ISLE OF ANGLESEY COUNTY COUNCIL	
Report to:	**Executive**
Date:	**25 January 2016**
Subject:	**Waste Collections Options Appraisal**
Portfolio Holder(s):	**Councillor John Arwel Roberts, Portfolio Holder for Highways, Property and Waste Management**
Head of Service:	**Dewi R. Williams**
Report Author: Tel: E-mail:	**Meirion P. Edwards** **2818** **mpepp@anglesey.gov.uk**
Local Members:	**All Members**

A –Recommendation/s and reason/s

The original report on changes to Waste Collection required to achieve Welsh Government recycling target of 70% was presented to both the Scrutiny and Executive Committees in November 2015. Following these presentations a consultation exercise with the public was undertaken, the result of which was that the favoured option was three weekly collection of residual waste, with the collection of food waste, green waste and recyclate staying the same, but increased capacity would be provided for collecting recyclate.

Whilst the financial savings from implementing three weekly collection (Option 2a) are minimal it should achieve circa 68% recycling and if recycling can be improved beyond this figure then four weekly recycling in the future could be avoided.

A Capital sum of £509k will be required to purchase:-

a) Additional recycling bins to collect all types of plastic (only soft plastics, i.e. plastic bottles are collected at present) .
b) To purchase a new baler for collected plastics at the Gwalchmai site.
c) Fund additional work for consultants to encourage the public to increase recycling.

It is hoped that external funding can be provided from external sources (Holyhead VVP and WRAP) to purchase circa 12,000 trolley boxes (£35 each) which can be distributed during 2016. Additional funding from WRAP will be requested for 2017/18.

The recommendations are summarised as follows:-

a) Implement three weekly residual waste collection from October 2016 onwards to achieve recycling targets, avoid heavy fines and to improve the environment.

b) Provide £509k capital funding to purchase new cycling boxes, a new plastic baling machine and to fund consultancy work to encourage greater recycling.
c) That staged introduction of stackable trolley boxes is introduced as funding becomes available.
d) That four weekly collections of residual waste in the future could be avoided if three weekly collections achieves the recycling target i.e. 70%

B – What other options did you consider and why did you reject them and/or opt for this option?

See Appendix 1 – several options have been considered as part of the enclosed Options Appraisal but none provide such strong benefits as four weekly residual waste collection.

Introducing smaller residual waste bins and maintaining the fortnightly collection cycle (Option 1) does not appear a cost effective solution. It was found to require a very significant capital budget (£1.25 million) and generate annual revenue savings of only £46k per annum. The performance improvement is also lowest of all considered variant collection options.

It can be expected that making a transition to three weekly residual waste collection will present much the same challenges as a transition to four weekly, but with considerably less benefit. Three weekly residual collection was shown to deliver under half the annual revenue savings of four weekly collection, and the performance improvement can be expected to be less.

Finally, from a survey of authorities who have switched to three weekly residual collection, it was highlighted that many of these saw no reason why a four weekly residual waste collection service could not work, with the added benefits of additional recycling and improved financial savings.

C – Why is this a decision for the Executive?

This is a major service change which will impact every household on Anglesey.

CH – Is this decision consistent with policy approved by the full Council?

Any change to the waste collection service will need to be reflected in an updated Waste Collection Policy.

D – Is this decision within the budget approved by the Council?

Each option considered will result in varying degrees of annual revenue savings to the existing budgets. Additional capital budget will be required for the purchase of new containers etc.

DD – Who did you consult?		What did they say?
1	**Chief Executive / Strategic Leadership Team (SLT)** (mandatory)	AO – 1) Need for a Risk Register – *prepared.* 2) Other questions considered within Section 7. GC 1) Service for vulnerable householders – *Fetch and Return bin service still provided as existing.*
2	**Finance / Section 151** (mandatory)	1) Capital bid has changed from £523k to £509k. - *Yes*
3	**Legal / Monitoring Officer** (mandatory)	No comments.
4	**Human Resources (HR)**	
5	**Property**	
6	**Information Communication Technology (ICT)**	
7	**Scrutiny**	
8	**Local Members**	
9	**Any external bodies / other/s**	Economic 1) Additional marketing and promotion bid required – *Agreed, £90k included within the Capital bid.* 2) Pilot Area – *would be problematic.* 3) Impact on small businesses – *No change to commercial collections.* 4) Major Energy Island projects – *Shared along commercial collections.* 5) Potential for fly tipping increase – *see section 7.* 6) Garden waste collection charge – *not at present.* Welsh Government – *see Section 6* Questions returned from Bury, Rochdale, Fife and Conwy.

E – Risks and any mitigation (if relevant)		
1	**Economic**	
2	**Anti-poverty**	
3	**Crime and Disorder**	
4	**Environmental**	
5	**Equalities**	
6	**Outcome Agreements**	
7	**Other**	

F - Appendices:
Appendix 1 – Restricted Residual Waste Collection Options Appraisal Modelling Report. **Appendix 2** – Response by Biffa.

FF - Background papers (please contact the author of the Report for any further information):

1.0 BACKGROUND

1.1 Anglesey's Waste Management service has now reached a critical point where a fundamental step change in service delivery will be required to meet long term targets. Major challenges exist in meeting future statutory recycling targets set by the Welsh Government (WG) combined with a need to operate services more efficiently due to budget cuts.

1.2 The fundamental principle of this report is that collecting and processing recycling materials is far cheaper than collecting and disposing/treating left over 'black bag' residual waste. Therefore, if new collection systems can be put into place where the level of residual waste can be restricted in some way, this will result in increased recycling and therefore reduce overall costs.

1.3 This report summarises the results of a recent waste collections options appraisal and compares recycling outputs and potential savings.

2.0 DRIVERS FOR CHANGE

2.1 WG has set very ambitious statutory local authority targets for reuse, recycling and recovery as set out in their waste strategy document titled Towards Zero Waste. These statutory targets are 58% recovery of municipal waste for 2015/16; 64% for 2019/20 and; 70% for 2024/25. Failure to meet these statutory targets can result in WG imposing fines of £200 per tonne based on the number of tonnes below the statutory target listed. For Anglesey, this means for every 1% failure in the recycling target set, the Council would have to pay around **£80k** in fines. As an example, based on the 2019/20 recycling target, if the Council failed to do any further recycling above the 55% baseline figure, this would result in a 9% shortfall, which would equate to an annual fine of around **£720k**.

2.2 The cost to collect and process recycling material is currently over **£40 per tonne** cheaper compared to the cost of collecting and disposing/treating a tonne of residual waste. If collection systems can be changed to encourage householders to recycle more, then the overall cost to deal with municipal waste will be reduced. Therefore, by restricting the volume of space available for left over 'black bag' residual waste, this automatically encourages householders to fully utilize their recycling services and recycle more.

2.3 Restricting residual waste therefore has a triple benefit; it increases recycling rates, it reduces the risk of fines and can bring about immediate savings in overall waste collection, processing and disposal/treatment costs.

3.0 CURRENT SERVICE AND OUTPUTS 3.1 The Council currently has a waste collection and cleansing contract with Biffa Municipal which started in 2007 and will continue until 2021. Biffa collects residual waste in standard refuse collection vehicles and dry recycling and food waste in purpose built resource recovery vehicles that maximize the amount of recyclable materials that are collected at the kerbside. 3.2 The current service provided to householders at the kerbside is noted below: **Container Provided**	**Materials Collected**	**Frequency**
55 litre Blue Box	• Plastic Bottles • Mixed Cans • Mixed Glass • Batteries • Mobile phones	Weekly
40 litre Red Box	• Paper • Grey Card • Brown Card	Weekly
23 litre Brown Bin	• Food Waste	Weekly
240 litre Green Bin	• Green Garden Waste	Fortnightly
240 litre Black Bin	• Leftover ‘black-bag’ Residual Waste	Fortnightly

* Average weekly volume available combining all waste containers = 358 litres

3.3 The current recycling performance based on all the existing 'front-end' recycling streams (recycling collected from the kerbside, recycling bring sites, household waste recycling centres etc) is estimated to be around 55% for 2015/16. The recycling service on Anglesey has reached a plateau in terms of 'front-end' recycling at around the 55% mark and even increased promotional initiatives have failed to further increase this recycling output.

3.4 To maximise the chances of meeting the 58% statutory recycling target for 2015/16, the Waste Management Section is currently sending some of its residual waste for treatment rather than all to landfill, where some of the 'back-end' Incinerator Bottom Ash material produced following incineration can be counted as recycling. It is hoped that the combination of 'front-end' and 'back-end' recycling will ensure the 58% target for 2015/16 will be achieved.

3.5 It is clear that based on the current flat-lining output of the existing recycling service on Anglesey that future statutory targets will not be met. Continuing with the current service moving forward will not be an option and therefore a further significant step change will be required to ensure WG statutory targets are achieved and fines avoided.

4.0 COLLECTIONS OPTIONS APPRAISAL

4.1 Officers of the Council have been in discussions with WRAP Cymru Collaborative Change Programme (funded by WG to support local authorities with service design, delivery and strategy), Biffa and officers from other Welsh local authorities over the last 12 months, to discuss what options exist to bring about the required step increase in recycling outputs. The conclusion of these discussions is that the most effective option to meet future recycling targets is to restrict residual waste capacity for householders, thus encouraging more recycling. A restriction on residual waste capacity is also included in the WG Collections Blueprint.

4.2 A recent compositional analysis of Anglesey's waste proved that significant tonnages of recyclable waste are still being thrown away and therefore not recycled. Restricting the available volume in the black bin encourages householders to fully utilise their recycling service. Most councils across Wales are looking at options to restrict residual waste further and several have implemented or are in the process of introducing smaller bins or 3 weekly collections of residual waste. An increasing number of local authorities are also considering 4 weekly collections of residual waste.

4.3 Using WRAP Cymru funding, an experienced external consultant (Eunomia) has been appointed to carry out a detailed options appraisal on different kerbside collection systems and to determine their resultant resources and costs, where the levels of residual waste would be restricted in some way. A joint working group made up of Council officers, WRAP Cymru, Biffa and Eunomia was formed earlier in the year to scope and review this work.

4.4 This joint working group identified some key principles that would need to be adopted as part of any new options appraisal modelling work related to any changes to the waste collection system. These included:

i) Mixed plastics would need to be added to any new kerbside collection systems (rather than just plastic bottles as is collected at present);
ii) To deal with the additional recycling volume collected, a third recycling box would have to be provided to householders with clear guidance provided to confirm which materials needed to be placed in which box;
iii) Any modelling should ensure that families with young children should be offered a service where nappies would be collected at the same frequency as currently (i.e. fortnightly).
iv) That the use of a three box stackable trolley for dry recycling (trolley-box) should be considered.

4.5 The options modelled considered the baseline outputs and costs, and compared these to the new restricted residual waste options. Taking into account all the points raised in 4.4) above, the following options (and their variants) were modelled:

i) Collecting residual waste in new 120 litre bins but still fortnightly (as existing),
ii) Collecting residual waste in the existing 240 litre bins but every three weeks (with and without the trolley box option for dry recycling);
iii) Collecting residual waste in the existing 240 litre bins but every four weeks (with and without the trolley box option for dry recycling).

5.0 RESULTS OF THE COLLECTIONS OPTIONS APPRAISAL

5.1 The full Options Appraisal prepared by Eunomia is shown in **Appendix 1**. However, in summary, the overall findings are shown in the table below:

Table Showing Summary of all findings of the Collections Options Appraisal

	Baseline 2014/15	**Baseline + Incinerator Bottom Ash (IBA) only**	**Op 1: New 120L bins x2 wk**	**Op 2a: Existing 240L bins x3 wk**	**Op 2b(i): Existing 240L bins x3wk + Trolley Box**	**Op 3a: Existing 240L x4wk**	**Op 3b(i): Existing 240L bins x4wk +Trolley Box**
A) TARGETS & FINES							
Overall total estimated recycling output (from all waste streams)	55%	63%	67%	68%	68%	71%	71%
Meets long-term 70% target	No	No	No	No	No	Yes	Yes
Estimated annual fine to be applied from 2019/20	£720k	£80k	£0	£0	£0	£0	£0
Estimated annual fine to be applied from 2024/25	£1.2M	£560k	£240k	£160k	£160k	£0	£0
B) POTENTIAL SAVINGS							
Estimated savings (Eunomia Report – Appendix 1)	£0	£0	£46k	£94k	£108k	£253k	£253k
Estimated savings (Biffa – Appendix 2)	£0	£0	£46k	£4k	£18k	£168k	£168k
C) CAPITAL INVESTMENT							
New containers, promotion, site re-processing adaptations etc.	£0	£0	£1.25M	£509k	£1.34M	£509k	£1.34M

5.2 The Council's waste collection contractor, Biffa, have been an integral part of the team who helped to complete the Collections Options Appraisal. However, the appointed consultant, Eunomia, and Biffa, were unable to reach agreement on the level of resources required on some of the options modelled - this means that Biffa believe that additional resources are required to deliver some of the options and that these, in their opinion, would therefore cost more to implement. This disagreement between the level of resources required is not unusual, and in all likelihood an expected outcome of such a process. In summary, the consultant's analysis is based on a complex computer modelling programme using Anglesey data plus information from other examples across the United Kingdom, whereas Biffa's analysis is based on their own direct experience of managing frontline waste collection services. Biffa have provided a formal response to the Collections Options Appraisal report highlighting this point and have provided some further feedback. Biffa's response is shown in **Appendix 2**.

6.0 FEEDBACK FROM THE WELSH GOVERNMENT

6.1 The following feedback has been received from WG regarding the future waste collection options being proposed:

"Any change in containers or frequency of residual collection, together with improved recycling, need to be both cost effective and contribute to 70% recycling by 2025.

Option 1 – This would have a high capital cost as the 240l bins are replaced with 120l bins. The option would effectively restrict weekly containment to 60l.
Option 2 – This would have a lower capital cost than option 1, however it might be less effective because it is not restricting the residual to the same extent, as it restricts weekly containment to 80l.
Option 2a) – This would have a higher cost than both Options 1 and 2 without necessarily achieving better results, with 80l/week containment.
Option 3 – This would have low capital costs and make the greatest revenue savings of the options, restricting containment to 60l/week.
Option 3a) – This would have a higher capital cost than Option 3, though it would be as effective in terms of residual containment.

Whichever of the options is chosen they will need to meet the statutory recycling targets set by Welsh Government. They should also deliver against the goals of the Wellbeing of Future Generations Act. There is evidence from other N Wales local authorities and from Northern Ireland that the introduction of trolley boxes helps to increase recycling, particularly amongst those who were previously non participants. ***Options 3a) and 3b) are likely to deliver the greatest reductions in residual waste and thus to increase recycling rates most****. Option 3b) might see a greater increase in recycling as the new containers incentivise wider participation.* ***The options presented align with the Welsh Government's strategies and policies including its Municipal Sector Plan and Collections Blueprint and would therefore be supported****. The final decision needs to be a balance between performance and cost.* ***Welsh Government statutory recycling targets of 70% have to be reached by 2025 and the assessment is that only Option 3b) has a realistic chance of achieving those targets then serious consideration should be given to this investment".***

7.0 TYPICAL QUESTIONS & ANSWERS

No.	Typical Question	Answer
1	"Collecting waste every 4 weeks is a huge reduction in service"	This is not so. All householders will still have a weekly collection of dry recycling and food waste and continue with a fortnightly collection of green garden waste. An additional 55 litre box will be provided to all householders and mixed plastics will be added to the recycling collections once the new service starts. The net effect when all available volumes from all containers are compared is only a 1% (5 litre) reduction per week in available space per week across all waste containers.
2	"Collecting every 4 weeks will result in rotting food which will attract rats and flies etc".	Food waste will continue to be collected every week and compostable bags will be provided free of charge to help householders contain their food waste. Food waste bins are secure and lockable to prevent unwanted access by pests. If everyone uses the weekly food waste collection service then no food waste should be left in the black bin and therefore any nuisance complaints should be kept to an absolute minimum.
3	"I have a baby in nappies and can't manage a cut from the existing 2 weekly collection to a 4 weekly collection from my black bin – I simply don't have the space".	The Council will organise a dedicated stand-alone collection service to any family with a young child in nappies, to ensure they are collected at the same frequency as present.
4	"Mixed plastics such as butter tubs, yogurt pots etc form a large part of my black bin now and therefore I will have no space if you change to a 4 weekly collection".	Mixed plastics will be collected as part of any change to 4 weekly collections. As noted, an additional 55 litre recycling box will be provided to all householders to assist with increased volumes.
5	"Why collect green garden waste during November, December and January – you could save a fortune if this was stopped?"	Even over these winter months significant levels of green garden waste is collected at the kerbside - over 750 tonnes by the Council's waste collection contractor in 2014/15. This contributes a significant level of recycling to the overall Council's target to ensure statutory targets are met (and fines are avoided). If this green garden waste ended up in landfill it would cost over £80k per annum to dispose of. In addition, Biffa have based their original tender on a whole year cost which takes into account the peak and low tonnages for the whole service i.e. as an integrated collection service with black bag residual waste. Although the option does exist to

No.	Typical Question	Answer
		charge householders to collect and dispose of green garden waste, the Council has decided not to apply this at the current time.
6	“Changing to 4 weekly collections will increase fly-tipping”.	Dry recycling and food waste will still be collected on a weekly basis with mixed plastics added as an additional material. In addition, feedback from external consultation with other local authorities who have been through a significant change in their waste collection service suggests that there are no significant increases in fly-tipping. Fly-tipping incidents will continue to be investigated.
7	“When would any change to 4 weekly collections be introduced?”	Based on lead times for ordering new vehicles and containers, and to avoid a service change at a time of increased tourist population during the summer months, it is recommended that any change is carried out during October 2016.

8.0 CONCLUSIONS

8.1 The purpose of this report and accompanying appendices is to appraise future waste collection options to ensure statutory recycling targets are met, fines are avoided and savings are made. Based on the modelling in Appendix 1, the only option which meets all three of these criteria is Option 3 (collecting left over residual ‘black bag’ waste every 4 weeks).

8.2 Option 3 is only realistically feasible if householders are provided with additional services to allow them to practically recycle every possible material. For this reason, every household will be given a new 55 litre recycling box under this option, to deal with the additional volume and also mixed plastics will be added as an additional material (only plastic bottles are collected currently). In addition, a new separate nappy collection service will be offered to householders where they have children in nappies.

8.3 A variant option exists around Option 3 which uses a stackable trolley-box (3 boxes), but this would be very expensive to roll-out for all householders across Anglesey. It is recommended that a trolley-box service be rolled out on an area by area basis as funds become available.

8.4 All options give varying degrees of savings but it is Options 3 that gives the maximum amount of annual savings to the Council. There is disagreement between the consultant (Eunomia) and Biffa (the Council’s waste collection contractor) regarding the level of savings which could be achieved by implementing the various options. For Option 3, Eunomia state the saving should be around £253k per annum but Biffa state that this should be around £168k per annum. Further detailed negotiation will be required over the coming weeks and months between all parties to arrive at a mutually agreeable position. However, even accepting the £168k per annum saving as a backstop position, this would save almost **£590k** over the remaining length of the current waste collection contract.

9.0 RECOMMENDATIONS

The original report on changes to Waste Collection required to achieve Welsh Government recycling target of 70% was presented to both the Scrutiny and Executive Committees in November 2015. Following these presentations a consultation exercise with the public was undertaken, the result of which was that the favoured option was three weekly collection of residual waste, with the collection of food waste, green waste and recyclate staying the same, but increased capacity would be provided for collecting recyclate.

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It is hoped that external funding can be provided from external sources (Holyhead VVP and WRAP) to purchase circa 12,000 trolley boxes (£35 each) which can be distributed during 2016. Additional funding from WRAP will be requested for 2017/18.

The recommendations are summarised as follows:-

a) Implement three weekly residual waste collection from October 2016 onwards to achieve recycling targets, avoid heavy fines and to improve the environment.
b) Provide £509k capital funding to purchase new cycling boxes, a new plastic baling machine and to fund consultancy work to encourage greater recycling.
c) That staged introduction of stackable trolley boxes is introduced as funding becomes available.
d) That four weekly collections of residual waste in the future could be avoided if three weekly collections achieves the recycling target i.e. 70%

Final Report

Isle of Anglesey County Council Restricted Residual Waste Collection Options Appraisal: Modelling Report

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Cost and Performance Modelling for the Collection of Household Waste for Isle of Anglesey County Council

Project code:
Research date: July – October 2015 Date: 28th October 2015

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Executive Summary

Background

Isle of Anglesey County Council (IoACC) faces challenging statutory Local Authority Recovery Targets of 58% by 2015/16, 64% by 2019/20 and 70% by 2024/25. Whilst recycling performance in Anglesey is good, rates have stagnated in recent years. Recycling performance was 55.2% in 2012/13, 54.4% in 2013/14, and 55.2% in 2014/15. It is clear that service changes will be needed if IoACC is to meet its future targets and avoid infraction fines of £200per tonne. Failing to meet the targets could result in fines for IoACC of £80,000 per percentage point below the relevant target rate.

IoACC has a waste collection services contract in place with Biffa until 2021. The current service configuration comprises a weekly dry recycling collection from kerbside boxes (a 55L blue box and 40L red box), weekly food waste collection (from 23L containers), fortnightly garden waste collection (from 240L wheeled bins, free of charge) and fortnightly collections of residual waste (from 240L wheeled bins).

The purpose of this report is to undertake an options appraisal of waste collection options that restrict residual waste capacity, helping to boost recycling performance, and reduce cost by diverting material from landfill to recycling. The report provides detailed information on the projected costs and recycling performance of each option.

Methodology and Options Investigated

A series of cost assumptions used for options modelling were developed and agreed. These are set out in Appendix A.1.0. The cost assumptions include the gate fees and material incomes for each material, annualised costs of vehicles, unit cost figures for employees, annualised costs of containers including an estimation of replacement costs and delivery charges. Any one off capital expenditures and infrastructure adaptation costs are shown separately from annual revenue costs. All costs are presented in real terms at 2015/16 values.

A baseline was built that reflects the current service and performance in Anglesey. This allows alternative collection options to be modelled and compared to the agreed baseline. The baseline was developed using 2014/15 data. The baseline was also considered in the situation where Anglesey's residual waste is sent to incineration, and hence the impact of incinerator metals and bottom ash recycling on progress towards the statutory local authority recovery targets can be observed.

A variety of options for restricting residual waste were modelled. These included the introduction of a smaller, 120l wheeled bin emptied fortnightly, a three-weekly and four-weekly collection cycle of 240L wheeled bins. With the exception of the baseline options, each option includes the addition of plastic pots, tubs and trays to the dry recycling collection, and also the introduction of an additional nappy collection service for properties requiring it. Switching the existing dry recycling service containment from kerbside boxes to stackable "trolley box" container systems was also examined. The nine options modelled are summarised below:

- Baseline 2014/15 – Weekly kerbside sort from boxes, weekly food waste, fortnightly free garden waste, fortnightly 240L residual;
- Baseline + IBA – as above but with residual waste sent to incineration and ash recycling credited to the statutory recycling rate;
- Option 1 – as above, but with the addition of plastic pots, tubs, and trays to recycling collections, a third recycling box provided to all households, and fortnightly residual waste collections from 120L wheeled bins;
- Option 2a – as per option 1, but with residual waste collected 3-weekly from 240L wheeled bins, and an optional nappy collection service available;
- Option 2b(i) – as per option 2a, but with trolley boxes used for dry recycling containment;
- Option 2b(ii) – as per 2b(i), but an additional 5 seconds modelled for each trolley box collection (providing a sensitivity analysis);
- Option 3a – as per option 2a, but residual waste collected four-weekly from 240L wheeled bins;
- Option 3b(i) – as per option 3a, but with trolley boxes used for dry recycling containment;
- Option 3b(ii) – as per option 3b(i), with an additional 5 seconds modelled for each trolley box collection.

Key Results

The overall impact of the options on IoACC's local authority recovery rate is shown in Figure E. 1. The headline financial results from the modelling are shown across two charts. Figure E. 2 shows the annual revenue costs of all options relative to no change. Figure E. 3 identifies the capital and other one off costs associated with the restricted residual waste options. The impact of potential fines should IoACC miss the recovery targets are not shown here but represent £80k per annum for every 1% under the target rates.

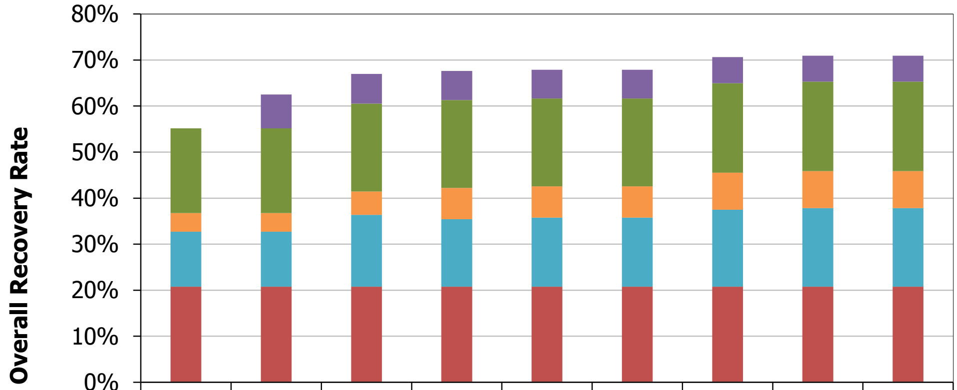
The four weekly residual waste collection options will provide the highest recycling rate for IoACC, and the best chance of meeting a 64% recovery rate for 2019/2020 and 70% recovery rate for 2024/25. Informed by the benchmarking and analysis undertaken, this change to kerbside systems is projected to take the County recycling rate from 55% to 65% on its own, or to 71% together with incinerator bottom ash recycling.

The recycling rate uplift for three weekly residual waste options is less significant, with the end result falling short of the long term recovery target at 68%.

The two weekly small bin option is shown to lead to a similar result as the three weekly options in relation to recycling rates (67%), but the total capital investment is significant (over £1.2m), and ongoing revenue savings the lowest of all considered options. Although both three and four weekly residual waste collection are shown to deliver annual revenue savings, the savings are roughly twice as significant in the four weekly residual collection options.

On the basis of the analysis undertaken, Option 3a gives the highest of all annual revenue savings modelled (£253k per annum compared to the baseline) but it also requires a comparatively low level of capital and one-off cost investment (£509k in total). The same option but with trolley boxes provided is shown to be equivalent in annual revenue cost savings if the boxes can be collected as quickly as a three box approach. If more collection time per property is required and an additional vehicle is needed then the net annual revenue savings are reduced slightly to £186k per annum.

Figure E. 1: IoACC Overall Recovery Rate as Related to Statutory Local Authority Targets



	BL 2014 /15	BL + IBA	Op 1: 120L*2 wk	Op 2a: 240L*3 wk	Op 2b(i): 240L*3 wk +TB	Op 2b(ii): 240L*3 wk +TB(et)	Op 3a: 240L*4 wk	Op 3b(i): 240L*4 wk +TB	Op 3b(ii): 240L*4 wk +TB(et)
Overall IoACC Recovery Performance	55%	63%	67%	68%	68%	68%	71%	71%	71%
IBA Recovery from Incineration	0%	7%	6%	6%	6%	6%	6%	6%	6%
Kerbside Garden Waste	18%	18%	19%	19%	19%	19%	19%	19%	19%
Kerbside Food Waste	4%	4%	5%	7%	7%	7%	8%	8%	8%
Kerbside Dry Recycling	12%	12%	16%	15%	15%	15%	17%	17%	17%
Non-Kerbside Reuse /Recycling /Composting	21%	21%	21%	21%	21%	21%	21%	21%	21%

Key: *BL = Baseline.*
BL+IBA = Baseline but with residual waste to incineration and 17% ash recovery credited as recycling.
**2 wk = Fortnightly residual waste collection. *3 wk = three weekly collection, etc.*
TB = Trolley box.
(et) = Extra time for trolley box collection operation.

To opt for trolley boxes would require capital investment in containers alone of around £1 million (the combined total including communications and facility adaptation costs is £1,343k of capital spend). However, although this may be a significant investment, it needs to be considered whether this may be a compensating factor that makes reduced residual waste collection frequencies both publically palatable and politically deliverable.

Although a waste prevention effect is not included within the modelling (due to lack of available evidence upon which to base assumptions), further performance improvement and cost savings may be achieved if the restricted residual waste options caused this to occur. The impacts would be expected to be strongest under the lowest frequency (and volume) of residual waste collection. This gives further support to a four weekly residual waste collection from householder's existing 240L bins.

It should be considered that change, of any form, is likely to meet some resistance upon implementation, but that this resistance tends to fade when the public become accustomed to the new systems. Ultimately there is little reason to consider that a four weekly residual collection option gives particular dis-benefits to residents compared to the three weekly alternative, if they are properly using their separate collection services.

Figure E. 2: Net Revenue Costs per Annum Relative to Baseline (units: £k)

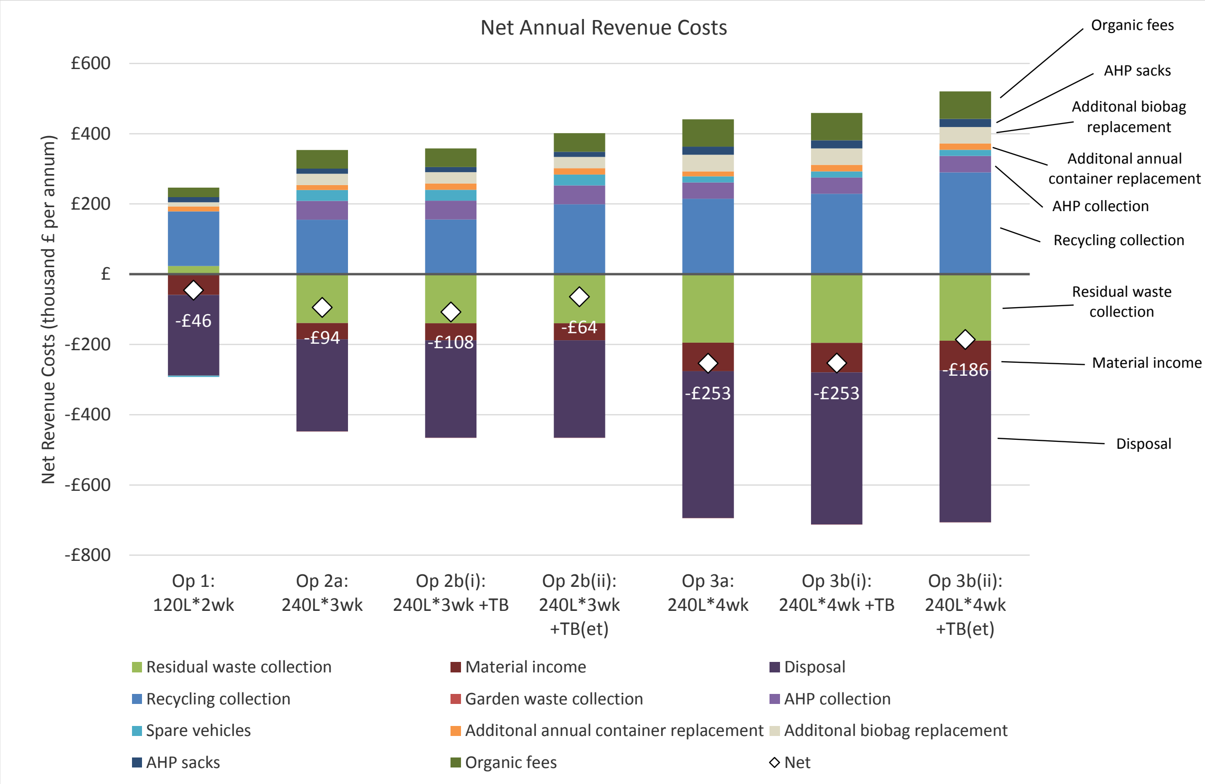
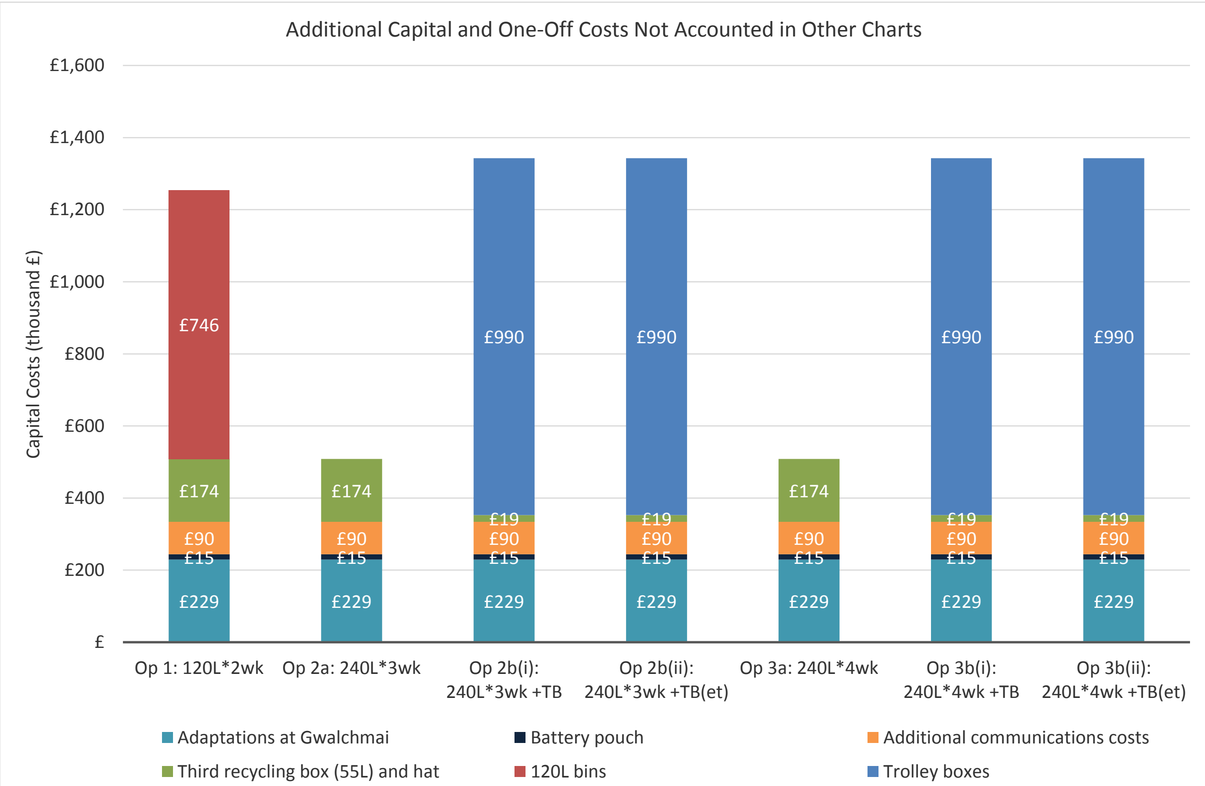


Figure E. 3: Additional Capital and One-off Costs (units: £k)



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Acknowledgements

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1.0 Introduction

1.1 Background and Purpose of the Report

Isle of Anglesey County Council (IoACC) faces challenging statutory Local Authority Recovery Targets of 58% by 2015/16, 64% by 2019/20 and 70% by 2024/25. Whilst recycling performance in Anglesey is good, rates have stagnated in recent years. Recycling performance was 55.2% in 2012/13, 54.4% in 2013/14, and 55.2% in 2014/15. It is clear that service changes will be needed if IoACC is to meet its future targets and avoid infraction fines of £200per tonne. Failing to meet the targets could result in fines for IoACC of £80,000 per percentage point below the relevant target rate.

A comprehensive modelling exercise was undertaken for IoACC in 2013 and included a range of recycling collection systems and residual waste restriction options.[1] As a result, Resource Recovery Vehicles (RRVs) are now being used for recycling collections and corrugated card has been added to the lift of materials collected. The residual waste service, however, remains unchanged as a fortnightly 240L collection. If targets are to be met, further changes to the service will be required.

Data from other UK local authority restricted residual waste service trials is now becoming available to inform modelling assumptions and future service choices. The restriction on available household residual waste containment volume is considered to be the strongest mechanism that IoACC has available to change the waste and recycling behaviour of residents and improve recycling rates.

The objective of this work is to undertake an options appraisal of restricted residual waste collections and to provide a detailed report on the costs and recycling performance projections for each option. The nine options modelled are defined in full in Section 2.3, and cover the following broad overarching principles:

- A baseline of current services against which costs and performance of the alternate options can be compared.
- No change to the baseline other than for residual waste going to energy from waste, from which the recycling of metals and incinerator bottom ash (IBA) is credited to the council's statutory recovery rate.
- Residual waste collection options with the following variants:
    - Fortnightly 120L;
    - Three weekly 240L; and
    - Four weekly 240L.
- Plastic pots, tubs and trays added to the existing weekly recycling collection system;
- Recycling container variants to cope with additional volumes of recycling:
    - Provision of a third recycling box to all households.

[1] *Eunomia Research & Consulting (2013)* Isle of Anglesey County Council Collection Options Appraisal*, Report for WRAP, 2013*

  - Provision of mobile stackable recycling containers (trolley boxes) to suitable households.
- A separate fortnightly collection of nappies in options with a reduction in the frequency of residual waste collection.

1.2 Structure of this Report

This report is structured as follows. As far as possible, technical detail and statistical analysis have been placed in the appendices.

- Section 1.0: Current Position - This provides background to the current situation at IoACC, its current contractual arrangements, and an overview of the services currently operated.
- Section 2.0: Kerbside Collection Modelling - This sets out the key principles and assumptions informing the modelling exercise, and the key results from the modelling.
- Section 3.0: Considerations Surrounding Collection Options – provides a discussion on the issues arising from the modelling that will impact IoACC.
- Section 4.0: Summary and Recommendations - This section brings together the analysis results with the wider implications for IoACC of the options considered, in order to draw overall conclusions and recommendations.
- Appendices: The detailed modelling assumptions are included in the appendices along with technical notes on the modelling process. This incorporates an updated version of the assumptions report shared with IoACC, Biffa and WRAP Cymru during the course of the project, as was used to debate and agree the background assumptions used in the modelling.

1.3 Current Situation for IoACC

IoACC has a 14 year contract in place with Biffa for all its household kerbside waste collection services, which will end in 2021. The services currently provided are weekly recycling, weekly separate food waste, fortnightly free garden waste collection and a fortnightly residual waste collection.

The details of the collection services are as follows:

- Weekly box based dry recycling collection, with a 55 litre blue recycling box for plastic bottles, mixed cans, mixed glass, household batteries and mobile phones, and a 40 litre red recycling box for paper (soft mix), corrugated card and textiles.
- Weekly food waste collection from 23 litre kerbside containers. Residents are also provided with a kitchen caddy and biobag liners which are replaced for free on request. Eight new 12t long wheel base Romaquip RRV vehicles are used for the front line recycling services.

  One mid wheelbase and one short wheelbase 12t RRV are used on a 60:40 shift pattern across the working week (the former operated three days per week and the latter two days per week), where the short wheelbase truck services 1,140 narrow access properties.

One additional 7.5t kerbsider is used for a further 750 narrow access properties.

- Fortnightly free garden waste collection from 240 litre wheeled bins, collected on a mix of 26 tonne and 16 tonne Refuse Collection Vehicles (RCVs).
- Fortnightly residual waste collection from 240 litre wheeled bins, collected by the same vehicles used for the fortnightly garden waste service.
- 750 restricted access properties are served by a 12t RCV collecting residual and garden waste on the standard alternating week basis.
- In addition, 350 remote properties are served under a one-pass co-collection approach where their weekly dry recycling (collected co-mingled in sacks and sorted at Gwalchmai), weekly separate food waste and alternating weekly residual / garden waste is co-collected on a 3.5 tonne caged vehicle.

The Biffa contract covers waste collection and cleansing only. IoACC takes responsibility for bulking and transfer of all wastes, including the marketing of collected recyclates.

2.0 Kerbside Collection Modelling

The following sections set out the key principles and assumptions informing the modelling exercise.

2.1 Benchmarking and Cost Assumptions

The recycling benchmarking figures which informed the captures modelled for Anglesey were set out and agreed upon in the Collections Assumptions Report, which is reproduced and updated where necessary in Appendix A.1.0. Data was taken from four restricted residual waste trials/implementations across the UK (see Table A. 13) to determine the likely future performance of IoACC under the restricted residual waste options modelled. This data was coupled with the capture rate analysis from Figure A. 1 (i.e. to ensure that all individual materials remain below 100% recycling) and was used to inform the yield adjustments for the alternate collection systems for Anglesey; the assumed yields in the various options being considered are shown in Table A. 14, and the associated capture rates are shown in Table A. 15.

The cost assumptions that were used in the modelling were also laid out and agreed upon through the Collections Assumptions Report process. All costs modelled and presented in this report are in real terms at 2015/16 values. The cost assumptions made included the gate fees and material incomes for each material, annualised costs of vehicles, unit cost figures for employees, costs of containers including annual replacements and delivery charges, and costs associated with changes to infrastructure at the Gwalchmai bulking facility.

2.2 Baseline Modelling

A baseline was built up to reflect the waste arisings, recycling performance, geographical challenges and deployment of vehicles and collection staff in Anglesey. This allows the alternative options modelled to be compared against an agreed baseline, with the difference in costs between the baseline and the alternative options representative of the potential costs and savings that may be achievable in Anglesey. This is captured in the 2014/15 baseline, as the data provided was from this particular financial year.

The baseline was also reproduced for a future point in time where residual waste goes to energy from waste and hence recycled bottom ash (17% of all combusted municipal waste) is credited towards the statutory recycling rate. This variant on the baseline, is referred to in this report as 'Baseline + IBA' (or 'BL + IBA').

It is important to point out that no housing or waste growth is assumed in any of the modelled options as this was not included in the project scope.

2.3 Options Modelled

A number of alternative residual waste collection options were selected for modelling (these were included within the original work specification and then were refined through an inception and options selection meeting held in Anglesey in July 2015). The restricted residual options also include the addition of plastic pots, tubs and trays to the weekly recycling collection and additional containment provided, as well as the introduction of a separate fortnightly collection of nappies where the residual waste collection frequency is reduced.

Where the trolley box collection system is concerned, this is modelled under two separate options to consider the possibility of additional collection time per property being needed compared to a two box system.

The current number of properties for remote and restricted access is assumed to remain unchanged in all modelling options.

The options modelled are shown in Table 1.

Table 1: Summary of Options to be Modelled

<table>
<tr><th>Option</th><th>Residual Waste</th><th>Separate Collection Services</th><th>Additional Services</th></tr>
<tr><td>Baseline 2014/15</td><td>As current</td><td>As current</td><td>-</td></tr>
<tr><td>Baseline + IBA</td><td>As current</td><td>As current</td><td>-</td></tr>
<tr><td>Option 1</td><td>Fortnightly collections using 120l bin</td><td>Mixed plastics added to current materials collected. Inclusion of one extra recycling box for households</td><td rowspan="7">Nappy collection</td></tr>
<tr><td>Option 2a</td><td rowspan="3">Three weekly collections using 240L bin</td><td>Mixed plastics added to current materials collected. Inclusion of one extra box for all households</td></tr>
<tr><td>Option 2b(i)</td><td>Mixed plastics added to current materials collected. Inclusion of a mobile stackable recycling container for suitable households (trolley box)*</td></tr>
<tr><td>Option 2b(ii)</td><td>Mixed plastics added to current materials collected. Inclusion of a mobile stackable recycling container for suitable households (trolley box) and additional collection time allocated per set-out compared to the dual box collection time</td></tr>
<tr><td>Option 3a</td><td rowspan="3">Four weekly collections using 240L bin</td><td>Mixed plastics added to current materials collected. Inclusion of one extra box for all households</td></tr>
<tr><td>Option 3b(i)</td><td>Mixed plastics added to current materials collected. Inclusion of a mobile stackable recycling container for suitable households (trolley box)</td></tr>
<tr><td>Option 3b(ii)</td><td>Mixed plastics added to current materials collected. Inclusion of a mobile stackable recycling container for suitable households (trolley box) and additional collection time allocated per set-out compared to the dual box collection time</td></tr>
</table>

*Note: For the purposes of the modelling it was assumed that 30,000 households are provided with trolley boxes and 3,600 households are provided with a third recycling box. All additional boxes are provided with a hat.

2.4 Nappy Collections for Households with Young Families

'Absorbent hygiene product' collections (which include nappies, feminine hygiene products and adult incontinence products) have been trialled successfully in several local authorities across the UK. It has been discussed in the course of this project that a reduction in frequency and/or volume of residual waste could have a disproportionate and potentially problematic impact on households with children in nappies in particular. In order to make a restricted residual service more viable, a separate collection service for nappies can be implemented alongside any reduction in residual collection frequency. This not only provides dedicated disposal capacity for nappies, but it also serves to ensure that the frequency of collection for such unhygienic items is not reduced from fortnightly (as per the current household collection services).

Table 2: Nappy Collection Arrangements Under the Different Residual Collection Cycles

	Collection Schedules
Option with fortnightly residual collections	No separate nappy collection service provided
Options with three weekly residual collections	Week 1: Dedicated nappy collection service Week 2: - Week 3: Full refuse collection service Week 1: Dedicated nappy collection service Week 2: - Week 3: Full refuse collection service
Options with four weekly residual collections	Week 1: Dedicated nappy collection service Week 2: - Week 3: Full refuse collection service Week 4: - Week 1: Dedicated nappy collection service Week 2: - Week 3: Full refuse collection service Week 4: -

It may be noted that since there is no local nappy recycling provision, and the true recycling rates achieved through a typical nappy recycling process are questionable, the collected nappy waste is assumed to be sent for disposal. This means that specialist nappy collection only needs to be provided on those weeks when residual waste is not being collected. On weeks when residual waste is collected, nappy sacks would be collected by the residual waste truck. This scheduling is shown by the week-by-week illustration in Table 2.

It should be noted that the intention behind providing the collection service is to alleviate a capacity issue and unpleasant waste build-up in properties with children in nappies who may strongly desire such a service. There is merit in restricting the provision of the service as far as is acceptable both to keep costs down, and also to maintain the residual capacity restriction concept as far as possible. As such, the intention is to offer the service for free but as a subscription only service for those properties who qualify for it, who request it (acknowledging that not all households with children in nappies will seek to take up the service), and who continue to use it (reflecting that the service should be withdrawn from those who cease using it).

Evidence from other authorities provides some lessons that might be considered for potential service design in Anglesey:

- Monmouthshire (fortnightly sack residual – maximum 2 sacks per property):
    - Previously using the Birmingham nappy recycling facility, which has since closed down. Nappies placed out in yellow sacks now disposed along with residual waste.

- Originally provided as a weekly collection service, but reduced this to fortnightly collection. Aside from a few general complaints during the transition, the service is reported to be working well.[2]

- Stevenage:
  - One week residents place nappies in the refuse, the next week use the purple sack collection service.
  - "Problems include:
    - *Residents overfilling bags – manual handling issue with constant heavy lifting.*
    - *Residents requesting the service and then not using it or only partially using it (need to constantly monitor this).*
    - *Rising costs of the service should it prove popular."*[3]
- Watford:
  - Sacks sold to the public at 25p each.
- Teignbridge District Council (fortnightly residual bin collection):
  - System has been running for 7 years.
  - Eligibility is for two or more children in nappies under the age of two, i.e. a more restrictive system. Of 54,000 households in the district, it is estimated within the ZWS report that only 200 properties (approximately) use the service.
- Bury – 3 weekly residual collection:
  - No nappy collection.
- Rochdale – currently rolling out 3 weekly collection:
  - No additional nappy collection currently, but contingency to allow 120L bin with pink lid for nappies if needed.

Lessons taken from this information support the view that a weekly collection service is expensive and unnecessary, as well as highlighting some additional operational measures to limit the uptake, and therefore costs, of the service.

Evidence of the performance of nappy collections were taken from Gwynedd (where collections have been implemented in some areas), as well as from an evaluation report written on several nappy trials in Scotland.[4] Additional research into birth rates in Anglesey suggests that around 6% of properties in the county are likely to have children in

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[2] *Personal communication with Laura Carter, Monmouthshire County Council 01/10/2015*

[3] Appendices to the *'Absorbent Hygiene Products Collection Trials'* report referenced below.

[4] Nicki Souter Associates (2013) *Evaluation of the Absorbent Hygiene Products Collection Trials in Scotland*, Report for Zero Waste Scotland, 2013

nappies.[5] A nappy collection service modelled on the collection cycles identified in Table 2 are assumed to lead to an 80% opt in rate in the three weekly residual waste collection options, and 95% for the four weekly residual waste collection options. The full assumptions made can be found Table A. 12 in Appendix A.1.6. Results of the modelling are presented within Section 2.9.

2.5 Optional Additional Kerbside Box and Trolley Box Adaptations

The main aim of restricting residual capacity is to displace material from the residual stream into other collections streams. Therefore it is essential to ensure that there is enough capacity within the dry recycling containers to take this displaced material. It is for this reason that the possibility of providing an additional recycling box or trolley boxes have been included in the modelling as variants of the three and four weekly residual waste collection options.

In the *'additional box'* options, an additional box with a hat (to keep materials contained and dry) is provided to all households, and the presentation of materials across the three boxes is reconfigured as described in Table 3.

Trolley boxes are comprised of three boxes which stack together on a trolley to enable them to be wheeled to the kerb. Householders separate their recyclable material into the three boxes based on the configuration also described in Table 3. This is shown alongside the configurations for the current service and other options for comparison, identifying the total number of streams to indicate the sorting requirement.

To summarise the information in the table, the third container, be this a kerbside box or trolley box container, can be used to separate glass and corrugated brown card from the soft mix stream, helping to protect material quality. One box is used to co-collect cans and plastics, helping to speed up the collection process.

As is clear from the identified material splits, in theory the three box system or trolley box approach (which both follow the same segregation of materials) both reduce the amount of materials sorting required by the crew at the kerbside compared to a two box approach. This might be expected to decrease the sort time per property. The trolley box system also allows all containers to be brought from the kerbside to the vehicle (and returned) in one motion, also theoretically providing a shortening effect on the collection time per property. However, the trolley box system requires crews to remove and replace the individual boxes back onto the trolley in the correct manner, which has the potential to be more time consuming than a dual kerbside box collection.

[5] On the basis of the mean average birth rate in Anglesey from 2009 to 2013 (794 births, source: statswales.wales.gov.uk) multiplied by a typical 2.5 year period for children in full time nappies (i.e. approximately 2,000 households or 6% of the total). In reality, there may be expected to be a small number of properties with adult absorbent hygiene product requirements, but that there is also likely to be some households with two children in nappies at the same time (from multiple child pregnancies and where separate births are relatively close together), so the figure of 2,000 properties is taken as a fair estimate.

Table 3: Trolley Box and Kerbside Box Sorting Configuration

Option	Number of streams sorted from each container
i) Baseline:	
○ 40L red box: 1. Soft mix [paper and light card] (collected mixed onto vehicles) 2. Brown [corrugated] card 3. Textiles (low presentation)	2 streams sorted plus rare material check
○ 55L blue box: 4. Mixed glass (collected as one stream onto vehicles) 5. Mixed cans and plastic bottles (collected as one stream onto vehicles) 6. Batteries (low presentation) 7. Mobile phones (very rare if at all)	2 streams sorted plus rare materials check
○ Loose alongside / bundled: 8. Further corrugated card overflow	1 stream
ii) Options with a third box provided:	
○ 40L red box: 1. Soft mix [paper and light card] (collected mixed onto vehicles) 2. Textiles (low presentation)	1 stream plus rare material check
○ 55L blue box: 3. Mixed cans and mixed plastics (collected as one stream onto vehicles)	1 stream
○ New 55L box (of a different distinctive colour): 4. Mixed glass (collected as one stream onto vehicles) 5. Brown [corrugated] card 6. Batteries (low presentation) – contained in a pouch 7. Mobile phones (very rare if at all) – in the pouch	2 streams sorted plus rare materials check
○ Loose alongside / bundled: 8. Further corrugated card overflow	1 stream
iii) Trolley box options:	
○ Top box: 1. Soft mix [paper and light card] (collected mixed onto vehicles) 2. Textiles (low presentation)	1 stream plus rare material check
○ Middle box 3. Mixed cans and mixed plastics (collected as one stream onto vehicles)	1 stream
○ Bottom box 4. Mixed glass (collected as one stream onto vehicles) 5. Brown [corrugated] card 6. Batteries (low presentation) – contained in a pouch 7. Mobile phones (very rare if at all) – in the pouch	2 streams sorted plus rare materials check
○ Loose alongside / bundled: 8. Further corrugated card overflow	1 stream

Information has been provided by officers at Conwy County Council, an early adopter of the trolley box system, on their experience of these issues, but overall impacts on pass rates are unknown. For this reason, the options which include a trolley box have been modelled using a standard collection time (no change from existing collection time per property collected), and also within a separately modelled option allowing an additional 5 seconds per set-out, in order to test the impact of an additional time requirement.

For the three box system options, it is anticipated that the time saved from the reduced sorting of materials is offset by the additional collecting and returning of boxes from the kerb. This approach avoids the need to manage and re-assemble trolley boxes, and thus no additional sorting time is assumed compared to the two box system. It is quite possible that the improved segregation of material across three containers could improve the collection time per property; the average loading time per property calculated by the WRAP Kerbside Analysis Tool (KAT) from its default timings for the dry materials in the Anglesey two box and three box approaches is 18.5 seconds and 16 seconds respectively. This would suggest that it is possible to improve the collection time per property under a three box system, but to be conservative we have not assumed this improvement within the modelled options. Communication with residents of which materials to place in which box is integral to facilitating the reduced sorting of the three box systems. The different coloured boxes intended under the three box system goes some way towards this. Stickers can also be provided which residents can place on their boxes in either the three box or trolley box systems.

Evidence from Conwy suggests that contamination remained an issue with the trolley boxes, as the paper box tended to be contaminated with plastic/card. This was likely due to the decrease in capacity for plastic/card when moving from their old system (a mixture of boxes and bags) to the trolley boxes. This would be a less acute issue for Anglesey where the option of larger capacity trolley boxes could be taken.[6]

The, albeit limited, evidence also suggests that set-out rates increase markedly with trolley boxes. A trial of trolley boxes in Newtonabbey in Northern Ireland (where residual waste capacity was concurrently reduced from 240L to 180L per fortnight) found that set out increased by 19.1% compared to an increase of 2.7% for the control area. [7] In Conwy (where trolley boxes were introduced without changing the residual collection system), set-out averaged 66% each week in the trolley box trial area as compared to 61.7% in the control area. However participation rates were similar, suggesting that trolley boxes are set-out more often, perhaps because they are easier to present even when there is lots of spare capacity in the boxes. Under a separate box system, individual boxes may not be presented when they are not full.[8]

Using the limited amount of benchmarking information available on the innovative trolley box containers, assumptions were made on their impact on participation, set-out and material capture. See A.1.5.5 for further details of the assumptions made for trolley box collections.

[6] *WRAP (2013)* Evaluation of Conwy CBC Pilot Kerbside Collection Containment System*, 2013*

[7] *Jacobs (2014)* Evaluation of Newtownabbey Borough Council 'Wheelie Box' Pilot*, Report for WRAP, 2014*

[8] *WRAP (2013)* Evaluation of Conwy CBC Pilot Kerbside Collection Containment System*, 2013*

2.6 Study of Working Day Lengths

Any proposed change to a collection system will have an impact upon the working patterns of collection crew. Therefore it is vital to characterise current working patterns and working day lengths in order to determine the impact any changes might have.

The collection vehicles in Anglesey are fitted with 'tracker' devices which provide information allowing us to study the effective work demand of the existing collections. To conduct a working day length analysis, sufficient data is needed to take account of small weekly variabilities, and the period of time analysed needs to represent standard collections. Biffa therefore provided tracker data for a three week period of time for dry recycling collections (from 08/06/15 – 26/06/15) and for six weeks for residual and garden collections (from 08/06/15 – 17/07/15). These time periods were chosen to avoid disruption to the service caused by the May Bank Holidays.

The summarised findings from the analysis, which lead to the working day lengths modelled, are shown in Table 4.

Table 4: Modelled Working Day Lengths and Overtime Calculation

Service	Total length of day identified	Overtime per day modelled	Depot duties identified	'Active' working hours identified (minimum)	'Standstill' time identified	'Active' collection operations time	Eunomia modelled 'active' collection operations time
Recycling and Food	8h 47m	29m	20m	5h 56m	2h 31m	5hr 56m – 7hr 57m	7h 31m
Residual	9h 29m	1h 12m	27m	6h 45m	2h 16m	6h 45m - 9hr 01m	9h 00m
Contracted working day length	*= 4 days × 8h + 1 day × 7h* *= 39h / week* *= 7h 48m / day* *plus 30 mins a day unpaid break on top of the 7h 48*						
Any differences in totals are due to rounding to the nearest minute.							

An issue encountered within the analysis was that there was a large amount of time from the GPS data that appeared as 'standstill' time (an average 2h 31mins for the RRV collections, and 2h 16mins for residual waste). This was due to a combination of:

- A weak GPS signal, meaning that when the signal dropped out the software did not record that the vehicle had moved;
- The GPS 'ping' rate, the frequency that GPS data is provided and logged, varied overall between 1-5 minutes, giving an overall low data resolution. This added additional non-moving time to vehicle standstills.
- Legitimate reasons that the vehicle is actually standing still, such as traffic lights etc.

- Reasonable 'breathing' or informal break time to enable the crews to keep working at pace.
- It is also noted that the RRVs don't always tip at the end of each working day. We understand that due to constraints at the site, tipping sometimes needs to be staggered, with some tipping off left until the next day. This will also have an effect on the data.

To summarise the findings identified in Table 4, column by column:

- The first data column shows the identified "morning engine on" to "evening engine off" duration.
- The overtime per day modelled is taken at time and a half of normal salary (including on-costs), and accounts for a 30 minute unpaid lunch in the total identified length of day.
- The third data column gives the identified operational depot time data.
- The 'active' working hour data identified in the GPS analysis is given, which represents a minimum amount of collection work time.
- The 'standstill' time identified includes the 30 minute lunch break and all gaps in the data due to GPS dropout and GPS ping issues (see above). These gaps in the data may well represent working time, but this cannot be determined form the GPS analysis.
- Consequently, the 'active' collection operations time column gives the range of possible working time, excluding lunch and depot duties.
- The final column gives the 'active' collection operations time that was actually modelled by Eunomia, taking account of the GPS data analysis and resource demands within the model.

Notwithstanding questions over the resolution of the data, it appears from modelling the baseline that collection crews are currently heavily utilised. Therefore the actual modelled active collections time was fairly close to the maximum active collection time identified through the analysis of the GPS data.

Similar results to the dry recycling were found for the residual waste collection services, but notably more time is being spent to complete the collection rounds. In this case, when modelling the baseline, the indications are that very little of the GPS 'standstill' time appears to be unproductive time. Therefore, again we have modelled towards the very maximum of the identified operational time, reflecting the fact that crews appear to be working at a high level of productivity.

Overall, in both the recycling and residual waste collection services, not only does the total working day length data indicate that crews are working into overtime on a regular basis, but it would also appear that crews are working to a relatively high level of effective utilisation/productivity. Therefore we have not allowed for any improvement in productivity within any of the alternative option modelling.

It is worth noting that only summer data is identifiable for garden waste collection, so it has not been possible to assess resource demand as part of this work. However, no impacts on the garden waste collection service are expected as part of the changes investigated in this work, so it will not have an impact on the modelling.

2.7 Material Captures

The captures of dry recycling, food, garden and residual waste that are predicted for each option are presented in Table 5. These are based on analysis of the evidence from other UK trials of restricted residual waste services (see Table A. 13).

Table 5: Current and Assumed Yields Under Alternate Residual Collection Systems for Anglesey (kg/hh/yr)

Yields kg/hh/yr	BL 2014/15	BL + IBA	Op 1	Op 2a	Op 2b(i)	Op 2b(ii)	Op 3a	Op 3b(i)	Op 3b(ii)
Mixed Glass	51		59	57	58		61	62	
Paper and Light Card	54		64	60	62		68	70	
Corrugated Card	11		13	12	12		14	14	
Mixed Cans	9		12	12	12		13	13	
Plastics	15		28	26	27		31	32	
Textiles	2		8	6	6		10	10	
Total dry	142		184	173	177		197	201	
Food	48		60	80	80		95	95	
Garden	217		225	225	225		229	229	
Nappy Collection	-		0	12	12		15	15	
Residual	457		369	354	350		298	294	
Residual diverted to HWRC / litter bins etc.	-		26	20	20		30	30	
Recycling diverted to bring sites and HWRCs	-		0	0	0		0	0	
Total waste prevention	-		0	0	0		0	0	
Total kerbside waste plus diverted / prevented material (for crosscheck purposes)	864		864	864	864		864	864	

Assumed yields of dry recycling increase from the baseline for all modelled options due to the addition of plastic pots, tubs and trays to the recycling collection, as well as restricted residual capacity. Assumed yields of dry recycling increase from the baseline with both the fortnightly 120L options and four weekly 240L options, as these represent a reduced residual waste capacity when worked out on a weekly basis. Dry recycling yields are slightly lower in the three weekly 240L residual option compared to the fortnightly 120L option because the three weekly option has a slightly greater effective weekly residual capacity.

The use of trolley boxes is assumed to have a positive impact on the amount of dry recyclable material captured. In Newtonabbey trolley box trial areas, where fortnightly residual waste was concurrently reduced from 240L to 180L, recycling yields increased by an average of 25% which broadly matches with the uplift modelled between the Anglesey baseline and Option 2b.[9] In Conwy, where no residual restriction was introduced alongside trolley boxes, an extra 55kg/hh/yr more was generated in the trial area than in the control area.[10]

Assumed yields of food waste also increase in relation to reduced frequencies of residual waste. The effect of residual waste volume is not thought to be so strong since food waste is dense, but the residual frequency effect is a strong one due to odour issues from food waste kept for long periods.

Nappy collection yields also rise with restricted residual waste capacity and frequency.

Garden waste yields are modelled to increase only very marginally across the options due to the current high captures already achieved in the existing free collection system (see Figure A. 1).

Residual waste yields decrease with each restricted residual option, with some material moved elsewhere (HWRCs, litter bins etc.) as a result; within the modelling this is assumed to go to disposal routes.

2.8 Net Recycling Rates

The material captures presented above have been used to calculate the kerbside recycling rate for IoACC for each of the options modelled. These are shown in Figure 1. Also shown is the net county recycling rate, as it relates to the statutory recycling target with a full breakdown of Anglesey's overall municipal waste as it relates to the statutory targets (as defined by the Statutory Local Authority Recovery Target, LART) in Table 6.

It is important to note that the impact of a restricted residual capacity, and any associated communications campaigns, have not been modelled to lead to a waste prevention effect (due to lack of evidence upon which to base this assumption from other authorities implementing these types of service change). Only the movement of waste between different waste streams has been modelled. If a prevention effect is achieved in practice, then this would improve the recycling and consequential financial results that may be achieved in practice.

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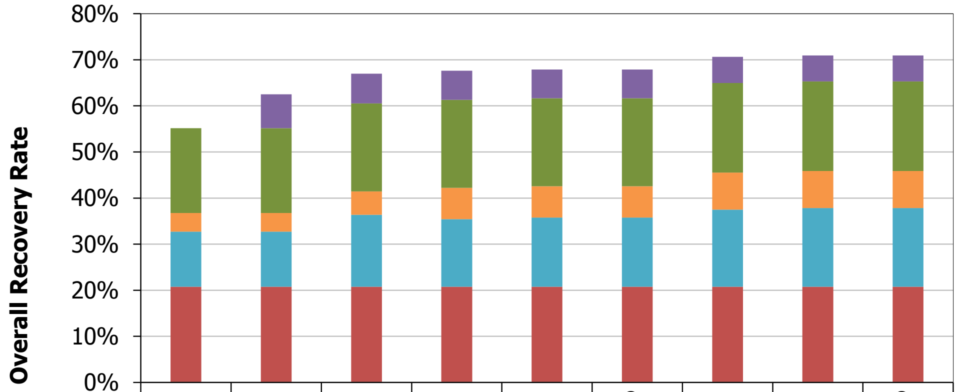
[9] Jacobs (2014) *Evaluation of Newtownabbey Borough Council 'Wheelie Box' Pilot*, Report for WRAP, 2014

[10] WRAP (2013) *Evaluation of Conwy CBC Pilot Kerbside Collection Containment System*, 2013

Figure 1: IoACC Overall Recovery Rate as Related to the Statutory Local Authority Targets



	BL 2014 /15	BL + IBA	Op 1: 120L*2 wk	Op 2a: 240L*3 wk	Op 2b(i): 240L*3 wk +TB	Op 2b(ii): 240L*3 wk +TB(et)	Op 3a: 240L*4 wk	Op 3b(i): 240L*4 wk +TB	Op 3b(ii): 240L*4 wk +TB(et)
Overall IoACC Recovery Performance	55%	63%	67%	68%	68%	68%	71%	71%	71%
IBA Recovery from Incineration	0%	7%	6%	6%	6%	6%	6%	6%	6%
Kerbside Garden Waste	18%	18%	19%	19%	19%	19%	19%	19%	19%
Kerbside Food Waste	4%	4%	5%	7%	7%	7%	8%	8%	8%
Kerbside Dry Recycling	12%	12%	16%	15%	15%	15%	17%	17%	17%
Non-Kerbside Reuse /Recycling /Composting	21%	21%	21%	21%	21%	21%	21%	21%	21%

Key:

BL = Baseline.
BL+IBA = Baseline but with residual waste to incineration and 17% ash recovery credited as recycling.
**2 wk = Fortnightly residual waste collection. *3 wk = three weekly collection, etc.*
TB = Trolley box.
(et) = Extra time for trolley box collection operation.

The current IoACC recycling rate is 55%, which improves to 63% in the future baseline through the recycling of bottom ash.

There is little difference between the recycling rates for fortnightly 120L and the three weekly 240L residual waste options with standard box recycling. The greater effective weekly residual waste volume of the three weekly options (240L ÷ 3 = 80L) means they achieve lower dry recycling rates than the two weekly option (120L ÷ 2 = 60L), but the frequency effect helps to better stimulate food waste segregation and these options result in recycling rates of 67% (fortnightly residual) and 68% (three weekly residual) when rounded to the nearest percent. Providing a trolley box under the three weekly collection option is modelled to add a little additional recycling than the three box approach, but not sufficient to change the county recycling rate when rounded to the nearest percentage point.

The recycling rate increases to 71% in all four weekly 240L collection options, the only options found to surpass the long term statutory recycling target. Whilst further changes can be made to improve recycling at HWRCs, the greatest impact on IoACC's performance will be achieved through changes to the collection service. As such, the four weekly residual waste collection options are expected to provide the highest recycling rate for IoACC, and the best chance of meeting a 70% recycling rate for 2024/2025.

Table 6: Impacts of the Kerbside Options Modelling and IBA Recycling on IoACC Overall Municipal Waste (tonnes)

		BL 2014 /15	BL + IBA	Op 1: 120L*2 wk	Op 2a: 240L*3 wk	Op 2b(i): 240L*3 wk +TB	Op 2b(ii): 240L*3 wk +TB(et)	Op 3a: 240L*4 wk	Op 3b(i): 240L*4 wk +TB	Op 3b(ii): 240L*4 wk +TB(et)
Total Municipal Waste Collected /Generated		39,624	39,624	39,624	39,624	39,624	39,624	39,624	39,624	39,624
Total Waste Reused /Recycled /Composted (Statutory Target)		21,854	21,854	23,990	24,292	24,427	24,427	25,737	25,872	25,872
Total Waste Reused /Recycled /Composted (Statutory Target)	Household Waste Reused /Recycled	8,340	8,340	9,791	9,421	9,556	9,556	10,228	10,362	10,362
	Household Waste Composted	11,312	11,312	11,997	12,669	12,669	12,669	13,308	13,308	13,308
	Non-Household Waste Reused /Recycled	2,199	2,199	2,199	2,199	2,199	2,199	2,199	2,199	2,199
	Non-Household Waste Composted	3	3	3	3	3	3	3	3	3
Waste sent for other recovery		0	0	0	0	0	0	0	0	0
Waste Incinerated with Energy Recovery		0	17,169	15,032	14,730	14,596	14,596	13,285	13,151	13,151
Waste Incinerated without Energy Recovery		54	0	0	0	0	0	0	0	0
Waste Landfilled		17,115	0	0	0	0	0	0	0	0
IBA and metals recycling (taken as 17% of incinerated waste)		0	2,919	2,555	2,504	2,481	2,481	2,258	2,236	2,236
Recycling rate without IBA recycling		55%	55%	61%	61%	62%	62%	65%	65%	65%
Percentage of Waste Reused/Recycled/Compost-ed including IBA recycling		55%	63%	67%	68%	68%	68%	71%	71%	71%

2.9 Resource Requirements and Net Financial Cost Results

Total system costs for each option are a result of the resource requirements and pass rates set out below, as well as the tonnages of waste to be collected, sorted and treated.

2.9.1 Resource Requirements

The total number of vehicles and crew needed to deliver each of the options is set out in Table 7 and Table 11. A full breakdown of vehicles is provided in Table 8. Further information relevant to the modelled resourcing is shown in Table 9.

Table 7: Total Numbers of Vehicles Required in Each Option

Option	Recycling & food collection	Garden waste collection	Nappy Collection	Residual waste collection	Spare vehicles*	Total
BL 2014/15	10.0	4.1	0.0	4.1	0.8	19.0
BL+IBA	10.0	4.1	0.0	4.1	0.8	19.0
Op 1: 120L*2wk	12.0	4.1	0.0	4.2	0.7	21.0
Op 2a: 240L*3wk	12.0	4.1	0.8	2.9	2.2	22.0
Op 2b(i): 240L*3wk +TB	12.0	4.1	0.8	2.9	2.2	22.0
Op 2b(ii): 240L*3wk +TB(et)	12.0	4.1	0.8	2.9	2.2	22.0
Op 3a: 240L*4wk	12.0	4.1	0.7	2.6	1.6	21.0
Op 3b(i): 240L*4wk +TB	12.0	4.1	0.7	2.6	1.6	21.0
Op 3b(ii): 240L*4wk +TB(et)	13.0	4.1	0.7	2.6	1.6	22.0

Any differences in totals are due to rounding.
**Fractional vehicles represent vehicles working part time. Any fractional vehicles not engaged on full time collection duties are recorded as spare vehicles.*

Table 8: Breakdown of Vehicles Required in Each Option

<table>
<tr><th>Option</th><th>Recycling & food collection</th><th>Garden waste collection</th><th>Nappy Collection</th><th>Residual waste collection</th></tr>
<tr><td>BL 2014/15</td><td rowspan="2">8 LWB RRVs,
1 MWB RRV (3 days per week),
1 SWB RRV (2 days per week),
1 small kerbsider</td><td rowspan="9">3 large RCVs full time, one RCV part time (2 days/week 4 months per year), one 12t RCV and one caged vehicle shared with residual for restricted access / remote properties</td><td rowspan="2">-</td><td rowspan="2">As for garden waste detailed to the left</td></tr>
<tr><td>BL+IBA</td></tr>
<tr><td>Op 1: 120L*2wk</td><td rowspan="6">9 LWB RRVs,
1 MWB RRV,
1 SWB RRV,
1 small kerbsider</td><td>-</td><td>As above but with additional resource demand for residual waste of 1 day per fortnight</td></tr>
<tr><td>Op 2a: 240L*3wk</td><td rowspan="3">One 7.5t RCV used 4 days per week</td><td rowspan="3">2 26t RCVs full time,
1 16t RCV used one day per week,
12t RCV and caged vehicle for restricted access used 11 days every 3 weeks</td></tr>
<tr><td>Op 2b(i): 240L*3wk +TB</td></tr>
<tr><td>Op 2b(ii): 240L*3wk +TB(et)</td></tr>
<tr><td>Op 3a: 240L*4wk</td><td rowspan="3">One 7.5t RCV used 7 days per fortnight</td><td rowspan="3">2 large RCVs full time, 12t RCV and caged vehicle for restricted access used 3 days per week</td></tr>
<tr><td>Op 3b(i): 240L*4wk +TB</td></tr>
<tr><td>Op 3b(ii): 240L*4wk +TB(et)</td><td>10 LWB RRVs,
1 MWB RRV,
1 SWB RRV,
1 small kerbsider</td></tr>
<tr><td colspan="5">LWB / MWB / SWB = long / mid / short wheelbase vehicles</td></tr>
</table>

Table 9: Additional Data Relevant to Resourcing within the Options Modelling

	Average number of tips per day: front line recycling vehicles	Average weight per tipped front line recycling vehicle (tonnes)	Change from Baseline in working time per day: recycling (minutes)	Change from Baseline in working time per day: residual (minutes)
BL 2014/15	1.46	1.84	-	-
BL+IBA	1.46	1.84	-	-
Op 1: 120L*2wk	1.45	1.98	-34	-2
Op 2a: 240L*3wk	1.46	2.05	-41	-8
Op 2b(i): 240L*3wk +TB	1.44	2.09	-33	-9
Op 2b(ii): 240L*3wk +TB(et)	1.45	2.07	1	-9
Op 3a: 240L*4wk	1.78	1.90	1	-58
Op 3b(i): 240L*4wk +TB	2.00	1.71	3	-59
Op 3b(ii): 240L*4wk +TB(et)	1.43	2.21	-4	-59

Table 10: Daily Vehicle Pass Rates (units: households passed per vehicle per day, unless otherwise noted)

Option	Dry recycling collection	Garden waste collection	Nappy collection (pickups, not passes)	Residual waste collection
BL 2014/15	672	820	-	820
BL+IBA	672	820	-	820
Op 1: 120L*2wk	560	820	-	801
Op 2a: 240L*3wk	560	820	120	772
Op 2b(i): 240L*3wk +TB	560	820	120	772
Op 2b(ii): 240L*3wk +TB(et)	560	820	120	772
Op 3a: 240L*4wk	560	820	130	646
Op 3b(i): 240L*4wk +TB	560	820	130	646
Op 3b(ii): 240L*4wk +TB(et)	517	820	130	646

Table 11: Numbers of Collection Operative Staff Required in Each Option (Full Time Equivalents)

Option	Recycling & food collection	Garden waste collection	Nappy Collection	Residual waste collection	Modelled super-visors*	Total
BL 2014/15	20.0	9.7	0.0	9.7	3.9	43.3
BL+IBA	20.0	9.7	0.0	9.7	3.9	43.3
Op 1: 120L*2wk	24.0	9.7	0.0	10.0	4.4	48.0
Op 2a: 240L*3wk	24.0	9.7	0.8	6.9	4.1	45.5
Op 2b(i): 240L*3wk +TB	24.0	9.7	0.8	6.9	4.1	45.5
Op 2b(ii): 240L*3wk +TB(et)	24.0	9.7	0.8	6.9	4.1	45.5
Op 3a: 240L*4wk	24.0	9.7	0.7	6.2	4.1	44.6
Op 3b(i): 240L*4wk +TB	24.0	9.7	0.7	6.2	4.1	44.6
Op 3b(ii): 240L*4wk +TB(et)	26.0	9.7	0.7	6.2	4.3	46.8

Any differences in totals are due to rounding.
**Supervisors modelled at 10% of collection staff.*

Eunomia's collection options logistics model by default quantifies non-integer numbers of vehicles to reflect the resource requirements of any option. In the Anglesey baseline case, one vehicle is used for residual and garden waste work for three days of the week for four months of the year. This equates to 0.2 FTE-vehicles and crew, split across the two services. In this case we account the fractional staff costs, but we effectively round up the fractional vehicle and record 0.8 spare vehicles. In this way, full annualised costs of whole vehicle numbers are accounted, and any fractional vehicles can be used to cover vehicle maintenance etc.

Within the alternate options the same approach is taken where absolutely necessary (i.e. there appears no better way than laying on part time collection resource – typically where the model calculates around half a vehicle is required). However, to avoid this situation we adjust the hours worked by collection crews to keep the resource requirements to whole numbers of rounds wherever possible. Any reduction in the average working day length is taken to reduce the overtime currently payable, however any increase in the working day length is paid as additional salary costs at time and a half. Due to the long hours already worked for residual collections (see Section 2.6), working day lengths of the existing residual crews is not increased in any option.

The average daily pass rates (numbers of properties served per vehicle per collection day) achieved under each option, as associated from the vehicle requirements above, are presented in Table 10.

The following main factors are impacting on the round requirements shown in Table 7 and associated pass rates shown in Table 10:

- Concerning recycling and food waste collections, increased numbers of vehicles are seen for the following reasons:
    - Higher participation and set out rates in the restricted residual options increase the work requirement;
    - Where an extra recycling box is provided, the collection time per property is considered to be unchanged (additional time is needed for collecting the third box, but reduced time would be experienced though the better segregation of materials and avoided sorting);
    - Trolley box collection under the 'extra-time' options slow the loading operations for all households setting out containers;
    - Higher set out rates for recycling associated with the modelled options add additional collection time, decreasing daily achievable pass rates;
    - Higher recycling yields can mean vehicles reach their capacity more quickly on collection rounds, forcing them to return to tip sooner and limiting the number of properties that can be collected from in a day.
    - For all options other than Option 3b(ii), the additional collection requirement are anticipated to be deliverable by adding an extra collection crew to the recycling rounds, and operating the mid and short wheelbase vehicles as full time vehicles. A slight increase in the working day length is modelled in certain cases (where the evaluated collection resource requirement was for instance 12.1 vehicles under current working hours),

modelled as overtime at time and half of salary costs. Under Option 3b(ii) one further additional full time vehicle is anticipated to be required.

- Concerning garden waste collections:
  - Only minimal impact on tonnage is modelled, not impacting on the collection resource required.

- Concerning residual waste collections:
  - Under the fortnightly 120L option, a slightly higher setout rate is modelled resulting in a slight increase in the collection vehicle requirement (0.1 additional vehicles effectively means a single additional collection day per fortnight for one vehicle).
  - Reduced frequencies mean less properties in total need collecting from each day, leading to lower collection vehicle resources required.
  - Under the three weekly collection options, the results indicate the potential to operate with two full time RCVs and one additional vehicle operating one day per week. In addition, the 12t RCV and caged vehicle serving restricted access and remote properties is only required for 11 days in the three week collection cycle.
  - Under the four weekly collection options, it would not be possible to cut the number of vehicles required in half. Instead, two full time RCVs are required with a reduction in the working time per day (and hence reduced overtime payable), plus the 12t RCV and caged vehicle serving restricted access and remote properties is required for 3 days per week.
  - It may be noted that the four weekly collection options are found to be easier to operate with whole numbers of rounds than the three weekly options (a third large RCV is required in the three weekly options required for one day per week), and may consequentially present less issues for the contractor in operating the service.
- Concerning nappy collections:
  - The vehicle requirements increase are slightly reduced in the four weekly collection cycle compared to the three weeks cycle. A slightly higher take up is however modelled in the four weekly collection options. In either case, it is evaluated to be possible to operate the service with one vehicle operating part time.

Overall, the total vehicles numbers are very similar between the options modelled, with any reduction in residual waste vehicles being offset by a greater number of recycling vehicles required. Options 1, 3a and 3b(i) all requires 21 vehicles in total (an increase in 2 from the current systems), and all other options require 22 vehicles in total.

As is observed in Table 11, the number of crew needed for each option naturally matches the trends seen for collection vehicles above. The labour force increases marginally in all restricted residual options (between 3% and 11% increase compared to the baseline), but the change is not significant as the increased labour requirements on recycling and nappy collections are partly offset by reduction in residual waste collection staffing.

2.9.2 Net System Costs

The differences in cost between each option compared to business as usual are laid out in this section. Figure 2 gives a comparison of the annual revenue costs of each option, and a full cost breakdown for each option is shown in Table 12. Figure 4 and Table 13 provides additional capital costs not included for in the annual revenue costs.

A summary of these costs as they are expected to impact on the Biffa contract price and the other costs falling on IoACC are identified in Figure 3. Note here that the nappy collection is included within the IoACC cost figures.

Table 12: Revenue costs per annum (units: £k)

	BL 2014/15	BL + IBA	Op 1	Op 2a	Op 2b(i)	Op 2b(ii)	Op 3a	Op 3b(i)	Op 3b(ii)
Recycling + food collection	£921	£921	£1,077	£1,077	£1,077	£1,121	£1,136	£1,150	£1,211
Garden waste collection	£431	£431	£431	£430	£430	£430	£431	£431	£431
Residual waste collection	£587	£587	£610	£448	£447	£447	£392	£391	£397
Spare Biffa vehicles	£30	£30	£26	£56	£56	£56	£40	£40	£40
Nappy collection	-	-	-	£54	£54	£54	£46	£46	£46
Spare nappy vehicles	-	-	-	£5	£5	£5	£7	£7	£7
Additional annual container replacement	-	-	£14	£14	£18	£18	£14	£18	£18
Additional biobag replacement	-	-	£12	£32	£32	£32	£47	£47	£47
Nappy sacks	-	-	£15	£15	£15	£15	£23	£23	£23
Material income	-£195	-£195	-£254	-£241	-£244	-£244	-£276	-£279	-£279
Organic fees*	£359	£359	£387	£412	£412	£412	£437	£437	£437
Disposal	£1,624	£1,624	£1,394	£1,362	£1,347	£1,347	£1,206	£1,191	£1,191
Total Revenue Costs	£3,757	£3,757	£3,711	£3,663	£3,649	£3,693	£3,504	£3,504	£3,571
Relative	-	-	-£46	-£94	-£108	-£64	-£253	-£253	-£186

Any differences in totals are due to rounding.
**Treatment of food and garden waste*

Figure 2: Net Revenue Costs per Annum Relative to 2016 Baseline (units: £k)

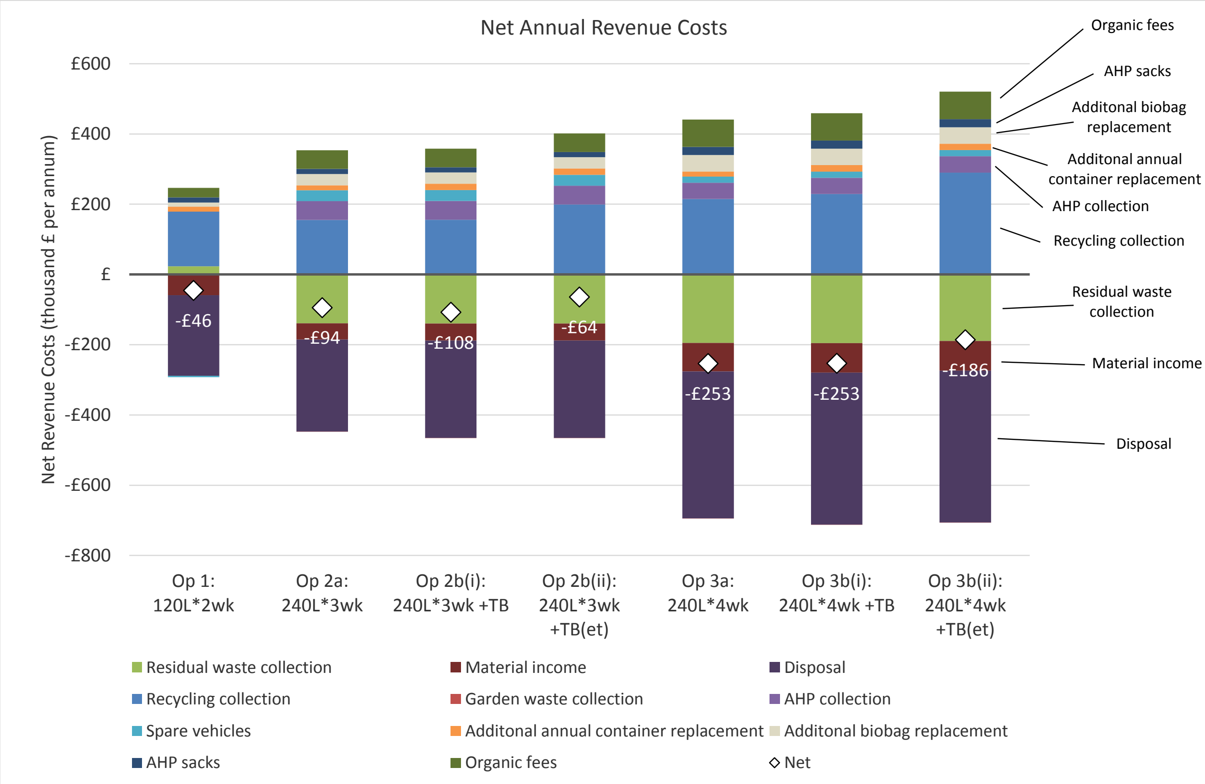
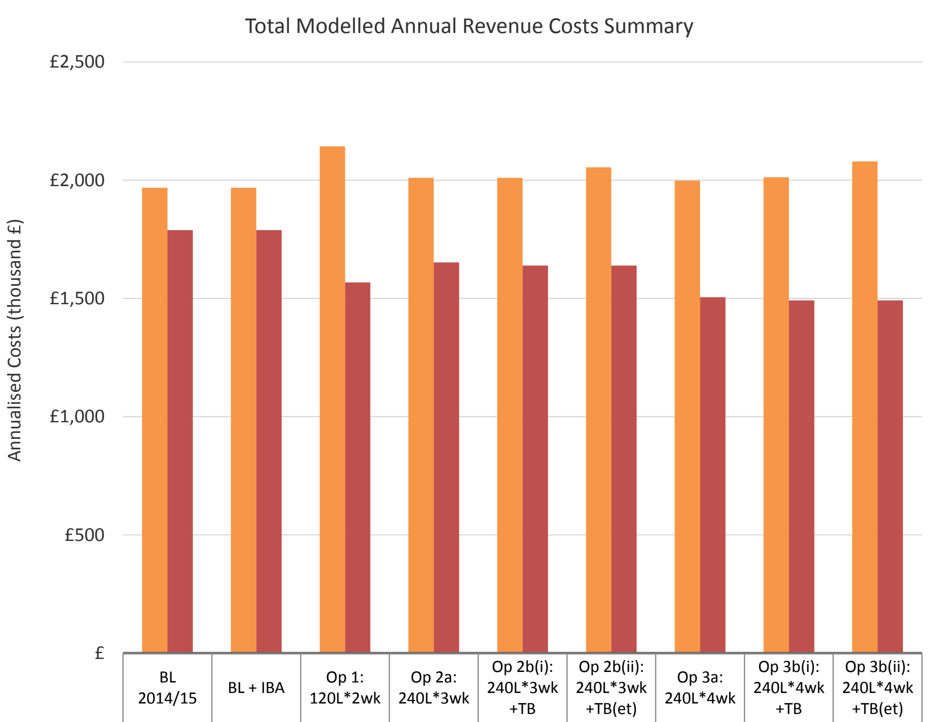


Figure 3: Total Modelled Costs Summary (Identifying the Biffa Household Collection Services Contract Costs)



	BL 2014/15	BL + IBA	Op 1: 120L*2wk	Op 2a: 240L*3wk	Op 2b(i): 240L*3wk +TB	Op 2b(ii): 240L*3wk +TB(et)	Op 3a: 240L*4wk	Op 3b(i): 240L*4wk +TB	Op 3b(ii): 240L*4wk +TB(et)
Total modelled costs within Biffa contract	£1,968	£1,968	£2,144	£2,011	£2,011	£2,054	£1,999	£2,012	£2,079
Total modelled costs otherwise falling on IoACC	£1,789	£1,789	£1,568	£1,652	£1,639	£1,639	£1,505	£1,492	£1,492

Figure 4: Additional Capital and One-off Costs (units: £k)

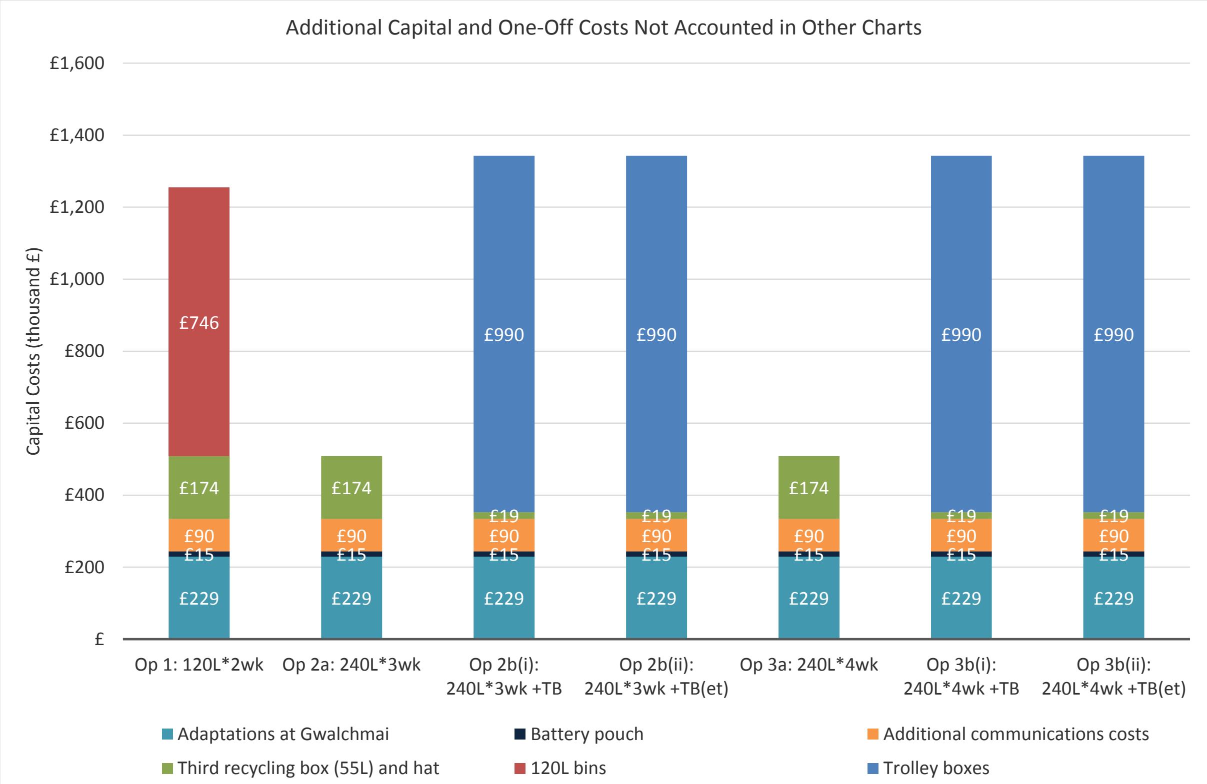


Table 13: Additional Capital and One-off Costs (units: £k)

	Op 1	Op 2a	Op 2b(i)	Op 2b(ii)	Op 3a	Op 3b(i)	Op 3b(ii)
Trolley boxes	-	-	£990	£990	-	£990	£990
Third recycling box (55L) and hat	£174	£174	£19	£19	£174	£19	£19
Battery pouch	£15	£15	£15	£15	£15	£15	£15
120L bins	£746	-	-	-	-	-	-
Additional communications costs	£90	£90	£90	£90	£90	£90	£90
Adaptations at Gwalchmai	£229	£229	£229	£229	£229	£229	£229
Total	£1,254	£509	£1,343	£1,343	£509	£1,343	£1,343

Note: All containers are shown here as delivered prices.

The greatest annual revenue savings come from Options 3a and 3b(i), both saving £253k per annum compared to the baseline. Even where additional trolley box collection time is assumed under the four weekly residual option (Options 3b(ii)), the net annual savings are still significant (£186k per annum). The three weekly residual options (options 2a to 2b(ii)) offer reduced savings ranging from £64k to £108k per annum. Option 1 offers the lowest of all modelled savings compared to the baseline (£46k per annum), plus it has one of the higher associated capital spends.

The annual revenue savings are achieved by a balance between greater spending on recycling and nappy collections, as well as organic fees, and savings on residual waste collections and disposal. Material income is also higher from the increased dry recycling collected, despite a lower price achieved for the mixed plastics than the current price for 'bottle only plastics'. Residual disposal costs to IoACC represent by far the greatest annual cost savings modelled, and these are most strongly resulting in the four weekly residual collections having the largest potential savings.

As Figure 4 shows, significant capital costs would be required for options 1, 2b(i), 2b(ii), 3b(i) and 3b(ii), through the purchasing of either 120L bins or trolley boxes. There would appear to be little gained through the 120L bin option as it has one of the higher total capital costs and lowest annual revenue savings. Option 3a not only gives the an equal highest annual revenue saving of £253k per annum but also requires a comparatively low level of capital and one-off cost investment (£509k), and therefore is found to be the most financially attractive option. The purchase of trolley boxes, at around £1 million, would be a significant investment but it needs to be considered whether this may be a compensating factor that makes the service both publically palatable and politically deliverable. Where residual waste is collected four weekly, under the two variant options with trolley boxes, the net cost savings are found to be either £253k or £186k per annum – the difference being attributed to an additional recycling vehicle from one option to the next.

It should also be understood that no waste prevention effect of restricted residual capacity has been included within the modelling here. This modelling has taken account of the movement of waste between different waste streams, but not any waste prevention that may result from greater awareness and incentives to reduce residual waste. This would reduce residual disposal costs even further, as well as having a beneficial effect towards recycling targets. Naturally the greatest waste prevention effect, if it were to occur, would be expected with the options for four weekly residual collections.

2.10 Commentary on Results

The following summarises key features of each of the core options in turn, and compares one to another as relevant.

Option 1 – A fortnightly 120L residual waste collection:

Under Option 1 dry recycling yields increase, food waste yields increase slightly and a projected county recycling rate of 68% would be achieved (including the uplift provided by bottom ash recycling). A total of 21 vehicles are required, with less of these acting as part time / spare vehicles than in other options. The highest number of staff of all considered options is required (a total of 48, or increase of 4.7 full time equivalents from the baseline). Residual waste collection vehicles increase very slightly in Option 1 due to a higher set-out rate as a result of the volume constriction, though they drop in all other options.

Required capital expenditure (not included in the annualised costs) totals £746k to purchase new 120L residual bins, £190k for the provision of additional 55L kerbside boxes with hats and battery pouches, £229k associated with adaptations at Gwalchmai, and £90k for communication costs associated with the changes (both of these last two expenditures are considered the same cost across all restricted residual waste options). Overall, only

£46k per year of annualised ongoing revenue savings would be achieved – making this a costly approach for least benefit of all considered alternate options.

Option 2a – A three weekly 240L residual waste collection, with recycling collected in boxes:

Under Option 2a greater yields of food would be achieved due to the lower frequency of residual waste collection. However, with a lower effective weekly residual waste volume (80L) compared to the two weekly residual option (60L) means Option 2a collects less dry recycling than Option 1. Compared to Option 1, less dry recycling but greater diversion of food waste leads to a similar county recycling rate of 68% being achieved (including bottom ash recycling).

Fewer vehicles and crew are needed in this option compared to the previous one, and relatively little capital would need to be spent on new containers (£190k compared to £935k in the previous option). Annual revenue savings of £94k per year could be achieved compared to the baseline.

Option 2b(i) – A three weekly 240L residual waste collection, with recycling collected in a trolley box:

Option 2b(i) has slightly recycling than option 2a due to the additional utility and promotional effect of the trolley box roll out, but only by 0.3% and thus not enough to change the recycling rate from the rounded 68% value. Total vehicle and crew requirements are the same as Option 2a, but this option requires over £800k of additional capital for the trolley boxes compared to a three box approach. Annual revenue savings are, however, very slightly higher than option 2a at £108k per annum (compared to £94k per annum for Option 2a).

Option 2b(ii) – A three weekly 240L residual waste collection, with recycling collected in a trolley box and allowing additional associated collection time:

The slower dry recycling loading time per property modelled in this option was found not to be sufficient to require a complete additional collection round, but around 30 minutes of additional collection time per day is required. In option 2b(i) it was possible to cut the average daily work time so that paying of overtime is avoided. In option 2b(ii) an amount of overtime similar to that currently experienced is anticipated. The additional expenditure on overtime compared to the previous option reduces the net savings of the option by around £44k per annum, which may make it less attractive than the three box approach in Option 2a. It is possible that the actual impact on collection time in a trolley box collection system in practice might be somewhere between these two options [2b(i) and 2b(ii)], which may reduce the overtime payable under Option 2b(ii).

Option 3a – A four weekly 240L residual waste collection, with recycling collected in boxes:

Under Option 3a, significant increases in food and dry recycling yields gives a county recycling rate of 71%, with a slight additional saving in vehicle and crew numbers to the three weekly residual options (the part time large RCV required in previous options is no longer necessary). Capital expenditure is low (£509k in total, the same as for Option 2a), and annual net savings are particularly high at £253k per annum.

For only a modelled 0.3% reduction in recycling rate from Options 3b(i) and 3b(ii), the annual savings are potentially greater and a large amount of capital expenditure is avoided. Although by far the most beneficial option overall, it is perhaps the most difficult to implement politically.

It should be considered that change, of any form, is likely to meet some resistance upon implementation, but that this resistance tends to fade when the public become accustomed to the new systems. Ultimately there is little reason to consider that a four weekly residual collection option gives particular dis-benefits to residents compared to the three weekly alternative, if they are properly using their separate collection services.

Option 3b(i) – A four weekly 240L residual waste collection, with recycling collected in a trolley box:

A 71% recycling rate is projected to be achieved through Option 3b(i), with no modelled change in the vehicle or crew numbers from the previous option. Although the annual revenue savings are equal highest at £253k per annum, the capital expenditure is higher at a total of £1,343k with the inclusion of trolley box purchases. The introduction of trolley boxes may, however, make a switch to four weekly residual collections easier for residents and more politically deliverable, so this requires further discussion with the scrutiny committee / members of council.

Option 3b(ii) – A four weekly 240L residual waste collection, with recycling collected in a trolley box and adjusted for additional collection times:

Option 3b(ii) shows the impact of additional time associated with trolley box collections under the four weekly residual frequency. Again, like the results seen for the three weekly options, the additional time and associated additional collection resource required mean that net savings would be reduced below those of the box based option due to an additional RRV being required. However, the net revenue savings are still significant at £186k per annum.

3.0 Considerations Surrounding Collection Operations

3.1 Practical Considerations Concerning the Collection Operations

- GPS tracker data provided by Biffa shows that for both the recycling and residual waste collection services, crews are working into overtime on a regular basis. It also appears that crews are working to a relatively high level of effective utilisation, therefore we have considered there is little scope for improvement in productivity with any future service change.
- Restricting available residual waste containment volumes will require:

- an extension of the recycling provisions and the recycling of a wider range of plastics to include all rigid plastic packaging;
- introduction of nappy collections, which are working successfully in other areas of Wales and elsewhere;
- policies to be adopted on HWRCs that minimise the transfer of kerbside residual to HWRC residual;
- an allowance for an initial increase in fly tipping incidents that will need to be followed up with enforcement activities, and potential for increased street cleaning issues; and
- sufficient enforcement and communications encouraging households to reduce, reuse and recycle and to prevent disposal.

■ The updated Anglesey composition analysis shows that there is a higher proportion of food waste in residual bins than in the survey which was conducted in 2009. The diversion of food waste from residual bins into kitchen caddies will increase with restricted residual collection frequency (in particular), but this must be combined with greater communication efforts and enforcement.

■ Evidence suggests that the use of trolley boxes for dry recycling can have a positive impact on the quantity of materials presented, and may improve participation rates (although this may be marginal for IoACC where the participation is reportedly very high already). Whether trolley boxes or a third recycling box is to be used, guidance should be given on how the materials collected should be split up into the three boxes available, taking account of collection vehicle configuration, box capacity and recycling compositions.

■ The use of trolley boxes may also increase collections times, and for some households additional capacity may be still be needed, particularly if residual collections move to four weekly. The options modelling suggests that the use of trolley boxes for recycling containment may give only a marginal improvement in captures above the provision of a third box. The options modelling assumes that the third box (in either the 'trolley box' or 'three recycling box' options) will be used for mixed glass, brown corrugated card, batteries and mobile phones (the final two of these may be contained in a pouch, though we would not expect any additional collection time implications associated with such an approach as presentation will be relatively infrequent). The other two boxes are primarily for the soft paper mix, and cans and plastics.

■ The evidence base for moving to three weekly residual collections is growing, with substantial increases in recycling yields of around 20%, and food increases of almost 50% recorded. Increases are also seen in garden waste (though this may be less marked in Anglesey assuming the accuracy of the composition data which suggests that very little is in residual waste currently). Reduction is also seen in residual tonnages of around 20%, and overall waste collected is also observed to be slightly reduced (though this may be moving to other routes).

■ Of the three-weekly residual options, if trolley box collections can be undertaken at the same collection speed per property as a two box system, Option 2b(i) is shown to generate the greatest savings of £108k per year, with no compromise on a recycling rate of 68%. The large capital investment for this option however means that the alternative of providing an optional third box to households may be preferable, and should the trolley boxes take longer to collect than the two box system then the three box approach is likely to also have lower annual revenue costs. However, it must be stressed that all three weekly options are not shown to be sufficient to meet the 70% recycling rate target set for 2024/2025.

- A switch to four weekly refuse collections from predominately 240 litre wheeled bins will result in the same effective residual waste capacity per household per week as 120 litre fortnightly collection, but the reduced amenity of the lower frequency is likely to result in the best overall recycling performance. This will be partly due to an increase in dry recycling performance and partly due to enhanced participation and capture rates for food waste collections.
- Given the trolley box considerations discussed two bullet points previously, of the four-weekly residual options, Option 3a(i) looks to provide the greatest overall benefits to IoACC. It gives a recycling rate of 71%, a reduced capital expenditure is required (totalling £509k) and annual revenue savings represent £253k. Although the most beneficial option overall, it may not be easy to implement on political level and hence the provision of trolley boxes may help to mitigate this.
- The four weekly residual collection cycle may in practice be easier for householders to follow as collection will follow a more regular pattern than the three weekly approach (four weekly residual waste more naturally matching with the two weekly garden waste collection). It is also considered to be operationally more straightforward collection cycle to manage.
- If residual waste collection polices are changed, this will influence the recycling rate and improve recycling performance, thus increasing the volume of recyclables and number of recycling containers set-out, which in turn will result in additional recycling collection resources being required. All options will to a greater or lesser extent require a change in operational approach and resource deployment. This will need to be considered within the confines of the current contract with Biffa.

3.2 The Impact of Potential Fines Associated with the Statutory Recovery Targets

Additional consideration ought to be given to the possibility of fines imposed on IoACC if the authority misses its statutory recovery targets. Failure to achieve the targets carries a £200 per tonne penalty. Although the cost of fines have not been included in the evaluated financial costs shown in Section 2.9 or elsewhere in this report, it is possible to quantify what these might be:

- For every 1% under the target, IoACC would face the prospect of fines equalling £80k per annum (or higher if waste growth is experienced);
- If no change from Anglesey's current 55.2% performance is achieved, then the fines for 2019/20 (where the target is 64%) would be £700k;
- Without changes to kerbside systems or any other initiatives, the uplift from IBA and metals recovery from energy from waste is assessed take local authority performance to only 62.5%, falling short of the target for 2019/20 and resulting in fines of £120k per annum.

- Of the constrained residual options, without IBA recovery only Option 3 (all variants) is shown to take Anglesey beyond its 2019/20 target of 64%. Without recovery of IBA from energy from waste, annual fines from 2019/20 associated with the evaluated options could be as follows:
  - Option 1 (Fortnightly 120L residual): £275k
  - Option 2a (3 weekly 240L residual): £215K
  - Option 2b: (3 weekly 240L residual + trolley box): £190k
- Of the constrained residual options, with the inclusion of IBA recovery only Option 3 (all variants) is shown to take Anglesey beyond its long term 70% target. In this situation, for the other options annual fines could still be as follows:
  - Option 1 (Fortnightly 120L residual): £240k
  - Option 2a (3 weekly 240L residual): £190K
  - Option 2b: (3 weekly 240L residual + trolley box): £165k

4.0 Summary and Concluding Remarks

A comprehensive options modelling exercise was undertaken in 2013, resulting in the adoption of RRVs for recycling collections. Further substantial changes to the kerbside collection service are however needed to reduce costs and for the long-term recycling rate target of 70% by 2024/25 to be considered achievable. Restricted residual capacity and/or frequency is the next logical step to achieving these goals. It holds promise of the most beneficial impact of all options currently open to Anglesey in terms of recycling rate and household waste cost savings.

In this report seven restricted residual options were modelled, looking at fortnightly, three weekly and four weekly residual collections, and the use of either a third box for recycling collections or replacement of the existing boxes with a trolley box system (with mixed plastics being collected in all cases). Trolley boxes have led to greater recycling yields in other areas, though there is uncertainty over whether these performances are sustained once the 'novelty' factor has worn off. To provide trolley boxes in Anglesey will require capital expenditure of around £1 million, compared to under £200k for the provision of a third box and hat.

The capital investment in trolley boxes is the most significant upfront spend of all considered options. However, if Anglesey is to go to reduced frequencies then the provision of trolley boxes may be the compensating factor that makes the service both publically palatable and politically deliverable. As such, the council may like to investigate the availability of funding for such capital expenditures.

All of the options modelled provide net annual revenue savings to IoACC, the result of a combination of an increase in recycling collections costs but greater income from recycling yields, and a reduction in residual waste collection and disposal costs. Under Option 2a, collecting residual waste in the existing 240L bin on a three weekly cycle, despite two additional full time recycling vehicles being needed, a reduction of one residual collection vehicle can be achieved, and minimal additional capital would need to be spent on new

containers, promotion and bulking facility adaptations (£509k in total). Annual revenue savings of £94k per year would be achieved, and the county recycling rate would reach 68%.

Under Option 3a, the existing 240L bins are collected on a four weekly cycle, creating significant increases in food and dry recycling yields to give a recycling rate of 71%. Annual savings are equal highest of all modelled options at £253k. Four weekly residual collection is also evaluated to be the only modelled option to take IoACC beyond its 2019/20 target without IBA recycling, or beyond its 2024/25 target with IBA recycling (and it is acknowledged that for each percentage point below the targets can result in fines of £80k per annum). Although by far the most beneficial option overall, a move to four weekly collections presents the greatest challenge to implement politically. Health and safety issues will need to be considered, but offering a fortnightly collection of nappies (included in the costs modelled here) will help to reduce the likely public concern over this option. Under Options 3b(i) and 3b(ii), the results are shown to either not impact at all on annual revenue savings compared to Option 3a, or to reduce the net savings to £186k per annum if an additional RRV is required.

The sooner a decision on restricted residual changes occurs, the greater the likelihood of recycling rates rising to where they need to be to meet the Welsh Governments short-term and long-term targets, and the sooner revenue savings can be accrued. As IoACC are contracted to Biffa until 2021, discussions will also need to be held to agree how change can be implemented within (or with modification from) the contractual terms.

A.1.0 Appendix 1: Key Modelling Assumptions

A.1.1. Introduction

This appendix is an updated reproduction of the assumptions report shared and discussed with IoACC, Biffa an WRAP Cymru though the development of the project. The purpose was to present and agree the headline assumptions made in the collection modelling work. Much of this has been supplied through, or calculated from, information provided by Anglesey Council and Biffa, as well as from additional information provided from other authorities and sources with relevance to the options being considered here for IoACC.

A.1.2. Existing Services and Options to be Modelled

A baseline model is set up which reflects the existing service in terms of resources and performance in order to calibrate the model. The current services provided in Anglesey are as follows:

- Weekly box based dry recycling and food waste collection:
- 55 litre blue recycling box – plastic bottles, mixed cans, mixed glass;
- 40 litre red recycling box – paper (soft mix), corrugated card, textiles;
- A kitchen caddy and kerbside bin for food waste, with biobag liners which are replaced for free on request.

  Eight 12t long wheel base Romaquip RRV vehicles are used for the front line recycling services.

  One mid wheelbase and one short wheelbase 12t RRV are used on a 60:40 shift pattern across the working week (the former operated three days per week and the latter two days per week), where the short wheelbase truck services 1140 narrow access properties.

  One additional 7.5t kerbsider is used for a further 750 narrow access properties.
- Fortnightly free garden waste collection from 240L wheeled bins, collected on a mix of 26t and 16t RCVs (four of the former and two of the latter).
- Fortnightly residual waste collection from 240L wheeled bins, collected by the same vehicles as above.
- 750 restricted access properties are served by a 12t RCV collecting residual and garden waste on the standard alternating week basis.
- In addition, 350 remote properties are served under a one-pass co-collection approach where their weekly dry recycling (collected comingled in sacks and sorted at Gwalchmai), weekly separate food waste and alternating weekly residual / garden waste is co-collected on a 3.5 tonne multi-compartment caged tipper vehicle.

A number of refined service configurations have been selected in the project inception meeting held at the Biffa depot offices at Gaerwen on 7th July 2015. These options, described in Table A. 1, are modelled and compared against Anglesey County Council's current baseline service.

The current number of properties for remote and restricted access is assumed to remain unchanged in all modelling options.

Table A. 1: Summary of Options to be Modelled

<table>
<tr><th>Option</th><th>Residual Waste</th><th>Separate Collection Services</th><th>Additional Services</th></tr>
<tr><td>Baseline 2014</td><td>As current</td><td>As current</td><td>-</td></tr>
<tr><td>Baseline 2016</td><td>As current</td><td>As current</td><td>-</td></tr>
<tr><td>Option 1</td><td>Fortnightly collections using 120l bin</td><td>Mixed plastics added to current materials collected.
Inclusion of one extra recycling box for all households</td><td rowspan="7">Nappy collection</td></tr>
<tr><td>Option 2a</td><td rowspan="3">Three weekly collections using 240L bin</td><td>Mixed plastics added to current materials collected.
Inclusion of one extra box for all households</td></tr>
<tr><td>Option 2b(i)</td><td>Mixed plastics added to current materials collected.
Inclusion of a mobile stackable recycling container for suitable households (trolley box)*</td></tr>
<tr><td>Option 2b(ii)</td><td>Mixed plastics added to current materials collected.
Inclusion of a mobile stackable recycling container for households (trolley box) and additional collection time allocated per set out compared to baseline collection time</td></tr>
<tr><td>Option 3a</td><td rowspan="3">Four weekly collections using 240L bin</td><td>Mixed plastics added to current materials collected.
Inclusion of one extra box for all households</td></tr>
<tr><td>Option 3b(i)</td><td>Mixed plastics added to current materials collected.
Inclusion of a mobile stackable recycling container for suitable households (trolley box)</td></tr>
<tr><td>Option 3b(ii)</td><td>Mixed plastics added to current materials collected.
Inclusion of a mobile stackable recycling container for suitable households (trolley box) and additional collection time allocated per set out compared to baseline collection time</td></tr>
</table>

*Note: For the purposes of the modelling it was assumed that 30,000 households are provided with trolley boxes and 3,600 households are provided with a third recycling box.

A.1.3. Local Authority Current Waste Arisings and Performance Data

Anglesey Council has a population of 68,600 and currently collects from 33,600 households. It is an island county located off the North West coast of Wales connected to the mainland by two bridges and covers 276 square miles of mainly rural landscape with key areas of population in Holyhead, Llangefni, Menai Bridge and Amlwch. All collected household waste streams are tipped on the island, with garden waste treated locally, but food waste, dry recycling and residual waste bulked and transferred off-island.

A.1.3.1. Waste Composition

Table A. 2: Household Total Kerbside Waste Composition and Modelled Bulk Densities

<table>
<tr><th>Material</th><th>Current Anglesey Council Household Kerbside Waste Composition</th><th>Previous Anglesey Council Composition (Wastes Work, 2009)</th><th>Wales Kerbside Composition (Burnley et. al., 2007)</th><th>Modelled 'On Vehicle' Bulk Densities (kg/m^3)</th></tr>
<tr><td>Paper (soft mix) – non compacted grey and white board</td><td>9.8%</td><td rowspan="2">22.7%</td><td rowspan="2">23.7%</td><td>250</td></tr>
<tr><td>Corrugated cardboard – OCC grade</td><td>1.7%</td><td>66</td></tr>
<tr><td>Cartons</td><td>0.2%</td><td>0.3%</td><td>0.0%</td><td>26</td></tr>
<tr><td>Plastic film</td><td>4.6%</td><td>3.4%</td><td>2.1%</td><td>30</td></tr>
<tr><td>Dense plastic packaging</td><td>1.9%</td><td>2.8%</td><td>2.1%</td><td rowspan="2">26</td></tr>
<tr><td>Plastic bottles</td><td>2.4%</td><td>1.8%</td><td>2.5%</td></tr>
<tr><td>Other dense plastics</td><td>2.3%</td><td>1.2%</td><td>1.5%</td><td>95</td></tr>
<tr><td>Clothes & shoes</td><td>1.9%</td><td>1.8%</td><td>3.0%</td><td>277</td></tr>
<tr><td>Mixed glass</td><td>7.1%</td><td>7.1%</td><td>7.2%</td><td>456</td></tr>
<tr><td>Ferrous cans</td><td>0.9%</td><td>1.7%</td><td>2.5%</td><td rowspan="4">50</td></tr>
<tr><td>Aluminium cans</td><td>0.7%</td><td>0.6%</td><td>0.5%</td></tr>
<tr><td>Aerosols</td><td>0.1%</td><td>0.1%</td><td>0.0%</td></tr>
<tr><td>Aluminium Foil</td><td>0.5%</td><td>0.3%</td><td>0.0%</td></tr>
<tr><td>Other metals</td><td>0.8%</td><td>0.6%</td><td>0.5%</td><td>63</td></tr>
<tr><td>Garden waste</td><td>27.9%</td><td>25.8%</td><td>8.3%</td><td>368</td></tr>
<tr><td>Kitchen waste</td><td>22.4%</td><td>16.3%</td><td>25.0%</td><td>500</td></tr>
<tr><td>Other</td><td>15.5%</td><td>13.7%</td><td>21.2%</td><td>350</td></tr>
<tr><td>Total</td><td>100.0%</td><td>100.0%</td><td>100.0%</td><td>-</td></tr>
</table>

The waste composition for Anglesey Council, presented in Table A. 2, is based on [as yet] unpublished data taken from a study into the composition of municipal solid waste in the Isle of Anglesey commissioned by WRAP. Also provided in Table A. 2 is the 2009 composition data for Anglesey Council.[11] An 'all Wales' kerbside waste composition is also provided for reference in the table (note we are not able to quote the Wastes Work & AEA

WRAP (2013) *Evaluation of Conwy CBC Pilot Kerbside Collection Containment System*, 2013

[11] *Wastes Work & AEA* (2010) *The composition of municipal solid waste in the Isle of Anglesey*, Report WRAP

national report as data for total kerbside collected waste cannot be calculated from the data given in this report).[12]

Particularly notable in the new composition data is the overall decrease in paper and cardboard, and increase in food waste. Garden waste is significant in Anglesey due to the free kerbside collection service offered.

Bulk densities, also shown in the table, are compiled from work done on behalf of WRAP.[13,14]

A.1.3.2. Current Performance

The total kerbside arisings in Anglesey for 2014/15 equate to 856 kg/household/annum. This is at the high end of total collected waste compared to similar authorities, but this is in part due to the free garden waste collection service provided in the authority which contributes 217 kg/household/annum. As shown in Table A. 3, total captures of dry recycling and food waste have fallen away since the last work, and although overall kerbside waste arisings have fallen slightly, residual waste has increased.

Table A. 3: Kerbside Collection Performance Comparison: 2011/12 to 2014/15

<table>
<tr><th rowspan="2">Kerbside Collection</th><th colspan="3">2011/12</th><th colspan="3">2014/15</th></tr>
<tr><th>Tonnes</th><th colspan="2">Kg/hh/yr</th><th>Tonnes</th><th colspan="2">Kg/hh/yr</th></tr>
<tr><td>Mixed Glass</td><td>1,671</td><td>51</td><td rowspan="6">181</td><td>1,712</td><td>51</td><td rowspan="6">141</td></tr>
<tr><td>Mixed Paper & Light Card (soft mix)</td><td rowspan="2">3,391</td><td rowspan="2">104</td><td>1,806*</td><td>54**</td></tr>
<tr><td>Corrugated Card</td><td>371***</td><td>11</td></tr>
<tr><td>Total Cans</td><td>443</td><td>14</td><td>291****</td><td>9</td></tr>
<tr><td>Plastics</td><td>389</td><td>12</td><td>494</td><td>15</td></tr>
<tr><td>Textiles</td><td>43</td><td>1</td><td>59</td><td>2</td></tr>
<tr><td>Green Garden Waste</td><td>7,230</td><td colspan="2">221</td><td>7,283</td><td colspan="2">217</td></tr>
<tr><td>Food Waste</td><td>2,067</td><td colspan="2">63</td><td>1,607</td><td colspan="2">48</td></tr>
<tr><td>Residual Collection</td><td>14,128</td><td colspan="2">432</td><td>15,368</td><td colspan="2">457</td></tr>
<tr><td>Total</td><td>29,361</td><td colspan="2">897</td><td>28,991</td><td colspan="2">856</td></tr>
</table>

*1,926 tonnes (Gwalchmai weighted out tonnage) minus 68.6 tonnes from Penhesgyn HWRC minus 68.6×75% estimate for Gwalchmai HWRC.
**Of which perhaps 40 kg/hh/yr paper.
***577 tonnes (Gwalchmai weighted out tonnage) minus 118 tonnes from Penhesgyn HWRC minus 118×75% estimate for Gwalchmai HWRC.
****314 tonnes minus 8 tonnes Community Recycling Skips tonnage minus 15 tonnes estimate for bring banks.

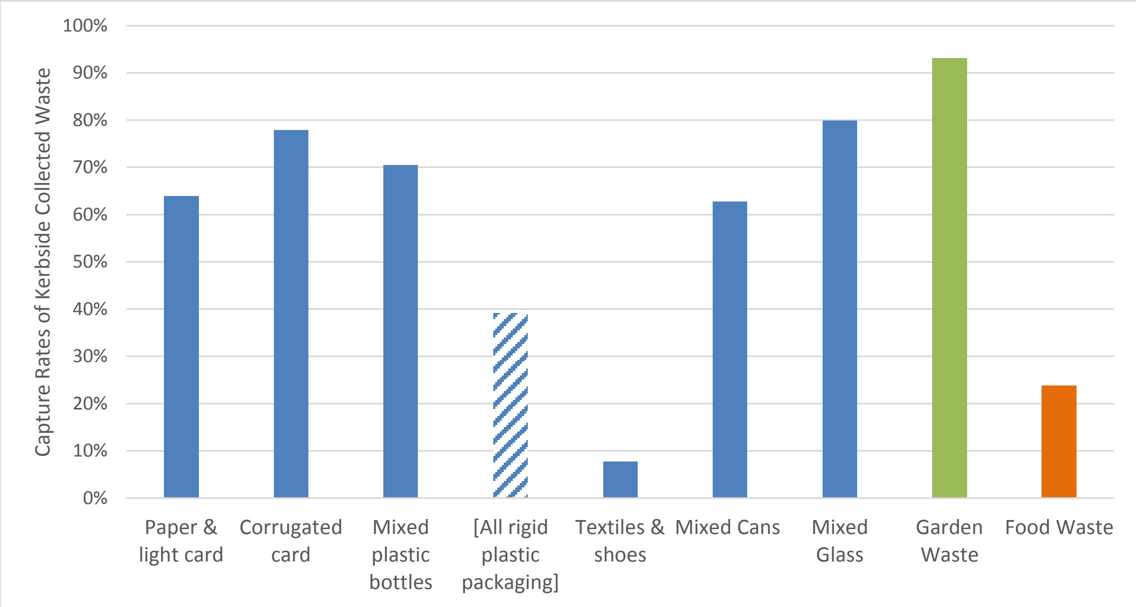
[12] S. Burnley, J. Ellis, R. Flowerdew, and A. Poll (2007) Assessing the Composition of Municipal Solid Waste in Wales. *Journal of Resources, Conservation & Recycling 49:264-283*.

[13] Resource Futures (2007) *Review of Bulk Densities of Various Materials in Different Containment Systems*, report for WRAP

[14] Resource Futures (2007) *Bulk Density Study: Phase 2*, report for WRAP

Figure A. 1 here gives a simple capture rate assessment using the updated residual waste composition. This assessment gives a broad depiction of which materials may have the greater potential for increased captures in the future following service changes and promotional activity.

Figure A. 1: Capture Rate Analysis of Targeted Materials using Updated Anglesey Composition Data and 2014/15 Kerbside Tonnages



This data suggests the following:

- Those materials which typically arise as dry and clean items (i.e. free from food waste etc.) such as corrugated card, plastic bottles and glass are fairly well captured;
- Mixed cans are slightly less well captured which typically relates to the need for householders to wash food containers;
- A similar capture rate is seen for paper and light card where it is perhaps the variety of sources, sizes and types that lead to a lower capture;
- There is greater potential for capture should non-bottle plastic packaging be added to the collection system;
- Clothes and shoes are poorly captured, though in practice this is not uncommon in local authority collection systems;
- Garden waste is very well captured via the free fortnightly collection system, but food waste is very poorly captured.

A.1.4. Logistical Assumptions

This section outlines the logistical assumptions associated with depot and tipping locations, local demographics, as well as the coverage of and participation data provided/modelled for each service within Anglesey Council.

A.1.4.1. Depot Locations and Tips

The current depot and tipping locations are summarised in Table A. 4. The tipping times are counted from arrival at the tip to being ready to depart, including queuing, weighing and unloading.

Table A. 4: Current Depot and Tip Locations for Each Waste Collection Service

Facility	Location	Postcode	Average Tipping Time (min)	Average Number of Tips per Vehicle per Day in Baseline
Vehicle Depot	Gaerwen	LL60 6HR	N/A	N/A
Recycling & Food Waste Tip	Gwalchmai	LL65 4PW	25 minutes	1.4*
Garden Waste Tip	Penhesgyn	LL59 5RY	15 minutes	2**
Residual Tip			15 minutes	2

*Calculated from tracker data analysis. To avoid queueing at the bulking facility, vehicles are able to park overnight with material left on the vehicle and thus are able to tip at different times of the day.
**We would expect lower numbers of tips in winter months, but model for peak service demand.

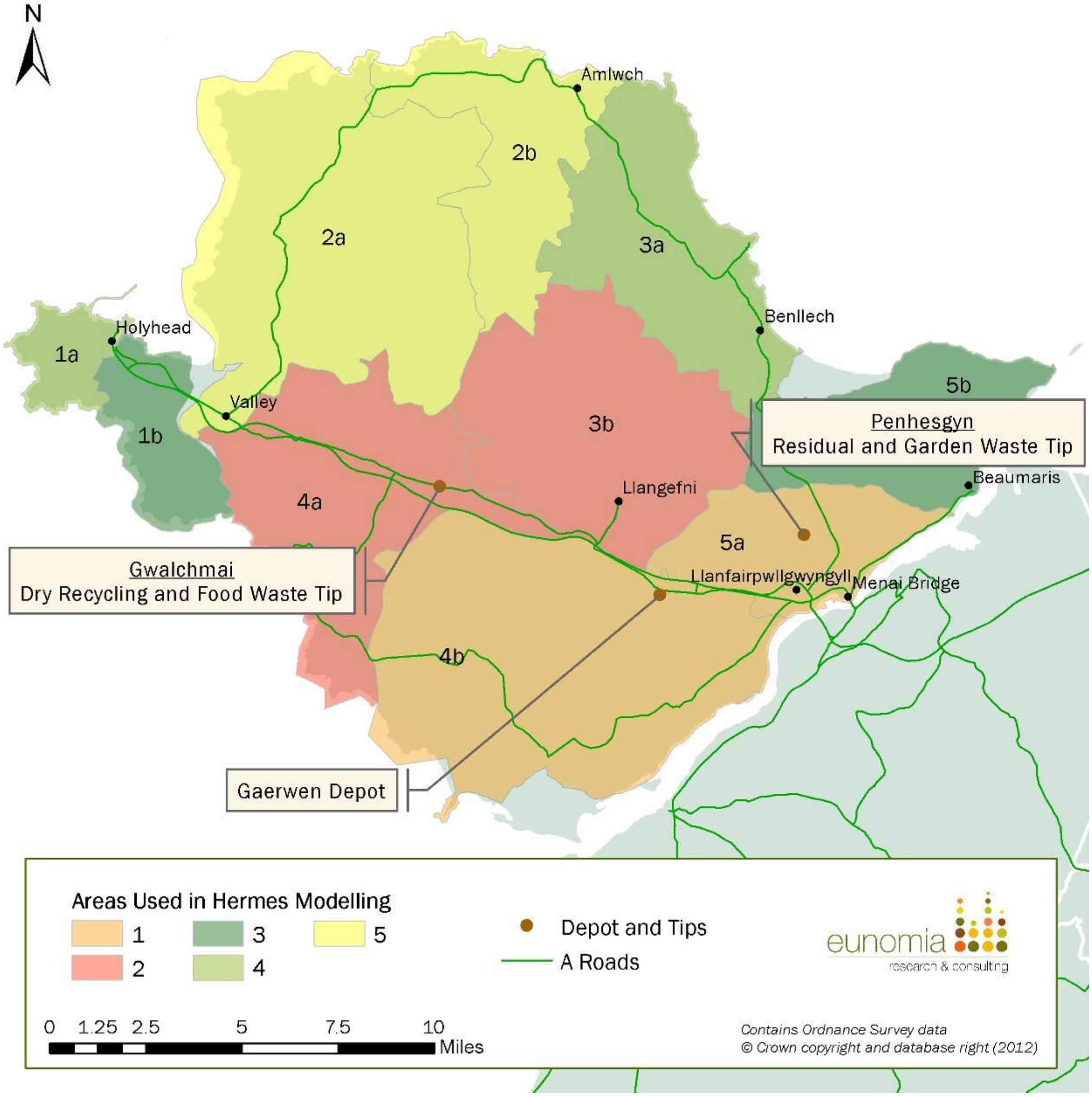
Since the previous modelling exercise Gwalchmai has been adapted for bulking and onward transport of food waste. This is done vehicle to vehicle, i.e. no food waste touches the floor. The food waste is bulked into a skip and collected and shipped to Biogen Gwyriad in Caernarfon, the transfer costs are included in the £38.62 gate fee.

A.1.4.2. Ward Demographics

Eunomia's proprietary collection model Hermes allows us to model six different collection 'areas'. These are not zones in the sense of round planning, but simply geographic areas that are grouped in a certain way. Hermes then divides the total material collected into these different areas and calculates the number of vehicles required for each collection service based on logistical parameters such as the time from the depot to the area, the time from the area to the tip, and the distances between dwellings in each area.

The five collection areas modelled for Anglesey, shown in Figure A. 2, are grouped by proximity to the depot since all of Anglesey Council's services run out of the same depot. This is done so that we can accurately represent a variety of collection logistics experienced within Anglesey. A sixth 'area' is used for restricted access (RA) collections which are assumed to be dispersed across the whole authority. The logistics modelled are effectively the same as was conducted in the previous modelling exercise, but that food waste is now tipped at Gwalchmai and not Penhesgyn. The number of households has also increased from the 32,730 considered in 2011/12, to 33,600 for 2014/15.

Figure A. 2: Areas used for Collection Modelling



A.1.4.3. Coverage, Participation and Set-Out

No official participation or set-out rate analysis has been conducted for the existing services since the last modelling exercise, though an estimate of 90% set out and 94% participation in dry recycling in all areas except Holyhead was suggested by Biffa. If Holyhead households (taken as 5,000) are assumed to be at 70% participation and 60% set-out, this leads to averages of 90% participation and 86% set-out for Anglesey as a whole. Concerning food waste, Biffa estimates 60% participation and 55% set-out (presumably also relating to non-Holyhead areas); however, the reduction in food waste capture observed in the recent tonnage data (see Table A. 3) would suggest that this service is less well used than previously and so we assume a slight reduction in the overall participation and set-out rates compared to the modelling for the 2011/12 year, as shown in Table A. 5.

Table A. 5: Baseline Participation and Set-Out Rates for Each Service

	2011/12				2014/15			
	Dry Recycling	Food Waste	Garden Waste	Residual Waste	Dry Recycling	Food Waste	Garden Waste	Residual Waste
Coverage	100%	100%	100%	100%	100%	100%	100%	100%
Participation	82%	57.5%	80%*	100%	90%	55%	80%*	100%
Set Out	66%*	50%	70%**	92%*	86%	45%	70%**	92%*

*No data, working assumption.
**No data, working assumption for peak demand (summer month) set-out.

A.1.5. Cost Assumptions

The key cost assumptions to be used in the modelling are presented in this section. All costs presented in this work are in real terms at 2015/16 values.[15]

A.1.5.1. Gate Fees and Material Incomes

Table A. 6 outlines the gate fees that used in the modelling. These are set as the baseline current prices where figures exist. For materials collected in a different manner (i.e. mixed plastics collection) prices are as quoted from the existing plastics recycler. It should be noted that market risk is inherent in materials traded on short term markets.

Table A. 6: Gate Fees (+ve values) and Material Incomes (-ve values) Used in the Modelling. Prices as Currently Achieved Plus Additional Assumed Values. (All values are £ per tonne)

Waste Stream	2015/16 Costs		Option Modelling Costs	
	Cost Per Tonne	Transfer Cost Per Tonne to Reprocessor Where Incurred	Cost Per Tonne	Transfer Cost Per Tonne to Reprocessor Where Incurred
Soft mix paper	-£30	-	-£30	-
Card	-£75	-	-£75	-
Mixed glass	-£35	Delivered – cost unknown, but income reduced to £10 if collected	-£10	-
Ferrous cans	-£65	-	-£65	-
Aluminium cans	-£520	-	-£520	-
Plastic bottles	-£40	-	-£40	-
Mixed rigid plastics (bottles, tubs and trays)*	-	-	-£20	-
Textiles and footwear	-£68	-	-£68	-
Food Waste	£38.62	-	£38.62	-
Garden Waste (IVC)	£40.83	-	£40.83	-
Residual Waste**	£108	-	£108	-

*Based on current price quoted by plastics recycler currently used by IoACC.
**Taken as the weighted average cost of current disposal routes (7.5k tonnes at £104, 5k tonnes at £108 and 4.5k tonnes at £114/tonne).

[15] Gate fees, material incomes and container costs are from latest available data. Where no new information was available, costs are taken from previous modelling but updated from 2012/13 prices to 2015/16 prices using HM Treasury GDP deflators from https://www.gov.uk/government/statistics/gdp-deflators-at-market-prices-and-money-gdp-march-2013

A.1.5.2. Vehicles and Crewing Assumptions

The modelled vehicle specifications are presented in Table A. 7. Some vehicles may be being leased currently. However, all existing vehicles within the options modelling are assumed purchased and written off over 7 years with the annualised cost calculated with capital interest at 7%. Due to the limited time left within the existing Biffa contract, any new vehicles required are written off over 4.5 years (following the assumption that service change may occur in the autumn of 2016).

The crewing levels per vehicle in all modelled options keep to the current arrangements. The number of crew modelled for all RRV options is driver+1. For residual/garden waste collection, currently four front line vehicles operate as driver+2, and two (plus the part time vehicles and the seasonal vehicle) operate as driver+1; the same proportions are kept in the alternate options.

Table A. 7: Vehicle Specifications

Vehicle	GVW Laden (tonnes)	Capacity (tonnes)	Capacity (m^3)	MPG	Capital Value
Frontline RCV large	26	10.4	21.4	4	£140,000
Frontline RCV medium	16	5.2	13	5	£125,000
Frontline RCV small (restricted access)	12	3.6	4.5	10	£90,000
Cage vehicle used for remote properties	3.5	1.3	10	14	£33,800
Small kerbsider	7.5	1.3	8	8	£80,000
RRV	12	4.1 (max in practice 3.75, normal 2.9, can be as low as 1.3t unbalanced)	31	8	£130,000

A.1.5.3. Staff Costs

The modelled staff unit costs are shown in Table A. 8. The Unit Cost figure including on-costs covers all employer costs (for example National Insurance, holiday and sickness cover, pension, bonuses etc.).

Table A. 8: Operational Staff Unit Costs

Staff	Total Annual Unit Cost
Driver	£20,000 + 15% on costs
Loader	£16,500 + 15% on costs
Supervisor	£25,000 + 15% on costs

A.1.5.4. Containment

All replacement containers are assumed purchased outright (i.e. no interest rate is applied to cover borrowing costs or represent leasing arrangements), and are accounted separately as a capital expenditure. Annual replacement rates are also modelled, as presented in Table A. 9. The unit costs and replacement rates for existing containers are based (where possible) on data provided, and with a lower replacement rate on wheeled bins following the policy change to charge householders for replacements (estimated according to discussions during the project with Meirion Edwards of IoACC).

Table A. 9: Container Specifications and Costs

Container	Volume (litres)	Cost per Unit	Annual Replacement Rate	Biffa delivery charge for replacements
Kerbside boxes	40	£3.70	3.7%	£6.02
Kerbside boxes	55	£3.70	3.7%	£6.02*
Kerbside box hats	n/a	£0.49	2.3%	£0.80
Battery pouch	Small pouch	£0.45	2.3%	£0.80
Food waste kerbside caddy	23	£3.50	2.4%	£6.02
Kitchen caddy	7	£2.10	0.3%	£6.02
Caddy liners	7	£0.025	Assumes 2 bags per week used by current participants and all additional usage in proportion to modelled captures	-
240L wheeled bins	240	£18.03	1.6%	£11.44
120l wheeled bins	120	£19.20	1.6%	£11.44; assume £3 for initial roll out (see below)
Trolley box	165	£30	Assume 3.7%	£3 initial rollout**; assume £6.02 for replacements
Nappy bags (tiger bags)	Standard tiger bag	£75 per 1000***	Assumes 2 bags used per week for participants	-

* Taken as £1 per delivered container if as part of a roll out of new boxes.
** Straight distribution cost for delivery to households quoted as £3/household.
*** Cromwell Polythene price from personal communication 2/10/15.

A.1.5.5. Containment Adaptation (Trolley Box) Assumptions

Trolley box (or trolibocs, also sometimes referred to as wheelie boxes) are comprised of three boxes that stack together on a trolley which can be wheeled to the street on collection day, just like a wheeled box. Evidence of the performance of this system comes from Conwy County Borough Council, who trialled a trolley box system in 2014. Paper goes in the top box, plastic, cans and tetrapaks in the middle box and glass and cardboard in the bottom box. Trials of the trolley box showed them to be popular and increase the amount of material recycled, so in spring 2015 41,000 households were given a trolley box, with residual waste collection remaining a fortnightly collection from 240 litre wheeled bins. Conwy is the first Welsh authority known to be using the trolley box system. Despite some complaints about the quality and ergonomics, overall the crew have been very positive about the new system. The modelling will be based on the Cabinet report and feedback obtained directly from staff at Conwy, shown below.

Relevant information from Cabinet report:

- Measured by WRAP, overall dry recycling in the trial areas during the trial period increased by 6.05%, equivalent to 10.4kg/hh/yr. Separately from the WRAP evaluation, Conwy also monitored recycling tonnage in the trial areas where they found an increase in recycling equivalent to 16.1 kg/hh/yr.
- Participation at 82% was slightly higher than the 81% for the control areas. Trolley box users were more likely to put out a full range of materials for recycling every week; for example, the weekly set out rate for paper was just 29% in the control areas, compared to 64% for trolley box users; glass and cardboard was put out weekly by 63% of trolley box users compared to 49% on the old system.
- Crew reaction to the trolley box system was mixed. Most crew felt that rounds took longer to complete due to high participation and set-out. Whilst some crews stated that there was more lifting involved due to the stacking and unstacking of the boxes, others felt that were was actually less lifting involved, possibly because residents were more likely to present their materials every week rather than storing them up. It was noted that materials in the trolley box were cleaner than those presented previously. Overall the crew felt that residents preferred the new scheme and that both participation and the amount of recycling collected had increased.

Feedback from the crews:

- More cross contamination/sorting required than the previous boxes and bags system; this is mainly plastics when the central box becomes full, but it does occur across the material streams in all boxes.
- The rounds took longer initially, an hour in some cases but it's settled since getting used to the system and collection has speeded up. The length of day extension in the early weeks was a due to combination of factors including additional participation and the crews getting used to the loading and reassembling of boxes.
- Prefer the stacker boxes as they're generally a much better system.
- One additional crew talked to disliked the quality, the ergonomics and the time they take to service. This crew were, however, known to be serial complainers.

Feedback from the Operations Manager:

- Rounds took longer because of increased participation and the crew's unfamiliarity with the system. The day length settled into a standard working day after approximately six weeks (there may have been some slack that allowed for extra time in some rounds).
- Some crews prefer them and some dislike them ("That's crews for you").
- Far fewer replacement containers being issued.

Incidental information and points to note:

- One resident spoken to, within a family of four, struggled with the capacity of stacker boxes and also used the 90L polypropylene bag (the previous Conwy system) to contain the extra cans and plastics.
- Conwy crews are driver +2 so additional support was available to help complete the rounds (compared with Anglesey who currently operate as driver +1).
- Conwy refuse is fortnightly, impact of stacker boxes on collection round times would be dramatically different with a 4 weekly refuse. If active recyclers struggle for space they can still use the residual bin; if 4 weekly is introduced the spare capacity won't be available, so there's a question about whether the stacker boxes will be big enough in this case or whether additional containers be required for larger households.
- Straight also manufacture a 70L middle box with a total unit capacity of 165L compared with the 55L in the Conwy version and a total capacity of 150L.

Based on the above information and supplementary information in the main body of the report, the assumptions taken for Anglesey are discussed in Table A. 10.

Table A. 10: Trolley Box Assumptions for Anglesey Modelling

Variable	Anglesey Assumptions
Impacts to participation, capture and working day length	Conwy information (where trolley boxes were introduced independently from changes to residual waste collection) suggests that additional time was needed when the containers were first introduced, but then returned to normal when crews got used to them. This is in spite of the Cabinet report indicating that participation increased marginally from 81% to 82%, the weekly set out rate also increasing (partly due to all containers always being wheeled out), and capture increasing from 172 to 182 kg/hh/yr. The Anglesey modelling assumes two cases: i) No additional time is needed to sort the trolley box system compared to the two kerbside box system operated at present (though it is recognised that crews will need to go through a few week period of adaptation to get used to the new containers). ii) An additional 5 seconds is provided compared to the two kerbside box system operated at present.

Container replacement	Although a low replacement rate is being observed in Conwy currently, the long term replacement rate may be expected to increase as container systems age. The same replacement rate as current boxes (3.7% per annum) is taken in the modelling.
Capacity	In Conwy some larger families have struggled with the capacity of the trolley box, and are also using their old containers to put out material (particularly cans and plastics), which is allowed. Conwy have a fortnightly residual collection. Any changes to the frequency of residual collection in Anglesey will have a knock-on effect if a trolley box system is also implemented, both on collection times and capacity issues. Conwy are using a 150L capacity trolley box, a larger 165L capacity model is also available so this could be one option for the system to adopt in a restricted residual situation for Anglesey.

A.1.5.6. Infrastructure Adaptation Costs

Within the modelled options, an additional capital budget allowance is attributed for adaptations at Gwalchmai facility when introducing a residual constraint, introducing mixed plastics collections and for dealing with the increased separately collected materials. From information provided by the council, the current sorter is run on average 3 days a week (4 days in some weeks when higher throughput etc.). The system currently has two manual tie off bailers for the plastic and steel cans and a stillage system to store the aluminium offline in the cardboard bailer. Current manning is 44 hours per week (two operator 3 days a week).

The following adaptions have been proposed and itemised by the council associated with the modelling options considered in this report:

1. Addition of an extra bottler perforator, required for the additional volume of plastics.
2. Addition of an automatic tying bailer for the plastics.
3. Addition of a line for manual bailing of the Aluminium cans (using the current plastic bailer).
4. Changes in the configuration of the sorting line to enable the extra storage area for the plastics without changing the building layout.

Costs associated with these adaptations have been provided by the council, are listed in the table below and are applied as an additional capital expense in the modelling. They have not been crosschecked or benchmarked by the consultants.

Table A. 11: Infrastructure Adaptation Costs Assumed for Gwalchmai Under Modelled Alternate Options

Item	Budget Costs
Twin ram automatic plastic bailer	£135,000
Changes to the sorter configuration, additional conveyor belts, plastic perforator, re-programming of the system, labour and lifting equipment.	£61,000
Lean-to building on the west side of the building for the bailed	£15,000
Moving of the current supply to the sorter and additional supply	£5,000
Civil works for ground works	£8,000
Drainage works	£5,000
Total	£229,000

A.1.6. Nappy Collections

Nappy (and other absorbent hygiene product) collections have been trialled successfully in several local authorities across the UK. Data was obtained from Gwynedd, where nappy collections started in Dwyfor in mid-October 2014 and were introduced in Meirionnydd in June 2015. To compare, data was also taken from Zero Waste Scotland's evaluation of the 6 month long trials conducted across four local authorities in Scotland, [16] as shown in Table A. 12. The Anglesey assumptions for a lower frequency collection cycle than taken in Gwynedd and in the ZWS trials is shown in the right hand column.

Table A. 12: Existing Data on Nappy Collections and Anglesey Nappy Collection Assumptions

Variable	Gwynedd Feedback	ZWS Trials Information [17]	Anglesey Assumptions
Containment	Yellow sack delivered with initial letter – waste collector leaves the next sack (in letter box or alternative) when collecting. No reported problems with sack breakages.	Mixture of wheeled bins only, wheeled bins and sacks, sacks only and containers provided only at HWRCs.	Tiger sacks.
Opt-in rate	Currently 0.8% but opt-in requests are still constantly being received following introduction of the service. This is 195 properties out of 15,800 in Dwyfor, and 100 properties out of 19,000 in Meirionnydd.	Households using absorbent hygiene products represent 12% of total households as an average (large variations across areas). Opt in rates were then 21% for sack collection, 33% for 120L wheeled bin collection, 57% for 80L sack with 87L container, or 89% for 30L tiger sack with 120L wheeled bin.	6% of households with children in nappies (estimated from recent birth rate data, see Section 2.4). Opt in rate of nappy households assumed to be high in restricted residual options even under the sack system – 95% for 4 weekly residual, and 80% for 3 weekly residual.
Frequency of collections	Weekly	Weekly (and an HWRC trial).	Fortnightly
Average participation (once within 3 weeks, compared to opt-in rate) and set-out rates	No reported issues with individuals not presenting.	Participation 77%. Set-out 55%.	Participation 100% of opting in households (on the basis that the service should be withdrawn from those no longer using it). Set-out 90% in three weekly option, 95% in four weekly option.

[16] Nicki Souter Associates (2013) *Evaluation of the Absorbent Hygiene Products Collection Trials in Scotland*, Report for Zero Waste Scotland, 2013

[17] *Nicki Souter Associates (2013)* Evaluation of the Absorbent Hygiene Products Collection Trials in Scotland*, Report for Zero Waste Scotland, 2013*

Variable	Gwynedd Feedback	ZWS Trials Information [17]	Anglesey Assumptions
Separate collections or with residual collections?	Separate	Separate	With residual where possible (see Table 2 in main report)
Routing approach	Bespoke	Bespoke	Bespoke
Number of hours and days per week collections are operated, pickups per day achieved	12 hour shift. One collection day in each area (at the moment), i.e. 150 properties collected per day.	Varied according to trial.	Modelled as 120 pickups per day in three weekly residual options, 130 in four weekly residual options.
Type of vehicle used and crew level	Caged vehicle. Driver only.	7.5t GVW RCV. Driver only.	7.5t GVW RCV. Driver only.
Collection charges	None	None	None
End destination/disposal point	Waste bulked up at waste transfer station. End destination: Nappycycle Ltd Unit 3, Capel Hendre Ind Estate, Ammanford	Knowaste Midlands Limited, Giffords Way, Off Kelvin Way, West Bromwich, West Midlands B70 7JR	Disposal at Penhesgyn
Licensing issues	None	Unknown	N/a
Contamination rates	Not known – no issues raised.	Contamination was less than 0.1% for each of the trial services.	N/a – all disposed.
Tonnages collected	Dwyfor: April 4.48T May 3.96T June 4.08T Meirionnydd : June 2.34T Suggests: 5kg/hh/wk	Average Total Weekly Tonnage 0.45 Actual Average Yield 3.25 kg/hh/wk	5kg/hh/wk per opted in household.
Cost of the service	Unknown	£66.25 per served household for Perth and Kinross £53.45 for Stirling	Modelled at £36/served household in three weekly residual options or £38/served household in four weekly residual options.
Service advertisement / Informational leaflet provided to users	Included in all literature sent out (and website) notifying of the 3 week change. Initial self-explanatory letter that is delivered to the householder is enclosed.	Communications to support the introduction of absorbent hygiene product kerbside recycling services should include: an introductory leaflet, bin or container decal (where appropriate) or reminder postcard emphasising the materials that can and cannot be recycled using this type of service, direct community engagement activities to relevant target groups, A4 posters to support community engagement activities.	Included within communications costs given in Section A.1.8.

A.1.7. Local Authority Waste Arisings and Performance Data Under Reduced Frequency of Collection

There is some initial evidence from other authorities across the UK who have trialled and/or implemented restricted residual waste collections, which have taken the form of three weekly collections using 240L bins, shown in Table A. 13. This data coupled with the capture rate analysis from Figure A. 1 (i.e. to ensure that all individual materials remain below 100% recycling) is used to inform the yield adjustments for the alternate collection systems for Anglesey, shown in Table A. 14.

Table A. 13: Data From Other Authorities on Impacts of Change to 3 Weekly Residual Collection

Yield change kg/hh/yr (percentage change)	Gwynedd – Dwyfor 240L bins 3 weekly	Bury – 240L bins 3 weekly	Somerset Waste Partnership 3 weekly trial	Falkirk – 240L bins 3 weeks	Average Percentage Change
DMR	143 - 161 (13%)	207 – 227 (10%)	-	193 – 239 (24%)	15.67
Card	-	-	36 – 47 (23%)	-	23%
Plastics/Cans	-	-	16 - 26 (60%)[1]	-	60%
Glass	-	-	83 – 99 (22%)	-	22%
Paper	-	-	47 – 57 (28%)	-	28%
Total dry recycling	143 - 161 (13%)	207 – 227 (10%)	182 – 229 (32%)	193 – 239 (24%)	20%
Food	43 - 56 (30%)	127 – 142 (12%)	68 – 99 (45%)	40 – 73 (84%)	43%
Garden	-		-	-	12%
Residual	285 – 230 (-19%)	393 – 327 (-17%)	343 – 250 (-27%)	384 – 287 (-25%)	-22.00%
Total Collected Waste (i.e. reduction in kerbside collection)	471 – 447 (-5%)	726 – 696 (-4%)	593 – 577 (-3%)	616 – 598 (-3%)	-4%

[1] *Mixed plastics were added at this point.*

Table A. 14: Current and Assumed Kerbside Yields Under Alternate Residual Collection Systems For Anglesey

Yields kg/hh/yr	Baseline 2014/15 actual kerbside data	Option 1 Fortnightly 120l residual + 3rd box	Option 2a 3 weekly 240L residual + 3rd box	Option 2b 3 weekly 240L residual + trolley box*	Option 3a 4 weekly 240L residual + 3rd box	Option 3b 4 weekly 240L residual + trolley box
Mixed Glass	51	59	57	58	61	62
Paper and Light Card	54	64	60	62	68	70
Corrugated Card	11	13	12	12	14	14
Mixed Cans	9	12	12	12	13	13
Plastics	15	28	26	27	31	32
Textiles	2	8	6	6	10	10
Total dry	*142*	*184*	*173*	*177*	*197*	*201*
Food	48	60	80	80	95	95
Garden	217	225	225	225	229	229
Nappy collection	-	0	12	12	15	15
Residual	457	369	354	350	298	294
Total residual diverted to HWRC / litter bins etc. in options where residual constraint is introduced	-	26	20	20	30	30
Total diverted to bring and HWRC recycling in options where residual constraint is introduced	-	0	0	0	0	0
Total waste prevention	-	0	0	0	0	0
Total kerbside waste plus diverted / prevented material (for crosscheck purposes)	864	864	864	864	864	864

Table A. 15: Capture Rates From Modelled Yields in Previous Table

	Baseline Current capture	Option 1 Fortnightly 120l residual	Option 2a 3 weekly 240L residual	Option 2b 3 weekly 240L residual + trolley box	Option 3a 4 weekly 240L residual	Option 3b 4 weekly 240L residual + trolley box
Mixed Glass	80%	92%	89%	91%	95%	97%
Paper and Light Card	64%	76%	71%	74%	81%	83%
Corrugated Card	77%	90%	83%	83%	97%	97%
Mixed Cans	63%	84%	84%	84%	91%	91%
Plastics*	36%	68%	63%	66%	75%	78%
Textiles	8%	31%	23%	23%	39%	39%
Food	24%	30%	40%	40%	47%	47%
Garden	93%	96%	96%	96%	98%	98%

*Capture rate of dense plastic packaging. Only bottles collected in current system, hence lower rate.

A.1.8. Communications Costs

A communications budget figure was provided by Meirion Edwards of IoACC at £90,000, equating to £2.70 per household. This is slightly higher than the range identified as the <u>additional</u> communications budget that should be set aside in relation to a change in residual waste service, as informed by WRAP (2013) *Improving Recycling Communications through effective Communications* (section 1.5):

> *"Depending on what you need to achieve, your communications will require funding - as a rule of thumb, you should aim for a budget figure of around £1.00 per household for standard communications. For communicating major service changes or more intensive communications activities for "hard to engage" residents, £1.50 to £2 per household is more realistic."*

For the purposes of modelling, for all residual constraint options we assume the higher £2.70/household as additional communications costs, though this is possible that in practice this may be slightly more that would be required to support the service changes being considered. These costs are accounted within the capital / one-off costs budget in Figure 4 in the main report.

A.1.9. Photo Reel

Figure A. 3: Biffa Romaquip RRV Collection Vehicles

Figure A. 4: Conwy Trolley Box, and Trolley Boxes at the Kerb on Collection Day

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recycle
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Gaerwen Industrial Estate
Gaerwen
Anglesey
LL60 6HR

Mr Meirion Edwards – Chief Waste Management Officer
Isle of Anglesey County Council
Council Offices
Llangefni
Anglesey
LL77 7TW

3rd November 2015

Dear Meirion

RE; Isle of Anglesey Collections Appraisal Report 2015

We are in receipt of the final Isle of Anglesey County Council Collections Appraisal Report published by Wrap Cymru produced in conjunction with Eunomia Research and Consulting. We would like to thank you for the opportunity to be a stakeholder in the process which has resulted in many queries and differences in assumptions being resolved through dialogue with the report producer(s). Unfortunately we have two critical differences on resources which we have been unable to resolve.

Biffa Municipal has vast experience in operating Local Authority collection contracts utilising over 1100 vehicles and employing over 3000 staff operating 42 contracts servicing 3.2 million households. Utilising our operational experience we also conducted a parallel collections modelling exercise with a view to checking our own data and resources and to allow us to respond accurately to the Wrap Cymru. Our own modelling has identified resource differences on two of the nine options, namely Option 2a (240 litre Residual Bin collected 3 weekly) and Option 3a (240 litre Residual Bin collected 4 weekly). Please see below our detailed response to each option.

a) Option 2a – (Table 7 – Page 24 Wrap Report) – Wrap/Eunomia suggests 2.9 vehicles are required under the Residual Waste Collection option (3 x 26t RCV's and one 12t RCV – with one 26t RCV only used part time) Our Modelling shows that 4 vehicles are required full time (2 x 26t RCV, 1 x 16t RCV and 1 x 12t RCV). What Wrap/Eunomia have not identified is the restricted access nature of some collections on the Isle of Anglesey versus vehicle capacity. 26t RCV's cannot access all of the required lanes on the island therefore our solution better reflects the reality of collections. We accept that the 12t RCV may be slightly under utilised due to the 16t RCV not being able to fit in the same small spaces as the 12t RCV, but the 12t RCV not having sufficient capacity to complete all of the work within the required hours. We believe that the Wrap/Eunomia solution is under resourced and that this would lead to missed collections.
b) Option 3a – (Table 7 – page 24 Wrap Report) – Wrap/Eunomia suggests 12 RRV collection vehicles are required under the Recycling and Food Collection options, this is the same level of resource as the 2a (3 weekly collection) option despite the addition of a third recycling box and a 15% increase in Dry Recycling and Food tonnages collected. Our solution utilises 13 RRV collection vehicles this is the same as Wrap/Eunomia's modelled Op 3b(ii) and Op 3a (12.8 RRV's in the draft report of 5th October 2015). Our solution also reflects Eunomia's modelled solution for 4 weekly collections during a previous Collections Appraisal Report

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(Table 9 – Page 24 – Option 8 PASS – Isle of Anglesey County Council Collections Appraisal Report 17th May 2013). When Biffa queried how a full round could be lost between Draft and Final reports the response received from the Wrap representative was that Eunomia had increased the number of trips to tip per day to 1.46. It is interesting that Wrap/Eunomia felt that it should alter the number of trips to tip per day when the whole principle of using RRV's is that they should only be required to tip once per day, therefore maximising collection time as stated on Page 31 – Option 4 RRV – Isle of Anglesey County Council Collections Appraisal Report 17th May 2013. In reality Biffa has not consistently achieved 1 tip per day with the average being 1.2 tips per day across the fleet. Wrap/Eunomia has recognised that using the baseline the Collection crews are currently heavily utilised (Page 19 – Wrap Report). We believe that the Wrap/Eunomia solution is under resourced and that this would lead to missed collections.

Biffa has a long history of working in partnership with the authority in meeting both its operational and financial challenges, by embracing the RRV concept Biffa was able to return by way of a discount £265k per annum (indexed) from the introduction of the new service in 2014. We have not sought to seek any further payment from the authority for the additional 0.2 tips per vehicle per day (average) as we accepted at that time (2014) that volume and tonnage risk was ours. At the point of purchasing the new fleet in 2014, we indemnified the authority that should our modelled assumptions be incorrect and we had over resourced we would give 75% of the saving to them.

It is no secret that we run our resources 'lean' so to commit to purchase and operate additional vehicles which come at considerable cost to Biffa is not a step we take lightly. Whilst we are confident that our modelled solutions to both Options 2a and 3a are correct, the move towards varying Residual collection frequencies to 3 or 4 weekly is new territory and something that no one can be confident of making accurate predictions on. We would suggest that any future Variation Order should include Risk/Reward elements based on waste flows, tonnages and work content with mechanisms to cover any costs incurred or return savings generated as a direct result of the actual waste flows being materially different.

Should the authority wish to progress and vary the frequency of its Residual collections, we are happy to work with the Officers in drafting and costing the required Variation Order.

We would recommend that any change to Collection frequency should be well communicated to residents. We would suggest that achieving changes by April 2016 leaves too short a time scale for communications and vehicle procurement, more suitable options may be October 2016 or March/April 2017. Please note that Christmas (December and January) and Summer (June, July & August) are difficult times to alter services.

Also, we'd recommend keeping Green waste collections during the winter months due to the following reasons;-

1) The collections service is contracted as AWC with resources shared between Residual & Green waste. All trucks are designated to the IACC contract.
2) The only identifiable saving is on DERV – Staff costs, Depreciation & Maintenance are still required, we estimate the DERV saving to be circa £14.3k(Baseline - 2015).
3) As previously stated in Point 1, we share the resources between services. In the summer we deploy an extra RCV at our cost to cope with the increased tonnages, in winter we use spare capacity on the Green waste trucks to avoid overtime on the residual rounds. The cost verses benefit ratio by doing this is about equal. If Green waste services are suspended this denies us the opportunity to balance the costs over a full 52 weeks. Therefore we would claim against the authority the costs of the additional summer round. We estimate this cost would be circa £13.8k(Baseline - 2015)
4) Therefore, the only realisable contract saving to the authority in suspending green waste service is £500.

5) In addition, from our experience on other contracts we estimate that at least 25% of the green waste tonnage would end up in the residual bin, which would likely cost the authority £16.9k to landfill.

In summary we recognise the challenge IACC faces in attempting to achieve the targets imposed by the Welsh Government and we are fully committed to working with you, however it is important as we both venture into this as yet unknown territory that we ensure that high service levels are maintained as poor service is one of the biggest blocks to achieving high recycling rates. To this end we recommend that a degree of caution is applied when resourcing the service.

Yours sincerely

Andrew Dutton
Regional Manager

C.c. Simon Crook – Operations Director
Pete Dickson – Commercial Director
Darren Atkinson – General Manager – Development
Roger Edwards – Managing Director.