Report

Falkirk Council: Collection Service Review

Shortlisted Options Report

Zero Waste Scotland works with businesses, individuals, communities and local authorities to help them reduce waste, recycle more and use resources sustainably.

Find out more at www.zerowastescotland.org.uk

Written by Zero Waste Scotland on behalf of Falkirk Council

Not for publication

Executive Summary

Scottish councils are facing a period of considerable change with respect to their recycling and waste collection services. The Scottish Governments Zero Waste Plan (ZWP) and Waste (Scotland) Regulations 2012 (WSR) are driving councils to increase the capture of materials collected for recycling and away from landfill.

Prior to 2003, households in the Falkirk area were provided with a single 240 litre container collected weekly. Since then a number of services have been introduced that now sees five containers being collected on varying cycles. The provision of additional kerbside collection services has increased the capacity from 240 litres per week prior to 2003 to over 430 litres per week in 2012. This represents an increase of over 80% in capacity.

As a result, officers identified the need to review the evolving services to ensure that they are fit for purpose in terms of both cost and compliance with the ZWP recycling targets and the WSR.

In 2012/13, a detailed Falkirk options appraisal was undertaken through which seven alternative collection options were modelled and the increases in performance and potential cost savings appraised. Following a review of the results, Council officer's shortlisted three options and asked for an additional option to be considered. This report focuses on the four shortlisted options and how these compare with the current service. The shortlisted options are described in Executive Summary Table 1.

Executive Summary Table 1: Overview of Shortlisted Options

Option	Residual Waste (240L)	Co-Mingled Recycling (240L)	Garden Waste (240L)	Black Box & Textiles (55L & 50L)	Food Waste (23L)
Current	F	F	F	F	W
2	3-Weekly	F	F	F	W
3	3-Weekly	W	F	F	W
7	4-Weekly	F	F	F	W
Enforced Policy	F	F	F	F	W

F= Fortnightly, W = Weekly

Options 2, 3 and 7 incorporate a variation of: (i) continued weekly collection of food waste; (ii) continued fortnightly collection of the black box, textiles and garden waste; (iii) reduced collection frequencies of the 240L residual waste made possible by the frequent separate collections of food waste (and additional capacity provided if required to those properties with significant arisings of absorbent hygiene products); and (iv) more frequent collections of co-mingled recycling to increase capture.

The **Enforced Policy Option** incorporates the education and enforcement policies that will be adopted by the Council (subject to Elected Member approval) including:

As per current practice	(i). no side waste will be collected and bin lids should be closed (ii). contamination present in the black box will not be collected and will be left in the black box with a note explaining what the non-target items were (iii). before emptying the blue and brown bins, crews will lift the lid and check for obvious signs of contamination with non-recyclable items
Additional to current practice	(iv). before emptying the green residual waste bin, crews will lift the lid and check for obvious signs of recyclable items. If it is apparent that there is a substantial quantity of recyclables that are not being sorted into the correct containers then three stages of education/enforcement will be carried out

Analysis of the shortlisted options to determine (a) the expected overall recycling rate performance and (b) the service cost compared with the current service is provided in Executive Summary Table 2.

Executive Summary Table 2: Summary of Shortlisted Options: Recycling Rate Performance and Service Cost

Option	Collection Frequency					Overall Recycling Rate (%)	2014/15 annual cost compared with current service (£)	2015/16 annual cost compared with current service (£)
	Residual Waste	Co-Mingled Recycling	Garden Waste	Black Box & Textiles	Food Waste			
Current	F	F	F	F	W	54.3%	-	-
2	3-Weekly	F	F	F	W	60.8%	-£258,826	-£385,543
3	3-Weekly	W	F	F	W	63.8%	-£9,035	-£167,898
7	4-Weekly	F	F	F	W	66.9%	-£487,890	-£754,561
Enforced Policy	F	F	F	F	W	56.5%	-£90,496	-£120,434

A review of the recycling rate performance and service cost of the four shortlisted options is below:

Option 2: Residual waste collection reduced from fortnightly to 3-weekly results in an increase in the recycling rate of 6.5% with a cost difference to the current service of -£258,826 in 2014/15 and -£385,543 in 2015/16

Option 3: Residual waste collection reduced from fortnightly to 3-weekly and co-mingled recycling collection increased from fortnightly to weekly results in an increase in the recycling rate of 9.5% with a cost difference to the current service of -£9,035 in 2014/15 and -£167,898 in 2015/16

Option 7: Residual waste collection reduced from fortnightly to 4-weekly results in an increase in the recycling rate of 12.6% with a cost difference to the current service of -£487,890 in 2014/15 and -£754,561 in 2015/16

Enforced Policy: There are no changes to the frequency of collections however increased education/enforcement policies will be required and would result in an increase in the recycling rate of 2.2% with a cost difference to the current service of -£90,496 in 2014/15 and -£120,434 in 2015/16

In addition to the recycling rate performance and service cost summary, a risk matrix for each of the four shortlisted options is provided in Executive Summary Table 3.

Executive Summary Table 3: Summary of Shortlisted Options: Risk Matrix

Option	Staffing Requirements	Service Cost	Recycling Rate Performance	Public Acceptability	Risk Score
2	Low (2)	Low (2)	Low (2)	Medium (4)	10
3	Low/Medium (3)	Medium (4)	Medium (4)	Medium (4)	15
7	Low (2)	Very Low (1)	Low/Medium (3)	High (5)	11
EP	Medium (4)	Medium (4)	Medium(4)	Medium (4)	16

An overall review of the recycling rate performance, service cost and risk score of the four shortlisted options is below:

Option 2: Recycling rate increase of 6.5%; service cost differences of -£258,826 (2014/15) & -£385,543 (2015/16); risk score of 10

Option 3: Recycling rate increase of 9.5%; service cost differences of -£9,035 (2014/15) & -£167,898 (2015/16); risk score of 15

Option 7: Recycling rate increase of 12.6%; service cost differences of -£487,890 (2014/15) & -£754,561 (2015/16); risk score of 11

Enforced Policy: Recycling rate increase of 2.2%; service cost differences of -£90,496 (2014/15) & -£120,434 in 2015/16; risk score of 16

Table of Contents

1 Introduction

1.1 Background to study

In 2011 the average recycling and composting rate achieved by Scottish Local Authorities was 40.1%[1], with Falkirk Council achieving 52.7%. Since 2011 the Council's recycling and composting performance is expected to have increased due to the implementation of a new separate collection of food waste which was phased in over 2012/13. Unverified figures suggest that Falkirk's recycling and composting performance in 2012 was 55.2%.

This report considers the potential for Falkirk to increase performance even further by optimising the frequency of collections and/or rationalising the capacities provided for each material stream. This study is part of a wider programme of work being delivered by Zero Waste Scotland that considers:

- The experience elsewhere of optimised/rationalised collections;
- The resources and costs associated with optimised/rationalised collections (including on-going operating costs) for case study local authorities;
- The health impacts (including laboratory analysis) of alternative frequency collections; and
- A survey of public attitudes.

In 2012/13 a detailed Falkirk options appraisal was undertaken[2] through which seven alternative collection options were modelled, and the potential cost savings and increases in performance appraised. Following a review of the results, Council officers shortlisted three options and asked for an additional option to be considered. This study focuses on the four shortlisted options, and how these compare with the existing service.

1.2 Policy Landscape

Scottish councils are facing a period of considerable change with respect to their waste and recycling collection services. The Zero Waste Plan (ZWP)[3] and Waste (Scotland) Regulations 2012 (WSR)[4] are driving councils to increase the capture of materials collected for recycling and away from landfill. Key requirements that will impact Falkirk Council's household collections include:

- Targets outlined in the ZWP to recycle/compost/prepare for reuse. The Council has already met the 2013 target and is well on its way to achieving the future targets:
    - 50% of household waste by 2013;
    - 60% of household waste by 2020; and
    - 70% of all wastes by 2025.
- Regulation 2 Paragraph 4 of the WSR amends section 45 of the Environmental Protection Act 1990 (EPA) so that Scottish local authorities are required to collect dry recyclable waste from any premises, and food waste from non-rural premises, if requested to do so by the resident. Dry recyclables to be collected include glass, metals, plastics, paper and card.
- Regulation 3 of the WSR amends the Pollution Prevention and Control (Scotland) Regulations 2000 (PPC). Paragraph 4 inserts regulations 9A and 9B in the PPC to create duties on SEPA to attach such conditions to

[1] SEPA recycling rates for 2011 (most up to date published data at the time of writing this report): http://www.sepa.org.uk/waste/waste_data/waste_data_reports/lacw_reporting/household_waste_reporting.aspx
[2] Zero Waste Scotland (2013). Falkirk Collection Options Report_Rev 4_07-02-13. Confidential report for Falkirk Council. Written by Rambøll and IKM Fehily Timoney.
[3] Zero Waste Plan: http://www.scotland.gov.uk/Publications/2010/06/08092645/0
[4] Waste (Scotland) Regulations 2012: http://www.legislation.gov.uk/sdsi/2012/9780111016657/contents

ensure that from 1st July 2012 (for any new or varied permits), where practicable waste including non-ferrous metals or hard plastics is not burnt. This will mean that waste collected by the Council will need to be sorted prior to incineration to extract non-ferrous metals and hard plastics.

- Regulation 4 of the WSR amends the Landfill (Scotland) Regulations 2003 with the effect that the operator of a landfill shall not accept separately collected waste or biodegradable municipal waste from 1st January 2014 and 1st January 2021 respectively.

1.3 Regulatory Impact on Falkirk Council

These requirements outlined above aim to realise the greatest environmental benefit by maximising the materials diverted for recycling and by ensuring they are of high quality, enabling, where possible, closed-loop recycling. The key measures that Falkirk Council may need to consider include:

- There are approximately 2,700 town centre properties that do not receive kerbside dry recycling collections, albeit the Council provides a comprehensive network of local bring banks and HWRCs. The Council may be asked to demonstrate that it meets the requirement to provide a separate collection to these properties by demonstrating that:
    - a) the amount of dry recycling collected at bring banks/HWRCs and recycled in closed loop processes is not significantly less than collected by other councils operating separate kerbside collections; and/or
    - b) significant amounts of dry recycling are not present in the residual waste stream.
- The Council may need to arrange for residual waste to be pre-sorted to remove non-ferrous metals or hard plastics; and also treat it in a way that means that biodegradable waste is not landfilled. Until May 2013 residual waste collected by the Council was pre-sorted at Avondale's dirty MRF, however this facility has since mothballed and the Council is exploring alternative sorting options. At the time of writing this report all residual waste was being sent to landfill.
- The Council will also need to consider if additional measures are required to increase the recycling of all wastes to 70% by 2025.

1.4 Service Impacts

The measures that are necessary to deliver the ZWP and WSR (outlined above) are needed at a time when council budgets are being squeezed, and thus service cost efficiency is essential. This means that the collection service design and delivery method adopted by Falkirk and other Scottish Councils may need to be reviewed and, where possible, optimised.

Optimised collection efficiency is achieved by ensuring that the optimal number of vehicles and crews are deployed to collect each waste stream; and that containers are collected at a frequency whereby they are close to being full[5], whilst preventing them overflowing or side waste being left beside the container.

Over the last decade the majority of councils have changed from collecting residual waste weekly, to alternate weekly collections (AWC) of residual waste and recyclables. Experience[6]from the move to AWC has demonstrated the following:

[5] It should be noted that it is not always possible to optimise collection frequency, for example if the waste is biodegradable and therefore requires more frequent collection due to an increased risk of undesirable health impacts as the waste degrades. As part of the wider programme of work Zero Waste Scotland had commissioned a study to understand if there are any impacts associated with alternative collection frequencies for residual waste.
[6]Alternate weekly collections guidance, WRAP, 2007http://www.wrap.org.uk/content/alternate-weekly-collections-guidance-local-authorities

- Altering the capacity of containers for residual waste has a positive impact on recycling rates. The longer residents have to retain waste within the household, the greater their incentive to sort waste to maximise the amount that is recycled.

- The quantity of residual waste presented when AWC was implemented reduced by approximately 30-50%. This is a result of the reduced capacity for residual waste and the increased diversion of material into recycling schemes.

- AWC schemes resulted in an increase in both participation in recycling and set out of recycling containers.

This report considers whether there is a benefit in taking another step by rationalising collections further. The key aims of such a service change would be to maximise service efficiency and performance.

This study for Falkirk Council focuses on four shortlisted options for maximising service efficiency and performance, and how these compare with the current service. The following report sections describe:

Section 2. The performance of the current service;
Section 3. An overview of the shortlisted options;
Section 4. The performance of the shortlisted options; and
Section 5. The resources and costs associated with each option when compared to the current service.

2 Waste and Recycling Services

2.1 Current collection system

Table 2.1 describes the kerbside collection services provided by the Council.

Table 2.1: Falkirk Council's Collection Services

Material Stream	Households Served	Coverage (%)	Collection Frequency	Container	Materials Collected
Residual waste	72,708	97%	Fortnightly	240 L green wheeled bin or communal bin	Residual waste
		3%	Weekly		
Co-mingled Recycling	70,000	96	Fortnightly	240 L blue wheeled bin or communal bin	Mixed plastics, beverage cartons, paper, cardboard, plastic bottles, food &drinks cans
Black Box	68,000	92	Fortnightly	55 L black box	Colour segregated glass, small WEEE & batteries
Textiles	68,000	92	Fortnightly	50 L plastic sack	Clothing, shoes, bags, belts, blankets, quilt covers, pillow cases &sheets
Garden Waste	64,420	89	Fortnightly	240 L brown wheeled bin	Flowers &plants, grass clippings, hedge trimmings, weeds, leaves, prunings, twigs &small branches
Food Waste	65,106	88	Weekly	5 L internal & 23 L external caddy	Food waste &unwanted leftovers

2.2 Recycling and Composting Performance

The total municipal waste arising in Falkirk Council in 2011/12 was 90,309 tonnes, of which 42,179 tonnes was sent to landfill and 48,130 tonnes was recycled or composted. Of the total waste managed by the Council, 56,591 tonnes (62.7%) was household waste collected at the kerbside.

Table 2.2: Average Weight collected per Household (2011/12)*

Material Stream	Households Served	WeightCollected (t/yr)	Weight/Household/ Year (kg/hh/yr)	Weight/Household/ collection (kg/hh)*
Residual waste	72,708	30,734	422.7	16.3 kg/fn
Co-mingled Recycling	70,000	11,830	169.0	6.5 kg/fn
Black Box	68,000	2,230	32.8	1.3 kg/fn
Textiles	68,000	46	0.7	0.03 kg/fn
Garden Waste	64,420	9,551	148.3	5.7 kg/fn
Food Waste**	65,106	2,201	33.8	0.65 kg/wk
Total		**56,591**	**807.2*** **	**30.4 kg/fn*** **

* fn = fortnight, wk = week. **A separate food waste collection was introduced in phases during 2012/13. 2011/12 residual waste weights have been adjusted to demonstrate the expected (whole year) performance. The average yield of food waste currently collected is approximately 0.65 kg/hh/wk.*** Average yield for those properties receiving all services.

2.3 Capture Rates

Table 2.3 describes the composition of waste presented in the residual waste bin which has been used to calculate the tonnage of each secondary category material remaining in the residual bin in 2011/12[7].

Table 2.3: Residual Waste Composition Analysis

Primary Category	Secondary Category	Composition %[8]	2011/12Tonnage
Garden Organics	Soft and woody	0.79	259.4
Kitchen Organics	Raw animal related waste meat/fish	1.04	7793.4
	Cooked animal related waste meat/fish	3.48	
	Mixed cooked and prepared food	10.02	
	Raw fruit and vegetable matter	11.21	
	Cooked Fruit & vegetable matter	1.04	
	Food still in its packaging unopened	3.55	
Pet Care Wastes	Organic animal bedding	1.69	556.7
Paper and Card	Newspapers, magazines	10.82	3,562.6
	Recyclable paper inc greetings cards	1.97	648.2
	Cardboard boxes/containers	2.65	872.6
	Non-recyclable (soiled) paper	4.25	1,400.8
Plastic film	Carrier bags and other packaging film	3.78	1,244.3
	Refuse sacks and other plastic film	1.42	468.1
Dense plastic	Dense Plastic 1 (PET bottles)	0.95	314.5
	Dense Plastic 2 (HDPE bottles)	0.94	309.3
	Other Plastics (packaging)	2.48	815.6
	Other plastics (non packaging)	2.03	669.6
Ferrous Metal	Ferrous food & beverage cans	1.47	485.2
	Aerosols	0.75	247.3
	Other ferrous metal	0.87	285.3
Non Ferrous metal	Non-ferrous food & beverage cans	0.77	253.4
	Aerosols	0.51	168.4
	Aluminium foil	0.84	275.5
	Other non-ferrous metal	0.58	192.1
Packaging glass	Glass bottles	1.57	518.2
	Glass jars	1.54	507.4
Non packaging glass	Non-packaging glass	0.89	292.4
Hazardous waste	Alkaline (or other) household batteries	0.56	185.4
	Lead acid batteries	0.49	163.0
	Chemicals or paint	0.49	160.5
	Oil - engine	0.50	164.9
	Fluorescent tubes/bulbs	0.49	160.5
	Other potentially hazardous items	1.88	619.0
WEEE	All WEEE	1.65	543.6
Other household items	Tetra pak/cartons	0.64	209.3
	Disposable nappies	1.59	523.2
	Identifiable clinical waste	1.04	343.5
	Sanitary towels	0.57	188.2
	Carpets and Underlay	0.77	254.2
	Wood	2.35	775.0
	Furniture	0.51	166.4
	Other miscellaneous combustibles	2.86	942.8
	Reusable textiles and shoes	1.74	574.5
	Non reusable textiles and shoes	2.09	687.0
	Inert (stones/soil)	0.99	326.0
	Other misc. non combustible	1.86	611.0
Liquid Waste	All liquids still in packaging	1.02	336.2
Fines	Mixed fines (10 mm sieved)	2.00	658.7
Total		**100**	**30,734**

[7]The weight of materials in residual waste bin has been calculated based on the % composition from the waste composition analysis, applied to the weight of residual waste collected at the kerbside in 2011/12 (adjusted to reflect the introduction of the new food waste service).
[8]The 2010 waste composition survey showed that 25.4% of material was fines which is due to a small town within the Council area using coal fires and therefore presenting large quantities of ash. Analysis was undertaken that suggests the average arisings of fines across the whole of Falkirk is 2% and therefore the results have been adjusted accordingly.

The weight of material collected for recycling and the weight of recyclable material remaining in the residual waste bin have been used to calculate the total arising of recyclable material. From this the capture rate can be calculated as shown in Table 2.4.

Table 2.4: Current Service Capture Rate

Material Stream	Weight Collected for Recycling (T)	Recyclable Material Remaining in Residual Waste Bin (T)	Total Arisings of Recyclable Material (t)	Capture Rate (%)
Mixed Paper	5,727	858	6,585	87%**
Cardboard	2,803	873	3,676	76%
News and Pams	2,322	3,563	5,885	39%**
Mixed Plastics	489	624	1,113	44%
Steel Cans	367	732	1,099	33%
Aluminium Cans	122	422	544	22%
Glass	2,032	1,026	3,058	66%
Small WEEE	197	892	1,089	18%
Textiles	46	574	620	7%
Garden Waste	9,551	259	9,810	97%
Food Waste*	2,201	7,793	9,994	22%
Total	**25,857**	**17,616**	**43,473**	**59%**

* Food waste capture rate is based on the expected weight of food waste that will be collected when the scheme has been in place for a full year. **It is understood that a high proportion of material classified as mixed paper in the analysis is likely to be high quality news and pams.

2.4 Summary

This review of the current collection system has demonstrated that there is an opportunity to increase capture rates and improve recycling and composting performance. The following sections describe four shortlisted options that have been analysed in detail to improve performance. The impact on resources and costs is described in Section 5.

3 Options Shortlisting

3.1 Introduction

An appraisal was undertaken to assess options to increase performance and optimise and rationalise efficiency over and above the current service. This follows on from a detailed options appraisal which was undertaken in 2012[9] through which seven scenarios were modelled in order to appraise the potential for cost savings and an increase in performance. These options are described in Table 3.1:

Table 3.1: Overview of Options

Option	Collection Frequency					Weekly collection capacity (L)	Kerbside Recycling Performance	Overall Recycling Performance	2014/15 annual cost compared with current service (£)*	2015/16 annual cost compared with current service (£)*
	Residual Waste**	Co-Mingled Recycling	Garden Waste	Black Box & Textiles	Food Waste					
Current	F (240L)	F	F	F	W	433	45.7%	54.3%	-	-
1	F (240L)	W	F	F	W	553	46.3%	54.8%	£457,254	£444,434
2	3-W (240L)	F	F	F	W	393	54.7%	60.8%	-£258,826	-£385,543
3	3-W (240L)	W	F	F	W	513	59.0%	63.8%	-£9,035	-£167,898
4	F (140L)	F	F	F	W	383	53.9%	60.2%	-£220,336	-£357,272
5	F (140L)	W	F	F	W	503	57.7%	62.9%	£71,287	-£111,285
6	4-W (240L)	W	F	F	W	493	63.7%	67.2%	-£37,987	-£297,155
7	4-W (240L)	F	F	F	W	373	63.2%	66.9%	-£487,890	-£754,561

3-W=3 weekly, 4-W = 4 weekly, F= fortnightly, W=weekly * Capital costs are presented annualised to represent the Council's approach for budgeting depreciation and interest payments. ** Approximately 6,500 flatted properties will continue to receive a fortnightly refuse collection. *** It is expected that some properties will require additional residual waste capacity due to significant arisings of absorbent hygiene products (disposable nappies and adult incontinence products).

Following a review of the results, Council officers shortlisted three scenarios and asked for an additional "Enforced Policy" scenario to be considered. This study focuses on the four shortlisted options, and how these compare with the existing service.

3.2 Shortlisted Options

The shortlisted options are described in Table 3.2. There is no variation between options in the sizes of container provided.

[9]Zero Waste Scotland (2013). Falkirk Collection Options Report_Rev 4_07-02-13. Confidential report for Falkirk Council. Written by Rambøll and IKM Fehily Timoney.

Table 3.2: Overview of Shortlisted Options

Option	Residual Waste	Co-Mingled Recycling	Garden Waste	Black Box & Textiles	Food Waste
Current	F (240L)	F	F	F	W
2	3-W (240L)	F	F	F	W
3	3-W (240L)	W	F	F	W
7	4-W (240L)	F	F	F	W
Enforced Policy	F (240L)	F	F	F	W

Options 2, 3 and 7 incorporate a variation of:

- Continued weekly collection of food waste;
- Continued fortnightly collection of the black box, textiles and garden waste;
- Reduced collection frequencies of the 240L residual waste bin, made possible by the frequent separate collections of food waste and additional capacity provided if required to those properties with significant arisings of AHPs; and
- More frequent collections of dry recycling to increase capture.

In the Enforced Policy Option the education and enforcement policies that will be adopted by the Council (subject to Elected Member approval) include:

- No side waste will be collected and bin lids should be closed (as per current practice).
- Crews will check all containers for contamination:
    - Contamination present in the black box will not be collected and will be left in the black box with a note explaining that non target items were presented (as per current practice);
    - Before emptying the blue and brown bins crews will lift the lid and check for obvious signs of contamination. If the blue or brown bin is contaminated the bin will not be collected and will be stickered asking the resident to remove the contaminants and present the bin on the next collection day (as per current practice); and
    - In addition to the existing practices described above, before emptying the green residual waste bin crews will lift the lid and check for obvious signs of recycling. If it is apparent that there is a substantial quantity of recyclables that are not being sorted into the correct containers then the following three stages of engagement/enforcement will be carried out:
        - Step 1 – The bin will be emptied and the bin then stickered notifying the resident that recyclable material should be sorted into the correct container. A "how to" leaflet will be posted through the letter box to explain what can be recycled and how to request containers. It is hoped that this intervention will encourage the majority of residents to recycle, however there may be a small number of instances where further intervention is required as described in Steps 2 and 3.
        - Step 2 – If the resident continues to place recyclable material in the residual waste bin then Step 1 will be repeated with a follow-up visit from a Recycling Adviser to explain the importance of recycling and notify that resident that the Council will not empty the residual waste bin if this continues.
        - Step 3 – On the third occasion the bin will be stickered again but this time not collected until the resident removes the contamination (i.e. recycling) from the bin.

An analysis to determine the expected performance of the shortlisted options is described in the following section.

4 Performance of Shortlisted Options

The sections below describe the kerbside recycling performance that is predicted for each option.

4.1 Options 2, 3 & 7

The performance for options 2, 3 and 7 was determined through the previous detailed options appraisal[10].

The assumptions made when appraising performance included:

- The increased frequency of collection and capacity provided for recyclables, and reduced frequency of collection and/or capacity provided for the residual waste collection is expected to increase the capture of materials for recycling. It is assumed that the longer residents have to retain waste within the household, the greater their incentive to sort waste and maximise the amount that is recycled.
- There will not be an increase in the capture of garden waste as waste composition analysis shows that the current collection captures 97% of this material stream.
- Increasing communication activitieswill promote public awareness of recycling services and therefore residents are likely to divert an increased amount of material from the residual waste to the recycling services.

The expected additional capture of recyclables for the shortlisted options is described in Table 4.1.

Table 4.1: Capture of Additional Materials

		Mixed Paper	Card-board	News & Pams	Mixed Plastics	Steel Cans	Aluminium Cans	Garden Waste	Food Waste	Glass	Small WEEE	Textiles
Current service capture %		88%	77%	42%	47%	37%	26%	97%	22%	66%	18%	7%
Weight of Recyclable Material in Residual (T)		858	873	3,563	624	732	422	259	7,793	1,026	892	574
% of Additional Material Captured	Option 2	30%	30%	30%	30%	30%	30%	0%	30%	30%	30%	10%
	Option 3	50%	50%	70%	50%	75%	75%	0%	30%	30%	30%	10%
	Option 7	55%	55%	73%	55%	78%	78%	0%	50%	60%	60%	20%
Total % of Material Captured	Option 2	91%	83%	58%	61%	53%	46%	97%	45%	77%	43%	17%
	Option 3	93%	88%	82%	72%	83%	81%	97%	45%	77%	43%	17%
	Option 7	94%	89%	83%	75%	85%	83%	97%	61%	87%	67%	26%

In Option 2 the capture of recyclables will increase above current levels as residual waste is collected 3-weekly. In Option 3 the capture of recyclables will be higher still as recycling is collected weekly which provides residents with an additional incentive to recycle further. In Option 7 the capture of recyclables is slightly higher than Option 3 as residual waste is collected 4-weekly.

[10]Zero Waste Scotland (2013). Falkirk Collection Options Report_Rev 4_07-02-13. Confidential report for Falkirk Council. Written by Rambøll and IKM Fehily Timoney.

4.2 Enforced Policy Option

Examples of where other councils across the UK have implemented and enforced a residual waste contamination policyare limited[11]. Due to the lack of evidence, an analysis was undertaken to determine the expected impact on performance of the Enforced Policy Option. It should be noted that there is a significant uncertainty associated with the results due to the lack of evidence. The analysis is summarised below and described in more detail in the sections that follow:

- The residual waste contamination policy will only impact upon those residents where significant quantities of recyclables are currently present in the residual waste bin. It is necessary to define the number of these "poor performers" in order to assess the impact of the new policy upon performance;
- It is then necessary to define the impact that the new policy is expected to have upon the capture rate of recyclables from the poor performers and the overall kerbside recycling rate.

4.2.1 Poor Performers

WRAP and Zero Waste Scotland periodically survey public behaviours related to reducing, reusing and recycling waste through an online"3Rs Tracking Survey". The latest survey was undertaken in February/March 2013 and was completed by residents with at least a shared responsibility for rubbish and recycling in their home (the profile of which was established in a separate survey undertaken by Omnibus). The responses from the survey were compared with information from the local authorities which described the materials that are collected for recycling. From this comparison[12] it is possible to determine the proportion of householders in Scotland that could recycle additional materials at the kerbside. This is described below inTable 4.2.

Table 4.2: Number of Additional Materials that could be Recycled at the Kerbside

Number of Additional materials that could be recycled at the kerbside	0 material	1 material	2+ materials
% households in Scotland	53%	26%	21%

It is expected that Falkirk Council's residual waste contamination policy would affect the 21% of households thatcould recycle two or more additional materials at the kerbside (i.e. 15,296 out of the total 72,708 households in Falkirk). The expected impact that the policy would have on these properties is described below.

4.2.2 Policy Impact

In order to estimate the impact of the implementation of a residual waste contamination policy on poor performing households it is necessary to:

- Estimate the current performance in terms of average weight collected from these households; and
- Estimate the likely impact of the new policy.

The annual weight of material collected was divided by the number of properties served by each service. It has been assumed that households that were identified in the survey as being able to recycle one additional material represent average behaviour, and therefore that the average weight collected per property is the mean figure (i.e. total weight collected divided across all properties that receive the service).

[11] Elsewhere, particularly in England, local authorities may undertake a waste audit to assess the amount of recyclables in the residual waste linked to a resident's request for a larger (or additional) container.
[12]Zero Waste Scotland (2013). 3Rs Tracking Survey: Scottish Results. Presentation delivered by Alex Plumb, icaro consulting 04/07/2013.

Where households can recycle no additional materials it is assumed that the yield of recycling collected is 20% higher than the average (i.e. 20% higher than the weight collected from households that could recycle one additional material). For garden waste the current level of capture is exceptionally high (97%)and therefore it has been assumed that there is no variation in performance.

The annual weight of material collected from the poor performing households was calculated by subtracting the weight collected from the high and average performing households from the total weight collected. The net weight was divided by the number of poor performing properties to provide the average weight collected per household served.

The calculated average yields for the high, average and poor performing households are described in Table 4.3.

Table 4.3: Assumed Current Weight Collected from High, Average and Poor Performing Households

Material Stream	Households Served	Weight Collected (t/yr)	Assumed yields (kg/hh served/fortnight)		
			0 material	1 material	2+ materials
Residual waste	72,708	30,734	14.57	16.26	20.52
Co-mingled Recycling	70,000	11,830	7.80	6.50	3.22
Black Box	68,000	2,230	1.51	1.26	0.62
Textiles	68,000	46	0.03	0.03	0.01
Garden Waste	64,420	9,551	5.70	5.70	5.70
Food Waste	65,106	2,201	1.56	1.30	0.64
		Kerbside recycling rate	**51.4%**	**45.7%**	**31.2%**

The residual waste contamination policy is only expected to impact the poor performing households where two or more additional materials can be recycled. It is thought that the average and high performing households will not present significant quantities of recyclables in the residual waste and therefore will not be impacted by the policy.

It is expected that the implementation of the residual waste contamination policy will encourage poor performing households to recycle more materials and that performance will be similar to average households. The impact of the policy on the kerbside recycling rate is described in Table 4.4.

Table 4.4: Impact on Performance of Residual Waste Contamination Policy

Material Stream	Assumed Weight Currently Collected From Poor Performing Households (T)	Assumed Poor Performing Yield with Policy (kg/hh served/fortnight)	Increased Performance due to Implementation of Policy (T)	Predicted Total Weight Collected (T, all properties)
Residual waste	8,145	16.28	- 1,728.6	29,005
Co-mingled Recycling	1,230	6.50	+ 1,254.0	13,084
Black Box	232	1.26	+ 236.4	2,466
Textiles	5	0.03	+ 4.9	51
Garden Waste	2,006	5.70	-	9,551
Food Waste	229	1.30	+ 233.1	2,434
Kerbside recycling rate	**31.2% (45.7% overall)**		**-**	**48.7%**

The results suggest that the implementation of the policy could lead to the capture of an additional 1,729 tonnes of recyclables which would be diverted from the residual waste. The kerbside recycling rate would be 48.7%, an increase of 3.0%.

4.3 Performance Summary

The performance of all shortlisted options are summarised in Table 4.5. An analysis was undertaken of weights collected at household waste recycling centres and bring sites in order to determine the expected overall recycling rate for the shortlisted scenario.

Table 4.5: Performance of Shortlisted Options

Option	Weight collected (Tonnes)						Kerbside Recycling Rate (%)	Overall Recycling Rate (%)
	Residual Waste	Co-Mingled Recycling	Garden Waste	Food Waste	Black Box	Textiles		
Current	30,734	11,830	9,551	2,201	2,230	46	45.7%	54.3*%
2	25,642	13,951	9,551	4,539	2,805	103	54.7%	60.8%
3	23,226	16,366	9,551	4,539	2,805	103	59.0%	63.8%
7	20,799	16,602	9,551	6,097	3,380	161	63.2%	66.9%
Enforced policy	29,005	13,084	9,551	2,434	2,466	51	48.7%	56.5%

*The current service recycling rate is higher than reported in 2011 due to the roll-out of food waste collections to 65,106 households.

The impacts on the resources required and costs associated with the service changes are described in Section 5.

5 Resources and Costs Associated with Shortlisted Options

5.1 Introduction

The sections below describe the resources and costs associated with each of the shortlisted options.

5.2 Options 2, 3 & 7

The resources and costs for options 2, 3 and 7 were determined through the previous detailed options appraisal. For all options there are no additional container costs (when compared to the existing service).

5.2.1 Option 2

In Option 2 the frequency of residual waste collection is reduced from fortnightly to 3-weekly; all other services continue to be collected at the same frequency as the current service.

Analysis suggests that the 3-weekly collection of residual waste can be achieved with the existing residual waste collection fleet and staff resources. There are no changes in the resources required to collect co-mingled recycling, the black box and textiles, and garden waste, however an additional food waste vehicle is required.

The impact on service costs is described in Table 5.1.

Table 5.1: Option 2 Service Costs when Compared to the Current Service**

Option 2 Costs	2014/15	2015/16
Staffing*	£82,000	£84,050
Vehicle Annualised Capital Costs	£7,439	£7,625
Vehicle Revenue Costs	£1,056	£1,082
New Service Communications	£36,354	£0
Treatment and Disposal	-£385,674	-£478,300
Total	**-£258,826**	**-£385,543**

*Includes contract payments for black box and food waste collections. **Where there are savings when compared to the current service costs this is shown as a negative figure in red.

In year one, Option 2 achieves a cost saving of £258,826 compared to the currentservice cost. In year two, Option 2 would result in a saving of £385,543.

5.2.2 Option 3

In Option 3 the frequency of residual waste collection is reduced from fortnightly to 3-weekly and the collection of co-mingled mixed dry recyclables is increased from fortnightly to weekly. All other services continue to be collected at the same frequency as the current service.

Analysis suggests that the 3-weekly collection of residual waste can be achieved with the existing residual waste collection fleet and staff resources and there are no changes in the resources required to garden waste and the black box and textiles. An additional three vehicles will be required to collect co-mingled recycling weekly and an additional food waste vehicle is required.

The impact on service costs is described in Table 5.2.

Table 5.2: Option 3 Service Costs when Compared to the Current Service**

Option 3 Costs	2014/15	2015/16
Staffing*	£344,511	£353,124
Vehicle Annualised Capital Costs	£85,736	£87,880
Vehicle Revenue Costs	£131,782	£135,077
New Service Communications	£36,354	£0
Treatment and Disposal	-£607,419	-£743,979
Total	**-£9,035**	**-£167,898**

*Includes contract payments for black box and food waste collections. **Where there are savings when compared to the current service costs this is shown as a negative figure in red.

In year one, Option 3 achieves a cost saving of £9,035 compared to the current service cost. In year two, option two would result in a cost saving of £167,898.

5.2.3 Option 7

In Option 7 the frequency of residual waste collection is reduced from fortnightly to 4-weekly.All other services continue to be collected at the same frequency as the current service.

Analysis suggests that the 4-weekly collection of residual waste can be achieved with one less vehicle than the current service whilst the co-mingled recycling service requires one additional vehicle. There are no changes in the resources required to collect garden waste and the black box and textiles, however three additional food waste vehicles are required.

The impact on service costs is described in Table 5.3.

Table 5.3: Option 7 Service Costs when Compared to the Current Service**

Option 7 Costs	2014/15	2015/16
Staffing*	£164,000	£168,100
Vehicle Annualised Capital Costs	£29,756	£30,500
Vehicle Revenue Costs	£3,167	£3,246
New Service Communications	£90,885	£0
Treatment and Disposal	-£775,698	-£956,407
Total	**-£487,890**	**-£754,561**

*Includes contract payments for black box and food waste collections. **Where there are savings when compared to the current service costs this is shown as a negative figure in red.

In year one, Option 7 achieves a cost saving of £487,890 compared to the current cost. In year two, Option 7 realises a cost saving of £754,561.

5.3 Enforced Policy Option

In the Enforced Policy Option there are no changes to the frequencies of collections, and hence no impact upon the resources required to undertake collections. The residual contamination policy will require additional resources to enforce, expected to be equivalent to two full time Recycling Advisors. Increased capture of recyclables results in a saving in disposal/treatment costs.

The impact on service costs is described in Table 5.4.

Table 5.4: Enforced Policy Option Service Costs when Compared to the Current Service

Enforced Policy Option Costs	2014/15	2015/16
Staffing	£60,000	£61,500
Vehicle Annualised Capital Costs	£0	£0
Vehicle Revenue Costs	£0	£0
New Service Communications	£0	£0
Treatment and Disposal	-£150,496	-£181,934
Total	**-£90,496**	**-£120,434**

Where there are savings when compared to the current service costs this is shown as a negative figure in red.

In year one, the Enforced Policy Option achieves a cost saving of £90,496 compared to the current cost. In year two there is a cost saving of £120,434.

5.4 Summary

The performance of all shortlisted options is summarised in Table 5.5.

Table 5.5: Cost and Performance Summary

Option	Collection Frequency					Overall Recycling Rate (%)	2014/15 annual cost compared with current service (£)	2015/16 annual cost compared with current service (£)
	Residual Waste	Co-Mingled Recycling	Garden Waste	Black Box & Textiles	Food Waste			
Current	F (240L)	F	F	F	W	54.3*%	-	-
2	3-W (240L)	F	F	F	W	60.8%	-£258,826	-£385,543
3	3-W (240L)	W	F	F	W	63.8%	-£9,035	-£167,898
7	4-W (240L)	F	F	F	W	66.9%	-£487,890	-£754,561
Enforced Policy	F (240L)	F	F	F	W	56.5%	-£90,496	-£120,434

This page is intentionally blank

6 Comparison and Risk Planning

A comparison of the options was undertaken and risk matrix developed as shown below.

Table 6.1: Risk Matrix

Option	Staffing Requirements	Service Cost	Recycling & Composting Performance	Public Acceptability	Risk Score
2	There is no change to the number of Council staff required. One additional crew will be required by the contractor to collect food waste. This option is likely to be acceptable to the workforce on the basis that rounds are redesigned to account for the variations in weight collected and to ensure that the workload is balanced.	The risk associated with a saving not being achieved is thought to be low. The saving is generated by reduced disposal costs due to waste being diverted from landfill.	The performance has been determined based on reasoned assumptions related to increased capture of materials for recycling. The risk associated with not achieving this is thought to be low.	The change from fortnightly to 3-weekly residual waste collections may receive a negative reception initially however analysis of containment capacity suggests that the majority of households should be able to manage with this service change without producing any side waste.	10
	Low Risk (2)	Low Risk (2)	Low Risk (2)	Medium Risk (4)	
3	Three additional vehicles will be required to collect co-mingled recycling i.e. three drivers and six loaders. One additional crew will be required by the contractor to collect food waste. This option is likely to be acceptable to the workforce on the basis that rounds are redesigned to account for the variations in weight collected and to ensure that the workload is balanced. If practical the Council may wish to rotate staff between the residual waste service (heavier bins) and recycling services (lighter bins collected weekly).	A saving is generated by reduced disposal costs due to waste being diverted from landfill, albeit additional vehicles are required to collect co-mingled recycling weekly which means the saving is reduced. There is a low-medium risk that the additional diversion when compared to Option 2 will not be as significant which will impact on disposal savings.	The performance has been determined based on reasoned assumptions related to increased capture of materials for recycling. The risk associated with not achieving this is thought to be low. There is a low-medium risk that the additional diversion when compared to Option 2 will not be as significant. As recycling is collected weekly there is also a risk that contamination of this waste stream may increase.	The change from fortnightly to 3-weekly residual waste collections may receive a negative reception initially however analysis of containment capacity suggests that the majority of households should be able to manage with this service change without producing any side waste. The weekly collection of co-mingled recyclables should reduce this risk slightly when compared to Option 2.	15
	Low / Medium Risk (3)	Medium Risk (4)	Medium Risk (4)	Medium Risk (4)	

Option	Staffing Requirements	Service Cost	Recycling & Composting Performance	Public Acceptability	Risk Score
7	There is no change to the number of Council staff required. Three additional crew will be required by the contractor to collect food waste. This option is likely to be acceptable to the workforce on the basis that rounds are redesigned to account for the variations in weight collected and to ensure that the workload is balanced.	The risk associated with a saving not being achieved is thought to be very low. The saving is generated by reduced disposal costs due to waste being diverted from landfill.	The performance has been determined based on reasoned assumptions related to increased capture of materials for recycling however there is less certainty regarding the improvement in performance above that achieved in Options 2 & 3.	The change from fortnightly to 4-weekly residual waste collections is expected to receive a negative reception and ongoing engagement with the public will be required to ensure that recycling containers are used to their full potential. Analysis of containment capacity suggests that the majority of households should be able to manage with this service change without producing any side waste.	11
	Low Risk (2)	Very Low Risk (1)	Low / Medium Risk (3)	High Risk (5)	
Enforced Policy	Two additional council staff will be required to undertake follow-up visits with residents. Contamination checks will need to be undertaken by residual waste crews – it is thought that this can be achieved with the existing resources. Additional supervision may be required to ensure that crews are undertaking contamination checks and enforcing the policies (excluded from costs presented in Section 5).	The risk associated with a saving not being achieved is thought to be medium. Collection supervisors and crews will need to ensure that the policy is enforced and therefore recyclables are diverted from the residual waste.	There is a significant uncertainty associated with the performance presented in Section 5 due to the lack of evidence. The Council may wish to undertake a trial to better understand the performance.	Those residents that make good use of their recycling containers will not be impacted by this option. Engagement with "poor performers" will be required to ensure that recycling containers are used to their full potential. The Council may need to develop further policies to support the enforcement e.g. handling confidential/sensitive waste.	16
	Medium Risk (4)	Medium Risk (4)	Medium Risk (4)	Medium Risk (4)	

Key to Risk Score: Very Low = 1, Low = 2, Low/Medium = 3, Medium = 4, High = 5

Zero Waste Scotland
Ground Floor, Moray House, Forthside Way,
Stirling FK8 1QZ.

E-mail: helpline@zerowastescotland.org.uk
Helpline freephone 0808 100 2040
www.zerowastescotland.org.uk