Final Report

Vale of Glamorgan Collections Modelling 2016 – Final Results

The following document gives a summary of the results from the options modelling undertaken by WRAP on behalf of Vale of Glamorgan Council.

Note: Main report relates to research undertaken between Aug 2015 to July 2016. Costs and resources are applicable to this period.

Research date: August 2015 to July 2016 **Date:** Aug 2016 (Addendum Aug 2017)

WRAP's vision is a world in which resources are used sustainably.

Our mission is to accelerate the move to a sustainable resource-efficient economy through re-inventing how we design, produce and sell products; re-thinking how we use and consume products; and re-defining what is possible through re-use and recycling.

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1. Background

The Vale of Glamorgan Council (VoG) has received support through the Welsh Government Collaborative Change Programme (CCP) to review its existing recycling and waste services using the Welsh Local Government Association (WLGA) Business Planning Toolkit, and look at how aspects of the service can be improved in the future.

As part of this, WRAP has undertaken a modelling exercise on behalf of VoG, in order to investigate the cost effectiveness of the VoG's existing recycling and waste kerbside collections (excluding bulky waste), in comparison to a number of alternatives.

This report summarises the results of this modelling.

2. Overview of Current Service

2.1. Collection Methods

VoG delivers an 'in house' kerbside waste and recycling service to approximately 56,681 households. The current kerbside service is summarised below.

Table 1- VoG Current Service Profile

Service	Frequency	Containers Used	Materials Collected	Vehicles used:
Dry Recycling	Weekly	• 45 litre boxes or 60 litre weighted reusable sacks • Residents can choose which they use, but must purchase the bags for £1 each, and the boxes for £1 (plus £1 for nets)	Glass Cans Plastic bottles Mixed plastic Paper Card	8 x 26 tonne RCVs 1 x 15 tonne RCV (temp vehicle to replace a 7.5 tonne vehicle) Crew: Driver + 2
Food Waste	Weekly	• 5 litre internal caddy • 23 litre kerbside caddy • Residents must purchase replacement containers for £1 each • Compostable caddy liners: Residents are provided with a supply of bag each year (enough for 3 per week), but must purchase extra themselves for £2 per roll of 50	All food waste	6 x 15 tonne RCVs Crew: Driver + 2
Garden Waste	Fortnightly (seasonal March to October, plus 1st week of January for	• 110 litre reusable hessian Sacks • Residents must purchase these containers for £1 each	All garden waste	2.4 x 26 tonne RCVs 1 x 15 tonne RCV Crew: Driver + 2

	Christmas trees). Additionally, a 'call to collect' service is provided throughout the winter	• Alternatively, residents may use compostable bags at a charge of £1 for 3		26 tonne vehicles are hired and all crew are agency. 15 tonne vehicle belongs to VoG 1x 15 tonner provided in winter months to service call to collect
Refuse	Fortnightly	• Single use plastic sacks • Residents must purchase these bags themselves • Residents may also have a 45l litre container to store nappies should they require it	Residual waste and nappies	4 x 26 tonne RCVs 0.5 x 15 tonne RCV Crew: Driver + 3 on 26 tonne vehicles, driver + 2 on 15 tonne vehicle

In addition to the above:

- Trade recycling and refuse is co-collected with domestic materials;
- VoG operates a 5 tonne multi compartment pick up in narrow access areas, collecting all services. This vehicle is operated on a driver plus one basis, with the driver making a 50% contribution to loading;
- VoG has one street (Elm Grove Place, Dinas Powys), which has to be collected by the street cleansing team because the only access to the road is limited by a low railway bridge. The street cleansing vehicle that the Vale has is the only one in their fleet low enough to fit under the bridge. This street has all material collected on a Monday;
- VoG does not operate wheeled bin collections as standard, however, it has two small areas in Barry and Dinas Powys where residents have wheeled bins resulting from a trial in 1996. However, VoG no longer replaces such bins; and
- Most of VoG crews work 8 hour days, however the drivers on the 26 tonne residual waste collections work 9 and ¼ hour days, with the crews working 8. Consequently, VoG has an additional 'rest day driver' that covers the service (although the role is currently unfilled and being covered by overtime).

2.2. Processing

2.2.1 Kerbside Dry Recycling Collection

VoG's dry recycling material is delivered directly to Cardiff Council's site in Lamby Way, Cardiff, from where it is bulk hauled to Casepak's material recovery facility (MRF) in Leicestershire. There is no separation of materials at the Cardiff site.

VoG currently receive an income of £5 per tonne for their materials, but pay a haulage fee of £26.50 per tonne, resulting in a net fee of £21.50 per tonne for the processing of their kerbside collected dry recyclates. This contract ends in April 2017 with the option of an additional year. Casepak also charge VoG for the disposal of any residual waste where input contamination exceeds 7%. VoG do not pay Cardiff CC to bulk materials at their Lamby Way site.

2.2.2 Kerbside Organics Collection

Food and garden waste are collected separately on separate vehicles and delivered directly to Cowbridge Compost Ltd in the Vale of Glamorgan.

VoG currently pays a gate fee of £40 per tonne for food waste and £25 per tonne for garden waste. Where VoG have to carry our emergency collections, to deal with mixed food and garden waste the price increases to £35 per tonne.

The existing contract term for this service ends on the 31st March 2016. The VoG has procured a 15 year (with 2 year optional extension) arrangement in partnership with Cardiff CC, commencing in April 2017 for the processing of food and garden waste.

2.2.3 Kerbside Residual Waste

Residual waste is delivered directly to the Viridor Energy from Waste Facility in Trident Park, Cardiff, as part of the Prosiect Gwyrdd partnership.

The gate fee paid by VoG under the Prosiect Gwyrdd contract is in the region of £60 per tonne.

2.2.4 Other Council Services

VoG operates two Household Waste Recycling Centres (HWRCs) located in Llandow Industrial Estate and Atlantic Trading Estate (ATE), Barry. The sites are open 7 days a week, 10 am to 5 pm and 8am to 6pm respectively in the summer, spring and autumn, and 10 am to 4pm in winter months. The sites are run by FCC on behalf of the council.

VoG also offers recycling and waste collections to businesses in the VoG. Both residual waste and recycling collections are co-collected with household waste. The VoG has around 353 customers having a residual waste collection, and 209 having recycling collections.

3. Modelling Methodology

3.1 Kerbside Assessment Tool (KAT)

The modelling was undertaken using WRAP's Kerbside Analysis Tool (KAT). The tool is an Excel based spread sheet model, which allows users to project the number of vehicles and crew required in a number of different scenarios and options.

The modelling requires a number of steps to be undertaken. The first is to create a baseline reflective of the Authority's current service. In order to do this, it is essential that:

- The resources and logistics of the existing services are reflected as accurately as possible so that it serves as a reliable foundation for testing various alternative collection service options;
- Authority-specific inputs to the baseline include information regarding the number and type of households, current services and service performance and resources; and
- Known inputs (from the perspective of the model these include tonnages of each material type collected, numbers and types of households offered the service, assumed tipping locations) are calibrated to known outputs (which in modelling terms includes the numbers of crew and vehicles used to deliver the collection services).

Factors such as productivity, pass rates, participation rates, recognition rates (and therefore capture rates) are subsequently checked (where known), or developed from scratch where required (depending on the data available and its quality) to provide a full baseline model.

Put simply, the baseline model should accurately reflect:

- Waste composition and tonnages;
- Current participation, set out, recognition and capture;
- Authority characteristics (household numbers, population, housing types, distances etc.);
- Travel logistics (time, distance, speed, pass rate, pick up time etc.); and
- Current vehicle and container types and costs.

This creates a sensible basis from which to establish the change in resource requirements for different potential future service configurations, ensuring that VoG's specific constraints are properly reflected.

The key factors that influence the outputs from KAT are shown below. KAT uses a series of calculations based on the interrelationship between refuse collection and recycling to make projections of resources required for a new service provision.

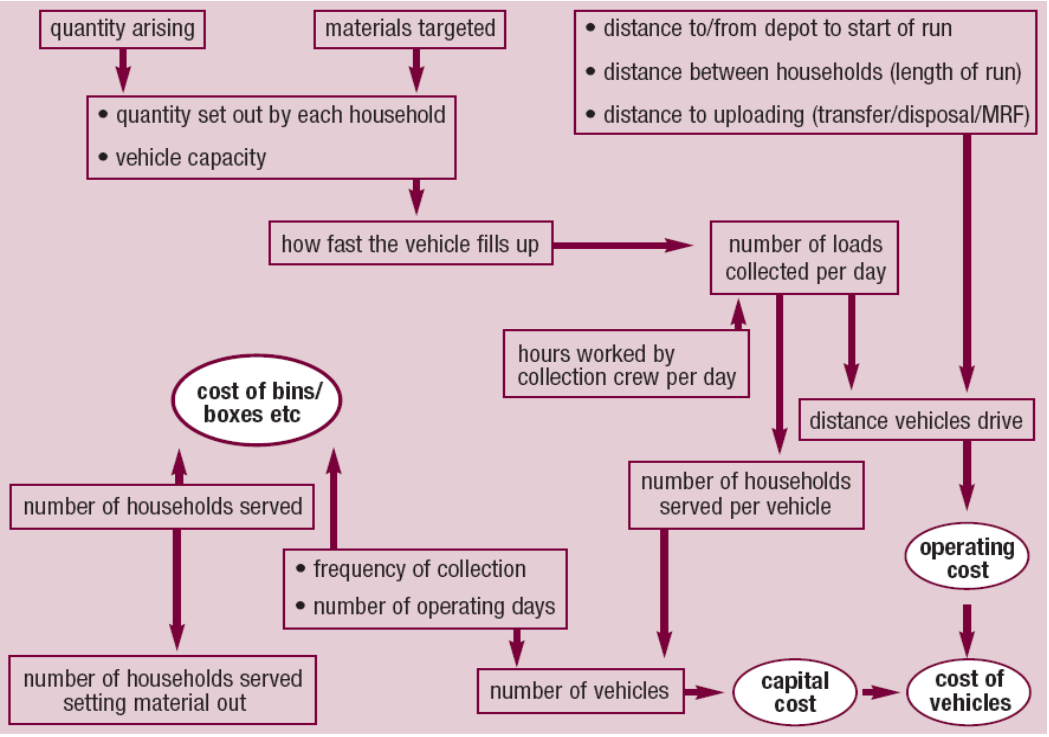


Figure 1- Overview of key operational factors considered in KAT

For VoG, the KAT baseline has been calibrated using the current collection arrangements based on data provided by the council.

KAT outputs are derived from projections of the infrastructure and resource requirements for new services e.g. numbers of collection vehicles required, numbers of loads per day, number of rounds and average round size. All projections are based on average and are therefore indicative of the authority as a whole. The projections highlight the costs of the different options in direct relation to the operational and capital requirements of the vehicles required to deliver the various service options being considered.

The projected costs are standardised in order to fairly assess the differences between options. **It is important to note that KAT modelling is relative and based on the current service, if efficiency savings could be made on the current services, then they would also be able to be made on the options. As such, it is the cost difference that is the relevant output of this work rather than the absolute numbers.**

3.1.1 The Enhanced Baseline

The enhanced baseline uses the baseline figures however; it is amended where necessary to ensure that inefficiencies shown in the baseline are removed. In addition, costs for aspects such as purchasing of vehicles and gate fees are brought up to date and reflective of current markets. The enhanced baseline is used as the key comparator to the options that are modelled.

For the VoG, the enhanced baseline does a number of things:

- It optimises the current service by extending the working hours of crews so that they work a full day;
- It updates MRF costs to reflect the current MRF gate fees that VoG could be expected to pay; and
- It updates the capital costs of vehicles.

3.2 Collections Modelling Options

Following discussions at an initial inception meeting with WRAP, surrounding the priorities of VoG, it was agreed that the following options would be modelled:

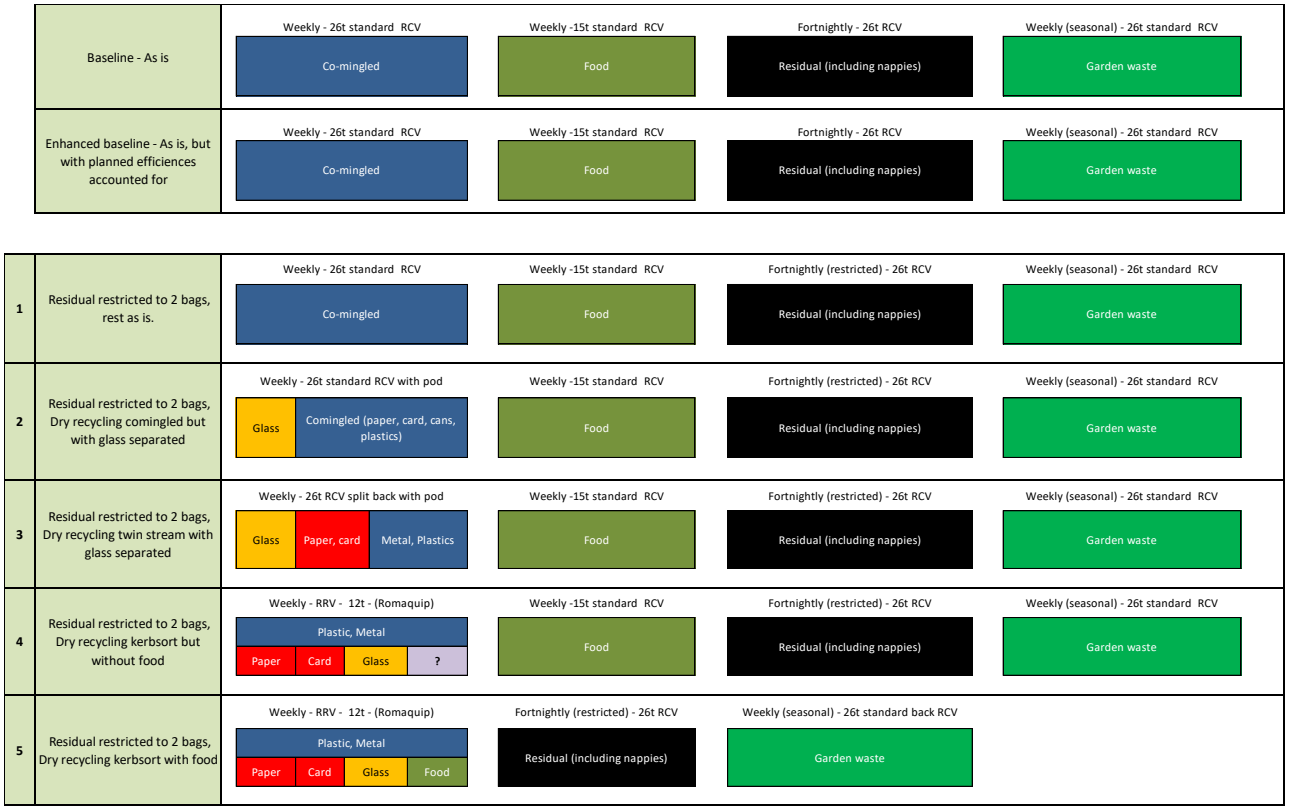


Figure 2: Options that were modelled

In addition to these initial 5 options, two extra were included in the modelling, these were:

- Option 6: This is the same as option 5, but the use of trolley boxes was modelled, instead of boxes and bags; and

- Option 7: This is the same as option 5, but a crew of a driver plus one was modelled, rather than driver plus 2 (as per the WG collections blueprint)

For the options, VoG requested that WRAP consider both bulking at current destinations (where feasible), and use of the Atlantic Trading Estate (ATE) site in Barry. This is a currently undeveloped site that is owned by the council and situated next to the council's HWRC.

In addition to the above, a number of sensitivities were considered. Including:

1. Options 1 to 4: Garden and food waste collected on a split body;
2. Increasing vehicle life from 6 years to 8 years; and
3. Decreasing crew cover from the current 20% to 16%.

3.3 Key Assumptions

Due to the nature of modelling collections options, it is always required to make a number of assumptions in the modelling. The key assumptions made are detailed below:

3.3.1 Vehicles

- Capital costs:
    - Vehicles are bought out of a capital pot, and repaid without interest over 6 years. There is no residual value assumed at the end of the 6 years;
    - For the baseline, capital costs of current vehicles at the time of purchase were used. For the enhanced baseline costs were updated to reflect current costs;
- Vehicle maintenance: Where possible, current VoG maintenance figures were used. For vehicles that VoG did not currently use (e.g. podded, split back vehicles) an increase or decrease was applied to the vehicle depending on vehicle size, axles, road fund license bracket etc;
- Narrow Access: A bespoke stillage vehicle will be used to collect the 500 narrow access properties. It is assumed that the one vehicle will be used across services;
- Spares vehicles: 4 have been modelled for each option;
- Trade residual collections: These will continue to be co-collected along with domestic refuse on all options; and
- Trade recycling: This will be co-collected along with domestic recycling on all options except options 4, 5, and 6. An extra commercial vehicle has been costed for in 5 and 6, working 3 days per week.

3.3.2 Crews

- Residual: All vehicles have been crewed with 3 loaders as at present;
- Food, garden and dry are all crewed with 2 loaders;
- The narrow access vehicle is crewed by 1 driver plus 1 loader;
- The trade vehicle is crewed by 1 driver and 1 loader;

- It is assumed that for garden waste, crews will be stood down for 4 months of the year (as at present);
- The cover rate used in the modelling is 20%; this covers sickness, holidays and training etc. The rate is broadly reflective of the agency cover currently budgeted for by VoG;
- It is assumed there would be no change in management and supervisory cover across option so this cost has not been included in the model; and
- Options 4 to 6 – an element of driver contribution has been included in the modelling – this is standard for most kerbsort collections with smaller round sizes.

3.3.3 Containers

- The combinations of containers used for each collection system is as below:
    - Option 1: Plastic box and hessian bag (as present);
    - Option 2: Plastic box and hessian bag (as present), it is assumed that all households would require one of each to be provided;
    - Option 3: It is assumed that receptacles as per option 2 would be required, but that additionally, all households would need to be provided with a box and lid for fibres;
    - Options 4, 5 and 7: It is assumed that receptacles would be as per option 3, but that blocks of flats would be collected communally using wheeled bins, so this cost has been included; and
    - Option 6: Trolley boxes would be used in placement of the boxes and hessian bags.
- On the basis that for all options the restriction of residual waste is assumed, a one off purchase of recycling containers (including food waste containers) has been included in the costs to account for the additional households participating in using the service. The one off purchase has been modelled as a capital cost however; VoG may choose to account for this differently. VoG currently charge householders for containers so may want to recoup this cost, although for the sake of the modelling, it has been assumed the cost would not be recouped;
- The rate for annual replacement of containers for the baseline and enhanced baseline have been modelled using current replacement rates/usage. The annual replacement of containers for other options has been increased in order to account for increased participation as a result of the restriction of residual waste;
- The annual replacement of containers has been modelled as being paid for in full through the revenue budget; and
- It is also assumed that VoG would continue to charge for replacement receptacles in line with current charges. A charge has also been included for food waste liners, although it is recognised that VoG has not yet implemented this charge. No impact on participation has been modelled and there is a risk that less people will use the scheme if liners are charged for.

3.3.4 Bulking

- Baseline:

    - Residual Waste: Delivered direct to Trident Park in Cardiff.
    - Dry: Delivered directly to Lamby Way, where it is bulked and transported to Casepak for processing; and
    - Food and garden waste: Delivered directly to Cowbridge Compost.
- Enhanced baseline and Option 1:
    - The above is assumed, except for garden and food waste, whereby it is assumed that these will be delivered directly to Tremorfa and Lamby Way in Cardiff respectively. This is to reflect the contract that VoG will have in place from Spring 2017.
- Enhanced baseline ATE, Option 1 ATE and all other options:
    - It is assumed that ATE will be used as a bulking station for materials, as well as being used as a vehicle depot; and
    - For options 3 to 7, it is assumed that cans and plastics will be sorted on site and sold separately to market.

3.3.5 House numbers

The house numbers used in the modelling are as below:

- Total: 56681;
- Main: 56181; and
- Narrow Access: 500

For the Kerbsort options, 4000 of the above properties have been modelled as flats and it has been assumed that a separate vehicle would be required to service these properties.

3.3.6 Tonnages

The tonnages used for the modelling are based on the 2014/15 financial year. These were then adjusted accordingly to account for any expected increases/decreases as a result of restricting residual waste. The effect of the residual restriction modelled was based on the performance achieved by other authorities who have implemented similar restrictions. It should be noted that a residual restriction will result in some waste being diverted to the Household Waste and Recycling Centre (HWRC), which we have assumed is not recycled. This is a worst case scenario and in reality a well-run HWRC site will be able to recycle much of this material.

In addition, many authorities have seen a reduction in overall waste arising's as a result of residual restriction. We have not used this assumption however, it is likely that the will be some reduction and savings on disposal costs.

The tonnages used are shown below:

Table 2: Tonnages used in the modelling

Collection:	2014/15 tonnages	Predicted tonnages – residual restriction
Dry-recycling	12563	14410
Residual Kerbside	17261	11489
HWRC residual	6232	7881
Food Waste	5564	7726
Garden Waste	5706	5820
Total:	47326	47326

The composition of the dry recycling materials was derived from using the first round of the WRAP composition analyses undertaken in 2015.

3.3.7 Income rates and gate fees

The income rates and gate fees used in the modelling are shown below. The rates are based on an analysis of current market prices applicable to VoG carried out by WRAP's marketing expert. Rates are applicable as per April 2016.

Table 3: Income rates and gate fees used in the modelling

Material	Income/Gate fee including haulage
Card	-£50
Paper	-£78
Mixed papers and card	-£42
Mixed glass	-£12.50
Mixed plastics	-£62
Ferrous Tins	-£50
Aluminium Cans	-£725
Co-mingled (baseline)	£21.50
Co-mingled (enhanced baseline) - from Lamby	£59
Co-mingled (enhanced baseline) - from ATE	£62
Co-mingled (no glass) - from Lamby	£54.50
Co-mingled (no glass) - from ATE	£58

Material	Cost per tonne	Haulage per tonne from ATE (used where applicable)
Food (current)	£40	n/a
Garden (current)	£25	n/a
Food (contract with Cardiff)	£44	£5.70

Garden (contract with Cardiff)	£34	£5.50
Residual Disposal	£60	£5.31

With reference to the rates used for co-mingled tonnages, the current haulage and income as per VOG's contract has been used for the baseline. In order to compare the co-mingled rates to the more current income rates that were used for source separated collections, MRF providers were contacted in order to determine up to date prices. These indicative prices along with haulage rates were used where applicable.

3.3.8 Fines:

The potential for receiving fines from WG as a result of failing to reach recycling targets has not been included in the modelling. Failure to reach such targets would heavily increase the cost of providing any service.

4 Results

The sections below show a breakdown of the costs for each option, split into capital and revenue costs.

Following discussions with VoG, it was determined that for options 2 to 7, where separation of dry recycling materials was necessary, it would not be possible to use Lamby Way as a bulking facility. On this basis, for these options, only bulking/sorting at ATE was modelled. For the enhanced baseline and option 1, both bulking at current sites/expected sites, and bulking at ATE were considered.

4.1 Capital Costs

The initial purchase of containers required for each option, as well as any ATE depot requirements have been classed as capital expenditure. For the purpose of the modelling the purchase of vehicles and replacement containers has not been included within the capital costs, costs for provision of these has been included in the revenue costs. However, it is appreciated that VoG may want to capitalise these in practice.

Some funding for the capital elements required in options 5, 6 and 7 can presently be applied for through the CCP, though this is looked at on a year by year basis.

In the table, 'ATE' refers to options where Atlantic Trading Estate is assumed to be required.

Table 4: Capital requirements

Capital	Enhanced Baseline ATE	Option 1	Option 1 - ATE	Option 2 - ATE	Option 3 -ATE	Option 4 -ATE	Option 5 -ATE	Option 6 -ATE	Opt 7: D+1 -ATE
Containers		43,820	43,820	224,740	411,940	571,745	571,745	2,023,425	571,745
Depot	1,377,000	0	1,377,000	1,377,000	2,162,000	2,162,000	2,162,000	2,162,000	2,162,000
Total	**1,377,000**	**43,820**	**1,420,820**	**1,601,740**	**2,573,940**	**2,733,745**	**2,733,745**	**4,185,425**	**2,733,745**

The infrastructure costs included in the 'depot costs' were taken from previous work undertaken by VoG looking at the site. Prior to using the costs, WRAP reviewed them in comparison to the set-up of similar sites and found them to be broadly comparative, though we do not have detailed information about site conditions.

The infrastructure costs were increased accordingly, to account for options where the site is being used as a sorting facility for cans and plastics and other aspects were included to make up the overall depot costs – principally the cost of purchasing the equipment.

The depot costs should be taken as indicative costs. Any final assessment of costs would require a detailed survey of the site.

With regards to capital costs for the containers, the costs reflect the assumption that where the service is changed, resulting in an extra waste stream being created, all households will need to be provided with any extra containers required.

A breakdown of the required capital costs, for both containers and depots, is shown in appendix one.

4.2 Revenue Costs

Table 5 below shows the yearly revenue costs for each option.

Table 5: Key Results – revenue

Revenue	Baseline	Enhanced Baseline	Enhanced Baseline ATE	Option 1	Option 1 - ATE	Option 2 - ATE	Option 3 - ATE	Option 4 - ATE	Option 5 - ATE	Option 6 - ATE	Opt 7: D+1 -ATE
Staff	1,969,080	1,803,480	1,677,120	1,883,040	1,756,680	1,928,040	2,034,120	2,467,080	2,075,400	2,295,720	1,888,320
Vehicles	1,252,074	1,255,492	1,137,229	1,305,638	1,173,183	1,410,972	1,577,150	1,566,962	1,381,062	1,496,795	1,537,592
Containers	69,142	69,142	69,142	94,044	94,044	97,180	103,964	103,100	103,100	113,140	103,100
ATE Operating Cost	0	0	180,464	0	180,464	193,694	284,238	268,053	268,053	268,053	268,053
Material Processing	270,109	741,229	778,919	850,190	893,420	592,911	-622,806	-799,568	-799,568	-799,568	-799,568
Kerbside Food Waste Processing	222,560	244,816	244,816	339,944	339,944	339,944	339,944	339,944	339,944	339,944	339,944
Kerbside Garden Waste Processing	142,650	194,004	194,004	197,880	197,880	197,880	197,880	197,880	197,880	197,880	197,880
Kerbside Residual Waste Disposal	1,056,912	1,035,660	1,035,660	689,361	689,361	689,361	774,445	795,640	795,640	795,640	795,640
Additional HWRC Waste Disposal	0	0	0	98,940	98,940	98,940	98,940	98,940	98,940	98,940	98,940
Additional Haulage from ATE	0	0	154,754	0	145,813	145,813	153,343	155,219	155,219	155,219	155,219
Total	**4,982,527**	**5,343,823**	**5,472,107**	**5,459,037**	**5,569,729**	**5,694,735**	**4,941,218**	**5,193,250**	**4,615,670**	**4,961,764**	**4,585,120**
Diff from baseline		***361,295***	***489,580***	***476,510***	***587,201***	***712,207***	***-41,309***	***210,723***	***-366,857***	***-20,764***	***-397,407***
Diff from enhanced baseline				***115,215***	***225,906***	***350,912***	***-402,605***	***-150,572***	***-728,152***	***-382,059***	***-758,703***
Diff from option 1						***235,697***	***-517,819***	***-265,787***	***-843,367***	***-497,274***	***-873,917***

The titles in the table above refer to the following:

- **Staff** - salaries of collection crews including 30% on-costs, plus an additional 20% for cover;
- **Vehicles** - annualised capital costs, plus running and standing costs (maintenance, fuel, road fund license etc.);
- **Containers** - includes (where applicable) costs of replacement boxes and bags etc, offset by income received in terms of the charge to householders for replacements. Note: where options require an initial capital outlay for containers such as for purchasing boxes, this is included in the capital table, not in the revenue table;
- **ATE Operating Costs -** includes the running costs for ATE (staffing, electric, rates etc.). It does not include any costs currently associated with the HWRC contract. If ATE was to be set up as a bulking station then there may be additional benefits from bulking HWRC site material;
- **Material Income -** includes any gate fees costs and material income associated with the processing of dry-recycling for each option. All values include haulage;
- **Processing costs (food, garden and residual) -** refers to the cost of processing kerbside collected waste for each option – including relevant gate fees but not haulage;
- **Additional HWRC Waste Disposal -** refers to the assumed transfer of some residual waste from kerbside collections to the HWRC as a result in the restriction of kerbside residual waste; and
- **Additional haulage from ATE -** includes the additional cost of haulage for food, garden and residual waste if ATE were to be used as a bulking/sorting station. The cost of haulage is from ATE to Trident Park, Tremorfa or Lamby Way as appropriate.

As shown in the table, option 5 and 7 were shown to be the most cost effective options for VoG in terms of future service provision. These options involve restriction of residual waste, and operating a kerbside sort collection system for dry recyclables. Although the collection costs for this option are greater than in some of the other options, the overall savings are generated through the cheaper material processing and the ability of the council to generate income for certain materials. Option 7 is the best option overall, in this option, the dry recycling crew is reduced to one loader, rather than the two loaders in option 5.

The enhanced baseline is more expensive than the baseline because although efficiency savings have been applied, the expected increase in MRF costs and updated costs of vehicle purchase are included, which outweigh any efficiency savings.

It must be noted, that contrary to what might be expected, option 1 (restriction of residual with a co-mingled collection) is shown to be more expensive than the enhanced baseline. There are a number of reasons for this:

1. When modelling the uplift in recycling collections a conservative approach was taken, reflective of VoG's data indicating that the council already has high participation and set out rates for recycling services. If this data has been over estimated slightly, then it is

likely to result in a higher uplift in recycling services than modelled. This will decrease processing costs.

2. It was also assumed that was diverted kerbside residual waste was not collected through the kerbside recycling services, that it would be taken to the HWRCs and disposed of in the residual waste skips. VoG has recently commenced a new HWRC management contract which includes consideration given to opening residual waste bags at site – this would increase recycling and further reduce the cost of the restricted residual options.
3.

4.3 Vehicle Numbers and Pass Rates

The required vehicle numbers for each option and pass rates for each service are shown below.

4.3.1 Vehicle Numbers

Total (unrounded) vehicle numbers required for each option are shown below:

Table 6: Unrounded Vehicle Numbers per Option

	Baseline	Enhanced Baseline	Enhanced Baseline ATE	Option 1	Option 1 - ATE	Option 2 - ATE	Option 3 - ATE	Option 4 - ATE	Option 5 - ATE	Option 6 - ATE	Option 7 - ATE
Dry	9.0	7.9	7.5	8.2	7.8	9.9	11.2	15.4	16.6	19.3	20.7
Flats								1.0	1.0	1.0	1.0
Food	6.0	5.8	5.4	6.4	6.0	6.0	6.0	6.0			
Garden	3.4	3.3	3.0	3.4	3.1	3.1	3.1	3.1	3.1	3.1	3.1
Residual	4.5	4.0	3.6	4.0	3.6	3.6	3.6	3.6	3.6	3.6	3.6
Narrow Access	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Trade Dry								0.60	0.60	0.60	0.60

The vehicle numbers shown above were combined across services (where feasible and where there were part vehicles in use), and rounded upwards to determine the total number of vehicles required for each option.

Total vehicle numbers required are shown below:

Table 7: Vehicle numbers required (rounded)

	Baseline	Enhanced Baseline	Enhanced Baseline ATE	Option 1	Option 1 - ATE	Option 2 - ATE	Option 3 - ATE	Option 4 - ATE	Option 5 - ATE	Option 6 - ATE	Option 7 - ATE
26 tonne RCV	15	13	12	14	12	6	6	6	6	6	6
26 tonne with pod						9					
26 tonne Split back RCV with pod							11				
15 tonne RCV	9	9	8	9	9	8	8	8	2	2	2
15 tonne RCV with Pod						1					
15 tonne RCV split back with Pod							1				
12 tonne RRV								16	17	20	21
15t 4C Flats recycling vehicle								1	1	1	1
26 tonne Split back RCV											
Stillage pick up	1	1	1	1	1	1	1	1	1	1	1
Trade Recycling - 3 compartment side loader								1	1	1	1
Total:	25	23	21	24	22	25	27	32	27	30	31

In addition to the above, for each option a number of spare vehicles were included in the costs. The total number of the vehicles required per option, including spares is shown below:

Table 8: Total vehicle numbers required including spares

	Baseline	Enhanced Baseline	Enhanced Baseline ATE	Option 1	Option 1 - ATE	Option 2 - ATE	Option 3 - ATE	Option 4 - ATE	Option 5 - ATE	Option 6 - ATE	Option 7 - ATE
26 tonne RCV	16	14	13	15	13	6	6	7	7	7	7
26 tonne with pod						10					
26 tonne Split back RCV with pod							12				
15 tonne RCV	11	11	10	11	11	9	9	9	3	3	3
15 tonne RCV with Pod						2					
15 tonne RCV split back with Pod							2				
12 tonne RRV								19	20	23	24
15t 4C Flats recycling vehicle								1	1	1	1
26 tonne Split back RCV											
Stillage pick up	1	1	1	1	1	1	1	1	1	1	1
Trade Recycling - 3 compartment side loader								1	1	1	1
Total:	28	26	24	27	25	28	30	38	33	36	37

4.3.2 Pass rates

The pass rates for each option are shown below:

Table 9: Vehicle pass rates

	Baseline	Enhanced Baseline	Enhanced Baseline ATE	Option 1	Option 1 ATE	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7
Dry	1,248	1,422	1,498	1,370	1,441	1,135	1,003	678	629	541	504
Flats								800	800	800	800
Food	1,873	1,937	2,081	1,756	1,873	1,873	1,873	1,873			
Garden	3,305	3,405	3,745	3,305	3,625	3,625	3,625	3,625	3,625	3,625	3,625
Residual	1,248	1,405	1,561	1,405	1,561	1,561	1,561	1,561	1,561	1,561	1,561

4.4 Sensitivities

A number of sensitivities were modelled in addition to the core results. This included using a split back RCV for garden and food waste in options 1 to 4, increasing vehicle life expectancy to 8 years (as opposed to 6), and decreasing crew cover to 16%.

4.4.1 Increasing vehicle life to 8 years

The core modelling assumed that vehicles are bought outright and paid for over 6 years through the waste budget. Standard practice for vehicle life has generally been 7 years and now that RCVs are no longer driving directly onto landfill sites, most private contractors and many councils have extended this further, such that 8 years is typical.

On this basis, we re-ran the options with the capital cost split over 8 years. We have assumed that maintained costs increase 50% in the 7th and 8th year to allow for the running of slightly older vehicles.

The results of this are shown below:

Table 10: Increasing vehicle life to 8 years

	Baseline	Enhanced Baseline	Enhanced Baseline ATE	Option 1	Option 1 ATE	Option 2	Option 3	Option 4	Option 5	Option 6	Opt 7 - D+1
Core annualised vehicle capital	566,373	573,338	529,504	599,171	547,504	669,838	773,338	777,340	689,629	750,498	770,788
Capital Equivalent	3,398,235	3,440,026	3,177,024	3,595,027	3,285,025	4,019,028	4,640,030	4,664,041	4,137,773	4,502,987	4,624,725
8 year annualised capital	424,779	430,003	397,128	449,378	410,628	502,379	580,004	583,005	517,222	562,873	578,091
Difference	**-141,593**	**-143,334**	**-132,376**	**-149,793**	**-136,876**	**-167,460**	**-193,335**	**-194,335**	**-172,407**	**-187,624**	**-192,697**
Running costs core	476,240	434,282	401,251	455,261	413,303	482,240	532,198	565,251	507,240	550,143	564,444
Running costs 8 years	506,005	461,425	426,329	483,715	439,134	512,380	565,460	600,579	538,942	584,526	599,721
Difference	**29,765**	**27,143**	**25,078**	**28,454**	**25,831**	**30,140**	**33,262**	**35,328**	**31,702**	**34,384**	**35,278**
Net Difference	***-111,828***	***-116,192***	***-107,298***	***-121,339***	***-111,045***	***-137,320***	***-160,072***	***-159,007***	***-140,705***	***-153,241***	***-157,419***

4.4.2 Reduction in cover ratio to 16%

The core modelling assumes a cover ratio for staff of 20% of the total staffing costs; this is based on council data, but it is high in comparison to WRAP's experience of other private industries and local councils. A figure between 13% and 16% is normal. It may be that this is a result of how cover is coded, rather an actual very high level of sickness. However, it does for all options mean that a high rate of cover is applied, with those

options that require greater staffing levels being affected more than those with lower levels. As such, a sensitivity has been carried out on a 16% cover rate. The results of this are shown below.

Table 11: Reduction of staffing cover to 16%

Cover	Baseline	Enhanced Baseline	Enhanced Baseline ATE	Option 1	Option 1 ATE	Option 2	Option 3	Option 4	Option 5	Option 6	Opt 7 - D+1
Core Cover	328,180	300,580	279,520	313,840	292,780	321,340	339,020	411,180	345,900	382,620	314,720
16% Cover	262,544	240,464	223,616	251,072	234,224	257,072	271,216	328,944	276,720	306,096	251,776
Difference	-65,636	-60,116	-55,904	-62,768	-58,556	-64,268	-67,804	-82,236	-69,180	-76,524	-62,944

4.4.3 Garden and food waste collected on a split back RCV

VoG requested that WRAP review whether the use of a split back RCV would be more beneficial for the collection of garden and food waste on options 1 to 4 than use of separate vehicles.

It was assumed in the sensitivity, that it would only apply to bulking at ATE, this is because with VoG's new organics contract in mind, whereby they would transfer to two locations (Tremorfa and Lamby Way). The required double tipping of the vehicles would not make the option viable.

Additionally, it has been assumed that crews would not be able to be stood down in winter.

The results of this sensitivity are shown below.

Table 12: Garden and food on a split back

Revenue	Option 1 - ATE	Option 2 - ATE	Option 3 - ATE	Option 4 - ATE
Staff	1,770,960	1,942,320	2,048,400	2,481,360
Vehicles	1,366,984	1,596,690	1,783,962	1,726,961
Containers	94,044	97,180	103,964	103,100
ATE Operating Cost	180,464	193,694	284,238	268,053
Material Income	893,420	592,911	-622,806	-799,568
Kerbside Food Waste Processing	339,944	339,944	339,944	339,944
Kerbside Garden Waste Processing	197,880	197,880	197,880	197,880
Kerbside Residual Waste Disposal	689,361	689,361	774,445	795,640
Additional HWRC Waste Disposal	98,940	98,940	98,940	98,940
Additional Haulage from ATE	145,813	145,813	153,343	155,219
Total	**5,777,810**	**5,894,732**	**5,162,310**	**5,367,530**
Diff from no split back	***208,081***	***199,998***	***221,092***	***174,279***

For all options, use of the split back increased costs in comparison to not using the split back. This is due to the following:

- The vehicle efficiencies of running a fortnightly garden waste collection have been largely lost because vehicles would have to run on a weekly basis in order to collect food waste weekly;
- The split back vehicles are inefficient in terms of fuel use in comparison to 15 tonnes and open back RCVs;
- Drivers would need to work all year in order to collect food waste and could not be stood down over winter; and
- Additionally, in option 4, use an additional spare vehicle (5 in total) was modelled. This was due to the need to cover all vehicle types that were used in the option.

It must be noted in the above, that no account was taken in the modelling for the potential of standing down loaders in the winter months. If this is an option that VoG wants to investigate further, WRAP could undertake further modelling on this aspect.

4.4.4 10% reduction in participation for option 5

VoG is concerned that a move to source separation may result in a decrease in recycling participation, which may lead to a reduction in recycling yields. Although it is the belief of WRAP that implementing a residual restriction policy will prevent this from happening, a sensitivity of a 10% fall in yield was modelled to consider the issue.

Table 13 shows the difference in costs as a result of a 10% lower recycling yield. Key differences are that less recycling collected means less income and greater disposal cost (shown in dry processing), but slightly less operation costs, the net revenue impact is an increase in the cost of this option of £119,957.

Table 13: 10% lower participation effect option 6

Revenue	Option 5 - ATE
Staff	2,053,440
Vehicles	1,381,957
Containers	103,100
ATE Operating Cost	266,719
Material Income	-739,766
Kerbside Food Waste Processing	339,944
Kerbside Garden Waste Processing	197,880
Kerbside Residual Waste Disposal	871,482
Additional HWRC Waste Disposal	98,940
Additional Haulage from ATE	161,931
Total	**4,735,627**
Diff from no reduction in participation	***119,957***

4.5 Compound Best Options

The most economically advantageous options shown across the modelling are shown below. The use of split back garden and food vehicles and three weekly residual waste collections were not included in the table on the basis that this was determined to be more costly than using separate vehicles.

Table 14: Compound Best Options:

Combined saving	Enhanced Baseline	Enhanced Baseline ATE	Option 1	Option 1 ATE	Option 2 ATE	Option 3 ATE	Option 4 ATE	Option 5 ATE	Option 6 ATE	Opt 7 - D+1
Core savings	361,295	489,580	476,510	587,201	712,207	-41,309	210,723	-366,857	-20,764	-397,407
16% Staff Cover	-60,116	-55,904	-62,768	-58,556	-64,268	-67,804	-82,236	-69,180	-76,524	-62,944
8 year vehicles	-116,192	-107,298	-121,339	-111,045	-137,320	-160,072	-159,007	-140,705	-153,241	-157,419
10% reduction in participation (option 5)								119,957		
Cost difference to baseline (£)	**184,988**	**326,378**	**292,403**	**417,601**	**510,620**	**-269,185**	**-30,520**	**-576,742**	**-250,528**	**-617,770**

The most economically advantageous option was found to be option 7, which generate a saving of £576,742 in comparison to the current service.

4.6 Restricted Residual Recycling Rate

The table below shows the expected impact of the restriction of residual waste in relation to the 2014/15 recycling rate as achieved by VoG.

Table 15: Effect of Restriction of Residual Waste on Recycling Rate

	Total MSW tonnage 2014/15 as per WDF	Total MSW including restricted residual changes
Dry	18220	19725
Composting	13724	16000
Residual	26407	22627
Total	58351	58351

Total Recycling	31944	35725
Recycling Rate	54.7%	61.2%
Difference:	**6.5%**	

In the period since 2014/15, VoG introduced changes which have increased the base recycling rate from 54.7% in 2014/15 to a figure of over 60% for 2015/16. Such changes have included the use of a 'dirty MRF' for the sorting of HWRC residual waste. This will mean that the predicted recycling rate figures as show above will be inaccurate. Consequently, the figure titled 'difference' should be the figure used, rather than the absolute totals.

On this basis, it can be said that by restricting residual waste, the VoG's base recycling, reuse and composting figure is predicted to increase by, in the region of, 6.5%.

Note (July 2017): The above recycling rate does not include provision for IBA recycing within the residual stream. This is now being claimed by VoG, so any recycling increase is likely to be 1-2% less than that stated above.

4.7 Do something or do nothing?

Figure 3 below gives a graphical indication of the cost implication of running certain options over time. The costs show 3 options – do nothing (i.e. to continue with the current service), restrict residual (option 1) and the WG Blueprint (option 5). Built into the graph are considerations for the following:

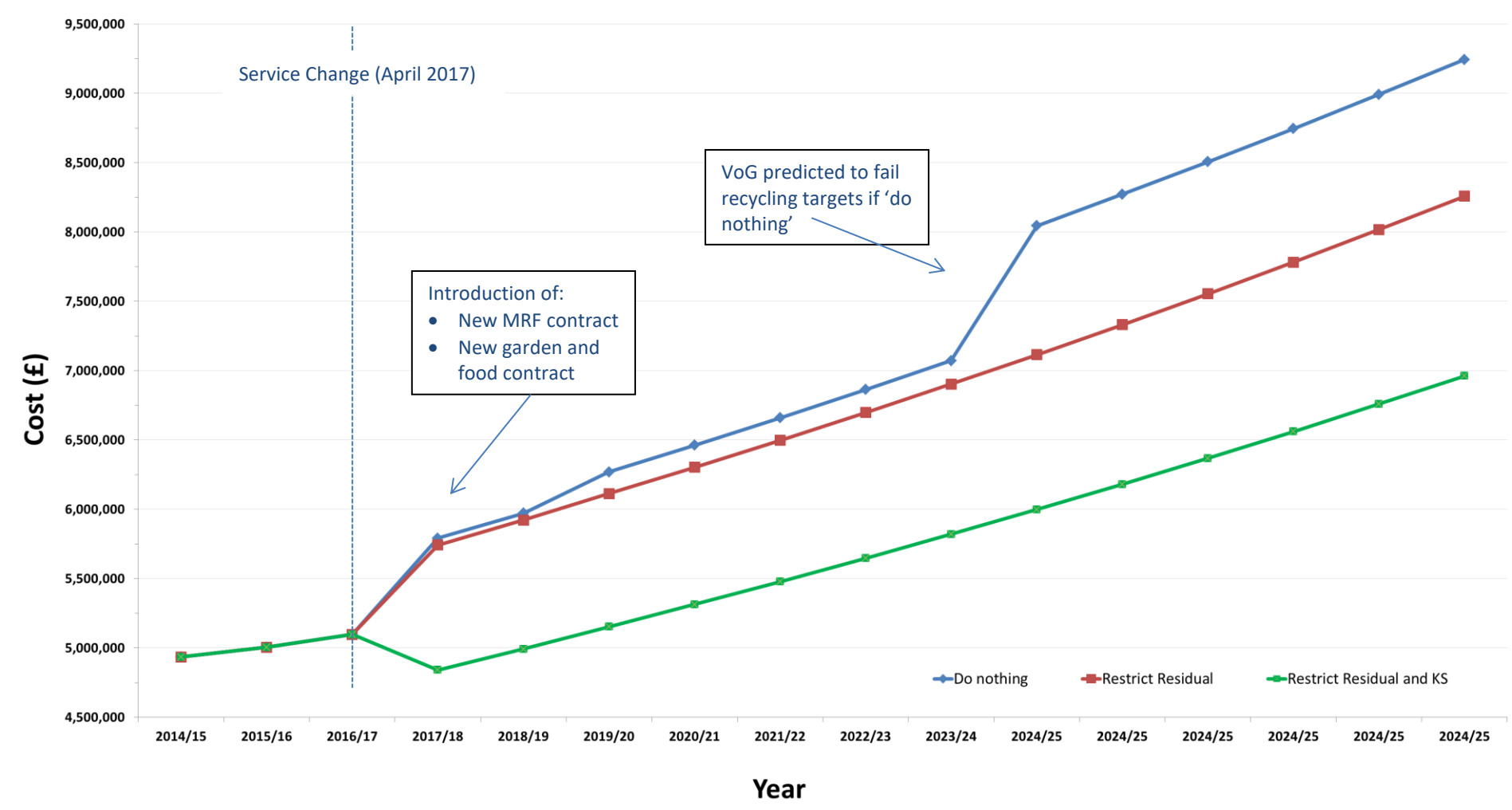
- Effects on costs related to the implementation of new contracts in 2017 (organics processing and MRF costs);
- Effect of housing growth within VoG, as per VOG's Local Development Plan, which required 650 properties to be built per annum; and
- Increase in costs resulting from expected inflation (as per the Office of Budget Responsibility's Consumer Price Index Forecast, March 2016).

The graph is a guide rather than a definitive and there are a number of caveats:

- In reality, housing growth would not lead to a linear increase in costs, instead, it is likely that for a number of years additional collection requirements would be absorbed within the current fleet, before coming to a point where capacity is exceeded and a 'step up' is needed in terms the increase in number of vehicles and crews;
- Inflation rates are subject to change, and have only been predicted to 2019/20, so the 2019/20 rate has been used for all years subsequent to this; and
- Material income rates have also been linked to the CPI rate within the graph. In reality, any changes to these will be more affected by market fluctuations than the CPI.

Should VoG wish to complete the Business Planning Toolkit process, a full cost benefit analysis similar to the above would be undertaken – including the effect of collections modelling changes as well as HWRC and trade changes.

Figure 3: Cost over time graph:



5 Funding change

The current waste service is funded from VoG's revenue budget, with a substantial contribution being made by the Environment Grant, provided by the WG on a formula basis to all local authorities in Wales. This funding will be reduced over coming years. In addition, the council is facing reductions in its general funding allocation.

The options modelled require an initial capital investment in containers and infrastructure. In order to achieve the best possible results and mitigate the risks associated with any significant service change, there will also be a need to fund the implementation of the new service, including education and enforcement activities.

Funding options include:

- **Prudential Borrowing**: loans can be sought from the Public Works Loan Board (PWLB), at rates of interest marginally above those at which the Government itself can borrow from the gilt market;

- **Invest to Save:** the Welsh Government operates a fund that provides investment on an interest-free repayable basis to pump-prime service changes that will generate savings. It can be used for up to 75% of eligible project costs but is generally more suitable for revenue costs associated with project implementation;

- **Council capital reserves:** some capital investments could be eligible for funding via MTCBC's capital programme. However, availability of funds is very limited and more suited to long-term investment in infrastructure than to the purchasing of vehicles, plant and containers that will require medium-term replacement; and

- **CCP Capital Grant:** Some funding for the capital elements required in options 5, 6 and 7 can presently be applied for through the CCP, though this is looked at on a year by year basis.

WRAP can provide support to develop more detailed business cases that may be needed for the authority to access funding streams.

6 Conclusion

WRAP has modelled a number of collection options on behalf of VoG in order to help them establish the most cost effective kerbside recycling and waste collection services in the future.

Based on the modelling carried out, **option 7** was the most cost effective (WG Collections Blueprint). Particular aspects of this system include: the separate collection of food and garden waste, the collection of source separated dry-recycling and food, using light weight multi-compartment vehicles and 1 loader. This option, combined with the reduction of crew cover to 16% and increase in vehicle life to 8 years, saves an **estimated £617,000** in comparison to the baseline.

However, as shown in the graph in section 4.5, the baseline (or 'do nothing') costs will increase with the introduction of a new MRF contract in 2017/18. At this point, any savings derived from moving to option 7 (or option 5 if VoG choose to use with two loaders rather than one) will increase the estimate above.

A change in collection system may require new depot infrastructure, this has been costed for within the report. Option 7 is the best performing and would require a significant depot infrastructure investment to accommodate a kerbside sort system. This is estimated to be £2,733,745. There are a number of ways VoG could fund this, including applying for capital through the CCP programme.

Whilst this report looks at collection systems and policies, no assumptions have been made regarding efficiency savings, beyond crews working a full day. If VoG were to make efficiency savings within the current system, this would not impact on the performance of the options modelled as these savings would be made across all options. Similarly if there are unit cost increases in the current service these would occur across each option.

Should the council wish to make changes to its collection services, then the Collaborative Change Programme can assist with sourcing funding and implementation support.

7 Appendix 1: Capital Breakdown

7.1 Depot Infrastructure Capital Requirements

The enhanced baseline ATE, Option 1 ATE, and options 2 to 7 will all require significant infrastructure in terms of the necessary construction of a bulking and (where applicable) sorting depot.

The capital investment that would be required is:

- £1,377,000: Enhanced Baseline ATE, Option 1 ATE and Option 2; and
- £2,162,000: Options 3 to 7.

7.1.1 Background

VoG does not currently have a bulking station of any sort within the County. Instead, residual waste is delivered directly to Trident Park in Cardiff, food and garden waste to Cowbridge Compost in the VoG. Dry mixed recycling is delivered directly to Lamby Way in Cardiff, from which it is bulk hauled to Casepak in Leicestershire.

From April 2017, VoG will commence a contract with Cardiff CC for the processing of food and garden waste. Under this contract, VoG will need to direct deliver these materials to Lamby Way and Tremorfa in Cardiff.

For a number of the options, it was determined during the collections modelling that a bulking station would be required within VoG. In addition, for the more source separated options (4 to 7) a sorting facility for cans and plastics would also be required.

VoG have identified a potential site at the Atlantic Trading Estate in Barry. This site is currently owned by the Council and is located next to Council's HWRC.

The key requirements of the site will be:

- Bulking facility for residual waste, food and garden waste;
- Bulking facility for paper, card and glass;
- Sorting facility for cans and plastics (options 4 to 7 only); and
- Baler for relevant materials (options 4 to 7 only).

VoG have previously developed costs for the development of the site on the basis of it being a bulking site for organics, residual and comingled dry recycling. WRAP has reviewed these costs and added additional fixed plant costs which would be required for sorting plastic and cans and baling separate material streams.

The required capital costs applicable to the different options are shown below.

7.1.2 Enhanced baseline ATE, Option 1 ATE and option 2

The breakdown of required capital for the enhanced baseline ATE, option 1 ATE and option 2 is shown in the table below:

Table 16: Capital Investment Requirement Bulking Station: Enh Baseline ATE, Opt 1 ATE and Opt 2

		Capital cost
Building and Infrastructure	Bulking shed	£ 230,000
	Civils (clearance, piling, concreting, electrics, landscaping etc.)	£ 750,000
	Weigh bridge and office building	£ 40,000
	Contingencies (10%)	£ 98,000
	Design, supervision and planning (15%)	£ 147,000
Equipment	Food waste skip	£ 7,000
	Loading shovel	£ 75,000
Other	Permit application	£ 30,000
		£1,377,000

7.1.3 Options 4 to 7

The breakdown of required capital for options 4 to 7 is shown below:

Table 17: Capital Investment Requirement Bulking and Sorting Station: Opt 4 – 7

		Capital cost
Building and Infrastructure	Bulking/sorting shed	£ 276,000
	Civils (clearance, piling, concreting, electrics, landscaping etc.)	£ 900,000
	Weigh bridge and office building	£ 40,000
	Contingencies (10%)	£ 117,600
	Design, supervision and planning (15%)	£ 176,400
Equipment	Sorting line (plastic & cans)	£ 335,000
	Baler	£ 150,000
	Food waste skip	£ 7,000
	Loading shovel	£ 75,000
	For lift truck	£ 25,000
	Fork lift truck (with bale clamp)	£ 30,000
Other	Permit application	£ 30,000
		£2,162,000

7.2 Containers

The second aspect of capital investment that will be required in the majority of the options is for the purchasing of an initial outlay of containers. The numbers and types of containers required vary between the options.

The capital investment that would be required is:

- £ 43,820: Option 1 and option 1 ATE;
- £ 224,740: Option 2;
- £ 411,940: Option 3,
- £ 571,745: Options 4, 5 and 7; and
- £2,023,425: Option 6.

7.2.1 Background

Householders living in the VoG currently use either a box or a reusable bag for co-mingled material. In order for the council to implement the various collection options, an initial capital investment would be required to purchase additional containers.

It is appreciated on all of the options, that on the basis that VoG currently charges householders for boxes and bags, that this might be the intention in any service change. However, the costs have been included as a guide.

7.2.2 Option 1

For option 1, additional containers will be required to account for the uptake in recycling as a result of the restriction of residual waste. The number of boxes/bins that have been stated to be required are derived from using the anticipated figures for the uplift in recycling participation, and considering current use.

The total additional containers required are shown in the table below:

Table 18: Capital Investment Requirement Containers – Option 1

Capital Containers	Unit Cost	Number required	Capital Cost
Box (comingled)	1.98	2,000	£ 3,960
Reusable sack with lid (comingled)	1.12	1,000	£ 1,120
Food kerbside box replacements	2.58	9,000	£ 23,220
Food waste caddy replacements	0.86	9,000	£ 7,740
Reusable sack (garden waste bags)	0.62	2,000	£ 1,240
Nappy box (with lid)	3.27	2,000	£ 6,540
			£ 43,820

7.2.3 Option 2

For option 2, it has been assumed that all households would need to be given a box for glass and a reusable bag for comingled material. This is on the basis that it would be difficult to determine which householders have what containers at present.

The total additional containers required are shown in the table below:

Table 19: Capital Investment Requirement Containers – Option 2

Capital Containers	Unit Cost	Number required	Capital Cost
Box (for glass only)	1.98	60,000	£118,800
Reusable sack x 1 (for co-mingled without glass)	1.12	60,000	£ 67,200
Food kerbside box replacements	2.58	9,000	£ 23,220
Food waste caddy replacements	0.86	9,000	£ 7,740
Reusable sack (garden waste bags)	0.62	2,000	£ 1,240
Nappy box (with lid)	3.27	2,000	£ 6,540
			£224,740

7.2.4 Option 3

For option 3, the additional containers required will be the same as option 2 but with the provision of an additional box for householders to collect fibres as a separate stream.

The total required containers are shown below:

Table 20: Capital Investment Requirement Containers – Option 3

Capital Containers	Unit Cost	Number required	Capital Cost
Box (for glass only)	1.98	60,000	£118,800
Box with lid (for fibres)	3.12	60,000	£187,200
Reusable sack x 1 (for co-mingled without glass)	1.12	60,000	£ 67,200
Food kerbside box replacements	2.58	9,000	£ 23,220
Food waste caddy replacements	0.86	9,000	£ 7,740
Reusable sack (garden waste bags)	0.62	2,000	£ 1,240
Nappy box (with lid)	3.27	2,000	£ 6,540
			£411,940

7.2.5 Options 4, 5 and 7

For these options, the requirements will be the same as for option 3, except it is assumed that the 4000 flats within the county will need to be provided with wheeled bin sets (due to the communal collection requirements). On this basis, wheeled bin sets have been

included in the cost and the number of other containers for dry recycling decreased by 4000.

Table 21: Capital Investment Requirement Containers – Option 4, 5 and 7

Capital Containers	Unit Cost	Number required	Capital Cost
Box (for glass only)	1.98	56,000	£110,880
Box with lid (for fibres)	3.12	56,000	£174,720
Reusable sack x 1 (for co-mingled without glass)	1.12	56,000	£ 62,720
Wheeled bin sets for flats – includes 2 sets per block, each set includes • 240l food bin: £57.10 • 660l Plastic and Cans: £104.75 • 660L Card/paper: £104.75 • 360L Glass: £71.65	338.25	546 sets	£184,685
Food kerbside box replacements	2.58	9,000	£ 23,220
Food waste caddy replacements	0.86	9,000	£ 7,740
Reusable sack (garden waste bags)	0.62	2,000	£ 1,240
Nappy box (with lid)	3.27	2,000	£ 6,540
			£571,745

7.2.6 Option 6

For option 6, the containers will be as per options 4, 5 and 7 but with the use of trolley boxes instead of individual boxes for dry recycling.

Table 22: Capital Investment Requirement Containers – Option 6

Capital Containers	Unit Cost	Number required	Capital Cost
Trolley Boxes	30.00	60,000	£1,800,000
Wheeled bin sets for flats – includes 2 sets per block, each set includes • 240l food bin: £57.10 • 660l Plastic and Cans: £104.75 • 660L Card/paper: £104.75 • 360L Glass: £71.65	338.25	546 sets	£ 184,685
Food kerbside box replacements	2.58	9,000	£ 23,220

Food waste caddy replacements	0.86	9,000	£ 7,740
Reusable sack (garden waste bags)	0.62	2,000	£ 1,240
Nappy box (with lid)	3.27	2,000	£ 6,540
			£2,023,425

8 Addendum

Written August 2017.

Subsequent to the finalising of the main collections modelling, VoG negotiated an extension to the Casepak MRF contract whereby the contract price will be maintained until the end of March 2018.

On this basis, VoG asked WRAP to run a re-model on the work undertaken in 2015-2016 and in doing so update material prices and gate fees of the dry materials to reflect the achieved co-mingled gate fee.

In addition to this, VoG requested that WRAP include the cost of an additional baler in the modelling, on the basis that other neighbouring councils have suffered with baler breakdowns in recent years.

This addendum reflects this work.

8.1 Income Rates

The income rates used in the revised modelling are detailed below:

Table 23: Material gate fees/income rates in original model and addendum modelling

	Material	Original model		Updated Prices	
		Material Value ex-works (£/t)/GF	Haulage (if applicable)	Material Value ex-works (£/t)/GF	Haulage (if applicable)
Separated material	Card - Hard Mix	-£50		-£85	
	N&P	-£78		-£98	
	Mixed papers and card	-£42		-£57	
	Mixed glass	-£12.5		-£12.5	
	Mixed plastics	-£62		-£70	
	Ferrous Tins	-£50		-£55	
	Aluminium Cans	-£725		-£820	
Co-mingled (including haulage)	Co-mingled (baseline)	-£5.0	£26.50	-£5.0	£26.50
	Co-mingled (enh baseline) - from Lamby	£45.0	£14.00	-£5.0	£26.50
	Co-mingled (enh baseline) - from ATE	£45.0	£17.00	-£5.0	£29.50
	Co-mingled (no glass) - from Lamby to SITA	£37.5	£16.99	-£12.5	£29.49
	Co-mingled (no glass) - from ATE to SITA	£37.5	£20.63	-£12.5	£33.13
	Mixed cans and plastics - ATE to SITA	-£20	£30.00	-£20	£30.00

8.2 Results:

8.2.1 Capital Costs:

The table below details the estimated capital costs with the inclusion of an additional baler.

It must be noted that although an extra baler has been costed for, it is in the experience of WRAP that if a baler is well maintained and used properly, then two should not be needed.

Table 24: Revised capital costs to include second baler where required

		Enh Baseline ATE	Option 1	Option 1 - ATE	Option 2 - ATE	Option 3 - ATE	Option 4 - ATE	Option 5 - ATE	Option 6 - ATE	Opt 7: D+1 -ATE
Main Report	Containers		43,820	43,820	224,740	411,940	571,745	571,745	2,023,425	571,745
	Depot	1,377,000	-	1,377,000	1,377,000	2,162,000	2,162,000	2,162,000	2,162,000	2,162,000
	Total	**1,377,000**	**43,820**	**1,420,820**	**1,601,740**	**2,573,940**	**2,733,745**	**2,733,745**	**4,185,425**	**2,733,745**
Addendum	Containers		43,820	43,820	224,740	411,940	571,745	571,745	2,023,425	571,745
	Depot	1,377,000		1,377,000	1,377,000	2,312,000	2,312,000	2,312,000	2,312,000	2,312,000
	Total	**1,377,000**	**43,820**	**1,420,820**	**1,601,740**	**2,723,940**	**2,883,745**	**2,883,745**	**4,335,425**	**2,883,745**
Difference Between Addendum and Main		-	-	-	-	150,000	150,000	150,000	150,000	150,000

8.2.2 Revenue Costs – Core Results:

Core Revised Results:

The table below shows the revised costs for the core modelling options.

Table 25: Revised revenue costs to include extended MRF contract and updated income prices

Revenue	Baseline	Enh Baseline	Enh Baseline ATE	Option 1	Option 1 - ATE	Option 2 - ATE	Option 3 -ATE	Option 4 -ATE	Option 5 -ATE	Option 6 -ATE	Opt 7: D+1 -ATE
Staff	1,969,080	1,803,480	1,677,120	1,883,040	1,756,680	1,928,040	2,034,120	2,467,080	2,075,400	2,295,720	1,888,320
Vehicles	1,252,074	1,255,492	1,137,229	1,305,638	1,173,183	1,410,972	1,577,150	1,566,962	1,381,062	1,496,795	1,537,592
Containers	69,142	69,142	69,142	94,044	94,044	97,180	103,964	103,100	103,100	113,140	103,100
ATE Operating Cost	0	0	180,464	0	180,464	193,694	289,750	273,566	273,566	273,566	273,566
Material Income	270,109	270,109	307,798	309,815	353,045	182,480	-769,580	-1,009,726	-1,009,726	-1,009,726	-1,009,726
Kerbside Food Waste Processing	222,560	244,816	244,816	339,944	339,944	339,944	339,944	339,944	339,944	339,944	339,944
Kerbside Garden Waste Processing	142,650	194,004	194,004	197,880	197,880	197,880	197,880	197,880	197,880	197,880	197,880
Kerbside Residual Waste Disposal	1,056,912	1,035,660	1,035,660	689,361	689,361	689,361	774,445	795,640	795,640	795,640	795,640
Additional HWRC Waste Disposal	0	0	0	98,940	98,940	98,940	98,940	98,940	98,940	98,940	98,940
Additional Haulage from ATE	0	0	154,754	0	145,813	145,813	153,343	155,219	155,219	155,219	155,219
Total	**4,982,527**	**4,872,702**	**5,000,987**	**4,918,662**	**5,029,354**	**5,284,303**	**4,799,957**	**4,988,605**	**4,411,025**	**4,757,118**	**4,380,474**
Diff from baseline		***-109,825***	***18,460***	***-63,865***	***46,826***	***301,776***	***-182,570***	***6,078***	***-571,503***	***-225,409***	***-602,053***
Diff from enhanced baseline				***45,960***	***156,651***	***411,601***	***-72,746***	***115,903***	***-461,678***	***-115,584***	***-492,228***
Diff from option 1						***365,641***	***-118,705***	***69,943***	***-507,637***	***-161,544***	***-538,188***

Comparison with Main Core Results:

The table below summarises the addendum core results in comparison to the core results from the main body of the work:

Table 26: Comparison of main body core revenue results to addendum core revenue results

	Revnue	Baseline	Enh Baseline	Enh Baseline ATE	Option 1	Option 1 - ATE	Option 2 - ATE	Option 3 -ATE	Option 4 -ATE	Option 5 -ATE	Option 6 -ATE	Opt 7: D+1 -ATE
Main Report	Staff	1,969,080	1,803,480	1,677,120	1,883,040	1,756,680	1,928,040	2,034,120	2,467,080	2,075,400	2,295,720	1,888,320
	Vehicles	1,252,074	1,255,492	1,137,229	1,305,638	1,173,183	1,410,972	1,577,150	1,566,962	1,381,062	1,496,795	1,537,592
	Containers	69,142	69,142	69,142	94,044	94,044	97,180	103,964	103,100	103,100	113,140	103,100
	ATE Operating	-	-	180,464	-	180,464	193,694	284,238	268,053	268,053	268,053	268,053
	Material processing/disposal	1,692,231	2,215,709	2,408,152	2,176,315	2,365,358	2,064,849	941,745	788,054	788,054	788,054	788,054
	Total	**4,982,527**	**5,343,823**	**5,472,107**	**5,459,037**	**5,569,729**	**5,694,735**	**4,941,218**	**5,193,250**	**4,615,670**	**4,961,764**	**4,585,120**
Addendum	Staff	1,969,080	1,803,480	1,677,120	1,883,040	1,756,680	1,928,040	2,034,120	2,467,080	2,075,400	2,295,720	1,888,320
	Vehicles	1,252,074	1,255,492	1,137,229	1,305,638	1,173,183	1,410,972	1,577,150	1,566,962	1,381,062	1,496,795	1,537,592
	Containers	69,142	69,142	69,142	94,044	94,044	97,180	103,964	103,100	103,100	113,140	103,100
	ATE Operating	-	-	180,464	-	180,464	193,694	289,750	273,566	273,566	273,566	273,566
	Material processing/disposal	1,692,231	1,744,589	1,937,032	1,635,940	1,824,983	1,654,417	794,972	577,896	577,896	577,896	577,896
	Total	**4,982,527**	**4,872,702**	**5,000,987**	**4,918,662**	**5,029,354**	**5,284,303**	**4,799,957**	**4,988,605**	**4,411,025**	**4,757,118**	**4,380,474**
Difference Between Addendum and Main		0	-471,120	-471,120	-540,375	-540,375	-410,431	-141,261	-204,645	-204,645	-204,645	-204,645

With regards to the two previous revenue tables:

- The changes in table 24, 25 and 26 in comparison to the core results in the main table are restricted to:
    - the updating of material income rates and gate fees to reflect the VoG negotiating an extention to their current MRF contract with Casaepak.
    - The inclusion of capital and maintenance costs to cover the cost of use of an additional baler where required.

- The baseline is applicable to the time of modelling (2016). Since this period, VoG have implemented a number of the savings that were recogised as to be achievable in the enhanced baseline. WRAP have reviewed the actual savings made by VoG to those that were modelled and they have been agreed to be comparable, though not exact.

  On this basis it should be assumed that savings identified from the baseline to the enhanced baseline have already been achieved by VoG and that savings still available will be in respect to difference from the enhanced baseine. Additionally, the savings should be taken to be comparative between options rather than exact figures.