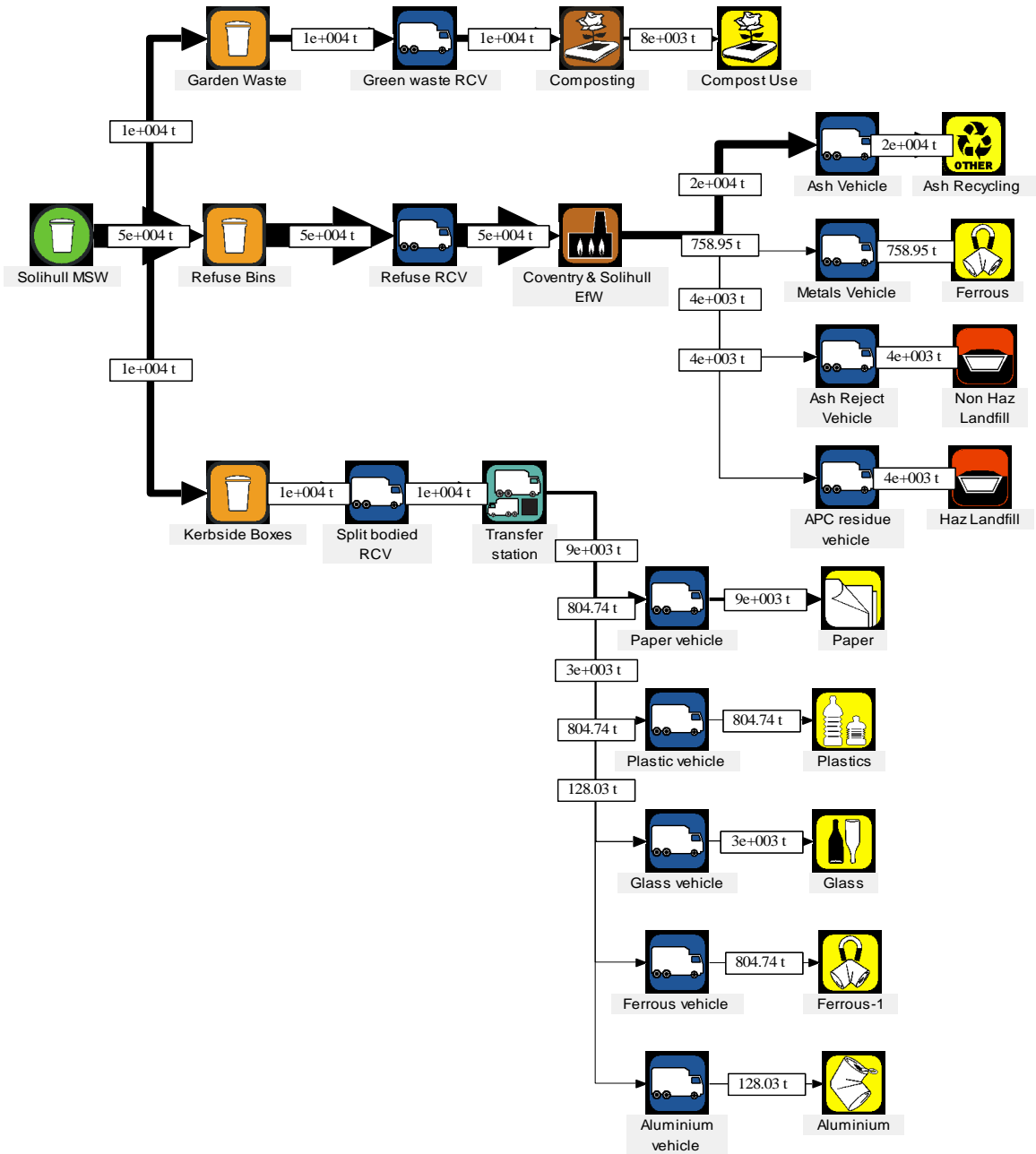
Appendix 4 WRATE Results (Life Cycle Analysis) & Schematics for Recycling & Composting

Table of Headline Results

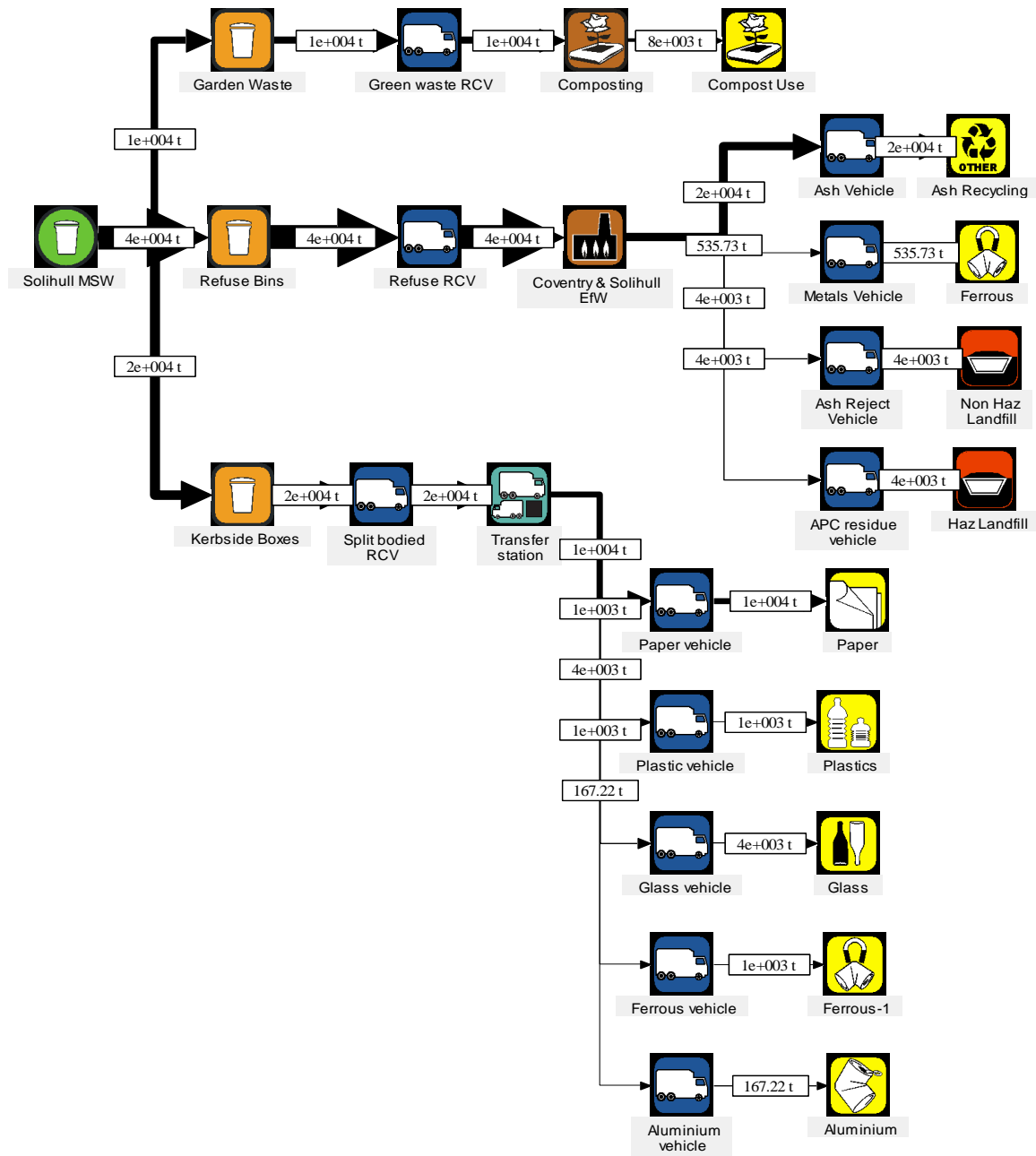
		Scen 0 Baseline	Scen 1 Optimised	Scen 2 Additional Recyclate	<i>Scen 3 Bring Bank</i>	<i>Scen 3 EfW Alt</i>	Scen 3 Carbon benefit	<i>Scen 3a HWRC improvmt</i>	<i>Scen 3a Landfill Altern.</i>	Scen 3a Carbon benefit	Scen 4 Food & IVC	Scen 4a Food & AD	Scen 5 EfW with Pretreat
Abiotic resource depletion	kg antimony eq.	-152927	-158468	-181292	-938	-588		-1107	-477		-144275	-152283	-150783
Freshwater aquatic ecotoxicity (FAETP inf.)	kg 1,4-dichlorobenzene eq.	-215117	-246586	-461123	606	521		-84266	5393		-185284	-202369	-978893
acidification (AP)	kg SO ₂ eq.	-1055	-16549	-30487	-917	219		-1080	144		-3590	2.34	-7106
eutrophication (EP1992)	kg PO ₄ ⁻⁻⁻ eq.	7775	6164	4856	-86.8	65.4		-94.5	40.1		7880	7774	7172
global warming (GWP100)	kg CO ₂ eq.	-2594827	-3961130	-5115135	-111281	26354	-137635	-185592	219952	-405544	-3482233	-4289582	-3352314
human toxicity (HTP inf.)	kg 1,4-dichlorobenzene eq.	5023759	4524362	1592702	-79046	15962		-94799	9894		6056966	4954464	4435721

Note: negative results mean a beneficial environmental impact, an environmental 'good'.

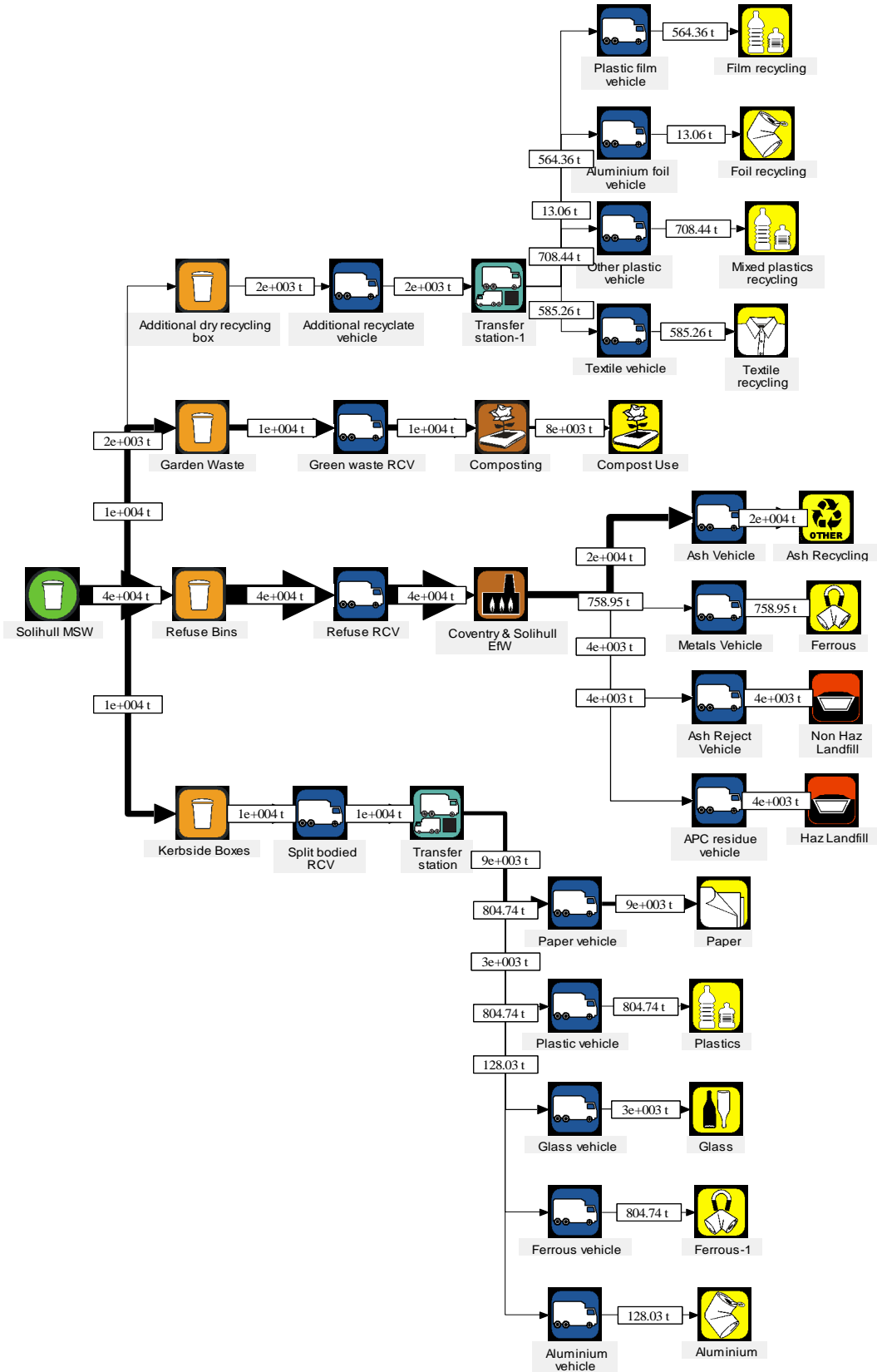
Scenario 0 Baseline



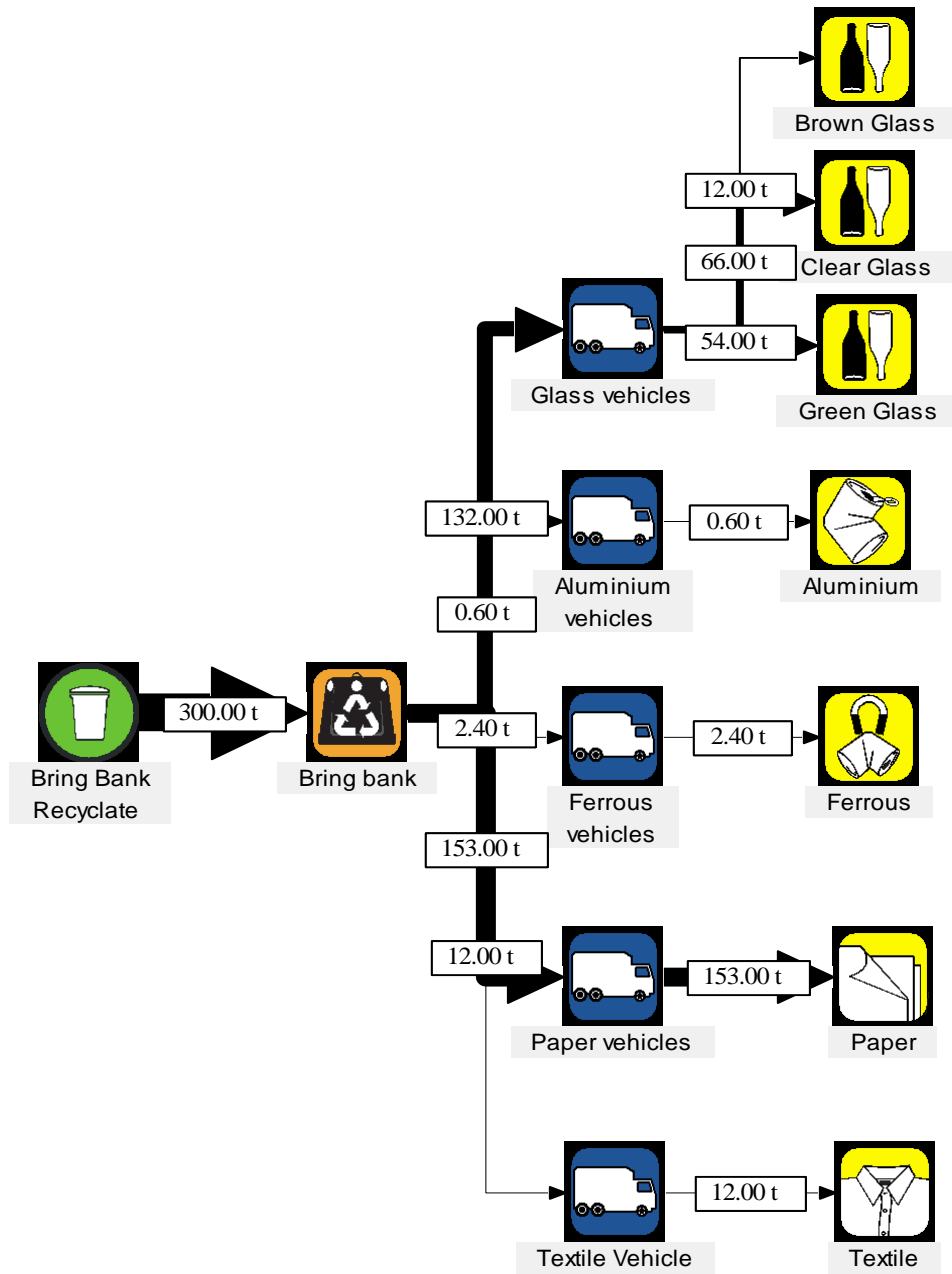
Scenario 1 Optimised Recycling



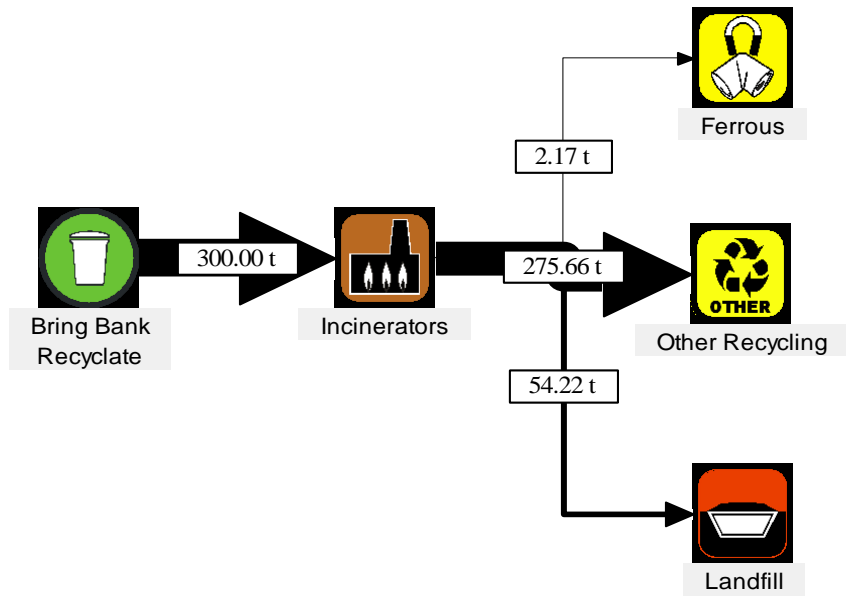
Scenario 2 Additional Recyclates Collected



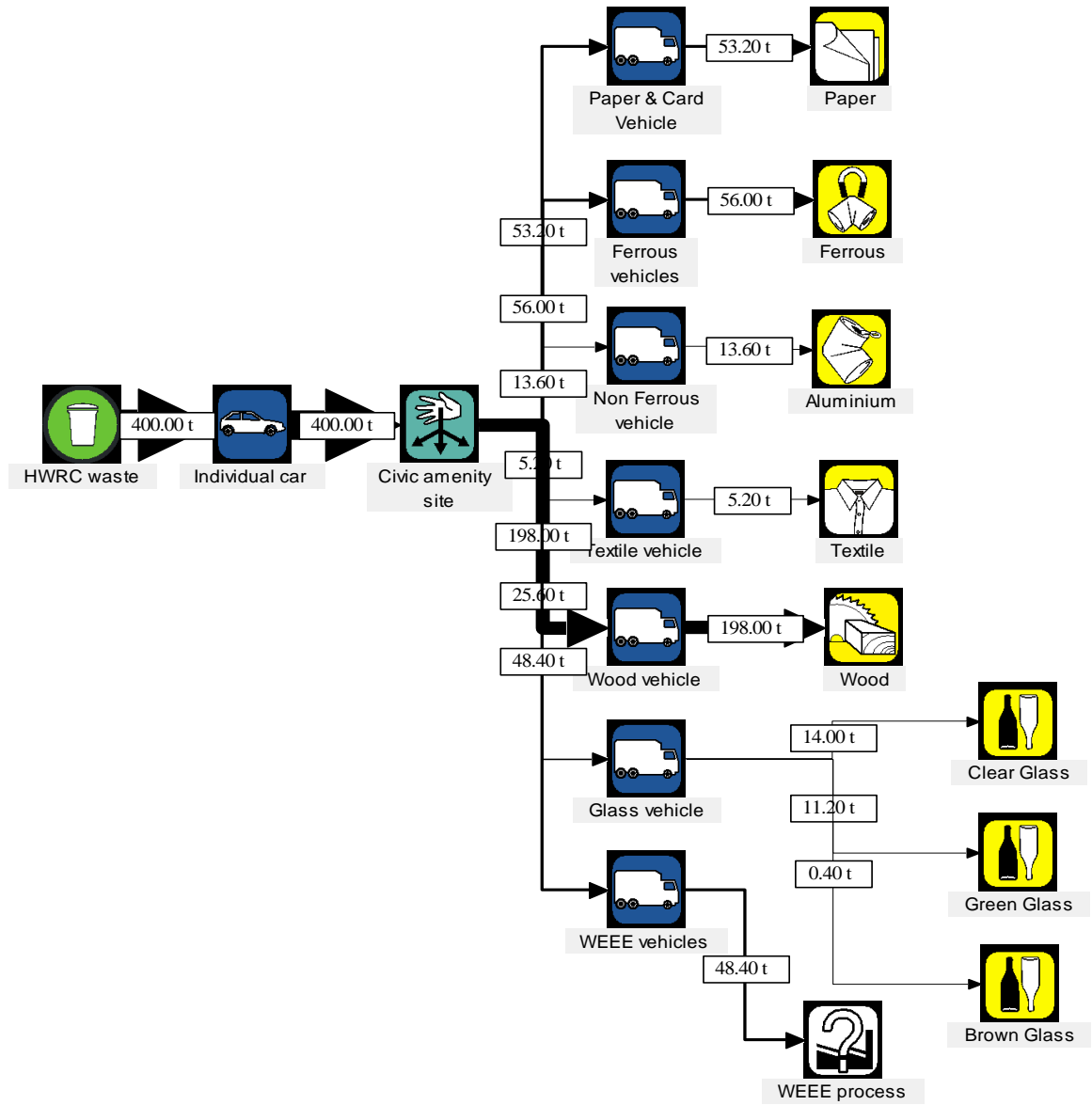
Scenario 3 Additional Bring Bank Recycling



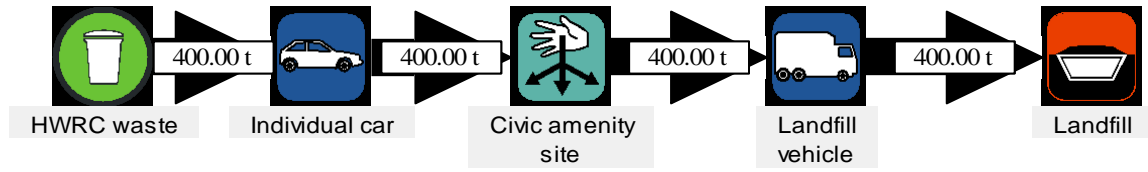
[Scenario 3 – EfW Alternative]



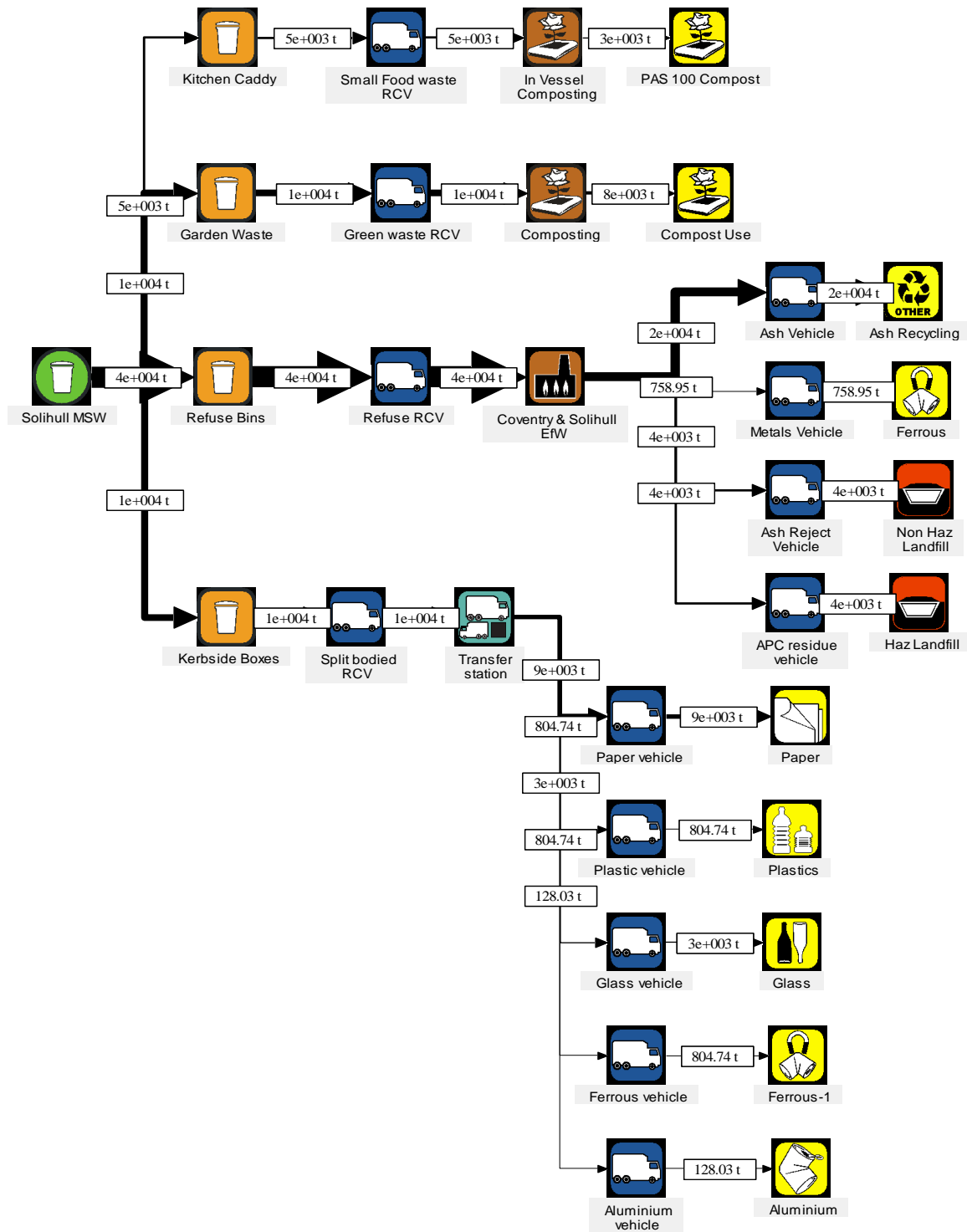
Scenario 3a Household Waste Recycling Centre Improvement



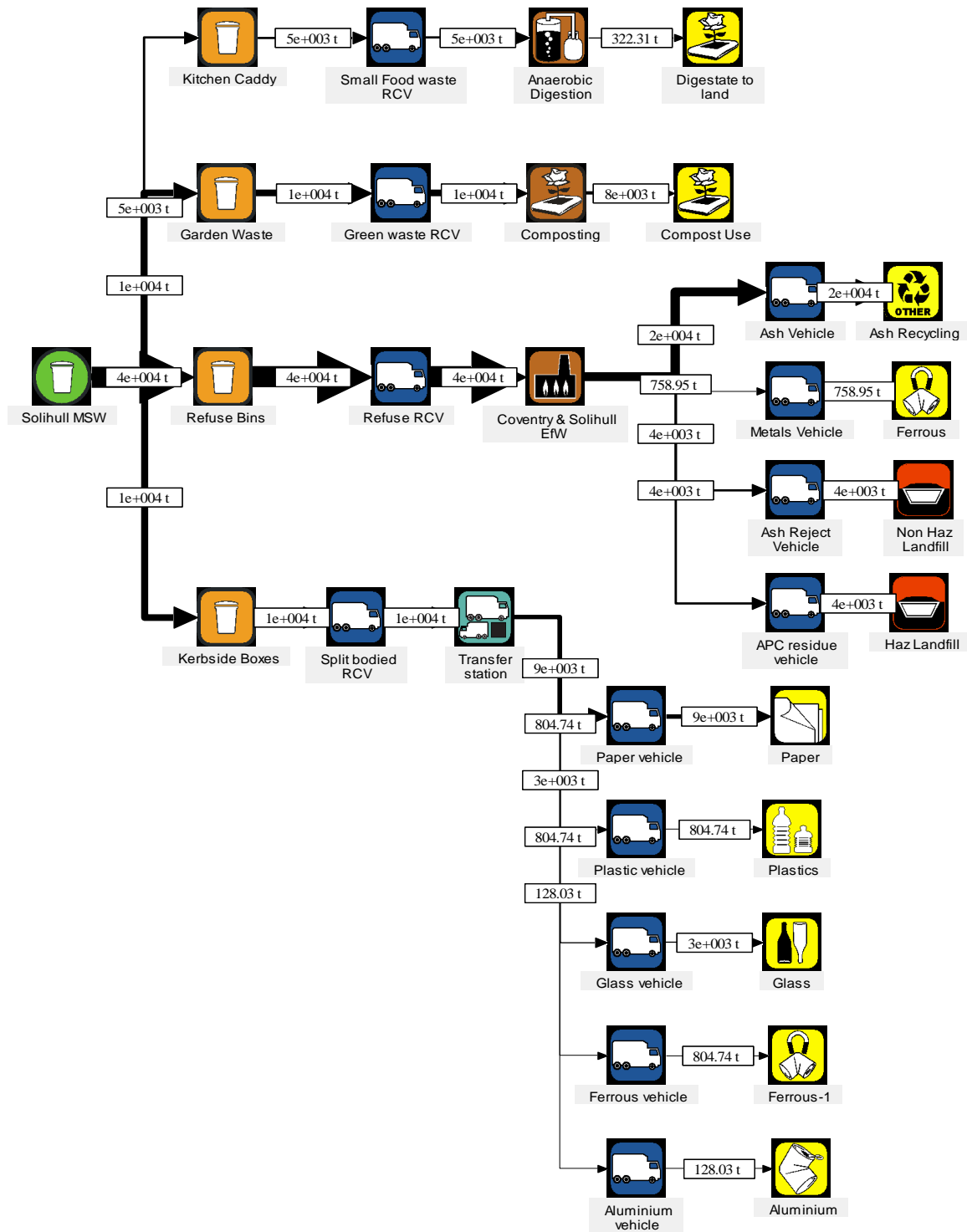
[Scenario 3a Landfill Alternative]



Scenario 4 Food Waste Collection with In Vessel Composting



Scenario 4a Food waste with Anaerobic Digestion



Scenario 5 Extraction of Recyclables from Residual Waste

