Volume 1 – Summary Report

Northern Ireland Kerbside Waste Composition 2017

The composition of kerbside collected household waste in Northern Ireland compiled from a two-phase fieldwork campaign in 2017

Project code: NIP005-001
Research date: January to December 2017

Document: Volume 1 – Summary Report
Date: March 2018

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

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

Find out more at www.wrapni.org.uk

This project report comes in two parts:

- Volume 1: Provides a summary overview of the project details results for Northern Ireland as a single entity.
- Volume 2: Provides result information for each of the eleven participating local authorities.

Written by: Debbie Nesbitt and Ciara Devine

RPS

Executive summary

Aims of the analysis

RPS was commissioned by WRAP, on behalf of the Department of Agriculture, Environment and Rural Affairs (DAERA), to undertake a study of the composition of household waste collected at the kerbside in Northern Ireland.

The aim was to determine overall waste composition, individual material capture rates and the extent to which recyclable or compostable materials are being disposed of in the residual waste stream. In addition, this report examines what has changed since 2007 in what we throw away in the residual waste stream, and the biodegradability of each waste stream for Northern Ireland.

Waste composition analysis of kerbside collected material was carried out for 11 local authorities in Northern Ireland. The waste streams covered in the household waste compositional analysis included:

- Kerbside collected residual waste
- Kerbside collected commingled recyclates
- Kerbside collected source segregated recyclates
- Kerbside collected separate glass
- Kerbside collected commingled organics
- Kerbside collected separate food
- Kerbside collected separate garden

Summary of the methodology

The study was conducted over two phases in order to account for seasonal changes that can occur in the waste streams. Phase 1 was undertaken from 13th March 2017 to 14th June 2017, while Phase 2 was undertaken from 4th September 2017 to 29th November 2017.

Household samples were identified based on socio-demographic (Mosaic) groups, service provision, collection rounds and local authority knowledge. Each local authority sample consisted of 150 households representative of the overall socio-economic makeup of the local authority. All kerbside collections services were sampled from the 150 households selected per local authority. In total, waste and recyclables (dry and organic) from 1,650 households was analysed during both Phase 1 and Phase 2.

Samples were collected by the local authority or RPS and delivered to a licenced site. RPS staff accompanied collection vehicles during collections to record the number of containers presented from each sample. Prior to the arrival of waste samples on the site, all empty containers to be used during the waste compositional analysis were weighed and the weight was recorded. Each waste stream (kerbside residual, recyclable and organic) was sorted separately. Samples were hand sorted into assigned containers for 54 pre-defined categories consistent with industry standard guidelines devised by Zero Waste Scotland

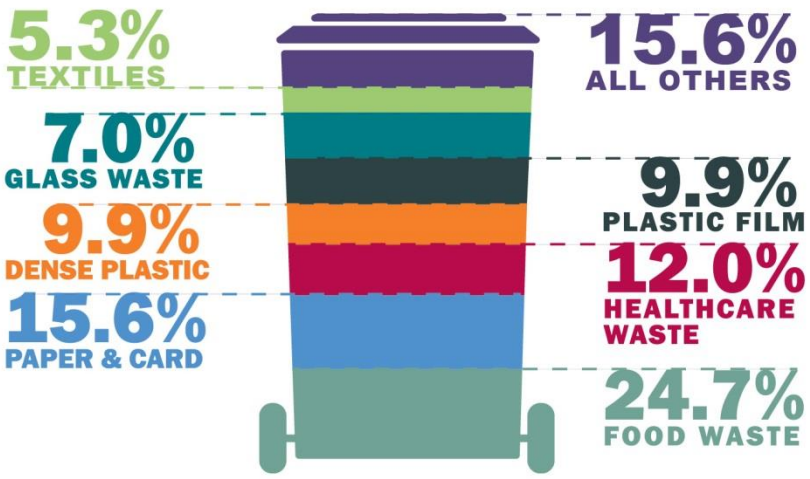
Kerbside collected residual waste

Total estimates for Northern Ireland were produced by applying the (household weighted) average composition of waste from local authority analyses to total waste arisings from the

Northern Ireland Local Authority Collected Municipal Waste Management Statistics 2016/17 Annual Dataset.

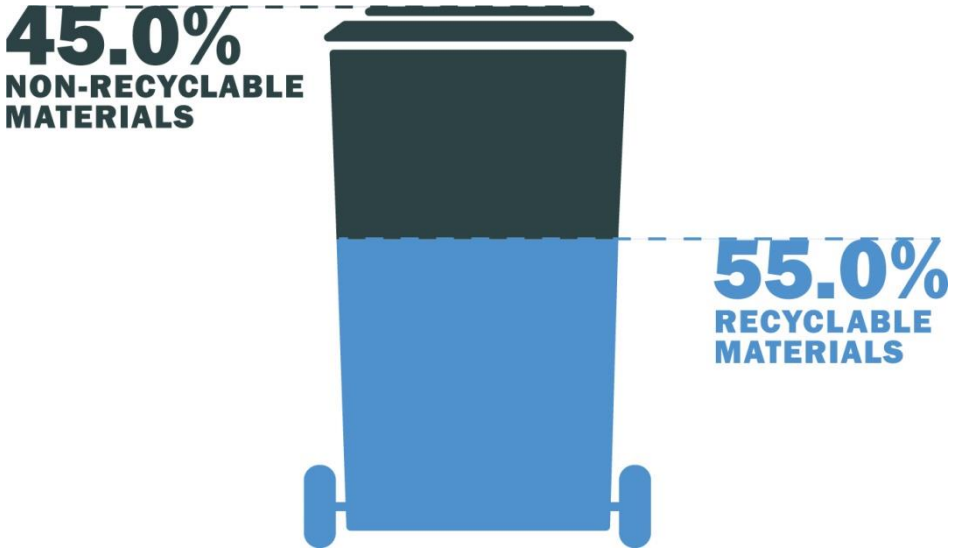
Typically a household in Northern Ireland disposes in the region of 478 kg of residual waste annually. Food waste makes up just under 25% of total residual waste arisings. This is followed by paper and cardboard (15.6%), healthcare waste (12%), plastic film (9.9%), dense plastic (9.9%) and glass (7%).

Figure 1 Summary composition of residual waste in Northern Ireland



The study estimates that 55% of the contents of the residual bin is made up of waste types that could commonly be recycled at the kerbside.

Figure 2 Recyclable materials found in the residual stream

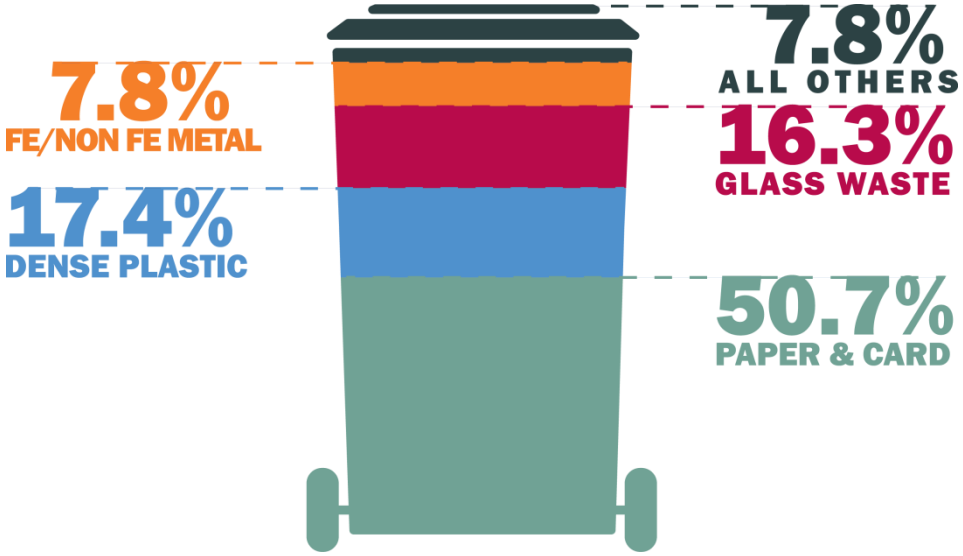


The quantity of residual waste collected at the kerbside has greatly decreased over the past 10 years with food waste showing the largest absolute reduction from 174,424 tonnes in 2007 to 87,062 tonnes in 2016-17.

Kerbside materials recycled

Typically a household in Northern Ireland puts 138kg of material into the recycling container annually. Paper and cardboard make up just over half of the total recycling waste arisings in Northern Ireland at 51,560 tonnes. Dense plastic (17.4%), glass (16.3%), ferrous metal (3.9%) and non-ferrous metal (3.9%) were also prominent.

Figure 3 Summary composition of the recyclates stream in Northern Ireland



The proportion of non-target materials (i.e. contaminant materials that cannot be recycled in services currently provided by local authorities) in the recycling bin averaged 13.3% in Phase 1 and 15.1% in Phase 2 for commingled collections and 2.6% in Phase 1 and 3.4% in Phase 2 for source segregated collections. Cleanliness of target materials was not taken into account, such as food residue in containers or target materials in plastic bags.

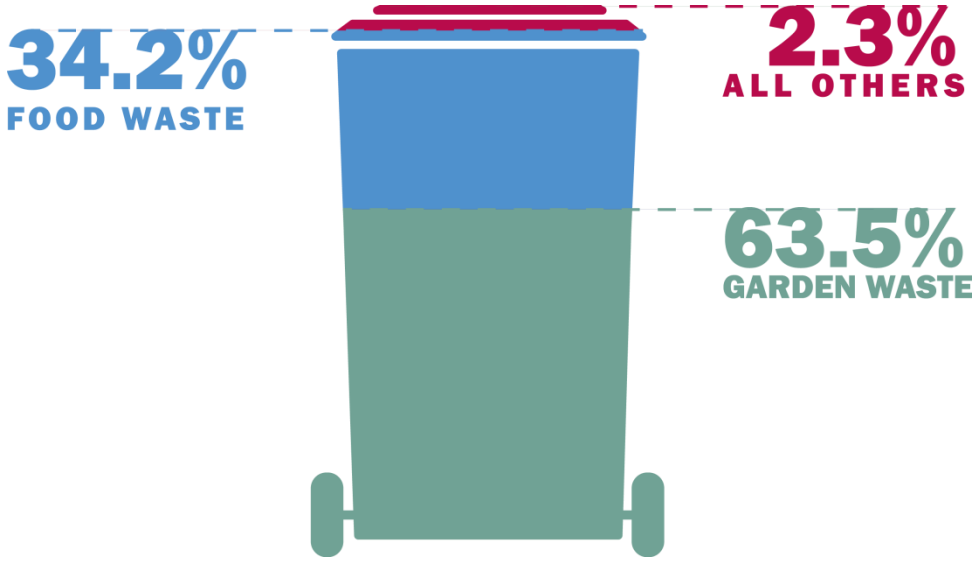
Kerbside collected organic waste

A household in Northern Ireland typically throws out in the region of 170kg of organic waste annually.

Garden waste is the largest waste type found in the organic waste stream making up just over 60% of the total organic waste arisings. Food waste makes up 34.2% of the kerbside collected organic stream and paper and cardboard accounts for 0.7%.

The proportion of target material is higher in the separate food sample than the commingled organics or separate garden samples for both phases of the study. The percentage of target material found in the commingled organic bin varies for each local authority from a low of 84.7% target materials to a high of 99.4% target materials, over the course of the two Phases. Likewise the percentage of target material found in the separate food samples also varies by local authority from 96.8% to 100.0% over the two Phases.

Figure 4 Summary composition of kerbside collected organic waste



Biodegradability

The biodegradable content has been estimated for the following waste streams collected at the kerbside:

- Residual 53%
- Dry recycling 54%
- Organics 97%

Capture rates

'Capture' refers to the quantity of a particular target material that is 'captured' by the service or scheme designed to accept that material. 'Capture rate' therefore refers to the proportion (as a percentage) of a targeted material that has been collected relative to the total quantity of that material arising (i.e. including both the residual bin and material recycled / composted).

The capture rates of key materials identified through this study are:

- Paper and cardboard - 57.7%
- Ferrous metal - 45.3%
- Glass - 40.6%
- Garden waste - 94.8%
- Food waste - 32.3%

Contents

Volume 1 – Summary Report

Acknowledgements

RPS wishes to thank all eleven local authorities in Northern Ireland for their support throughout the duration of the project.

The following are also thanked for their invaluable support to the success of the project (in alphabetical order):
Alan Millar Skip Hire
Avenue Recycling Ltd
Bryson Recycling
McAteer Recycling
NWP
Re-Gen Waste

Volume 1

Summary Report

1.0 Introduction

1.1 Study objectives

RPS was commissioned by WRAP, on behalf of the Department of Agriculture, Environment and Rural Affairs (DAERA), to undertake a study of the composition of household waste collected at the kerbside in Northern Ireland. The last time a similar study was conducted was in 2007.

1.2 Project scope

Waste composition analysis of kerbside collected material was carried out for 11 local authorities in Northern Ireland. The materials covered in the analysis included:

Residual waste. Analysis of the content of residual waste bins to determine the composition of the waste and the extent to which recyclable or compostable materials are being disposed of the residual waste stream.

Dry recycling. Compositional analysis was conducted for each of the kerbside recycling collection systems in each local authority. This was used to calculate capture rates for dry recyclables and contamination rates for the recycling stream.

Organic waste. Analysis of food and garden waste collections to calculate composition, capture rates and contamination rates.

In addition, this report examines what has changed since 2007 in what we throw away in the residual waste stream, and to assess the biodegradability of each waste stream for Northern Ireland.

1.3 Key considerations when reading this report

This report is a summary of key findings, and concentrates on data for Northern Ireland as a whole. The analysis excluded household waste collected at non-kerbside locations, such as recycling points and household recycling centres. Therefore, this is not a complete analysis of local authority or national recycling performance. However, kerbside collected waste is the largest component of household waste managed by local authorities.

2.0 Methodology

2.1 Sampling Methodology

This section describes the methodology used for selecting sample areas. RPS developed a sampling methodology in association with WRAP. The aim of the sampling methodology was to select samples to ensure that all local authorities have a robust, representative sample. The objective of the sampling methodology was to determine sample areas which are representative of the socio-economic composition and waste collection services of each local authority within reasonable bounds of precision and confidence.

The study identified a sample of 150 households for each local authority which were representative of the overall socio-economic makeup and the waste collection services provided by the local authority. All waste and recycling services provided to these sample householders were then surveyed.

2.1.1 Coverage by sampling phases conducted

The study was conducted over two phases in order to account for seasonal changes that occur in the waste streams, particularly the organic stream. Phase 1 was undertaken from 13th March 2017 to 14th June 2017, while Phase 2 was undertaken from 4th September 2017 to 29th November 2017.

2.1.2 Coverage by socio-economic breakdown

Household samples were identified based on Mosaic[1] group, service provision, collection rounds and local authority knowledge. Each sample consisted of 150 households proportional of the overall socio-economic makeup of the local authority. 75 households were also identified as reserve households for each sample area to ensure sufficient samples were available for collection. RPS reviewed the breakdown of local authority populations into the 15 socio-economic Mosaic classifications. This data was used to determine the number of households to be sampled from each Mosaic group to make up a sample of 150 households.

2.1.3 Coverage by waste streams sampled

Consistency in terms of waste services offered to householders differs significantly between local authorities and in many cases within local authorities. Therefore, to ensure coverage was adequate for all the various waste streams and collection methods, RPS reviewed the collection services offered by each local authority.

The percentage of households in local authorities provided by each waste collection service was assessed and inclusion of households was monitored to ensure that households within each sample were proportional in relation to the waste collection services provided by each local authority.

Table 1 outlines the number of households sampled from each waste stream in Phase 1 and Phase 2.

[1] *MOSAIC is a socio-demographic profiling system. More details can be found at: www.experian.co.uk/assets/marketing-services/brochures/mosaic-ps-brochure.pdf*

Table 1 Target number of households sampled for each local authority by waste stream

	Residual		Commingled Food and Garden		Separate Food		Separate Garden		Commingled Recyclates		Separate Kerbside		Separate Glass	
	Ph 1	**Ph 2**	**Ph 1**	**Ph 2**	**Ph 1**	**Ph 2**	**Ph 1**	**Ph 2**	**Ph 1**	**Ph 2**	**Ph 1**	**Ph 2**	**Ph 1**	**Ph 2**
Antrim and Newtownabbey	150	150	116	150[2]	34	0[2]	0	0	98	98	52	52	0	0
Ards and North Down	150	150	150	150	0	0	0	0	150	150	0	0	0	150[3]
Armagh, Banbridge and Craigavon	150	150	108	108	42	42	0	0	108	108	42	42	0	0
Belfast	150	150	92	82	58	68	0	0	92	82	58	68	23	23
Causeway Coast and Glens	150	150	60	60	30	30	0	15[4]	150	150	0	0	0	0
Derry and Strabane	150	150	0	0	54	150[5]	38	88[5]	150	150	0	0	0	0
Fermanagh and Omagh	150	150	0	0	87	150[5]	0	0	150	150	0	0	0	0
Lisburn and Castlereagh	150	150	150	150	0	0	0	0	111	111	39	39	0	0
Mid and East Antrim	150	150	150	150	0	0	0	0	47	47	103	103	0	0
Mid Ulster	150	150	150	150	0	0	0	0	150	150	0	0	0	0
Newry, Mourne and Down	150	150	150	150	0	0	0	0	150	150	0	0	0	0

[2] *Between Phase 1 and Phase 2, Antrim & Newtownabbey Borough Council extended its commingled organics bin collection service to all households in the council replacing food caddies.*

[3] *A kerbside glass collection was introduced to all households in Ards and North Down Borough Council after Phase 1 in June 2017 which is uplifted every 4 weeks.*

[4] *Separate garden waste collection in Causeway Coast and Glens Borough Council was suspended between November and mid-March therefore separate garden waste was not sampled in Phase 1.*

[5] *Waste collection service was extended in the local authority area between Phase 1 and Phase 2*

2.1.4 Planned service changes

To ensure the results would reflect, as much as possible, the actual situation on the ground, the sampling framework also took into consideration planned service changes and reviewed the capital funded projects that local authorities had planned for the 2017 financial year. The following service changes were included in Phase 2 of the project:

- Ards & North Down Borough Council - Kerbside glass collections with an inner insert;
- Armagh, Banbridge & Craigavon Borough Council - Separate food waste collection;
- Belfast City Council - Separate food waste collection;
- Derry City & Strabane District Council - Separate food waste collection;
- Fermanagh & Omagh District Council - Separate food waste collection;
- Newry, Mourne & Down District Council - Commingled brown bin collection extended to all households.

3.0 Operational Methodology

Significant liaison with local authority officers in charge of collection rounds, crews and transfer stations was required. Liaison, buy-in and cooperation was also required with other private waste operators such as Bryson Recycling and Avenue Recycling who collect household waste at the kerbside to ensure the study was a success.

Monitoring at the kerbside was conducted by RPS and the set out rate was noted for each sample.

Samples were collected by the local authority or RPS in non-compacting RCVs, smaller 12.5 tonne minipac RCVs and/or van and delivered to a licenced site. RPS staff accompanied the collection vehicle during collections to record the number of bins presented from each sample.

The waste was tipped onto a tarpaulin sheet at the sorting site. The sorting team transferred materials to a sorting table and the material was hand-sorted into the various categories until all the material had been sorted. Each waste stream (kerbside residual, recyclable and organic) was sorted separately. Samples were sorted into assigned containers for 54 pre-defined categories in accordance with industry standard categories devised by WRAP and Zero Waste Scotland[6].

[6] *Zero Waste Scotland - 'Guidance on the Methodology for Waste Compositional Analysis'.*

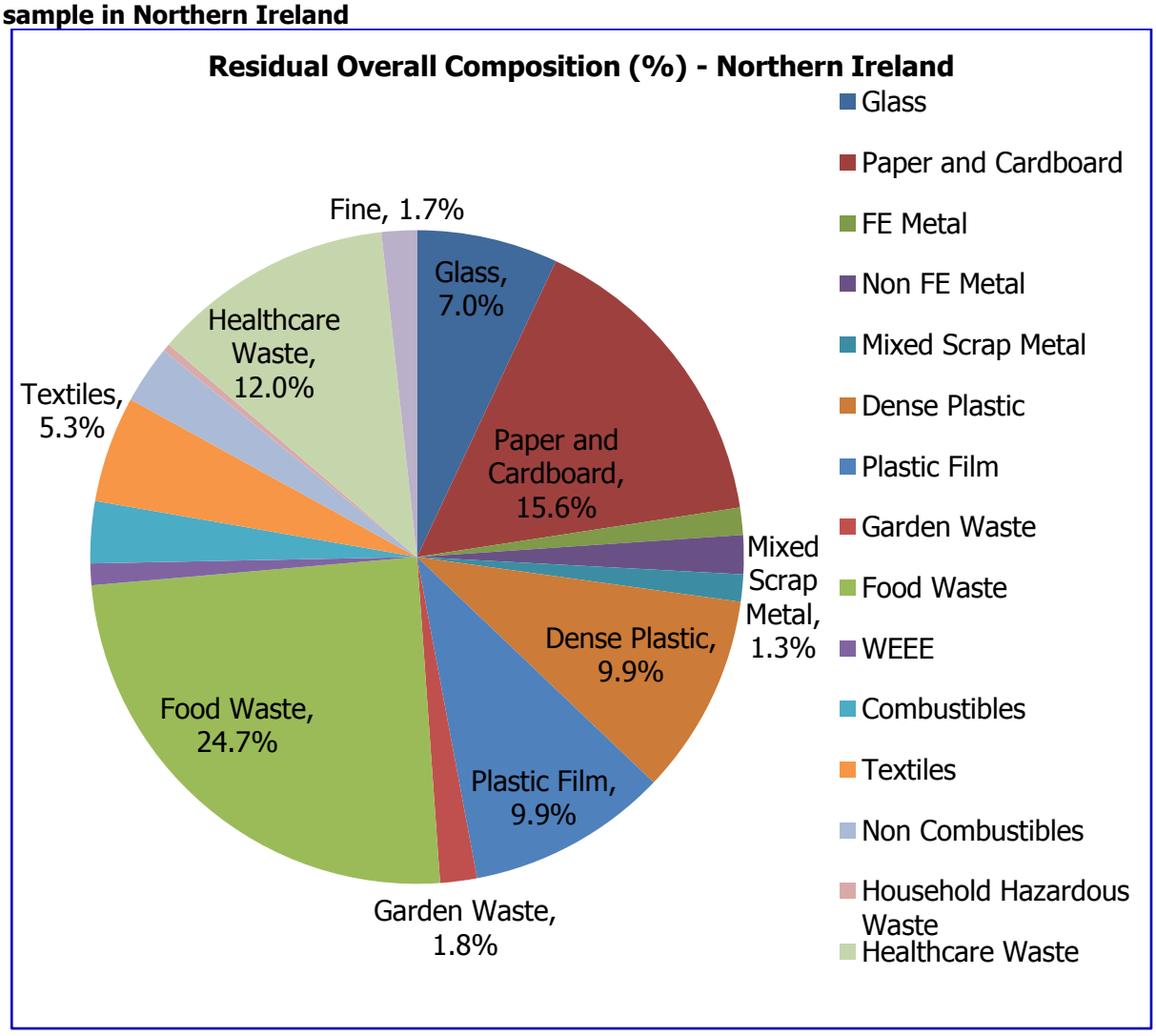
4.0 Residual Waste Analysis

4.1 Composition of the residual bin

Total estimates for Northern Ireland have been produced by applying the (household weighted) average composition of waste from the local authority analyses to the total waste arising. Current waste management statistics from NIEA dataset 2016-17 detail that 351,806 tonnes[7] of residual household waste was collected at the kerbside by local authorities for disposal. We have used this figure in our analysis. Typically a household in Northern Ireland throws out in the region of 478 kg of residual waste annually.

The composition of primary waste categories in the residual waste stream in Northern Ireland is presented in Figure 1 and Table 2 below. The key materials found predominately in the residual bin are food waste, paper and cardboard, healthcare waste[8], plastics and glass.

Figure 1 Overall composition (%) of primary waste categories in residual waste stream sample in Northern Ireland



[7] *Northern Ireland Local Authority Collected Municipal Waste Management Statistics 2016/17 Annual Data.*

[8] *Primary category 'Healthcare waste' includes secondary categories 'Dead animals' and 'Pet excrement and bedding'. Refer to Table 3 for detailed breakdown of primary categories into secondary categories.*

Table 2 Composition of residual waste in Northern Ireland with corresponding tonnage

Primary Level	Composition	Kerbside collected residual waste for disposal (tonnes) 2016-17
Food Waste	24.7%	87,062
Paper and Cardboard	15.6%	54,844
Healthcare Waste	12.0%	42,192
Plastic Film	9.9%	34,977
Dense Plastic	9.9%	34,894
Glass	7.0%	24,577
Textiles	5.3%	18,478
Combustibles	3.1%	10,778
Non Combustibles	2.9%	10,144
Non FE Metal	1.9%	6,769
Garden Waste	1.8%	6,400
Fines	1.7%	6,131
FE Metal	1.3%	4,741
Mixed Scrap Metal	1.3%	4,734
WEEE	1.1%	3,755
Household Hazardous Waste	0.4%	1,330
Total	**100%**	**351,806**

Table 3 sets out the detailed composition of household residual waste collected at the kerbside in Northern Ireland. For a more detailed breakdown of recycling collections in each local authority, refer to Volume 2.

Table 3 Detailed composition of kerbside residual waste in Northern Ireland

Primary Level	Secondary Level	Composition
Glass	All glass containers	6.8%
	Non-packaging glass	0.2%
Paper and Cardboard	Newspaper, magazines, Yellow Pages/directories	1.1%
	Other recyclable paper	4.0%
	Non-recyclable paper	5.2%
	All card packaging	4.6%
	Cardboard beverage packaging / cartons	0.3%
	Other card	0.1%
	Books	0.3%
FE Metal	Ferrous cans and tins	1.2%
	Ferrous aerosols	0.2%
Non FE metal	Non Ferrous cans	0.7%
	Non Ferrous aerosols	0.1%
	Aluminium foil	1.1%
Mixed scrap metal	All scrap and other metal	1.3%
Dense Plastic	HDPE drink bottles	0.4%
	PET drink bottles	1.2%
	Other plastic bottles	1.2%
	Dense plastic packaging exc. EPS	4.3%

Primary Level	Secondary Level	Composition
	Other dense plastic - non-packaging e.g. CD, DVD	2.3%
	Expanded polystyrene packaging	0.5%
Plastic film	Carrier bags	1.7%
	Bin bags and other plastic film	8.2%
Garden waste	Green and woody garden waste	1.2%
	Soil	0.7%
Food waste	Avoidable food waste	13.3%
	Unavoidable food waste	10.1%
	Cooking oil/fats	0.0%
	Liquids	1.3%
WEEE	Large Domestic App	0.0%
	Small Domestic App	1.1%
	Cathode Ray Tubes	0.0%
	Fridges & Freezers	0.0%
Combustibles	Wood untreated inc wood furniture	0.5%
	Wood treated e.g. chipboard, MDF	0.3%
	Carpet & underlay Moved from Textiles	0.6%
	Other combustibles inc soft furniture and cushions	1.6%
Textiles	Clothing textiles	2.8%
	Shoes, belts & bags	1.0%
	Non-clothing textiles	1.4%
Non combustibles	Plasterboard	0.0%
	Other construction and demolition waste inc rubble	1.6%
	Other non-combustible materials	1.2%
Household Hazardous Waste	Household Batteries	0.1%
	Car Batteries	0.1%
	Engine Oil	0.0%
	Asbestos	0.0%
	Other Potentially Hazardous inc Tyres	0.2%
Healthcare waste	Disposable Nappies	7.9%
	Other absorbent hygiene products	1.0%
	Potentially hazardous healthcare waste	0.4%
	Dead animals	0.1%
	Pet excrement and bedding	2.7%
Fines	<10mm	1.7%
Total		**100%**

4.2 Key materials in the residual bin

4.2.1 Food waste

Table 2 shows that food waste makes up the largest single waste type at just under 25% of the kerbside collected residual waste. Of the 351,806 tonnes of local authority collected kerbside waste for disposal in 2016-17, food waste makes up over 87,000 tonnes of material. It is estimated that the average household threw away approximately 118 kg of food waste in 2016/17. There is significant potential to divert this material away from disposal.

4.2.2 Paper and cardboard

Paper and cardboard is the second largest waste type thrown away in the residual bin. Paper and cardboard makes up 15.6% of the residual bin. Further detail provided in the secondary categories shows that over two thirds of paper and cardboard identified in the residual stream could potentially have been recycled through current systems.

4.2.3 Plastics

Plastic film is the fourth largest waste type thrown away in the residual bin. The 9.9% or 34,977 tonnes of plastic film are composed of 28,998 tonnes of bin bags and plastic film and 5,979 tonnes of carrier bags. Dense plastics make up 9.9% or 34,894 tonnes of what is thrown away in the residual bin. Further breakdown into the secondary categories shows that just over 70% of this dense plastic could potentially be recycled in current systems.

4.2.4 Healthcare waste

Healthcare wastes make up 42,192 tonnes or 12% of the residual bin and includes 27,822 tonnes of disposable nappies and 9,404 tonnes of pet excrement and bedding. The classification of secondary categories 'Dead animals' and 'Pet excrement and bedding' under primary category 'Healthcare waste' is in accordance with Zero Waste Scotland 'Guidance on the Methodology for Waste Compositional Analysis'.

4.2.5 Glass

Table 2 shows that glass makes up 24,577 or 7% of waste thrown away in the residual bin. This includes 24,018 tonnes of glass containers and 559 tonnes of non-packaging glass.

4.3 Potential recyclate from residual collections

This section focuses on those waste types found in the residual waste stream that are commonly targeted for recycling by local authorities using kerbside services.

This calculation is a gross estimate for Northern Ireland to highlight the scale of what is currently thrown away that is commonly recycled at the kerbside. Table 4 shows the assumptions used in determining the percentage of material commonly collected at the kerbside for recycling that is being presented in the residual waste.

Table 4 Recycling assumption by secondary level composition category materials

Primary Level	Secondary Level	Recycling Assumption
Glass	All glass containers	✓
	Non-packaging glass	×
Paper and Cardboard	Newspaper, magazines, Yellow Pages/directories	✓
	Other recyclable paper	✓
	Non-recyclable paper	×
	All card packaging	✓
	Cardboard beverage packaging / cartons	✓
	Other card	✓
	Books	✓

Primary Level	Secondary Level	Recycling Assumption
FE Metal	Ferrous cans and tins	✓
	Ferrous aerosols	✓
Non FE metal	Non Ferrous cans	✓
	Non Ferrous aerosols	✓
	Aluminium foil	✓
Mixed scrap metal	All scrap and other metal	×
Dense Plastic	HDPE drink bottles	✓
	PET drink bottles	✓
	Other plastic bottles	✓
	Dense plastic packaging exc. EPS	✓
	Other dense plastic - non-packaging e.g. CD, DVD	×
	Expanded polystyrene packaging	✓
Plastic film	Carrier bags	×
	Bin bags and other plastic film	×
Garden waste	Green and woody garden waste	✓
	Soil	✓
Food waste	Avoidable food waste	✓
	Unavoidable food waste	✓
	Cooking oil/fats	✓
	Liquids	✓
WEEE	Large Domestic Appliances	×
	Small Domestic Appliances	×
	Cathode Ray Tubes	×
	Fridges & Freezers	×
Combustibles	Wood untreated inc wood furniture	×
	Wood treated e.g. chipboard, MDF	×
	Carpet & underlay Moved from Textiles	×
	Other combustibles inc soft furniture and cushions	×
Textiles	Clothing textiles	×
	Shoes, belts & bags	×
	Non-clothing textiles	×
Non combustibles	Plasterboard	×
	Other construction and demolition waste inc rubble	×
	Other non-combustible materials	×
Household Hazardous Waste	Household Batteries	×
	Car Batteries	×
	Engine Oil	×
	Asbestos	×
	Other Potentially Hazardous inc Tyres	×
Healthcare waste	Disposable Nappies	×
	Other absorbent hygiene products	×
	Potentially hazardous healthcare waste	×
	Dead animals	×
	Pet excrement and bedding	×
Fines	<10mm	×

This study estimates that 55% of the contents of the residual bin comprise materials that are typically recycled at the kerbside in Northern Ireland. Based on the 351,806 tonnes of residual waste collected at the kerbside in 2016-17, this equates to 192,089 tonnes of material that could be recycled.

The materials accepted for recycling at the kerbside in Northern Ireland vary by local authority area, and variances are found in different locations within local authorities. Table 5 below shows the percentage of target recycling material found in the residual waste stream that is actually accepted for recycling in each local authority.

Table 5 Target recycling in residual bin (%) for each Phase

Local Authority	Target Recycling (Dry recycling, food & garden) in Residual Bin (%)	
	Phase 1	**Phase 2**
Antrim & Newtownabbey	57.4%	54.9%
Ards & North Down	34.6%	42.6%
Armagh City, Banbridge & Craigavon	57.1%	60.6%
Belfast	63.3%	62.9%
Causeway Coast & Glens	56.9%	54.1%
Derry City & Strabane	59.5%	57.6%
Fermanagh & Omagh	53.2%	40.0%
Lisburn & Castlereagh	54.0%	48.9%
Mid & East Antrim	55.8%	49.9%
Mid Ulster	54.6%	45.6%
Newry, Mourne & Down	49.5%	50.0%
Average	**54.2%**	**51.6%**

4.4 The biodegradable content of residual waste at the kerbside

A set of biodegradability assumptions were applied to the materials list used in the waste composition analysis. These assumptions were the same as those used in the previous (2007) study to determine the biodegradability of the waste streams, thus aligning these results with those previous studies.

The biodegradable content of residual waste collected at the kerbside is estimated to be 53%, compared to 60% in the 2007 study.

Table 6 Biodegradability of the kerbside collected residual waste

Primary Level	Secondary Level	Composition	Biodegradability content	Biodegradability
Glass	All glass containers	6.8%	0%	0.0%
	Non-packaging glass	0.2%	0%	0.0%
Paper and Cardboard	Newspaper, magazines, Yellow Pages/directories	1.1%	100%	1.1%
	Other recyclable paper	4.0%	100%	4.0%
	Non-recyclable paper	5.2%	100%	5.2%

Primary Level	Secondary Level	Composition	Biodegradability content	Biodegradability
	All card packaging	4.6%	100%	4.6%
	Cardboard beverage packaging / cartons	0.3%	50%	0.2%
	Other card	0.1%	100%	0.1%
	Books	0.3%	100%	0.3%
FE Metal	Ferrous cans and tins	1.2%	0%	0.0%
	Ferrous aerosols	0.2%	0%	0.0%
Non FE metal	Non Ferrous cans	0.7%	0%	0.0%
	Non Ferrous aerosols	0.1%	0%	0.0%
	Aluminium foil	1.1%	0%	0.0%
Mixed scrap metal	All scrap and other metal	1.3%	0%	0.0%
Dense plastic	HDPE drink bottles	0.4%	0%	0.0%
	PET drink bottles	1.2%	0%	0.0%
	Other plastic bottles	1.2%	0%	0.0%
	Dense plastic packaging exc. EPS	4.3%	0%	0.0%
	Other dense plastic - non-packaging e.g. CD, DVD	2.3%	0%	0.0%
	Expanded polystyrene packaging	0.5%	0%	0.0%
Plastic film	Carrier bags	1.7%	0%	0.0%
	Bin bags and other plastic film	8.2%	0%	0.0%
Garden waste	Green and woody garden waste	1.2%	100%	1.2%
	Soil	0.7%	0%	0.0%
Food waste	Avoidable food waste	13.3%	100%	13.3%
	Unavoidable food waste	10.1%	100%	10.1%
	Cooking oil/fats	0.0%	100%	0.0%
	Liquids	1.3%	100%	1.3%
WEEE	Large Domestic App	0.0%	0%	0.0%
	Small Domestic App	1.1%	0%	0.0%
	Cathode Ray Tubes	0.0%	0%	0.0%
	Fridges & Freezers	0.0%	0%	0.0%
Combustibles	Wood untreated inc wood furniture	0.5%	50%	0.3%
	Wood treated e.g. chipboard, MDF	0.3%	50%	0.2%
	Carpet & underlay Moved from Textiles	0.6%	50%	0.3%
	Other combustibles inc soft furniture and cushions	1.6%	50%	0.8%
Textiles	Clothing textiles	2.8%	50%	1.4%
	Shoes, belts & bags	1.0%	50%	0.5%

Primary Level	Secondary Level	Composition	Biodegradability content	Biodegradability
	Non-clothing textiles	1.4%	50%	0.7%
Non combustibles	Plasterboard	0.0%	0%	0.0%
	Other construction and demolition waste inc rubble	1.6%	0%	0.0%
	Other non-combustible materials	1.2%	0%	0.0%
Household Hazardous Waste	Household Batteries	0.1%	0%	0.0%
	Car Batteries	0.1%	0%	0.0%
	Engine Oil	0.0%	0%	0.0%
	Asbestos	0.0%	0%	0.0%
	Other Potentially Hazardous inc Tyres	0.2%	0%	0.0%
Healthcare waste	Disposable Nappies	7.9%	50%	4.0%
	Other absorbent hygiene products	1.0%	50%	0.5%
	Potentially hazardous healthcare waste	0.4%	0%	0.0%
	Dead animals	0.1%	100%	0.1%
	Pet excrement and bedding	2.7%	100%	2.7%
Fines	<10mm	1.7%	0%	0.0%
Total		**100%**		**53%**

4.5 Residual waste composition changes since 2007

As illustrated in Figure 2 the overall quantity of household residual waste collected at the kerbside has greatly decreased since the last publication[9] of the composition of waste in Northern Ireland.

[9] *(Department of Environment - Environment and Heritage Service, 2008, Review of Municipal Waste Component Analysis)*

Figure 2 The overall quantity of household residual waste collected at the kerbside, from previous waste composition study in 2007 and the current study.

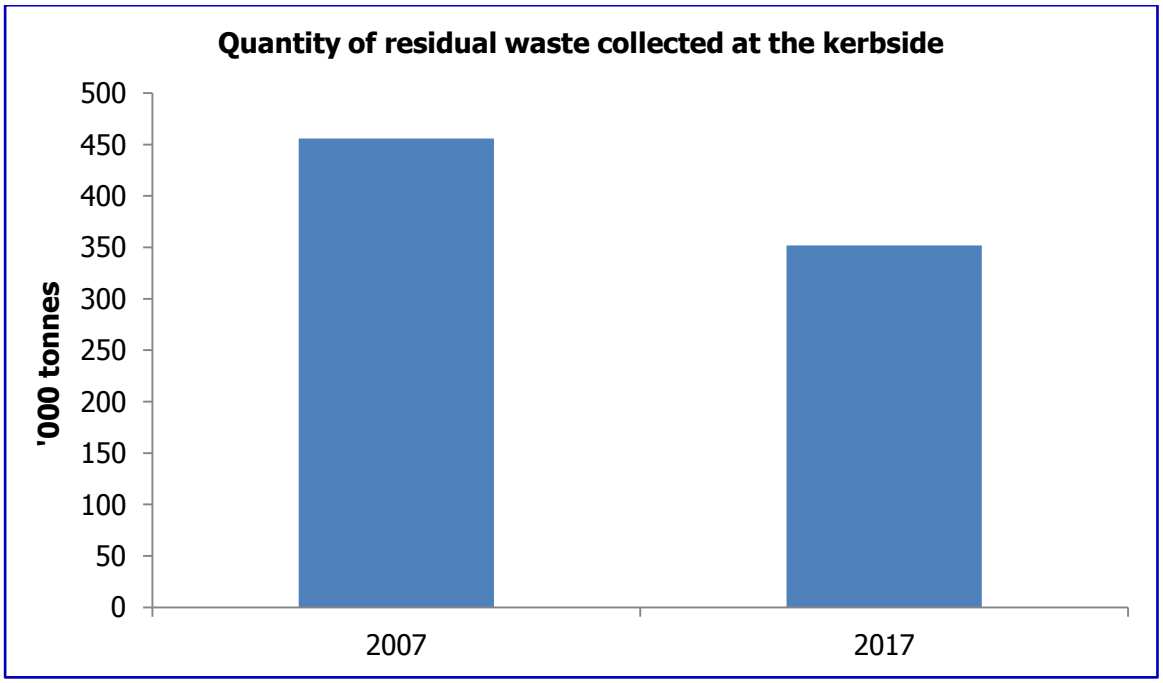


Table 7 summarises the change in the tonnage of the materials by primary category. Food waste has shown the largest absolute reduction from 174,424 tonnes in 2007 to 87,062 tonnes in 2016-17 however there are clearly still very large quantities of food waste remaining in the residual bin in 2016-17 that could be recycled.

Table 7 Comparison of residual composition from 2007 study to the current study

Primary Level	Tonnage 2007	Tonnage 2017	Composition 2007	Composition 2017
Food Waste	174,424	87,062	38.28%	24.75%
Paper and Cardboard	61,300	54,844	13.45%	15.59%
Healthcare Waste	28,036	42,192	6.15%	11.99%
Plastic Film	36,109	34,977	7.92%	9.94%
Dense Plastic	37,971	34,894	8.33%	9.92%
Glass	34,373	24,577	7.54%	6.99%
Textiles	14,596	18,478	3.20%	5.25%
Combustibles	8,856	10,778	1.94%	3.06%
Non Combustibles	18,265	10,144	4.01%	2.88%
Non FE Metal	5,166	6,769	1.13%	1.92%
Garden Waste	12,355	6,400	2.71%	1.82%
Fines	5,305	6,131	1.16%	1.74%
FE Metal	9,650	4,741	2.12%	1.35%
Mixed Scrap Metal[10]	0	4,734	0.00%	1.35%
WEEE	7,403	3,755	1.62%	1.07%
Household Hazardous Waste	1,882	1,330	0.41%	0.38%
Total	**455,692**	**351,806**	**100%**	**100%**

[10] *Mixed scrap metal was classified under primary categories 'Ferrous Metal' and 'Non Ferrous Metal' in the 2007 study.*

4.6 How much are we throwing away?

Based on the housing stock[11] data for Northern Ireland this study has calculated that the average household in Northern Ireland throws away 9.2 kg of residual waste per week.

The composition has been expressed in Table 8 as kilograms per household per week.

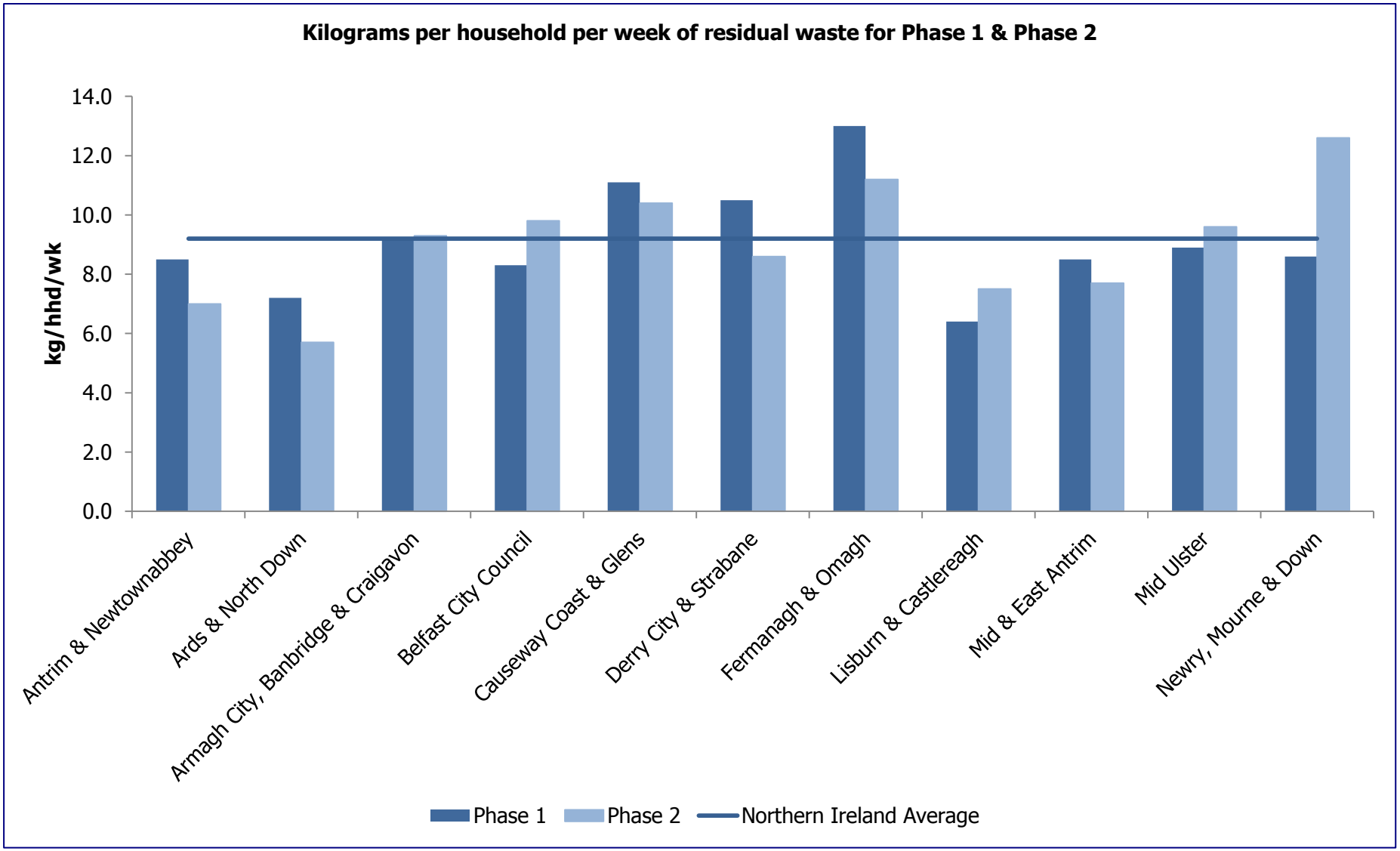
Table 8 Composition of household residual waste thrown away on a weekly basis in Northern Ireland

Primary Category	Kg/hhd/wk
Food Waste	2.27
Paper and Cardboard	1.43
Healthcare Waste	1.10
Plastic Film	0.91
Dense Plastic	0.91
Glass	0.64
Textiles	0.48
Combustibles	0.28
Non Combustibles	0.26
Non FE Metal	0.18
Garden Waste	0.17
Fines	0.16
FE Metal	0.12
Mixed Scrap Metal	0.12
WEEE	0.10
Household Hazardous Waste	0.03
Total	**9.19**

Figure 3 shows our analysis of how much householders who participated in the study were disposing in their residual collection for each phase of the study. Although all residual collections are now collected on a fortnightly basis we have illustrated the results on a weekly basis for comparison to the 9.2 kg average (per household per week).

[11] *The housing stock figure has been derived from the Northern Ireland Local Authority Collected Municipal Waste Management Statistics 2016/17 Annual Data. The number of occupied households is estimated from the total housing stock adjusted for vacant properties using the 2011 Census.*

Figure 3 Weight of residual waste in the bin for each local authority expressed as kilograms per household per week



4.7 Comparison of Phase 1 and Phase 2

Table 9 shows the composition of the residual bin in Phase 1 and Phase 2.

Table 9 Composition (%) of residual waste in Phase 1 and Phase 2

Primary Category	Phase 1 Composition	Phase 2 Composition
Glass	7.7%	6.2%
Paper and Cardboard	15.0%	16.2%
FE Metal	1.4%	1.3%
Non FE metal	2.0%	1.9%
Mixed scrap metal	1.3%	1.4%
Dense Plastic	9.4%	10.4%
Plastic film	9.8%	10.1%
Garden waste	2.1%	1.5%
Food waste	25.6%	23.9%
WEEE	0.9%	1.2%
Combustibles	2.8%	3.3%
Textiles	5.4%	5.1%
Non combustibles	2.8%	2.9%
Household Hazardous Waste	0.3%	0.4%
Healthcare waste	11.8%	12.2%
Fines	1.6%	1.9%
Total	**100%**	**100%**

The results are very consistent across phases. Small changes of the magnitudes observed between phases cannot be taken as strong evidence of an underlying change, due to both random fluctuations in waste arisings and composition and seasonal effects.

From the 1st April 2017, all Northern Ireland councils have been required to provide each household with a container for the collection of waste food for recycling under the Food Waste Regulations (Northern Ireland) 2015. There has been a significant push on food waste recycling communications across Northern Ireland between Phase 1 and Phase 2. The percentage of food waste in the residual bin has reduced from 25.6% in Phase 1 to 23.9% in Phase 2 which may be linked to communications campaigns; however this reduction is also within expected upper and lower limit levels of data confidence and we cannot directly relate the communications to the reduction in this instance.

5.0 Kerbside Recycling Analysis

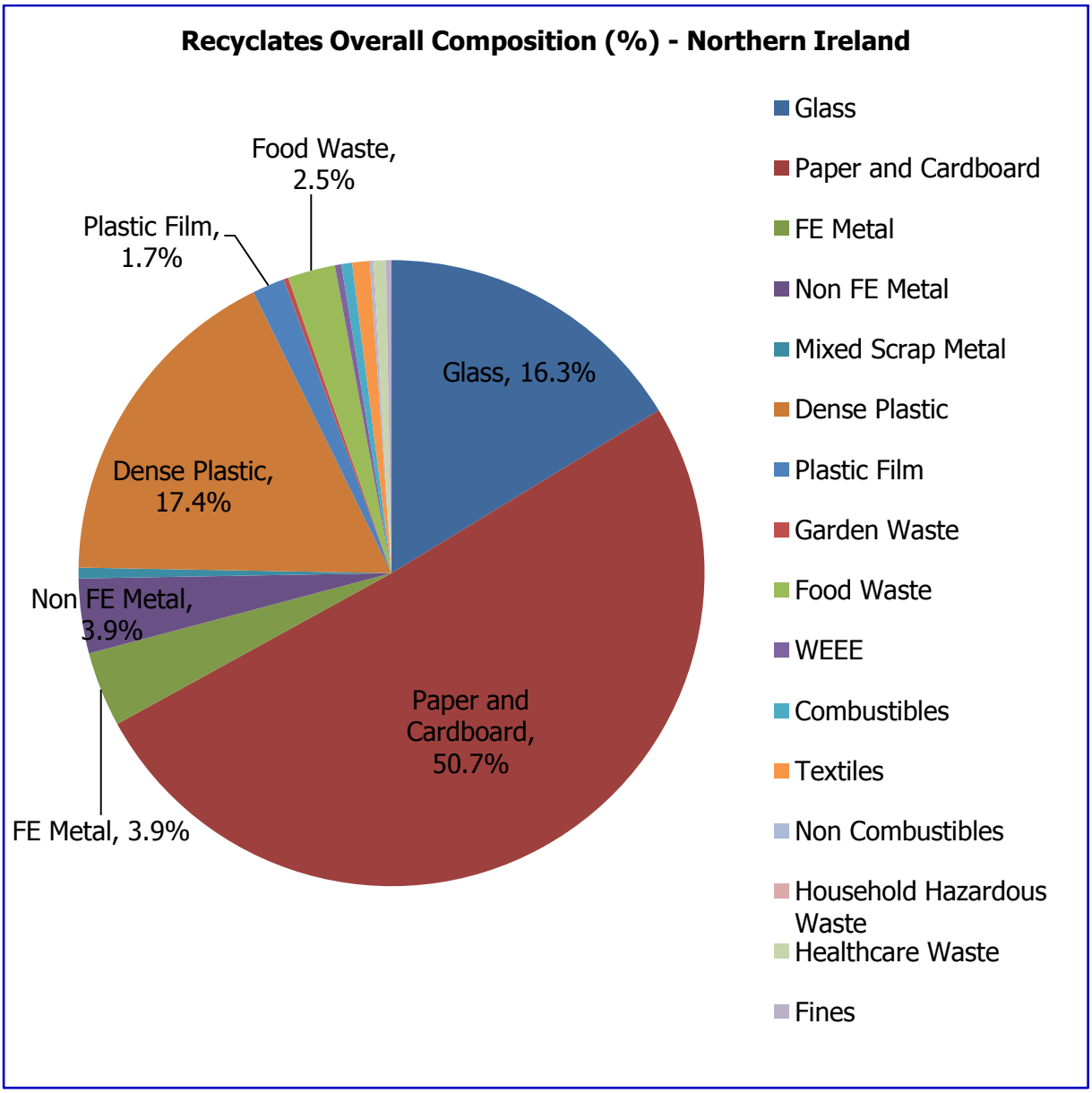
5.1 Composition of the various dry recycling collections

This section summarises the overall composition of various dry recycling collections in Northern Ireland including commingled recyclates collections, source segregated recyclates collections and separate glass collections.

The materials accepted for recycling at the kerbside in Northern Ireland vary by local authority area and indeed variances are found in different locations within local authorities.

The composition of primary waste categories in the recyclates waste stream in Northern Ireland is presented in Figure 4 below.

Figure 4 Overall composition (%) of primary waste categories in recyclates stream sample in Northern Ireland



The NIEA 2016-2017 dataset reports that 101,687 tonnes[12] of kerbside recycling was collected by local authorities. Typically a household in Northern Ireland puts 138 kg of material into the recycling container annually. The (household weighted) average composition of kerbside recycling from the local authority analyses was applied to the total recycling arising to estimate the quantity of each material in the dry recycling stream.

Table 10 Composition of kerbside recycling in Northern Ireland with corresponding tonnage

Primary Level	Composition	LAC Kerbside waste for disposal (tonnes) 2016-17
Paper and Cardboard	50.7%	51,560
Dense Plastic	17.4%	17,744
Glass	16.3%	16,566
FE Metal	3.9%	3,939
Non FE Metal	3.9%	3,921
Food Waste	2.5%	2,496
Plastic Film	1.7%	1,694
Textiles	0.9%	919
Healthcare Waste	0.6%	632
Mixed Scrap Metal	0.6%	565
Combustibles	0.6%	562
WEEE	0.3%	343
Fines	0.3%	289
Garden Waste	0.2%	252
Non Combustibles	0.1%	149
Household Hazardous Waste	0.1%	56
Total	**100%**	**101,687**

Table 11 sets out the detailed composition of household dry recycling material collected at the kerbside in Northern Ireland. For a more detailed breakdown of recycling collections in each local authority, refer to Volume 2.

Table 11 Detailed composition of household dry recycling collected at the kerbside in Northern Ireland

Primary Level	Secondary Level	Composition
Glass	All glass containers	16.2%
	Non-packaging glass	0.1%
Paper and Cardboard	Newspaper, magazines, Yellow Pages/directories	19.5%
	Other recyclable paper	6.5%
	Non-recyclable paper	0.9%
	All card packaging	20.7%
	Cardboard beverage packaging / cartons	1.4%
	Other card	0.7%
	Books	1.1%

[12] *This figure has been calculated by RPS from analysing WasteDataFlow returns relating to Q10.*

Primary Level	Secondary Level	Composition
FE Metal	Ferrous cans and tins	3.5%
	Ferrous aerosols	0.4%
Non FE metal	Non Ferrous cans	3.3%
	Non Ferrous aerosols	0.2%
	Aluminium foil	0.3%
Mixed scrap metal	All scrap and other metal	0.6%
Dense Plastic	HDPE drink bottles	3.0%
	PET drink bottles	5.9%
	Other plastic bottles	3.4%
	Dense plastic packaging exc. EPS	3.3%
	Other dense plastic - non-packaging e.g. CD, DVD	1.6%
	Expanded polystyrene packaging	0.2%
Plastic film	Carrier bags	0.2%
	Bin bags and other plastic film	1.4%
Garden waste	Green and woody garden waste	0.2%
	Soil	0.1%
Food waste	Avoidable food waste	1.0%
	Unavoidable food waste	0.5%
	Cooking oil/fats	0.0%
	Liquids	0.9%
WEEE	Large Domestic App	0.0%
	Small Domestic App	0.3%
	Cathode Ray Tubes	0.0%
	Fridges & Freezers	0.0%
Combustibles	Wood untreated inc wood furniture	0.1%
	Wood treated e.g. chipboard, MDF	0.0%
	Carpet & underlay Moved from Textiles	0.1%
	Other combustibles inc soft furniture and cushions	0.3%
Textiles	Clothing textiles	0.4%
	Shoes, belts & bags	0.2%
	Non-clothing textiles	0.3%
Non combustibles	Plasterboard	0.0%
	Other construction and demolition waste inc rubble	0.1%
	Other non-combustible materials	0.0%
Household Hazardous Waste	Household Batteries	0.0%
	Car Batteries	0.0%
	Engine Oil	0.0%
	Asbestos	0.0%
	Other Potentially Hazardous inc Tyres	0.0%
Healthcare waste	Disposable Nappies	0.4%
	Other absorbent hygiene products	0.0%
	Potentially hazardous healthcare waste	0.1%
	Dead animals	0.0%
	Pet excrement and bedding	0.0%
Fines	<10mm	0.3%
Total		**100%**

5.2 Key materials in the recycling bin

5.2.1 Paper and Cardboard

Paper and cardboard is the largest waste type found in the recycling bin at 51,560 tonnes; just over half of the total recycling waste arisings for Northern Ireland. Further detail provided in the secondary categories shows that 98% of this paper and cardboard is recyclable material.

5.2.2 Dense Plastic

Dense plastic is the second largest waste type in the recycling bin at 17.4% or 17,744 tonnes of total kerbside recycling. From the secondary categories it can be seen that just over 70% or 12,507 tonnes of this dense plastic is made up of HDPE and PET drink bottles and other plastic bottles and just less than 20% of dense plastic, or 3,379 tonnes, is plastic packaging.

5.2.3 Glass

Table 10 above shows that glass makes up 16.3% of the recycling bin. This equates to 16,566 tonnes. From the detailed secondary categories this includes 16,456 tonnes of glass containers which are accepted for recycling by some local authorities.

5.3 Non-target materials in the recycling bin

The study considered target and non-target materials found in the recycling bin. Target materials are recyclable materials placed in the correct recycling bin. The target materials have been confirmed by gathering data from the participating local authorities. This information has also been verified by a web search to ascertain the level of information on items accepted or not to the householder for example, kerbside recycling information leaflets. The target and non-target materials have also been verified via the specific sampling plan and operational plan developed for each local authority by RPS prior to initiation of the fieldwork.

Non-target materials are materials that cannot be recycled in services currently provided by local authorities. Cleanliness of target materials was not taken into account, such as food residue in containers or target materials in plastic bags

The average composition of target and non-target material from all local authority recyclates collection services has been calculated for Phase 1 (Figure 5) and for Phase 2 (Figure 6).

The percentage of target material found in the commingled dry recycling bin varies for each local authority from a low of 75.8% target materials to a high of 90.5% target materials, over the course of the two Phases.

Likewise the percentage of target material found in the source separated recyclates samples also varies by local authority from 90.4% to 99.3% over the two Phases.

Figure 5 Average target and non-target materials in the Phase 1 recycling collections

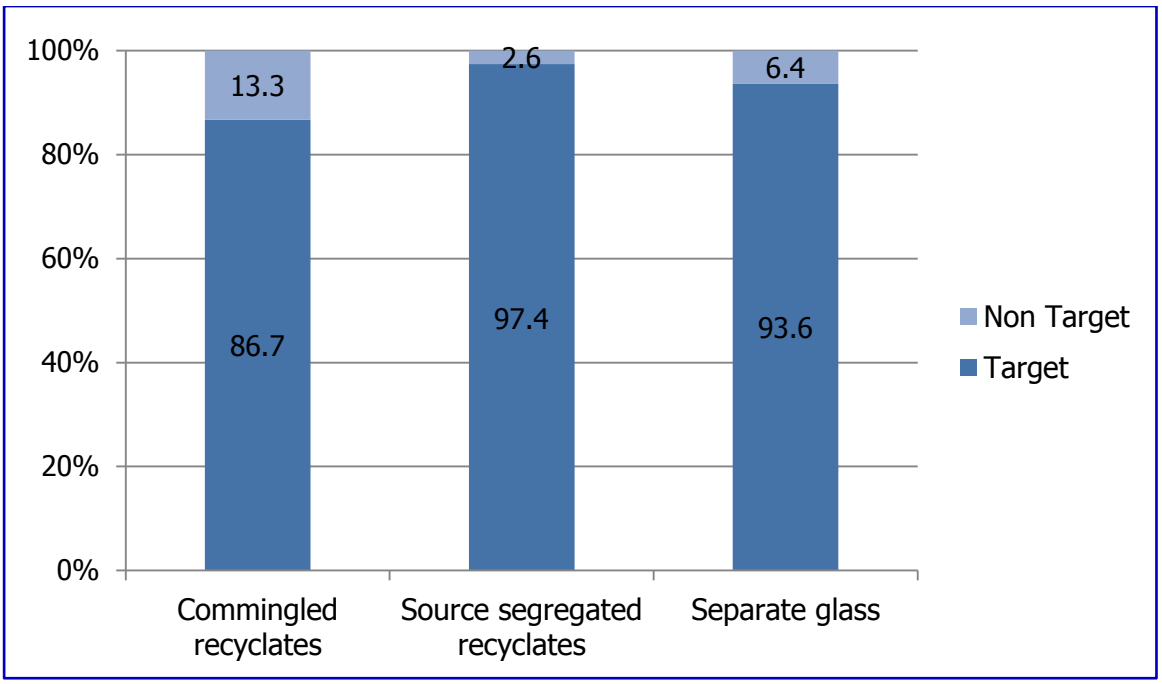
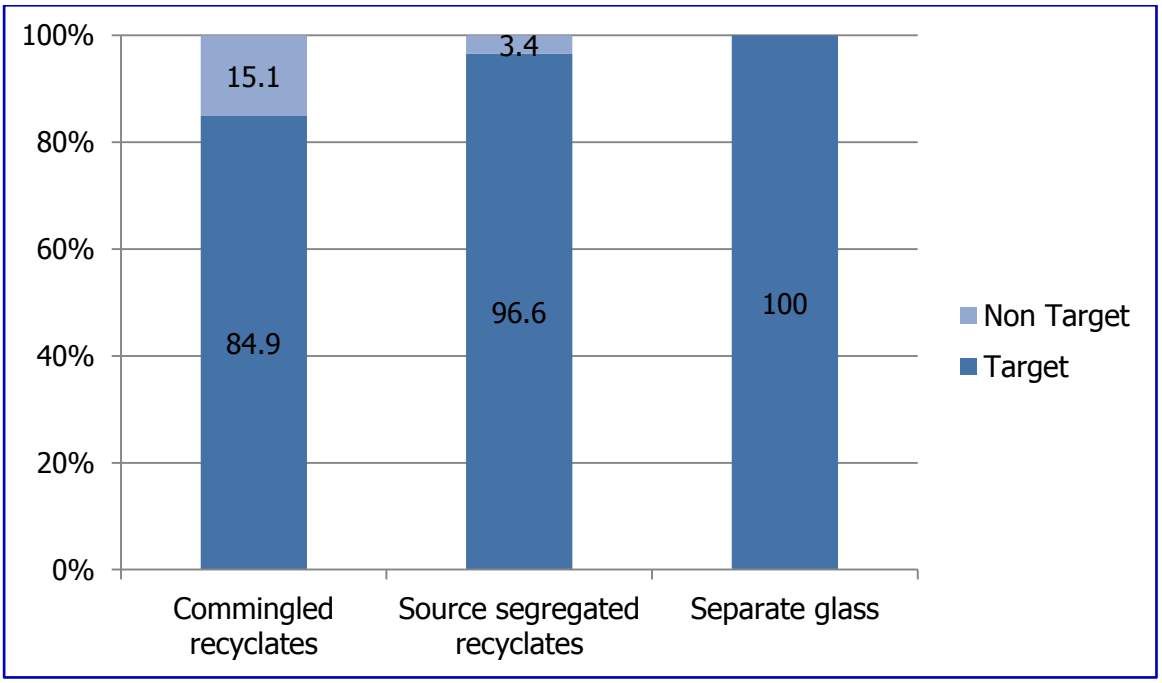


Figure 6 Average target and non-target materials in the Phase 2 recycling collections



The composition of target and non-target materials in commingled recyclates samples is illustrated in Figure 7 (Phase 1) and Figure 8 (Phase 2) below.

Figure 9 (Phase 1) and Figure 10 (Phase 2) below present the composition of target and non-target materials in source segregated recyclates samples.

Figure 7 Target and non-target materials in Phase 1 commingled recyclates sample

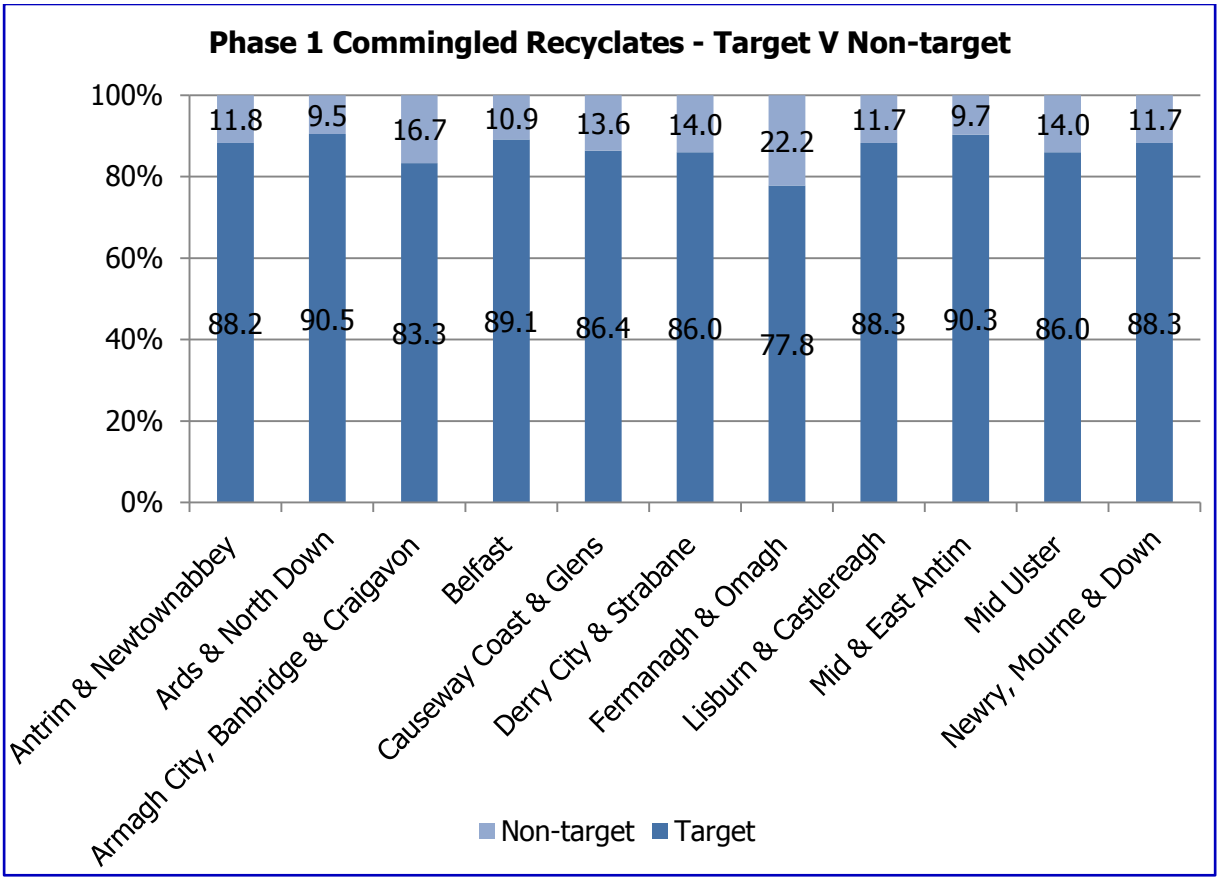


Figure 8 Target and non-target materials in Phase 2 commingled recyclates sample

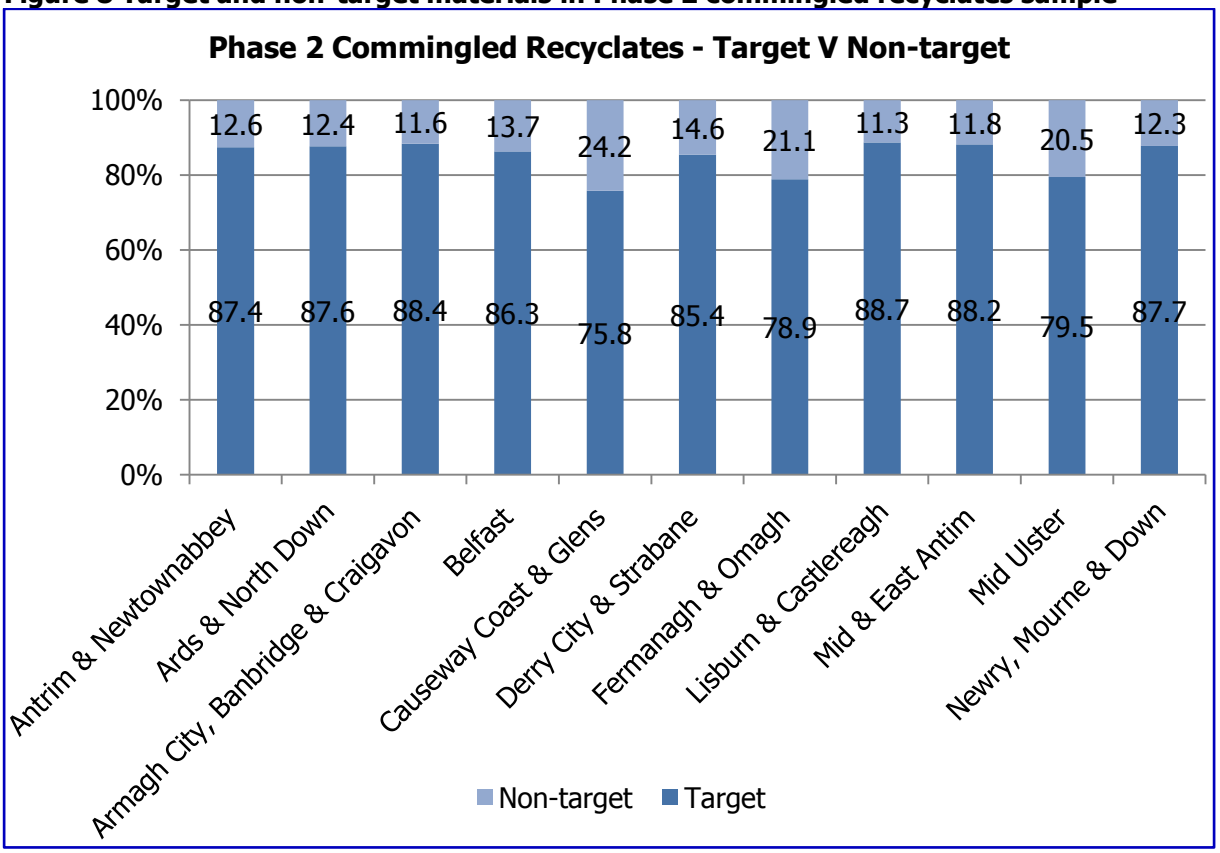


Figure 9 Target and non-target materials in Phase 1 source segregated recyclates sample

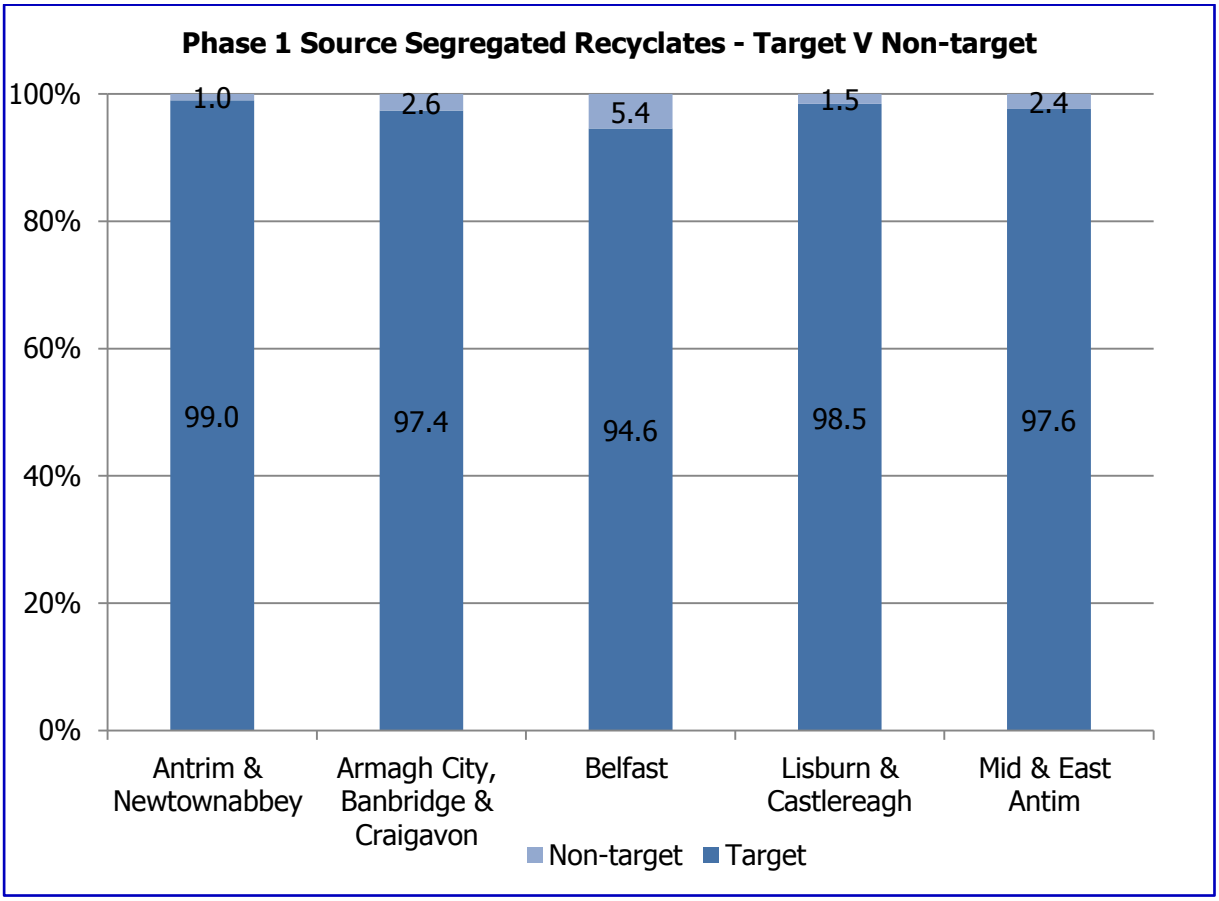
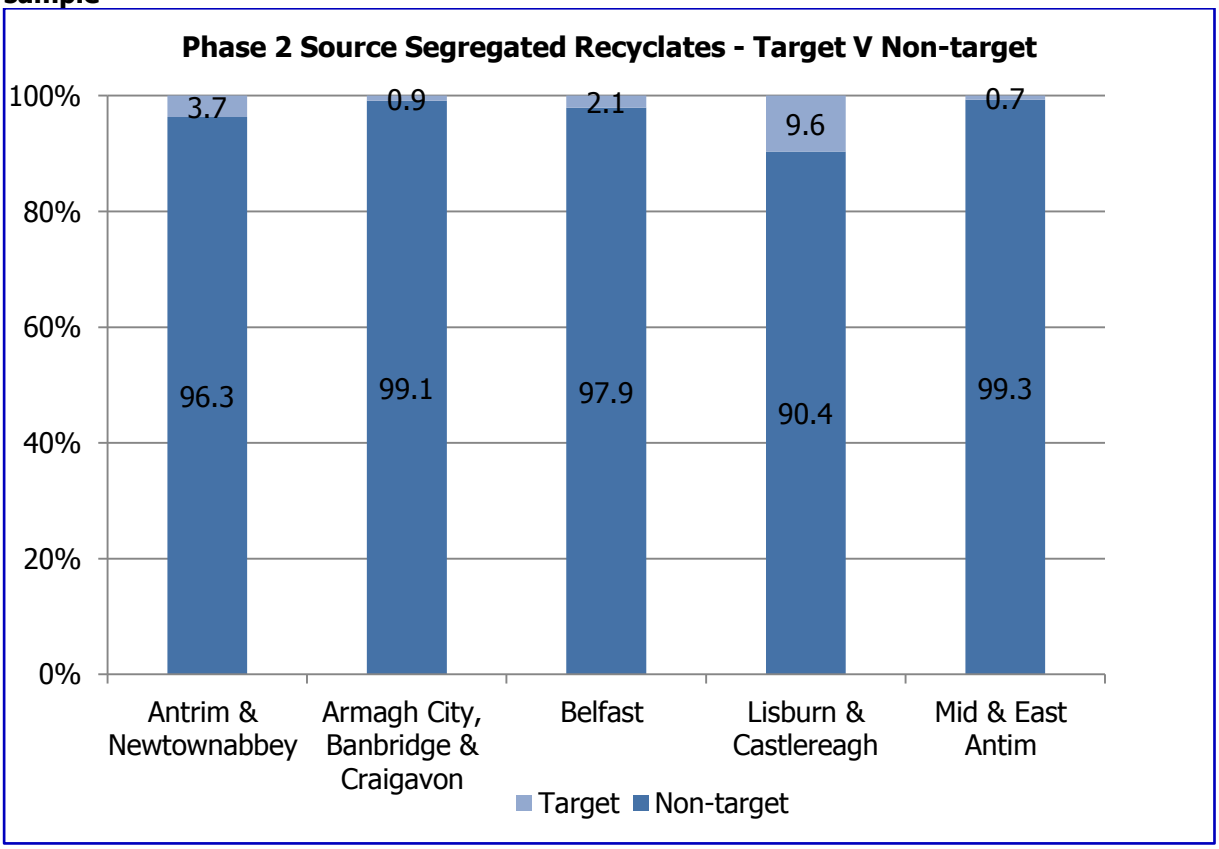


Figure 10 Target and non-target materials in Phase 2 source segregated recyclates sample



5.4 Capture rates of key recyclable materials

'Capture' refers to the quantity of a particular target material that is 'captured' by the service or scheme designed to accept that material. 'Capture rate' therefore refers to the proportion (as a percentage) of a targeted material that has been collected relative to the total quantity of that material arising (i.e. including both the residual bin and material recycled / composted). Table 12 shows the capture rates for the widely recyclable materials. Only materials widely accepted in the services are included in the figures.

Table 12 Capture rates of the main materials in the kerbside collected dry recycling streams

	Total NI Tonnage Available	Capture Weight	Capture Rate
Paper and cardboard[13]	87,610	50,589	57.7%
Ferrous metal[14]	8,692	3,938	45.3%
Glass[15]	40,548	16,480	40.6%
Dense plastic[16]	41,148	15,902	38.6%
Non-ferrous metal[17]	10,742	3,933	36.6%

5.5 How much are we recycling at the kerbside?

From the data collected it is possible to calculate set out rates for each local authority collection during the study. Set out rates vary greatly by local authority and service as illustrated below. The average set out rates for the various dry recycling collections are illustrated in Figure 11.

[13] *Materials assumed widely recyclable for the Paper and cardboard primary category = Newspaper, magazines, yellow pages / directories; Other recyclable paper; All card packaging; Cardboard beverage packaging / carton; Other card; and Books.*

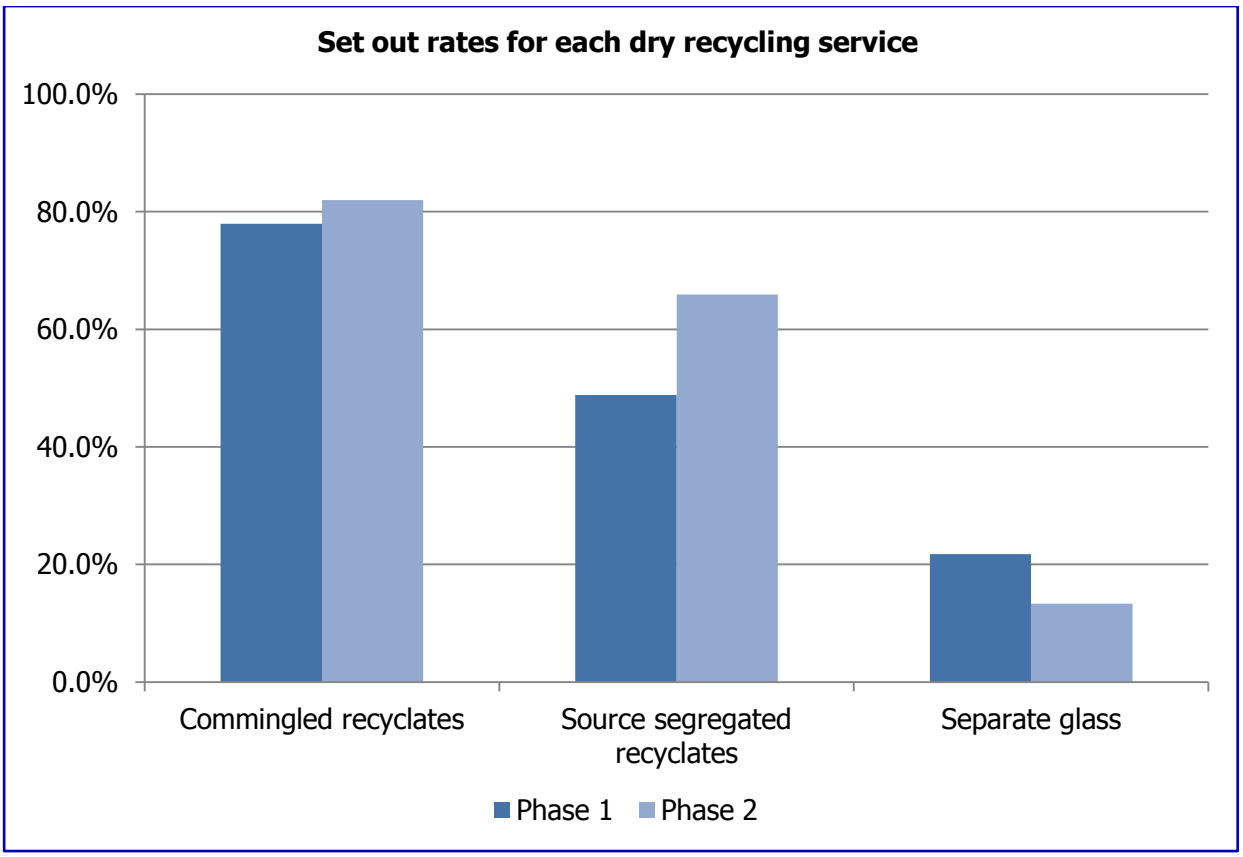
[14] *Materials assumed widely recyclable for the Ferrous metal primary category = Ferrous cans and tins; and Ferrous aerosols.*

[15] *All glass containers and jars.*

[16] *Dense plastic – HDPE drink bottles, PET drink bottles; Other plastic bottles; Dense plastic packaging excluding expanded polystyrene packaging.*

[17] *Non-ferrous cans; Non-ferrous aerosols; and Aluminium foil.*

Figure 11 Set out rates determined during fieldwork



Please note that the above figures do not give an indication of participation as participation is monitored over duration of three collection opportunities, this study only considered set out.

The data collected in relation to the set out rates facilitated an analysis of how much householders were recycling at the kerbside on a weekly basis for:

- the total number of households included in the sample area (kilogram/household/week);
- the households only setting out their receptacle for recycling (kilogram/household/week – setting out).

Table 13 shows analysis from the study relating to the commingled, source segregated and separate glass collections.

Table 13 Average household waste generation

Recycling Service	Kilogram/household/ week		Kilogram/household/ week - setting out	
	Phase 1	**Phase 2**	**Phase 1**	**Phase 2**
Commingled recyclates	3.05	3.46	3.89	4.24
Source segregated recyclates	2.44	2.71	4.97	4.16
Separate glass	0.74	0.47	3.41	1.78

5.6 The biodegradable content of recycling at the kerbside

The biodegradable content of recycling collected at the kerbside has been estimated to be 54%. This was calculated at 78% in the 2007 Study. The significant reduction in biodegradability between 2007 and 2017 could be attributed to the reduced composition of newspapers, magazines, yellow pages/directories and other recyclable paper from 60.6% in 2007 to 26.0% in 2017 as this waste type is considered 100% biodegradable.

Table 14 Biodegradability content of kerbside recycling

Level 1	Level 2	Composition	Biodegradability
Glass	All glass containers	16.2%	0.0%
	Non-packaging glass	0.1%	0.0%
Paper and Cardboard	Newspaper, magazines, Yellow Pages/directories	19.5%	19.5%
	Other recyclable paper	6.5%	6.5%
	Non-recyclable paper	0.9%	0.9%
	All card packaging	20.7%	20.7%
	Cardboard beverage packaging / cartons	1.4%	0.7%
	Other card	0.7%	0.7%
	Books	1.1%	1.1%
FE Metal	Ferrous cans and tins	3.5%	0.0%
	Ferrous aerosols	0.4%	0.0%
Non FE metal	Non Ferrous cans	3.3%	0.0%
	Non Ferrous aerosols	0.2%	0.0%
	Aluminium foil	0.3%	0.0%
Mixed scrap metal	All scrap and other metal	0.6%	0.0%
Dense Plastic	HDPE drink bottles	3.0%	0.0%
	PET drink bottles	5.9%	0.0%
	Other plastic bottles	3.4%	0.0%
	Dense plastic packaging exc. EPS	3.3%	0.0%
	Other dense plastic - non-packaging e.g. CD, DVD	1.6%	0.0%
	Expanded polystyrene packaging	0.2%	0.0%
Plastic film	Carrier bags	0.2%	0.0%
	Bin bags and other plastic film	1.4%	0.0%
Garden waste	Green and woody garden waste	0.2%	0.2%
	Soil	0.1%	0.0%
Food waste	Avoidable food waste	1.0%	1.0%
	Unavoidable food waste	0.5%	0.5%
	Cooking oil/fats	0.0%	0.0%
	Liquids	0.9%	0.9%
WEEE	Large Domestic App	0.0%	0.0%
	Small Domestic App	0.3%	0.0%
	Cathode Ray Tubes	0.0%	0.0%
	Fridges & Freezers	0.0%	0.0%
Combustibles	Wood untreated inc wood furniture	0.1%	0.1%

Level 1	Level 2	Composition	Biodegradability
	Wood treated e.g. chipboard, MDF	0.0%	0.0%
	Carpet & underlay Moved from Textiles	0.1%	0.0%
	Other combustibles inc soft furniture and cushions	0.3%	0.2%
Textiles	Clothing textiles	0.4%	0.2%
	Shoes, belts & bags	0.2%	0.1%
	Non-clothing textiles	0.3%	0.1%
Non combustibles	Plasterboard	0.0%	0.0%
	Other construction and demolition waste inc rubble	0.1%	0.0%
	Other non-combustible materials	0.0%	0.0%
Household Hazardous Waste	Household Batteries	0.0%	0.0%
	Car Batteries	0.0%	0.0%
	Engine Oil	0.0%	0.0%
	Asbestos	0.0%	0.0%
	Other Potentially Hazardous inc Tyres	0.0%	0.0%
Healthcare waste	Disposable Nappies	0.4%	0.2%
	Other absorbent hygiene products	0.0%	0.0%
	Potentially hazardous healthcare waste	0.1%	0.0%
	Dead animals	0.0%	0.0%
	Pet excrement and bedding	0.0%	0.0%
Fines	<10mm	0.3%	0.0%
Total		**100%**	**54%**

6.0 Organic Waste Analysis

6.1 Composition of kerbside collected organics

Organic bin collection services include commingled organic bins, separate garden waste bins and separate food waste caddies.

Current estimates from the NIEA dataset 2016-17 detail that 125,083 tonnes of organic waste was collected at the kerbside by local authorities for composting and anaerobic digestion. This figure has been used in the analysis. Typically a household in Northern Ireland throws out in the region of 170 kg of organic waste annually.

The typical composition of organic waste in Northern Ireland is outlined by primary categories in Table 15 and secondary categories in Table 16 below.

Table 15 Compostion of the kerbside collected organics materials

Primary Level	Composition	LAC Kerbside waste for disposal (tonnes)
Garden Waste	63.5%	79,435
Food Waste	34.2%	42,789
Paper and Cardboard	0.7%	822
Healthcare Waste	0.5%	621
Combustibles	0.3%	378
Plastic Film	0.2%	255
Dense Plastic	0.2%	215
Fines	0.1%	186
Non Combustibles	0.1%	168
Textiles	0.1%	72
Glass	0.0%	55
Non FE Metal	0.0%	39
Mixed Scrap Metal	0.0%	28
FE Metal	0.0%	13
WEEE	0.0%	7
Household Hazardous Waste	0.0%	0
Total	**100%**	**125,083**

Table 16 Detailed composition of kerbside collected organics

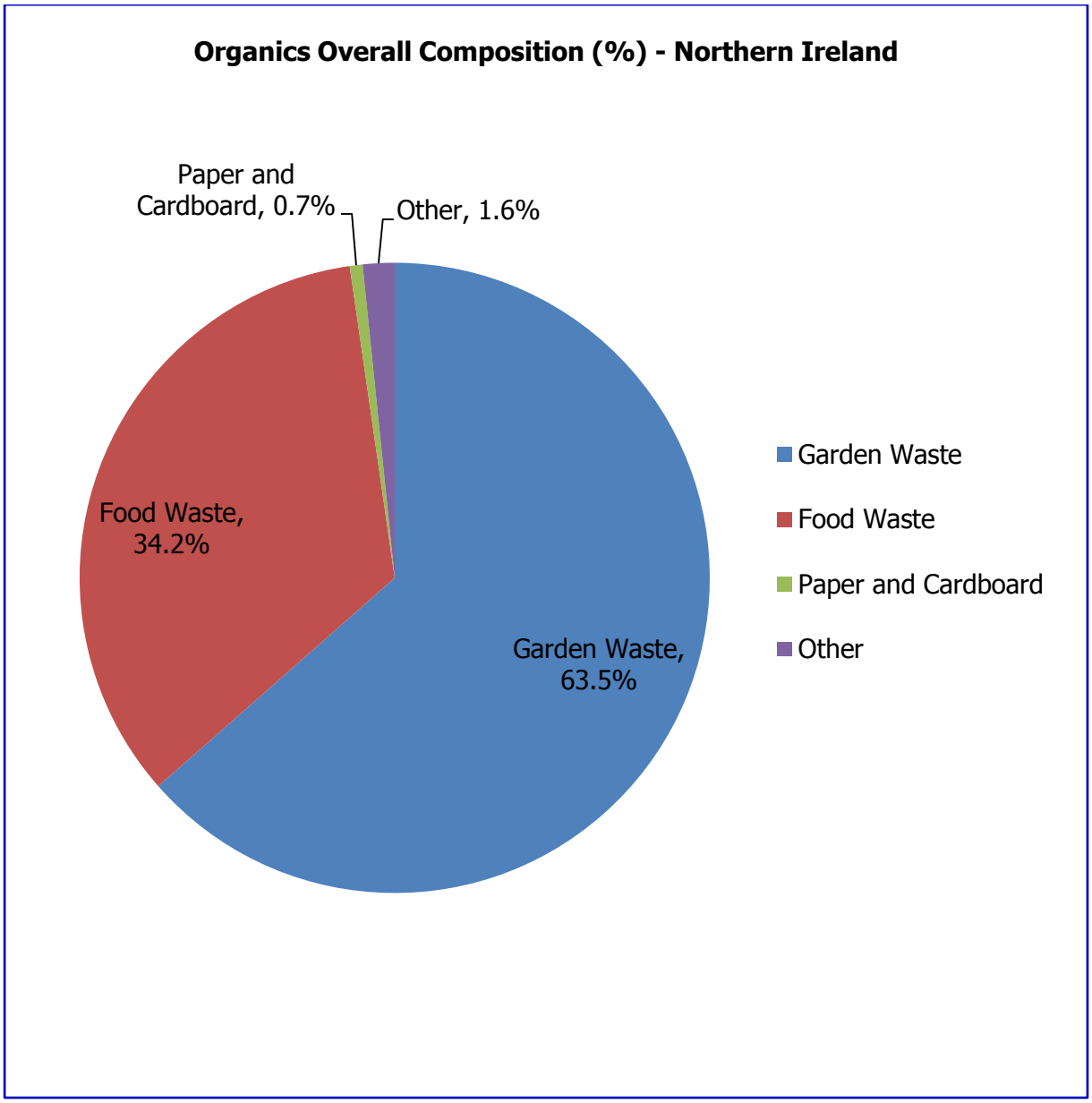
Primary Level	Secondary Level	Composition
Glass	All glass containers	0.0%
	Non-packaging glass	0.0%
Paper and Cardboard	Newspaper, magazines, Yellow Pages/directories	0.1%
	Other recyclable paper	0.1%
	Non-recyclable paper	0.1%
	All card packaging	0.3%
	Cardboard beverage packaging / cartons	0.0%
	Other card	0.0%
	Books	0.0%
FE Metal	Ferrous cans and tins	0.0%

Primary Level	Secondary Level	Composition
	Ferrous aerosols	0.0%
Non FE metal	Non Ferrous cans	0.0%
	Non Ferrous aerosols	0.0%
	Aluminium foil	0.0%
Mixed scrap metal	All scrap and other metal	0.0%
Dense Plastic	HDPE drink bottles	0.0%
	PET drink bottles	0.0%
	Other plastic bottles	0.0%
	Dense plastic packaging exc. EPS	0.1%
	Other dense plastic - non-packaging e.g. CD, DVD	0.0%
	Expanded polystyrene packaging	0.0%
Plastic film	Carrier bags	0.1%
	Bin bags and other plastic film	0.2%
Garden waste	Green and woody garden waste	61.8%
	Soil	1.7%
Food waste	Avoidable food waste	14.9%
	Unavoidable food waste	19.2%
	Cooking oil/fats	0.1%
	Liquids	0.0%
WEEE	Large Domestic App	0.0%
	Small Domestic App	0.0%
	Cathode Ray Tubes	0.0%
	Fridges & Freezers	0.0%
Combustibles	Wood untreated inc wood furniture	0.2%
	Wood treated e.g. chipboard, MDF	0.1%
	Carpet & underlay Moved from Textiles	0.0%
	Other combustibles inc soft furniture and cushions	0.0%
Textiles	Clothing textiles	0.0%
	Shoes, belts & bags	0.0%
	Non-clothing textiles	0.0%
Non combustibles	Plasterboard	0.0%
	Other construction and demolition waste inc rubble	0.1%
	Other non-combustible materials	0.0%
Household Hazardous Waste	Household Batteries	0.0%
	Car Batteries	0.0%
	Engine Oil	0.0%
	Asbestos	0.0%
	Other Potentially Hazardous inc Tyres	0.0%
Healthcare waste	Disposable Nappies	0.1%
	Other absorbent hygiene products	0.0%
	Potentially hazardous healthcare waste	0.0%
	Dead animals	0.0%
	Pet excrement and bedding	0.4%
Fines	<10mm	0.1%
Total		**100%**

6.2 Key materials in the organic waste stream

Figure 12 below outlines the composition of organic waste collected at the kerbside for Northern Ireland.

Figure 12 Overall composition (%) of primary waste categories in organics stream sample in Northern Ireland



6.2.1 Garden Waste

Garden waste is the largest waste type found in the organic bin at 79,435 tonnes, just over 60% of the total organic waste arisings for Northern Ireland. This includes 2,171 tonnes or 1.7% of soil.

6.2.2 Food Waste[18]

Food waste was the second largest waste category, making up 42,789 tonnes or 34.2% of the organic bin. This includes 18,641 tonnes (14.9%) of avoidable food waste and 23,961 tonnes (19.2%) of unavoidable food waste with the remaining being cooking oil/fats and liquids.

6.2.3 Paper and Cardboard

Paper and cardboard were the third largest primary category making up 822 tonnes or 0.7% of the organic bin. Further break down in the secondary categories shows that just under 80% of this paper and cardboard could potentially be recycled in current systems. However the secondary waste category non-recyclable paper which made up 180 tonnes (0.1%) of the organic bin is accepted in small amounts by some local authorities.

6.2.4 Healthcare Waste

Table 15 shows that healthcare waste makes up 621 tonnes (0.5%) of the organic bin. This includes 550 tonnes (0.4%) of the secondary waste category pet excrement and bedding which is a target material in some local authorities.

6.3 Composition of various organics collections

The composition of the various collection streams has been calculated and is detailed in Table 17 below.

Table 17 Composition of organic waste collection streams

Primary Level	Composition % Commingled organics collection	Composition % Separate food waste	Composition % Separate garden waste
Garden Waste	72.1%	0.2%	97.9%
Food Waste	25.2%	99.3%	0.2%
Paper and Cardboard	0.7%	0.3%	1.0%
Healthcare Waste	0.6%	0.0%	0.1%
Combustibles	0.4%	0.0%	0.2%
Plastic Film	0.3%	0.1%	0.0%
Dense Plastic	0.2%	0.1%	0.1%
Fines	0.2%	0.0%	0.1%
Non Combustibles	0.2%	0.0%	0.0%
Textiles	0.1%	0.0%	0.1%

[18] *This analysis was conducted using the division of food waste into avoidable, unavoidable, cooking oil/fats and liquids. Since this research was commissioned WRAP has aligned its food waste reporting with the Food Loss and Waste Accounting and Reporting Standard, and now classifies food waste as being composed of wasted food and inedible parts.*

Glass	0.0%	0.0%	0.2%
Non FE Metal	0.0%	0.0%	0.0%
Mixed Scrap Metal	0.0%	0.0%	0.0%
FE Metal	0.0%	0.0%	0.0%
WEEE	0.0%	0.0%	0.0%
Household Hazardous Waste	0.0%	0.0%	0.0%
Total	**100%**	**100%**	**100%**

6.4 Target materials found in each of the organic collection streams

The average composition of target and non-target material from all local authority organics collection services has been calculated for Phase 1 (Figure 13) and for Phase 2 (Figure 14).

The proportion of target material is higher in the separate food sample than the commingled organics or separate garden samples for both phases of the study.

The percentage of target material found in the commingled organic bin varies for each local authority from a low of 84.7% target materials to a high of 99.4% target materials, over the course of the two Phases.

Likewise the percentage of target material found in the separate food samples also varies by local authority from 96.8% to 100.0% over the two Phases.

Figure 13 Details of target and non-target materials in organics collection schemes (Phase 1)

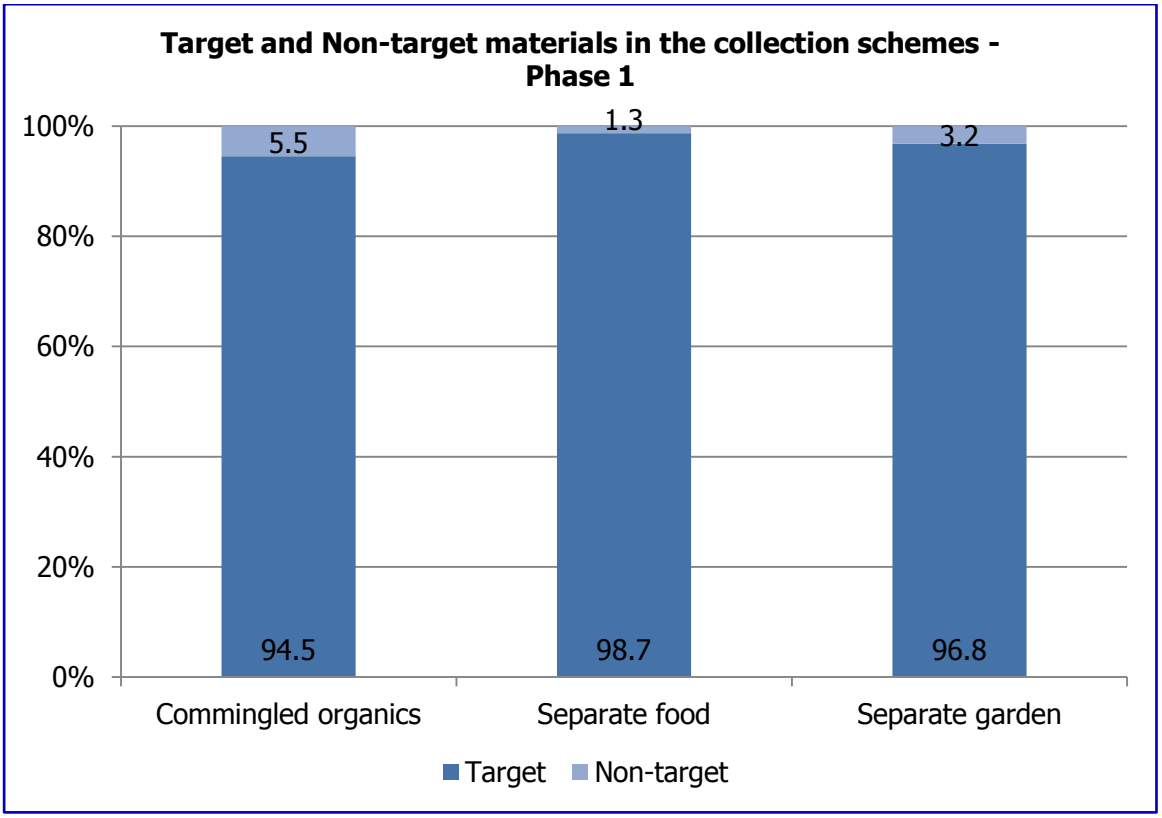
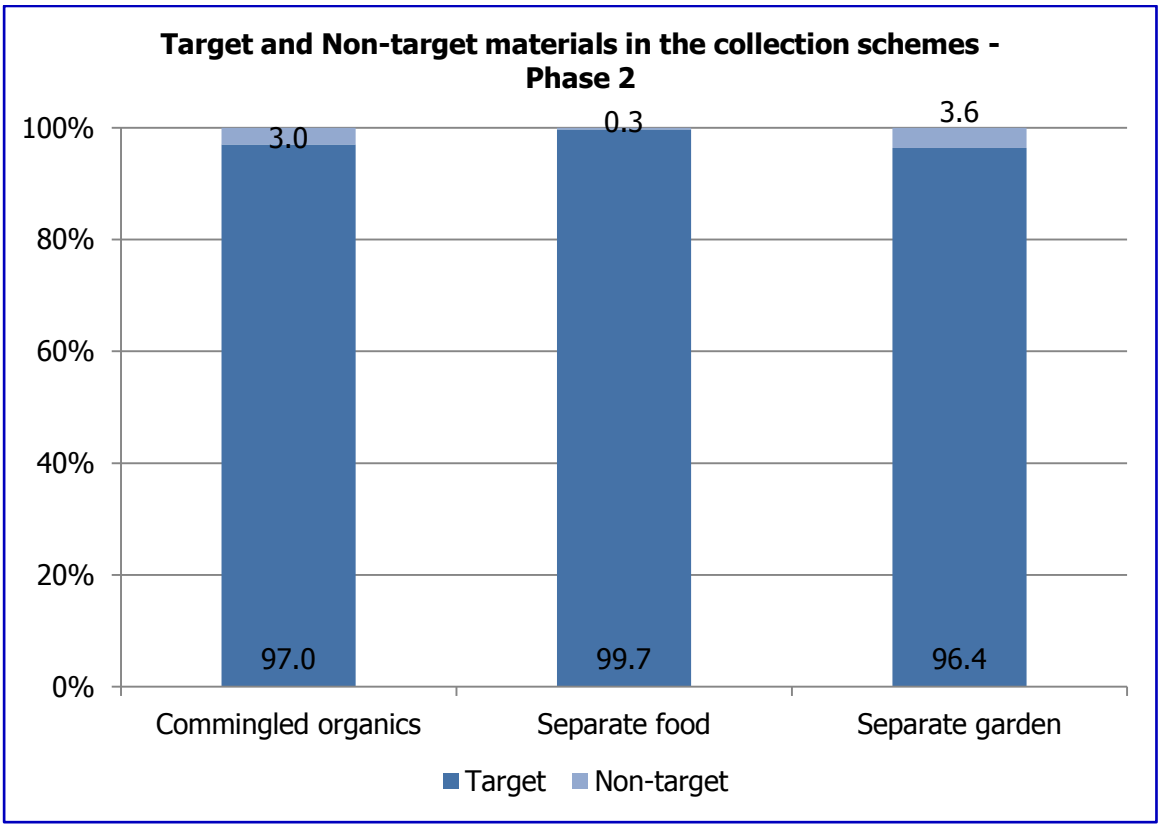


Figure 14 Details of target and non-target materials in organics collection schemes (Phase 2)



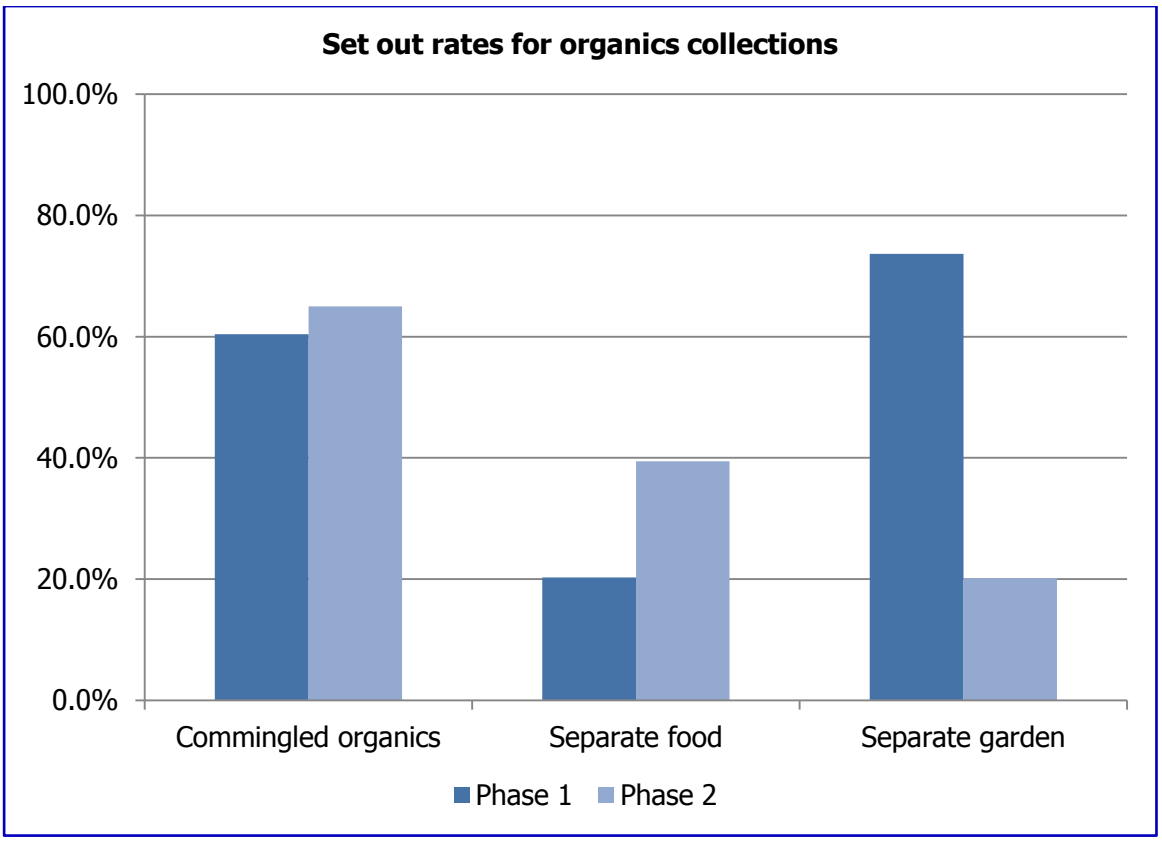
6.5 Set out rates

Set out rates were recorded for the organics stream for Phase 1 and Phase 2 and illustrated in Figure 15. Set out rates vary greatly by local authority and service.

Set out rates for the separate food collection increased from 20.3% in Phase 1 to 39.5% in Phase 2. This could be linked to the additional roll out of food caddies in local authorities and associated communications campaigns.

On the other hand set out rates for separate garden collection decreased from 73.7% in Phase 1 to 20.2% in Phase 2 which is likely attributed to the seasonality of garden waste.

Figure 15 Set out rates for the various organics collections offered at the kerbside



6.6 How much organics materials are we setting out for recycling and treatment at the kerbside

The data collected in relation to the set out rates facilitated an analysis of how much householders were recycling at the kerbside on a weekly basis for:

- the total number of households included in the sample area (kilogram/household/week);
- the households only setting out their receptacle for recycling (kilogram/household/week – setting out).

Table 18 shows analysis from the study relating to:

- Commingled organics;
- Separate food collections;
- Separate garden waste.

Table 18 Average household organic waste generation

Collection		Kilogram/household / week		Kilogram/household / week setting out	
		Phase 1	**Phase 2**	**Phase 1**	**Phase 2**
Commingled organics	Overall[19]	6.59	6.09	10.67	9.28
	Of which food	1.07	1.32	1.84	2.05
	Of which garden	5.16	4.57	8.22	6.91
Separate food		0.92	1.64	4.71	4.43
Separate garden		9.67	1.46	13.13	8.33

6.7 Capture rates of the organics streams

The capture rates for garden waste and food waste collected by all organic waste collection schemes are contained in Table 19.

Table 19 Capture rates of the main materials in the kerbside collected organic streams

	Total Weight	Capture Weight	Capture Rate
Garden waste	81,549	77,303	94.8%
Food waste	132,287	42,736	32.3%

6.8 The biodegradable content of organics collections at the kerbside

The biodegradable content of organics collected at the kerbside has been estimated to be 97%. This was calculated at 94% in the 2007 Study.

Table 20 Biodegradability content of kerbside organics

Primary Level	Secondary Level	Composition	Biodegradability
Glass	All glass containers	0.0%	0.0%
	Non-packaging glass	0.0%	0.0%
Paper and Cardboard	Newspaper, magazines, Yellow Pages/directories	0.1%	0.1%
	Other recyclable paper	0.1%	0.1%
	Non-recyclable paper	0.1%	0.1%
	All card packaging	0.3%	0.3%
	Cardboard beverage packaging / cartons	0.0%	0.0%
	Other card	0.0%	0.0%
	Books	0.0%	0.0%
FE Metal	Ferrous cans and tins	0.0%	0.0%
	Ferrous aerosols	0.0%	0.0%
Non FE metal	Non Ferrous cans	0.0%	0.0%
	Non Ferrous aerosols	0.0%	0.0%
	Aluminium foil	0.0%	0.0%
Mixed scrap	All scrap and other metal	0.0%	0.0%

[19] *Total commingled organic values includes food and garden as well as non-target materials such as glass or plastic.*

Primary Level	Secondary Level	Composition	Biodegradability
metal			
Dense plastic	HDPE drink bottles	0.0%	0.0%
	PET drink bottles	0.0%	0.0%
	Other plastic bottles	0.0%	0.0%
	Dense plastic packaging exc. EPS	0.1%	0.0%
	Other dense plastic - non-packaging e.g. CD, DVD	0.0%	0.0%
	Expanded polystyrene packaging	0.0%	0.0%
Plastic film	Carrier bags	0.1%	0.0%
	Bin bags and other plastic film	0.2%	0.0%
Garden waste	Green and woody garden waste	61.8%	61.8%
	Soil	1.7%	0.0%
Food waste	Avoidable food waste	14.9%	14.9%
	Unavoidable food waste	19.2%	19.2%
	Cooking oil/fats	0.1%	0.1%
	Liquids	0.0%	0.0%
WEEE	Large Domestic App	0.0%	0.0%
	Small Domestic App	0.0%	0.0%
	Cathode Ray Tubes	0.0%	0.0%
	Fridges & Freezers	0.0%	0.0%
Combustibles	Wood untreated inc wood furniture	0.2%	0.1%
	Wood treated e.g. chipboard, MDF	0.1%	0.0%
	Carpet & underlay Moved from Textiles	0.0%	0.0%
	Other combustibles inc soft furniture and cushions	0.0%	0.0%
Textiles	Clothing textiles	0.0%	0.0%
	Shoes, belts & bags	0.0%	0.0%
	Non-clothing textiles	0.0%	0.0%
Non combustibles	Plasterboard	0.0%	0.0%
	Other construction and demolition waste inc rubble	0.1%	0.0%
	Other non-combustible materials	0.0%	0.0%
Household Hazardous Waste	Household Batteries	0.0%	0.0%
	Car Batteries	0.0%	0.0%
	Engine Oil	0.0%	0.0%
	Asbestos	0.0%	0.0%
	Other Potentially Hazardous inc Tyres	0.0%	0.0%
Healthcare waste	Disposable Nappies	0.1%	0.0%
	Other absorbent hygiene products	0.0%	0.0%
	Potentially hazardous healthcare waste	0.0%	0.0%
	Dead animals	0.0%	0.0%
	Pet excrement and bedding	0.4%	0.4%
Fines	<10mm	0.1%	0.0%
Total		**100%**	**97.3%**

7.0 Northern Ireland Kerbside Collected Household Waste

7.1 Overall composition of kerbside collected waste

This section summarises the overall composition of what is thrown away in residual, dry recyclates and organic bins in Northern Ireland.

NIEA 2016-2017 dataset estimates that 578,576 tonnes of kerbside waste was collected by local authorities. Total estimates for Northern Ireland have been produced by applying the (household weighted) average composition of waste from the local authority analyses to the total waste arising which is presented in Table 21 below. It is estimated a household in Northern Ireland throws away 786 kg of waste annually.

Table 21 Composition of all kerbside collected household dry recyclates, organics and residual waste

Primary Level	Composition	All kerbside collected household dry recyclates, organics and residual waste (tonnes)
Glass	7.1%	41,222
Paper and Cardboard	18.5%	107,212
FE Metal	1.5%	8,692
Non FE metal	1.9%	10,742
Mixed scrap metal	0.9%	5,324
Dense Plastic	9.1%	52,867
Plastic film	6.4%	36,923
Garden waste	14.9%	86,125
Food waste	22.9%	132,287
WEEE	0.7%	4,103
Combustibles	2.0%	11,715
Textiles	3.4%	19,466
Non combustibles	1.8%	10,461
Household Hazardous Waste	0.2%	1,385
Healthcare waste	7.5%	43,446
Fines	1.1%	6,606
Total	**100%**	**578,576**

Figure 16 below presents the composition (%) of primary waste categories in the overall Northern Ireland kerbside collected waste arisings.

Figure 16 Overall composition (%) of primary waste categories in Northern Ireland kerbside collected waste

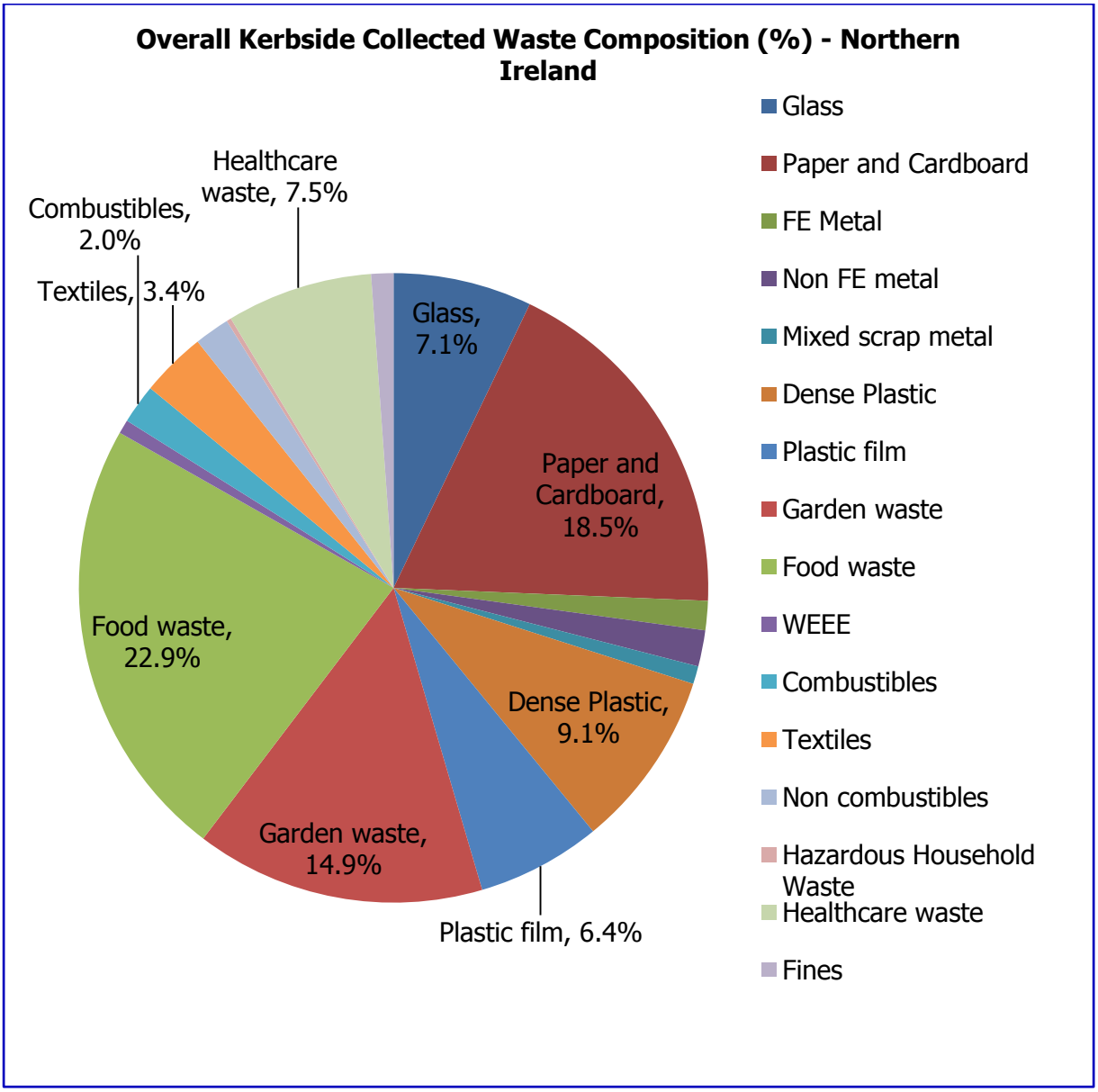


Table 22 below outlines the detailed composition of all dry recyclables, organics and residual waste collected at the kerbside in Northern Ireland.

Table 22 Detailed composition of all kerbside collected household dry recyclates, organics and residual waste in Northern Ireland

Primary Level	Secondary Level	Composition
Glass	All glass containers	7.0%
	Non-packaging glass	0.1%
Paper and Cardboard	Newspaper, magazines, Yellow Pages/directories	4.1%
	Other recyclable paper	3.6%
	Non-recyclable paper	3.4%
	All card packaging	6.5%
	Cardboard beverage packaging / cartons	0.4%

Primary Level	Secondary Level	Composition
	Other card	0.2%
	Books	0.4%
FE Metal	Ferrous cans and tins	1.3%
	Ferrous aerosols	0.2%
Non FE metal	Non Ferrous cans	1.0%
	Non Ferrous aerosols	0.1%
	Aluminium foil	0.7%
Mixed scrap metal	All scrap and other metal	0.9%
Dense Plastic	HDPE drink bottles	0.8%
	PET drink bottles	1.8%
	Other plastic bottles	1.3%
	Dense plastic packaging exc. EPS	3.2%
	Other dense plastic - non-packaging e.g. CD, DVD	1.7%
	Expanded polystyrene packaging	0.3%
Plastic film	Carrier bags	1.1%
	Bin bags and other plastic film	5.3%
Garden waste	Green and woody garden waste	14.1%
	Soil	0.8%
Food waste	Avoidable food waste	11.5%
	Unavoidable food waste	10.3%
	Cooking oil/fats	0.1%
	Liquids	1.0%
WEEE	Large Domestic App	0.0%
	Small Domestic App	0.7%
	Cathode Ray Tubes	0.0%
	Fridges & Freezers	0.0%
Combustibles	Wood untreated inc wood furniture	0.4%
	Wood treated e.g. chipboard, MDF	0.2%
	Carpet & underlay Moved from Textiles	0.4%
	Other combustibles inc soft furniture and cushions	1.0%
Textiles	Clothing textiles	1.8%
	Shoes, belts & bags	0.6%
	Non-clothing textiles	0.9%
Non combustibles	Plasterboard	0.0%
	Other construction and demolition waste inc rubble	1.0%
	Other non-combustible materials	0.7%
Household Hazardous Waste	Household Batteries	0.0%
	Car Batteries	0.1%
	Engine Oil	0.0%
	Asbestos	0.0%
	Other Potentially Hazardous inc Tyres	0.1%
Healthcare waste	Disposable Nappies	4.9%
	Other absorbent hygiene products	0.6%
	Potentially hazardous healthcare waste	0.2%

Primary Level	Secondary Level	Composition
	Dead animals	0.0%
	Pet excrement and bedding	1.7%
Fines	<10mm	1.1%
Total		**100%**

Food waste makes up the largest waste type at 22.9% or 132,287 tonnes of total waste arisings in Northern Ireland in 2016-17. This includes 66,529 tonnes (11.5%) of avoidable food waste and 59,783 (10.3%) of unavoidable food waste.

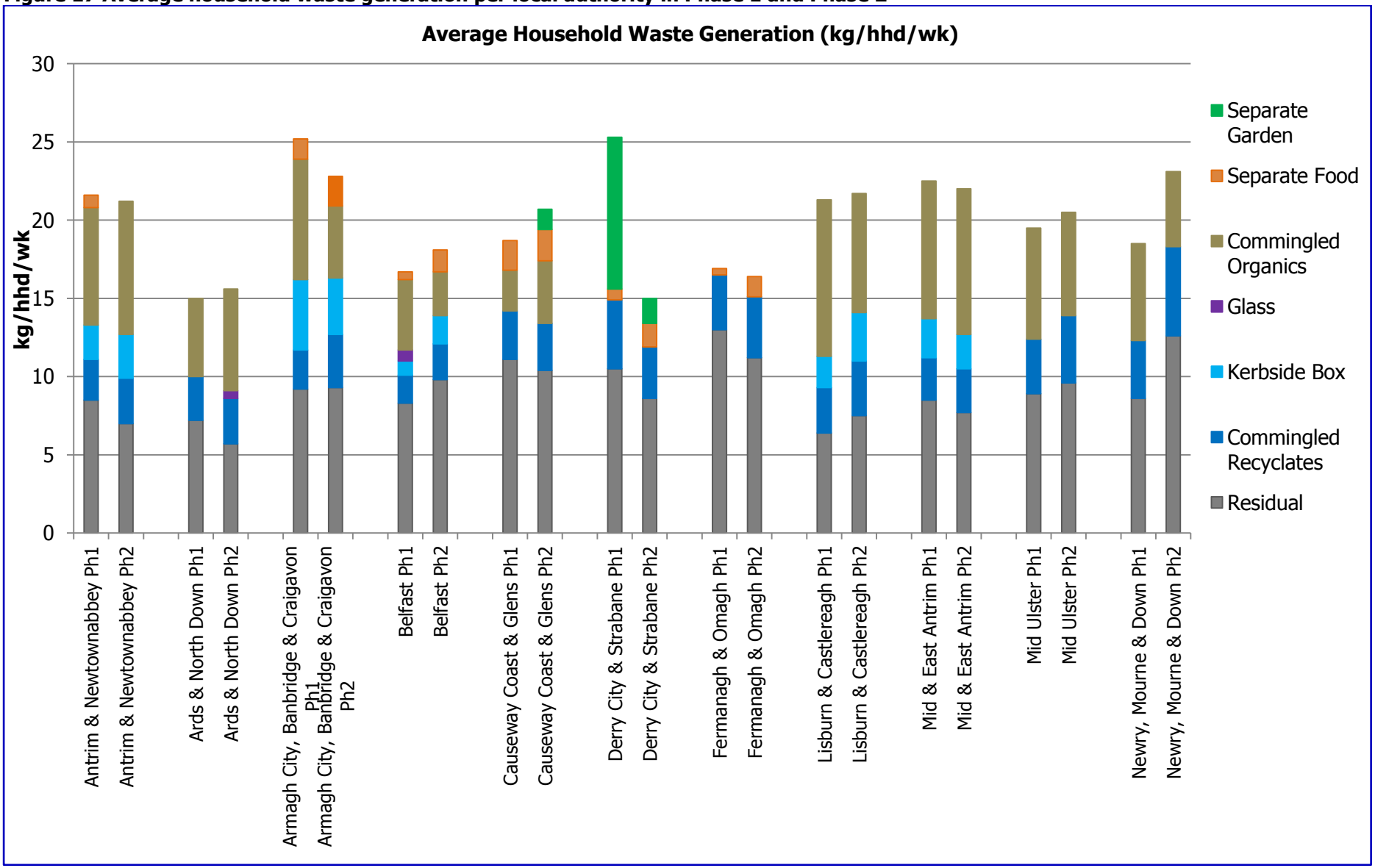
Table 21 shows that paper and cardboard is the second largest waste type making up 18.5% or 107,212 tonnes of total waste arisings. Detailed breakdown in Table 22 shows that over 80% of this paper and cardboard can be recycled in current waste collection schemes.

Garden waste is the third largest waste type at 14.9% or 86,125 tonnes of total waste arisings. This consists of 81,549 tonnes (14.1%) of green and woody garden waste and 4,577 tonnes (0.8%) of soil.

7.2 Average household waste generation

Figure 17 illustrates the average household waste generation per week for each local authority in Northern Ireland over Phase 1 and Phase 2 analyses. This figure related solely to the data captured as part of the study.

Figure 17 Average household waste generation per local authority in Phase 1 and Phase 2



7.3 Biodegradability of all kerbside collected household waste

The biodegradable content of combined kerbside collected household waste in Northern Ireland has been estimated to be 62.5%. This was calculated at 67.8% in the 2007 Study for the same waste stream This figure considers kerbside collected household waste only and does not include bring banks or household recycling centre waste.

Table 23 Biodegradability of Northern Ireland kerbside collected household waste

Primary Level	Secondary Level	Composition	Biodegradability
Glass	All glass containers	7.0%	0.0%
	Non-packaging glass	0.1%	0.0%
Paper and Cardboard	Newspaper, magazines, Yellow Pages/directories	4.1%	4.1%
	Other recyclable paper	3.6%	3.6%
	Non-recyclable paper	3.4%	3.4%
	All card packaging	6.5%	6.5%
	Cardboard beverage packaging / cartons	0.4%	0.2%
	Other card	0.2%	0.2%
	Books	0.4%	0.4%
FE Metal	Ferrous cans and tins	1.3%	0.0%
	Ferrous aerosols	0.2%	0.0%
Non FE metal	Non Ferrous cans	1.0%	0.0%
	Non Ferrous aerosols	0.1%	0.0%
	Aluminium foil	0.7%	0.0%
Mixed scrap metal	All scrap and other metal	0.9%	0.0%
Dense Plastic	HDPE drink bottles	0.8%	0.0%
	PET drink bottles	1.8%	0.0%
	Other plastic bottles	1.3%	0.0%
	Dense plastic packaging exc. EPS	3.2%	0.0%
	Other dense plastic - non-packaging e.g. CD, DVD	1.7%	0.0%
	Expanded polystyrene packaging	0.3%	0.0%
Plastic film	Carrier bags	1.1%	0.0%
	Bin bags and other plastic film	5.3%	0.0%
Garden waste	Green and woody garden waste	14.1%	14.1%
	Soil	0.8%	0.0%
Food waste	Avoidable food waste	11.5%	11.5%
	Unavoidable food waste	10.3%	10.3%
	Cooking oil/fats	0.1%	0.1%
	Liquids	1.0%	1.0%
WEEE	Large Domestic App	0.0%	0.0%
	Small Domestic App	0.7%	0.0%
	Cathode Ray Tubes	0.0%	0.0%
	Fridges & Freezers	0.0%	0.0%

Primary Level	Secondary Level	Composition	Biodegradability
Combustibles	Wood untreated inc wood furniture	0.4%	0.2%
	Wood treated e.g. chipboard, MDF	0.2%	0.1%
	Carpet & underlay Moved from Textiles	0.4%	0.2%
	Other combustibles inc soft furniture and cushions	1.0%	0.5%
Textiles	Clothing textiles	1.8%	0.9%
	Shoes, belts & bags	0.6%	0.3%
	Non-clothing textiles	0.9%	0.5%
Non combustibles	Plasterboard	0.0%	0.0%
	Other construction and demolition waste inc rubble	1.0%	0.0%
	Other non-combustible materials	0.7%	0.0%
Household Hazardous Waste	Household Batteries	0.0%	0.0%
	Car Batteries	0.1%	0.0%
	Engine Oil	0.0%	0.0%
	Asbestos	0.0%	0.0%
	Other Potentially Hazardous inc Tyres	0.1%	0.0%
Healthcare waste	Disposable Nappies	4.9%	2.4%
	Other absorbent hygiene products	0.6%	0.3%
	Potentially hazardous healthcare waste	0.2%	0.0%
	Dead animals	0.0%	0.0%
	Pet excrement and bedding	1.7%	1.7%
Fines	<10mm	1.1%	0.0%
Total		**100%**	**62.5%**

8.0 Summary of Key Figures and Findings

8.1 Residual Headline Figures

It is clear that there are significant amounts of recyclable material, considered to be widely recyclable materials, still present in the residual waste stream. This is calculated as 55% (192,089 tonnes) for Northern Ireland.

Just under one quarter (25%) of the material found in the residual bin was food waste. Of this 25% of food waste, just over 13% is considered to be avoidable food waste.

Combined plastics, plastic film (9.9%) and dense plastic (9.9%), make up almost one-fifth of of the residual waste stream.

While we know from the study that paper and cardboard is one of the highest materials captured from the residual waste stream for recycling, the study shows that 15.6% of the residual bin comprises paper and cardboard. Further analysis of the secondary categories shows that just over four fifths of this paper and cardboard could potentially be recycled in current systems.

Glass makes up 7% of the residual waste stream. Of this 7%, 6.8% is recyclable glass bottles and jars.

8.2 Dry Recyclates Headline Figures

Just over half of the composition of dry recycling collections in Northern Ireland comprises paper and cardboard at 51,560 tonnes (55%).

Paper and cardboard is one of the highest captured materials. 58% of paper and cardboard was captured in the current recycling collection services.

8.3 Organics Headline Figures

Garden waste is the largest waste type found in the organic bin at 79,435 tonnes, just over 60% of the total organic waste arisings for Northern Ireland.

Food waste was the second largest waste category, making up 42,789 tonnes or 34% of the overall organic bin.

8.4 Overall Headline Figures

The biodegradable content of all kerbside collected household waste in Northern Ireland has been estimated to be 62.5%.

www.wrapni.org.uk