

Public Document Pack

Date of meeting Thursday, 12th February, 2015
Time 6.00 pm
Venue Training Room 1 - Civic Offices, Merrial Street,
Newcastle-under-Lyme, Staffordshire, ST5 2AG
Contact Julia Cleary

Recycling and Waste Strategy Cabinet Panel

AGENDA

PART 1 – OPEN AGENDA

4 Cabinet Member Panel 12th February 15 (Pages 3 - 68)

Members: Councillors Mrs Beech (Chair), Bailey, Fear, Mrs Hambleton, Loads,
Miss Reddish and Mrs Williams

PLEASE NOTE: The Council Chamber and Committee Room 1 are fitted with a loop system. In addition, there is a volume button on the base of the microphones. A portable loop system is available for all other rooms. Should you require this service, please contact Member Services during the afternoon prior to the meeting.

Members of the Council: If you identify any personal training/development requirements from any of the items included in this agenda or through issues raised during the meeting, please bring them to the attention of the Democratic Services Officer at the close of the meeting.

Meeting Quorums :- 16+= 5 Members; 10-15=4 Members; 5-9=3 Members; 5 or less = 2 Members.

Officers will be in attendance prior to the meeting for informal discussions on agenda items.

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Recycling and Waste Cabinet Panel Thursday 12 February

Prepared by Trevor Nicoll – Head of Recycling, Waste and Fleet Services

Report Title: Update and Overview of progress towards implementing the new recycling and waste strategy 2016.

1. Depot and Transfer Facility

Officers of the Recycling, Waste and Fleet Service and Assets are currently working on the changes to the infrastructure of the Knutton Lane depot site to ensure that it is fit for purpose prior to the start of the new service.

Within the supporting documents, plans and images have been included regarding the changes.

This work has been supported by a firm of technical consultants to help with the conversion of part of the large shed into the new sorting station.

Officers have also consulted with other departments regarding the changes and currently the Council's Health and Safety Officer is undertaking a depot safety appraisal for the new layout.

Over the next few months officers will need to start the following procurement, planning and preparation work. .

- Procurement for new weighbridge
- Procurement for structural building changes to large shed
- Procurement for storage bays and sorting equipment
- Submit changes for Planning Approval (Planning will be determined by NBC)
- Submit changes to the Waste Permit for approval to the Environment Agency (EA)

It is anticipated that all changes to the depot will be in place by early 2016

Recommendations:

- a) That Officers implement the operational and structural changes to Knutton Lane depot within the capital envelope agreed by the Cabinet.
- b) That Officers provide required updates to the Panel at subsequent meetings.

2. Staffing

Following the report undertaken by the Waste Resources Action Programme (WRAP) regarding the new service, there are a number of staffing related changes that will be required prior to start of the service change. These changes break down into two major areas, firstly involving the TUPE transfer in of staff from the current recycling service contractor to the Council and secondly changes to staff terms and conditions to support new service. All these changes will be undertaken with the support and guidance of the Council Human Resources team.

TUPE transfer in of staff

A detailed project plan has been developed by the Head of Human Resources, to ensure that approximately the 32 staff working for Acumen Logistics Limited are transferred over to the Council in a timely and efficient manner. This plan has been discussed with the Acumens HR and Contract Managers and we are currently waiting comments.

Recommendations:

- c) That Officers continue to develop and work through the project plan for the transfer in of Acumen staff.
- d) That Officers provide regular updates to the Panel of progress with this and highlight any delays that may occur.

Changes to in-house staff terms and conditions

In order to deliver the predicted revenue savings from the new service, there will need to be a number of changes to staff terms and conditions. It is important that these changes are made to enable efficiencies to be delivered. A summary of changes required are as follows:

- Change from the current 4 day operation to 5 day operation. This reduces the working day from 9.25 hours to 7.4 hours. This will support efficiency in vehicle management and improve safety of staff.
- Introduction of flexible start times ongoing between 6am to 7am. This will reduce the number of vehicles leaving and returning to the depot at the same time; improve the operation of the waste transfer facility and increase safety.
- Review of Christmas and Bank Holidays working arrangements to ensure that the service can operate during these times with the minimum disruption to residents.

Recommendation:

- e) That Officers commence a consultation process with staff and trades unions to ensure that they are fully engaged with changes to terms and conditions to support the service changes as detailed above. It is planned to consult on these changes in April 2015 as agreement is required prior to developing new collection rounds.

3. Recycling Collection Vehicles

Within the report undertaken by WRAP, consultants for WRAP have looked at the number of collection vehicles required for the service.

Based on a 5 day collection service, the service will require 13 operating vehicles for the collection of recyclate on a weekly basis and 1 operational spare. Therefore a total of 14 vehicles will need to be purchased. It is worth noting at this point that additional vehicles would be required if the change from a 4 day working week to a 5 day working week proposed above was not implemented.

Officers are in dialogue with the 3 main suppliers of these vehicles and currently there is a supply time lag of about 9 to 12 months from order to delivery. This does not include the time required for procurement which tends to be between 3 and 5 months additional time.

Recommendations:

f) That Officers develop specification and procurement documents to ensure that orders for vehicles can be placed by July 2015.

g) That Officers report the outcome of the procurement exercise prior to orders for the fleet being placed.

4. Communication Plan.

At the last meeting, the Panel was presented with a Service Change Identity Document. The document challenges our current branding for the service in terms of container colouring, design of icons and resident information

It is proposed that Officers of the Recycling and Waste Service work with the staff of the Councils Communication Company SubLyme to develop a Communication sub plan to cover the complete service roll out.

The views of the Cabinet Panel will be sought in respect of whether the Council should change from the currently service iconology and move to revised iconology.

To support with communication, Officers believe that it is important that the Council supply residents with three colour coded boxes. The decision on the colours for each box will be required by September 2015, however at this stage, consideration is being given to whether these should be blue, green and black or blue, green and red.

Recommendations:

h) That Officers develop a communications sub plan for the rolling out of the new service.

i) That Officers develop suggested box colours and associated rationale for consideration by the Cabinet Panel at a subsequent meeting.

Supporting Information

WRAP Service Review Report

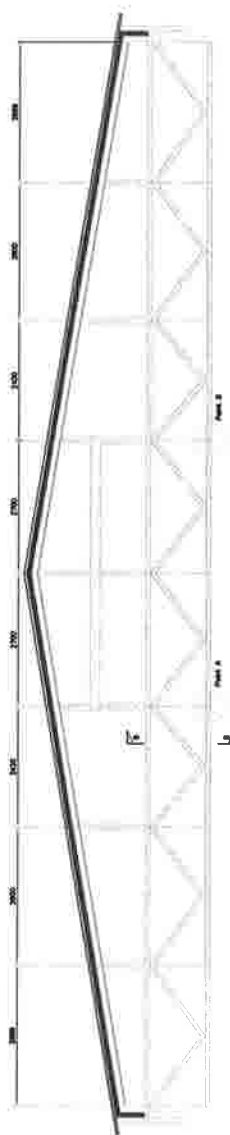
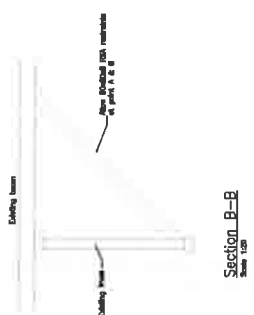
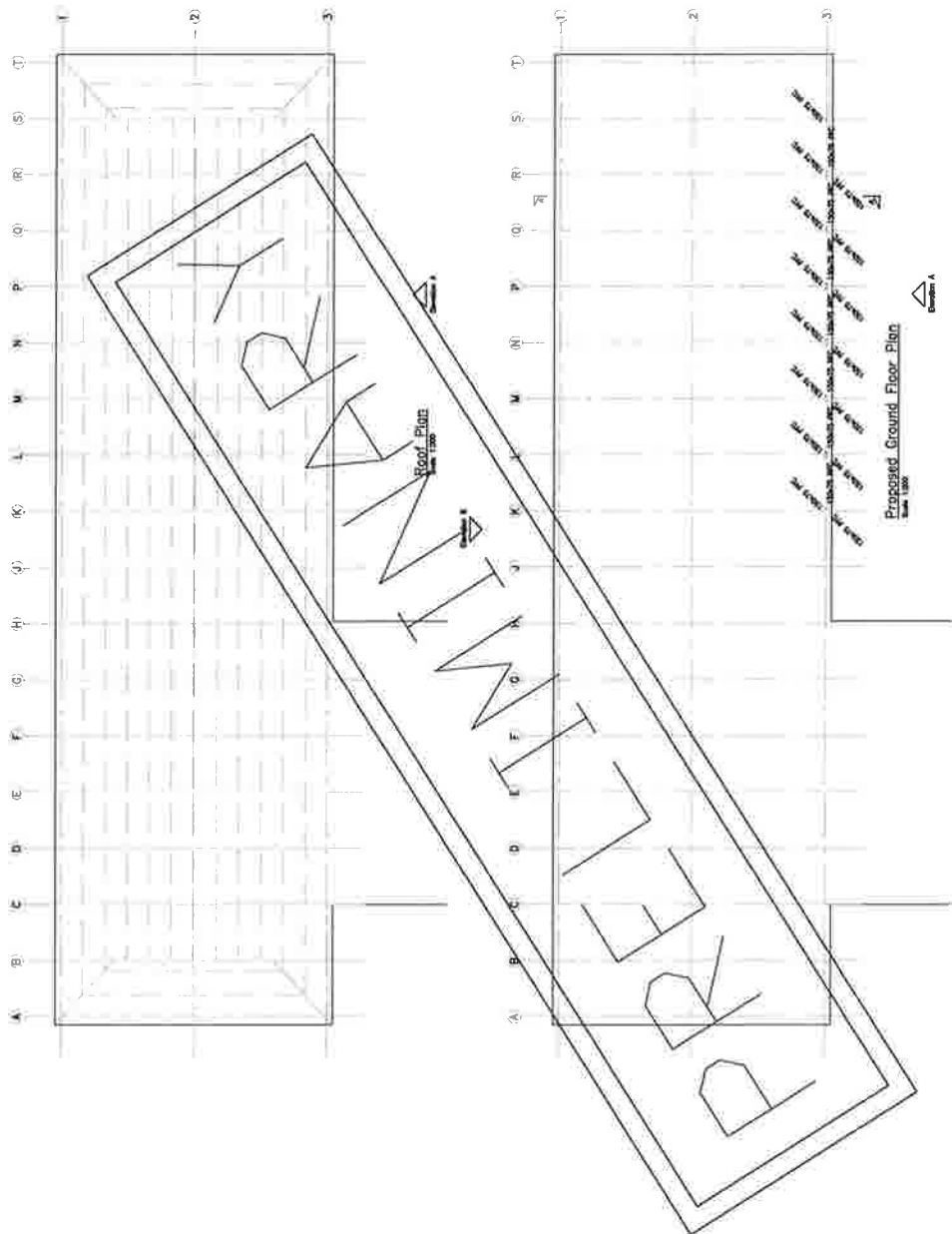
Depot Development Document

Service Change Identity Document

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Confidential - This drawing is released in part of the digital format which shall be used for the design of the structure only and shall not be used for any other purpose. © Copyright 2012

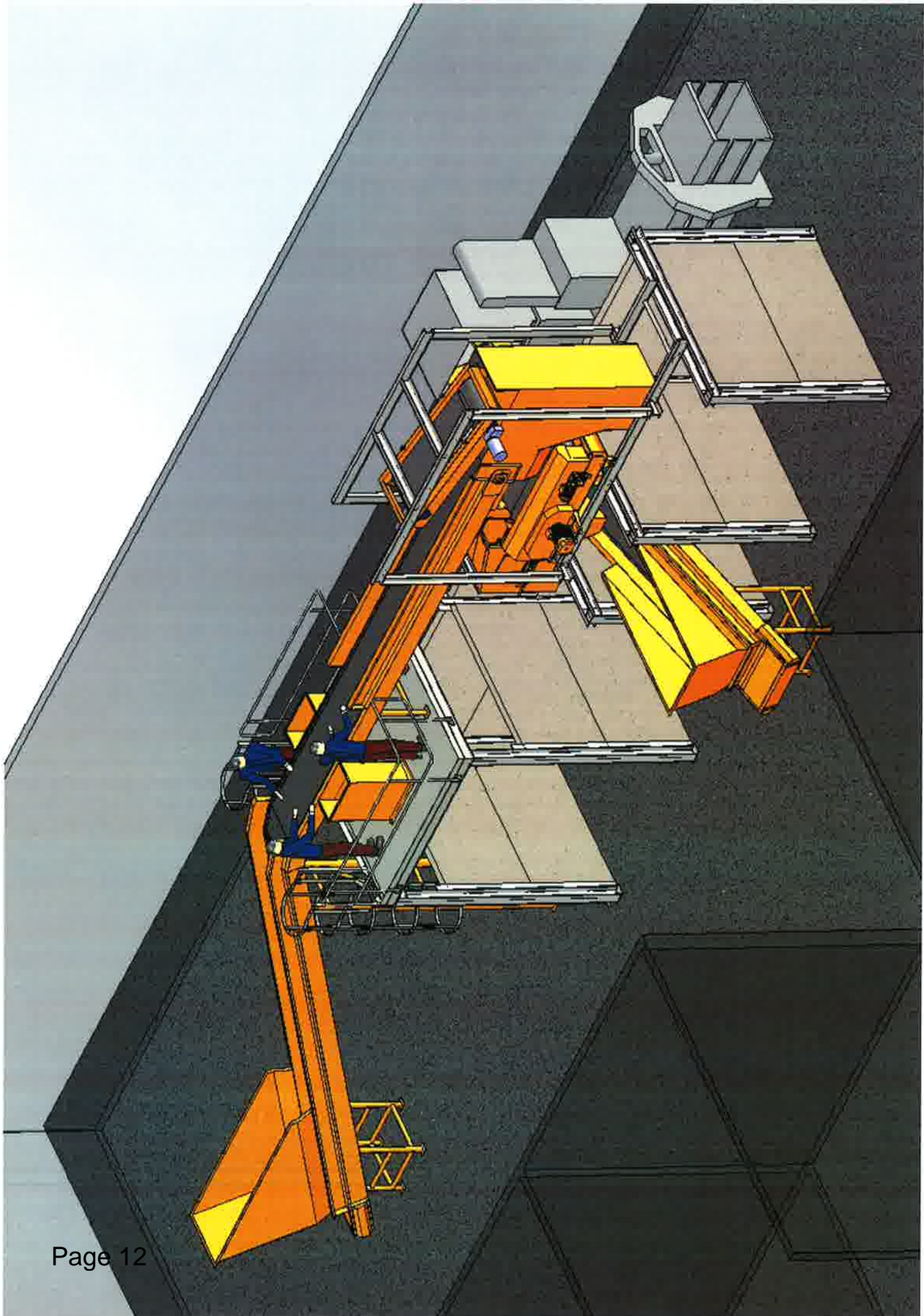
1. THE DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ASPIN CONSULTING, ARCHITECTS AND SPECIALIST DRAWINGS
2. ALL FABRICATED STEELWORK IS TO BE SUBMITTAL TO THE STEELWORK FABRICATOR FOR APPROVAL PRIOR TO PROCEEDING WITH FABRICATION. THE FABRICATOR SHALL BE RESPONSIBLE FOR CHECKING ALL DIMENSIONS TO BE GRADUATED IN ACCORDANCE WITH BS 1300 ARCHITECTS DETAILS
3. THE STEELWORK FABRICATOR IS TO BE RESPONSIBLE FOR CHECKING OUT AN ACCURATE SITE SURVEY IN ORDER TO DETERMINE THE EXACT POSITION AND DIMENSIONS TO ENABLE FABRICATION OF THE STEELWORK
4. ALL CONNECTIONS TO BE DESIGNED BY THE STEELWORK FABRICATOR TO THE ULTIMATE FORCES SPECIFIED IN THE DRAWING. THE FABRICATOR SHALL PROVIDE DETAILS OF ALL CONNECTIONS TO BE SUBMITTED TO THE ARCHITECT FOR APPROVAL
5. ALL HOLDING DOWN BOLTS ARE TO BE SUPPLIED BY THE STEELWORK FABRICATOR TO THE GENERAL FOUNDATIONS
6. ALL BRACING AND SYSTEMS SHALL BE TO BE PROVIDED WITH ANTI-SWAY RESTRAINTS AS NECESSARY IN ACCORDANCE WITH MANUFACTURERS REQUIREMENTS
7. ROOF CLADDING, DOWNHAND COOKS AND WALL CLADDING AND WALL SHEETING IS TO BE FIXED TO THE STEELWORK TO PROVIDE FULL LATERAL RESTRAINT TO ALL MEMBERS. ALL CLADDING ANGLES ETC. NECESSARY FOR FIXING TO THE STEELWORK TO BE SUPPLIED BY STEELWORK FABRICATOR
8. ALL STEELWORK TO BE DESIGNED AND FABRICATED IN ACCORDANCE WITH BS 1300

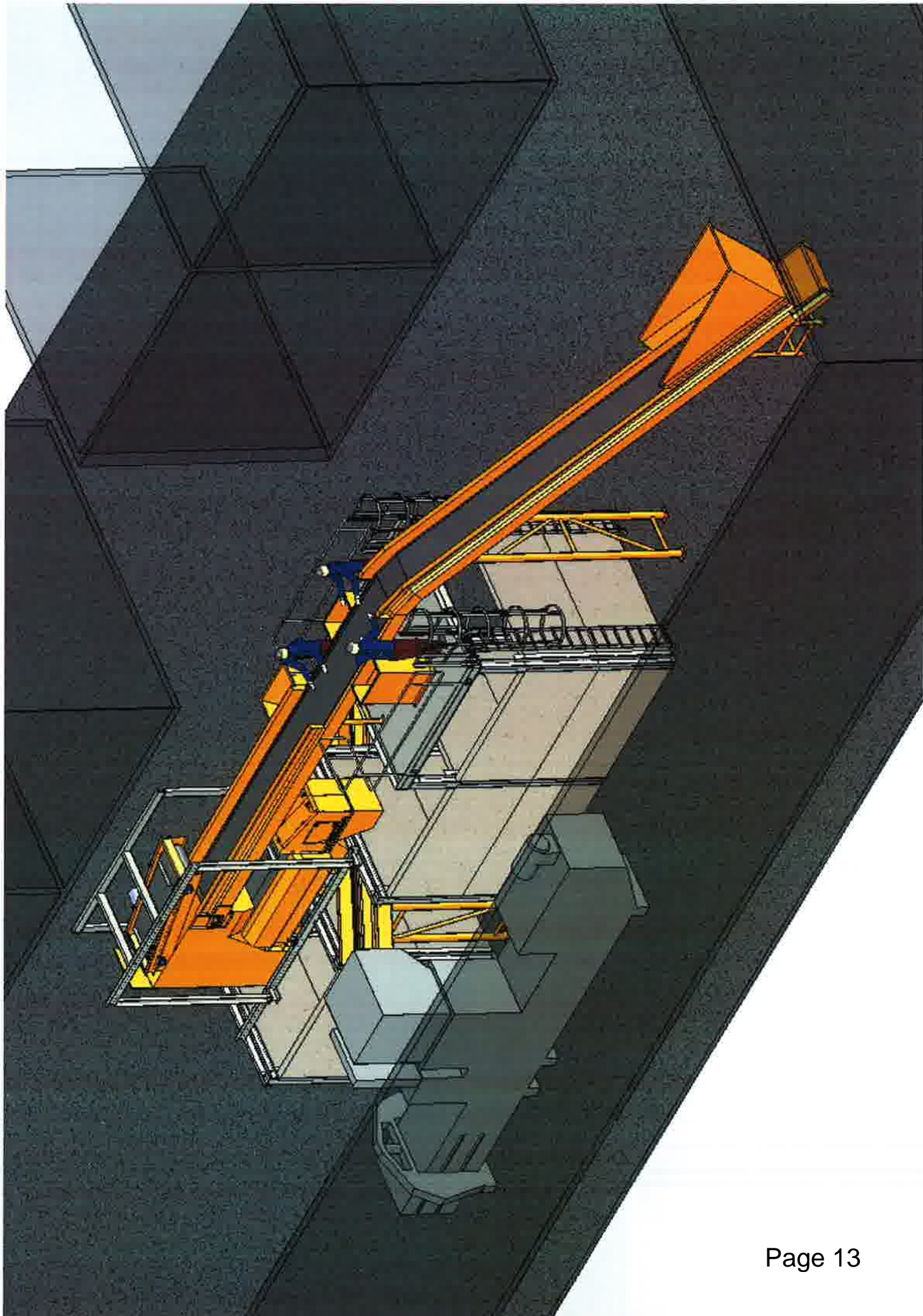


| | | | |
|---|------|---|-----------|
| Newcastle Under Lyme Borough Council | | Knutton Depot Ground & Roof Layout | |
| Scale | 1:50 | Project No. | AC2489-01 |
| Sheet No. | P01 | Revision | |
| ASPIN CONSULTING BUILDING SERVICES | | 10th, 15th, 20th, 25th, 30th, 35th, 40th, 45th, 50th, 55th, 60th, 65th, 70th, 75th, 80th, 85th, 90th, 95th, 100th | |









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Service Change Identity

The design aim

- To communicate to residents the changes to their collection service, with regard to both the containers, and to the way in which the collections will take place.
- To explain why the change is happening, and to promote it as a simple, improved service.
- To explore ways to communicate the above using both WRAP and non-WRAP design styles.

Visual Identity

A look at the current WRAP brand compared to a 'new' brand

Typeface

Futura is the WRAP font – it is clean, legible and works well for headers and body copy.

An alternative font, however, would help make the service feel new.

Futura Book

Aa Bb Cc Dd Ee Ff Gg Hh Ii Jj Kk Ll Mm Nn Oo Pp Qq Rr Ss Tt Uu Vv Ww Xx Yy Zz 0123456789

recycle plastic paper metals

FF Speak

Aa Bb Cc Dd Ee Ff Gg Hh Ii Jj Kk Ll Mm Nn Oo Pp Qq Rr Ss Tt Uu Vv Ww Xx Yy Zz 0123456789













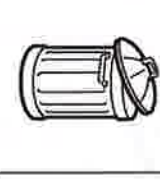
recycle plastic paper metals



WRAP material icons

Current WRAP icons, designed to be a 'one size fits all' solution with multiple icons for what may be a single collection.

The reason for the multiple colours is not clear when most streams are collected on the same day.

| | |
|--|----------------------------|
|  | paper |
|  | cardboard |
|  | food tins & drink cans |
|  | foil |
|  | aerosols |
|  | plastic bottles |
|  | mixed glass bottles & jars |
|  | food waste |
|  | mixed textiles & clothes |
|  | small appliances |
|  | batteries |
|  | garden waste |
|  | household waste |

Alternative material icons

The suite of icons could be condensed and simplified in both colour and style to look more clean and modern.

Each recyclable is blue, as they are collected together. Grey and white versions of all icons would be used for other applications where necessary.



paper



cardboard



metal



plastic
bottles



glass



food waste



textiles
& clothing



small
appliances



batteries



garden
waste



non
recyclables

Garden Waste or Green Waste?



Positives

- Familiarity for residents
- New icons would give the opportunity to make garden waste brown, to reflect the bin, or to keep the arguably more aesthetic, green
- Avoids mentioning 'green' which is not the bin colour
- The stream is solely for waste from the garden

Negatives

- Soil, plant pots and turf are not collected, which could be classed as garden waste



Positives

- The name would match the icon colour

Negatives

- The bin is not green
- May be misinterpreted as suitable for some foods
- As Garden Waste, soil, plant pots and turf are not collected, which could be classed as green waste

Brand in action

This is how the concept brand could work to explain the new service.

Focus is on minimal wording and colours, with the icons telling the story as much as possible.

- simple
- clean
- legible

The design works well with the line 'every week is blue week', which could be the initial title of the communications to residents. This would be a transitional phrase only, phased out by Christmas 2016.

Naming the weeks

The weeks, previously 'blue week' and 'green week', could be...

GARDEN WEEK and REFUSE WEEK

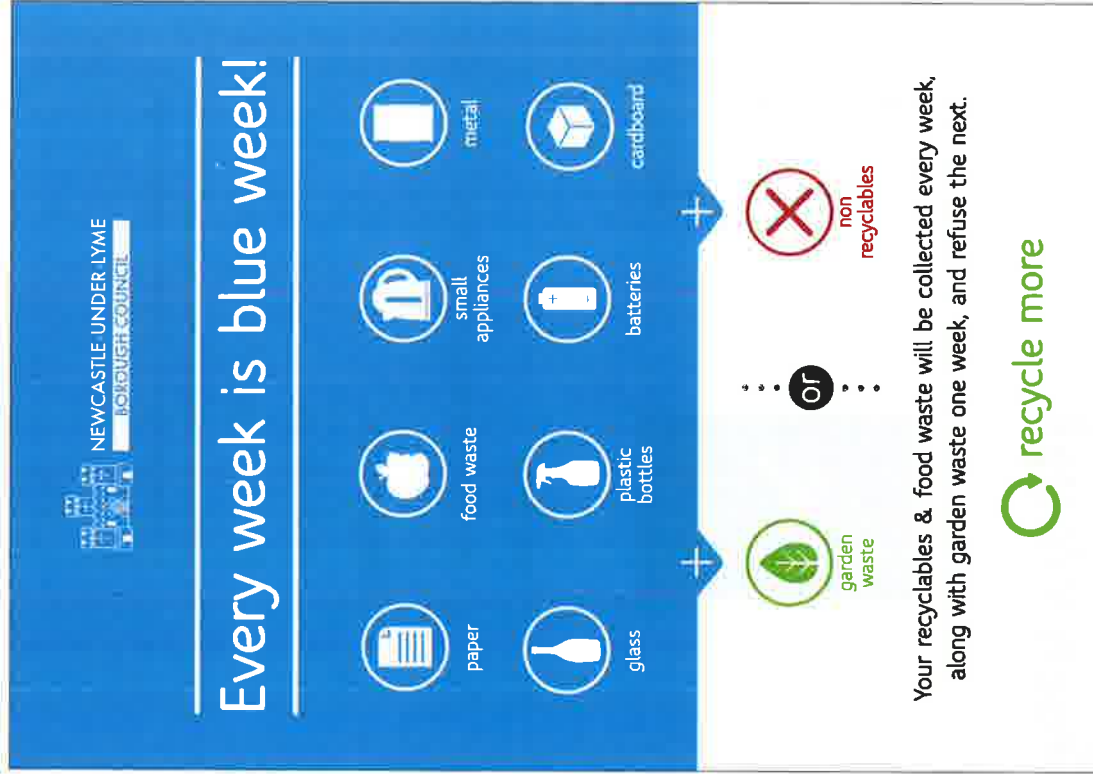
this idea draws attention to refuse which is negative

RECYCLABLES & GARDEN WEEK and **RECYCLABLES & REFUSE WEEK**
not very catchy


RED WEEK and BROWN WEEK / GREEN WEEK

again, drawing attention to the unique stream collected on a given week

I think residents will call the weeks whatever sticks with them. It will be difficult to depict the weeks on the calendar in a way which avoids showing refuse. In summary, I think as long as the accompanying wording is simple, the naming of the weeks is less important.



Concept executed with the new branding, simple wording including new container icons, introducing the Re-Stack.



Every week is blue week!

| | | | |
|-------|-----------------|------------------|-----------|
| paper | food waste | small appliances | metal |
| glass | plastic bottles | batteries | cardboard |

garden waste OR non-recyclables

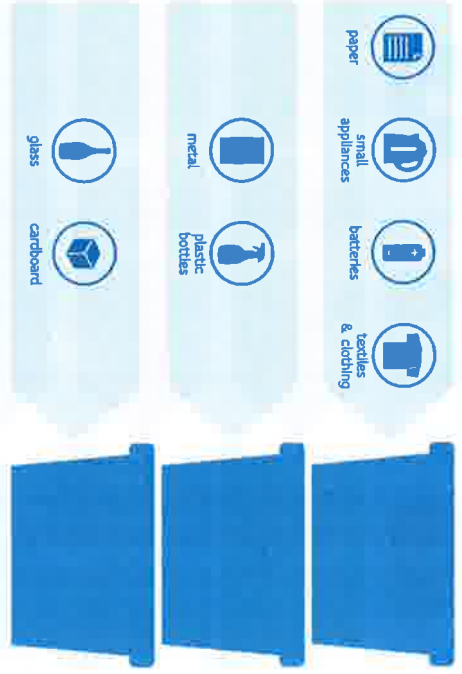
Your recyclables & food waste will be collected every week, along with garden waste one week, and refuse the next.

recycle more

Introducing your new Re-Stack....


Your Re-Stack is the same size as a regular bin. You can fill it using the letterbox at the front of each container.

Your Re-Stack helps keep everything separate and tidy!




| | | |
|------------|--------------|-----------------|
| food waste | garden waste | non-recyclables |
|------------|--------------|-----------------|









recycle more






Second version of the new brand showing alternative box colours for the Re-Stack



Every week is blue week!


| | | | | | | | |
|---|--|--|---|---|---|---|---|
|  paper |  food waste |  small appliances |  metal |  glass |  plastic bottles |  batteries |  cardboard |
|---|--|--|---|---|---|---|---|


+

| | | |
|---|----|--|
|  garden waste | or |  non-recyclables |
|---|----|--|

+

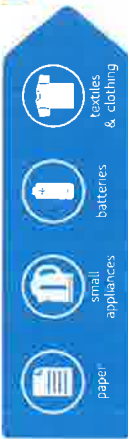











Your recyclables & food waste will be collected every week, along with garden waste one week, and refuse the next.


 **recycle more**





Introducing your new Re-Stack...

Your Re-Stack is the same size as a regular bin. You can fill it using the letterbox at the front of each container.
Your Re-Stack helps keep everything separate and tidy!

| | | |
|---|--|--|
|  |  |  |
|  paper |  small appliances |  batteries |
|  textiles & clothing |  plastic bottles |  glass |
|  cardboard |  garden waste |  non-recyclables |

 **NEWCASTLE UNDER LYME BOROUGH COUNCIL**

 **recycle more**



Concept executed with the WRAP brand, keeping the same simple approach.

NEWCASTLE UNDER LYME BOROUGH COUNCIL

Every week is blue week!

| | | | | | |
|-----------------|---------------------------|----------------------|--------------------------|------------------|-----------|
| paper | cardboard | corrugated cardboard | food tins & drink cans | foil | aerosols |
| plastic bottles | mixed glass bottles & jns | food waste | mixed teryles & textiles | small appliances | batteries |

+ OF ... +

garden waste

household waste

Your recyclables & food waste will be collected every week, along with garden waste one week, and refuse the next.

Recycle for Newcastle-under-Lyme

Introducing your new Re-Stack...

Your Re-Stack is the same size as a regular bin. You can fill it using the letterbox at the front of each container.

Your Re-Stack helps keep everything separate and tidy!

| | | | | | |
|-----------------|---------------------------|----------------------|--------------------------|------------------|-----------|
| paper | cardboard | corrugated cardboard | food tins & drink cans | small appliances | batteries |
| plastic bottles | mixed glass bottles & jns | food waste | mixed teryles & textiles | household waste | |

garden waste

household waste

NEWCASTLE UNDER LYME BOROUGH COUNCIL

Recycle for Newcastle-under-Lyme



Second version of the WRAP brand showing alternative box colours for the Re-Stack

NEWCASTLE UNDER LYME BOROUGH COUNCIL

Every week is blue week!

| | | | | | | | | | | | |
|-------|-----------|----------------------|------------------------|------|----------|-----------------|----------------------------|------------|--------------------------|------------------|-----------|
| paper | cardboard | corrugated cardboard | food tins & drink cans | foil | aerosols | plastic bottles | mixed glass bottles & jars | food waste | mixed textiles & clothes | small appliances | batteries |
|-------|-----------|----------------------|------------------------|------|----------|-----------------|----------------------------|------------|--------------------------|------------------|-----------|

+

or


+

garden waste

household waste

Your recyclables & food waste will be collected every week, along with garden waste one week, and refuse the next.

recycle for Newcastle-under-Lyme



Introducing your new Re-Stack...

Your Re-Stack is the same size as a regular bin. You can fill it using the letterbox at the front of each container.

Your Re-Stack helps keep everything separate and tidy!

| | | |
|----------------------------|------------------------|----------------------|
| plastic bottles | small appliances | batteries |
| plastic bottles | food tins & drink cans | aerosols |
| mixed glass bottles & jars | corrugated cardboard | corrugated cardboard |



household waste

garden waste

food waste

recycle for Newcastle-under-Lyme

NEWCASTLE UNDER LYME BOROUGH COUNCIL

Phasing out the transitional message

NEWCASTLE UNDER LYME BOROUGH COUNCIL

Recycling week is every week!

paper, food waste, small appliances, metal, glass, plastic bottles, batteries, cardboard

+ garden waste OR non-recyclables +

Your recyclables & food waste will be collected every week, along with garden waste one week, and refuse the next.

recycle more

NEWCASTLE UNDER LYME BOROUGH COUNCIL

We recycle every week!

paper, cardboard, composted household waste, food waste, household waste, garden waste, household waste, household waste, household waste, household waste, household waste, household waste

+ garden waste OR household waste +

Your recyclables & food waste will be collected every week, along with garden waste one week, and refuse the next.

recycle for Newcastle-under-Lyme

Further development

The calendar has remained blue to emphasise the 'Every week is blue week' statement

The cover carries the key message

Recycle more every week!

- Please keep this handy table - it tells you how all your waste can be disposed of and your collection dates will never summer or hived - including Christmas/New Year
- If you need more containers for recycling or food waste please order them through the Contact Centre or website
- Extra garden waste bins are available too for a small annual charge which reduces during the year. Items that do not fit in a bin you order will have to be taken away
- Your recyclables and food waste will be collected every week
- Collections of garden waste and refuse on most alternative weeks
- If you have any questions please call us on 01782 212171

Facebook: Newcastle-under-Lyme @NuneNMC
<https://www.facebook.com/newcastle-under-lyme>

Twitter: @NuneNMC
<https://twitter.com/NuneNMC>

Website: www.newcastle-under-lyme.gov.uk

01782 212171

NEWCASTLE UNDER LYME
 RECYCLE
 NEWCASTLE UNDER LYME

Washing up
 Washing up has long been a household chore. From now there means not just a sink full of soapy water but also a bin full of washed up items. All bottles, such as ketchup, salad cream, and other condiments, should be recycled.

Recycling bank
 To find out the cost of buying you, contact 01782 212171 or email binholders@newcastle-under-lyme.gov.uk

Recycling bank
 The recycling bank network covers the Borough of Newcastle-under-Lyme. Some have banks for the full collection and some have just a few. You can find out more about the bank you live in on the website www.newcastle-under-lyme.gov.uk

Recycling bank
 If you open your health or a disability makes it hard for you to get some or all of your containers to the bank, and have a new one, please bring it to the bank. You might be able to help by providing on a special order.

Recycling bank
 It's a simple, no charge application process. Just your card, your own ID and a photo will be used to verify your identity. We will then be able to provide the collection arrangements.

Your Collection Dates 15/16

Your collection day is **Tuesday**

| Waste Type | 15/16 | 17/18 | 19/20 | 21/22 | 23/24 | 25/26 |
|----------------------|-------|-------|-------|-------|-------|-------|
| General Refuse | 5 | 12 | 19 | 26 | 2 | 9 |
| Recycling | 5 | 12 | 19 | 26 | 2 | 9 |
| Food Waste | 5 | 12 | 19 | 26 | 2 | 9 |
| Garden Waste | 5 | 12 | 19 | 26 | 2 | 9 |
| Household Appliances | 5 | 12 | 19 | 26 | 2 | 9 |
| Household Batteries | 5 | 12 | 19 | 26 | 2 | 9 |
| Household Textiles | 5 | 12 | 19 | 26 | 2 | 9 |
| Household Glass | 5 | 12 | 19 | 26 | 2 | 9 |
| Household Paper | 5 | 12 | 19 | 26 | 2 | 9 |
| Household Metal | 5 | 12 | 19 | 26 | 2 | 9 |
| Household Appliances | 5 | 12 | 19 | 26 | 2 | 9 |
| Household Batteries | 5 | 12 | 19 | 26 | 2 | 9 |
| Household Textiles | 5 | 12 | 19 | 26 | 2 | 9 |
| Household Glass | 5 | 12 | 19 | 26 | 2 | 9 |
| Household Paper | 5 | 12 | 19 | 26 | 2 | 9 |
| Household Metal | 5 | 12 | 19 | 26 | 2 | 9 |

19 **7/11**

Please put your containers out for 2pm and bring them back in after they've been emptied

Your Collection Services 2015/16

Your recyclables & food waste will be collected every week along with garden waste one week, and refuse the next

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 RECYCLE
 NEWCASTLE UNDER LYME

New container icons to simplify further

Weekly collections

Paper
 All kinds of paper - blank, just used, newspapers, wrapping paper, magazines, newspapers, books and shredded paper too. In a standard paper or a central bag so it doesn't blow around on collection day.

Cardboard
 Every kind of cardboard - greetings cards - cereal boxes, computer boxes, crumpled boxes. Fold down big boxes and be safe when you're in your collection area.

Metal
 Cans, tins, clean cooking foil and empty aerosols - just rinse all off very well.

Plastic
 All sorts of plastic bottles, no matter what they're contained in - milk, shampoo, shower gel, oil, etc. Rinse them out well. No food trays, lids or pots. Wash once inside to get more in.

Weekly collections

Glass
 Chips, bottles, and jars - just rinse. We take all colours and you don't need to remove labels etc.

Textiles
 Unwashed clothing, soiled shoes, and household textiles such as towels, sheets and curtains - equivalent to 600 items per household per week. Bring to keep everything dry.

Appliances
 We collect small household appliances such as kettles, toasters, blenders, etc. Put them in the top bag and label them in the top bag. Call us if you're unsure whether your items will be accepted.

Batteries
 We collect household car and other batteries. Call us if you're unsure whether your items will be accepted.

Weekly collections

Food waste
 We collect food waste every week, and the volume is all types of food waste. We don't collect all sorts of waste food. Using a bag to line your food caddy is a simple way to deal with the waste clearly. Put in the bag and drop it into the green caddy in your collection area.

Food waste
 If you've had your caddy, just call us and we'll deliver replacements - there's no charge.

Food waste
 If you're a big household and find it hard to avoid having bin of food waste, we can provide extra green caddies to help you get the most out of this service.

Alternating collections

Garden waste
 Certain waste collections accept grass, leaves, twigs, prunings, cut flowers, hedge cuttings, twigs and small branches. We don't collect soil, plant pots or cut. Additional garden waste bins are available for a small annual charge.

Garden waste
 Don't use bin bags or put ordinary household waste in this bin. Use a small amount of household waste can mean that everything in the vehicle is rejected.

Garden waste
 We won't be able to empty your bin if it has the wrong things in.

Non-recyclable household waste
 Household waste includes any other items not listed elsewhere in this leaflet - plastic packaging, items not accepted by recycling services, broken glass, household appliances, car tyres, and many more.



Alternate brand option (second version)

Recycle more every week!

- Please keep this matter safe - it tells you how all your waste can be disposed of and your collection dates until next summer are listed - including Christmas/New Year.
- If you need more containers for recycling of food waste, please order them through the Contact Centre or website.
- Extra garden waste bins are available, too, for a small annual charge which reduces during the year. Remember to use a bag to line your silver kitchen caddy - corner bags are best!
- Your recyclables and food waste will be collected every week.
- Collections of garden waste and refuse are made on alternate weeks.
- If you need advice about the service look at the website or call Customer Services.
- Collections are made between 7am and 6pm. Any missed collections must be reported on the next evening.
- If you need any further information, or have any queries, please contact Newcastle-under-Lyme Borough Council.

Newcastle-under-Lyme @newcastle-under-lyme
www.newcastle-under-lyme.gov.uk/recycling
customerservices@newcastle-under-lyme.gov.uk
 01782 717177



bulky collections

Waste with irregularly sized bulky items of furniture such as beds, chairs and fridges can be collected and recycled. To find out the cost of having your household items collected, contact Helen at bulkycollections@newcastle-under-lyme.gov.uk

recycling bank

The bank can be convenient to drop recycling at when you go shopping, or when your house and bins are full. The website tells you what's available where.

assisted collections

If your age, poor health or a disability makes it hard for you to get some or all of your containers to the kerbside and there's a real-life colouring blind at home, the Council might be able to help by providing an assisted collection. It's a simple door-to-door collection process, and you can do it on a regular basis. Call us on 01782 717177 to find out more about the collection process.

Your Collection Dates 15/16

Your collection day is Tuesday

Your recyclables & food waste will be collected every week along with garden waste one week, and refuse the next.

| Waste Type | 15/16 | 16/17 | 17/18 | 18/19 | 19/20 | 20/21 | 21/22 |
|--------------|-------|-------|-------|-------|-------|-------|-------|
| Recyclables | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| Food Waste | 12 | 12 | 12 | 12 | 12 | 12 | 12 |
| Garden Waste | 19 | 19 | 19 | 19 | 19 | 19 | 19 |
| Refuse | 26 | 26 | 26 | 26 | 26 | 26 | 26 |

Refuse is collected by a Contractor to your usual collection pattern.

Containers out by 7am please!

Your Collection Services 2015/16

Your recyclables & food waste will be collected every week along with garden waste one week, and refuse the next.

Newcastle-under-Lyme Borough Council



Weekly collections

Using your 'Re-Stack'



- paper**
All kinds of paper - letters, just mail, envelopes, wrapping paper, newspapers, magazines, books and shredded paper. Use the shredded paper in a carrier bag so it doesn't blow around on collection day.
- food**
Cans, tin, clean cooking oil and empty cans - just rinse off any food.
- garden**
Every kind of 'outdoor' - garden furniture, lawn mowers, power tools, garden hoses, garden tools, garden sheds and garden sheds.
- bulky**
All kinds of 'bulky' - no matter what they contain - fridges, freezers, washing machines, air conditioners, etc. No food tins, tins or cans. Wash and squish to get more in.

garden

Garden bottles and jars - just rinse them out. We take all colours and you don't need to remove labels etc.

bulky

Household electrical goods, garden furniture, tools, sheds and caravans - regardless of condition. All items must be clean and the bag to help everything dry.

bulky

We collect small electrical goods in our bulky collection bag. Call us if you're unsure whether your item is suitable, but we'll collect it. We don't accept car and industrial wastes.

bulky

The garden from household appliances and garden furniture must be put them in the bin bag. Call us to check if you're unsure. We don't collect car, plant pots or turf. Additional garden waste bins are available for a small extra charge.

Alternating collections

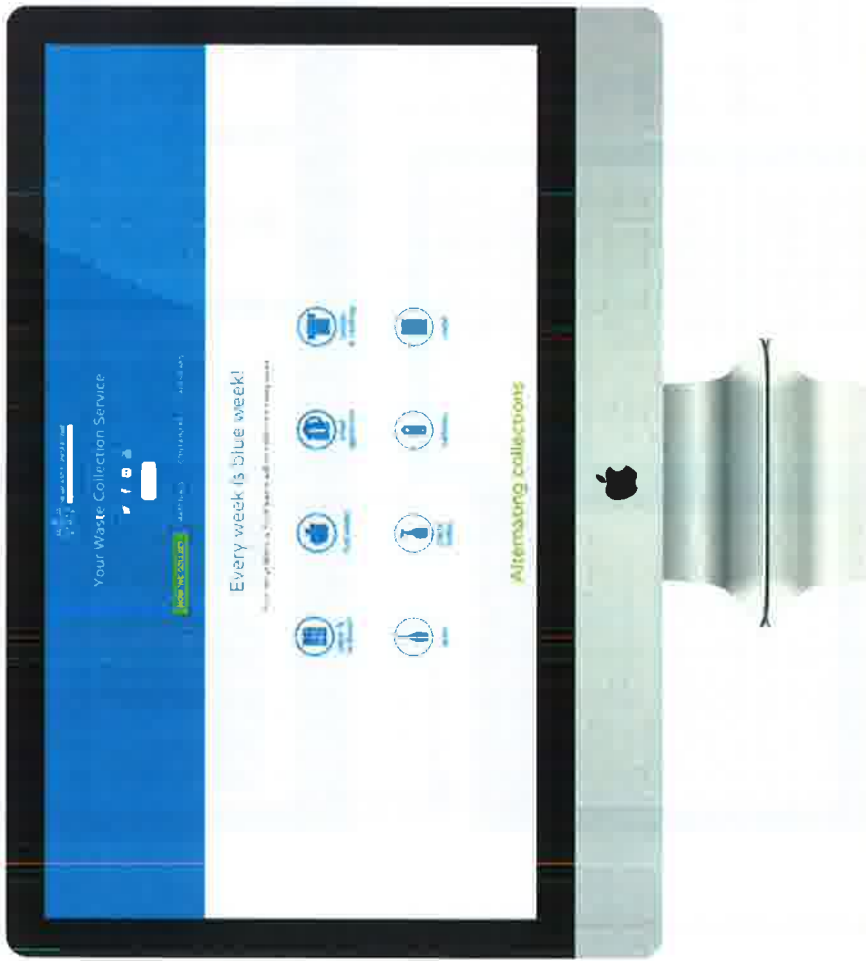
Garden waste collections are made on alternate weeks. We collect garden waste on alternate weeks. We don't collect car, plant pots or turf. Additional garden waste bins are available for a small extra charge.

Household waste is collected on alternate weeks. We don't collect car, plant pots or turf. Additional garden waste bins are available for a small extra charge.

- garden**
Garden waste collections are made on alternate weeks. We collect garden waste on alternate weeks. We don't collect car, plant pots or turf. Additional garden waste bins are available for a small extra charge.
- bulky**
Household waste is collected on alternate weeks. We don't collect car, plant pots or turf. Additional garden waste bins are available for a small extra charge.



A look at web



The new style has been applied to some sample web content at:

www.greatgreydesign.com/NUIBC

(make sure to use the caps)

Newcastle-under-Lyme Recycling and Waste Service Review



Cost, performance and service delivery options for the collection of household recycling and waste for NuLBC Borough Council

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Written by: James Fulford, Oliver Priestly-Leach, Amy Slack



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Executive summary

1 Introduction

Newcastle-under-Lyme Borough Council (Newcastle or NuLBC) has already carried out a significant amount of work in order to understand how it might improve its recycling and waste collection service to achieve a 60% recycling target and deliver a better recycling service to residents whilst reducing costs. This has resulted in the decision to harmonise collection services, bringing all services back in-house. A number of service configurations have already been explored and assessed against a number of risks including materials markets, legislation, participation and treatment costs. The Council has subsequently arrived at the following preferred service configuration:

- Weekly dry recycling collections – 3 x 55l box
- Weekly food waste collections – kerbside caddie (collected with dry recycling)
- Fortnightly garden waste collections – 240l wheeled bin
- Fortnightly residual waste collections – 180l wheeled bin

The only major change from the current service configuration is the change in frequency of the dry recycling service from fortnightly to weekly collections and the number and type of containers provided for dry recycling. This report summarises the findings of modelling undertaken to understand the resource requirements for the increased-frequency dry recycling service under the Council's preferred service configuration. It is intended that this will support the Council in bringing the dry recycling collection service back in-house as part of the harmonisation of its collection services.

2 Modelling results

Core modelling was based on the following assumptions:

- Five day working week
- 6.5 hours of the working day utilised for collection
- 50% of vehicles with driver plus two loaders, 50% of vehicles with driver plus one loader
- A 10% driver contribution to loading for vehicles with two loaders, 25% driver contribution to loading for vehicles with one loader
- An 8% increase from 2013/14 dry recycling yield to 167kg/hh/yr

Based on these assumptions a total of 14 vehicles would be required to deliver the dry recycling collection service under the Council's preferred service configuration.

In order to understand the factors to which resource requirements are most sensitive, a number of variables were tested. The results of this analysis are summarised below.

- **Working day & crew configuration –**
 - Because of the time it takes to tip and return to the round, the contribution of additional loaders, utilised for collection for 6.5 hour of the working day, only reduces the number of vehicles required once *there are two loaders on all vehicles*. In this case only 12 vehicles would be required.
 - However, when the time utilised for collection is increased to 7 hours, resource requirements can generally be reduced through using additional loaders, *the exception being* the scenario where only 25% of vehicles have a driver plus two loaders, resulting in 14 vehicles still being required for the service.
 - It should be noted that the working week is 37 hrs for operational staff and an average collection time of seven hours per day would mean only 20 minutes/day for:
 - pre and post departure activities;
 - "Rest and Relaxation" (R&R) time; or
 - any task and finish incentive to maintain productivity.It should therefore not be assumed that this level of productivity is reasonably achievable.

- **Vehicle loading time –**

- Increasing the time taken to load a vehicle, per container set out, in order to account for a four bin system, has the greatest impact on vehicle numbers *where 100% of the vehicles have two loaders*.
 - The overall fleet for the scenario where 100% of vehicle have two loaders would still remain smaller than other fleet configurations.
- **Tipping time –**
 - The time taken to tip has the most influence on resource requirements when vehicles have to tip twice – this is mainly the case in the scenario where 100% of vehicles driver plus two loaders. Staggering the start times would mitigate this impact through avoiding vehicles returning to tip at the same time and thus reducing the time taken to tip off.
 - If vehicles are only tipping once, then staggered starts may have most benefit for the depot operators, who otherwise would be faced with emptying the majority of the fleet at the same time at the end of the day.
 - From a collection perspective, if the majority of vehicles are only tipping once, longer queueing times for unloading will not affect actual collection efficiency significantly.
- **Material yields –**
 - Where material yield increases are moderate (6% increase) vehicle requirements generally increase by one vehicle, regardless of the number of vehicles, when they have a driver plus two loaders configuration.
 - With a greater increase in material yields (11% increase) one additional vehicle is required, when *more* than 50% of vehicles have two loaders, and two additional vehicles are required when *less* than 50% of vehicles have two loaders.
 - Overall this suggests that a service in which more vehicles have a driver plus two loaders is more resilient to increases in material yields than where there are fewer loaders.
- **Housing growth –**
 - Two additional vehicles will be required to accommodate the anticipated growth in housing unless the proportion of vehicles with two loaders is greater than 50%, in which case only one additional vehicle is needed.
- **Food waste –**
 - Should participation in food waste increase by 10% this would have a limited impact on resource requirements and would not affect the amount of resource required to deliver the service.

3 Recommendations

Initial results suggest the optimal fleet configurations to be either:

- 14 vehicles with a driver plus two on 50% of the vehicles; or
- 12 vehicles but with a driver plus two on all vehicles.

A smaller fleet with more loaders may be able to service the authority; however, small reductions in available collection time (e.g. longer loading and tipping times or longer travel times) may quickly require additional vehicles or leave no spare capacity for breakdowns, delays and population growth. Likewise, a fleet of 14 vehicles with only 50% of vehicles with two loaders is operating optimally and provides no spare capacity for growth or spare vehicles.

On this basis, the recommended service configuration is:

- 13 operational vehicles
- 1 spare vehicle
- A minimum of 23 loaders

This configuration would allow additional capacity to be met by increasing the proportion of vehicles with two loaders and, in the longer term, utilising the spare vehicle on standard rounds. This also allows for increases in yield and set-out due to improved performance, increases in the number of households served and any potential increases in travel time or tipping time.

Contents

- 1 Introduction 6**
 - 1.1 Background6
 - 1.2 Overview of the report structure.....7
- 2 Benchmarking 7**
- 3 Collections options modelling 8**
 - 3.1 Methodology8
 - 3.2 Options modelling9
 - 3.3 Sensitivities10
- 2 Operational considerations 18**
 - 3.4 Working patterns18
 - 3.5 Routing Considerations18
- 4 Conclusions and recommendations..... 19**
- Appendix 1: Modelling results 20**
- Appendix 2: Assumptions 24**

1 Introduction

1.1 Background

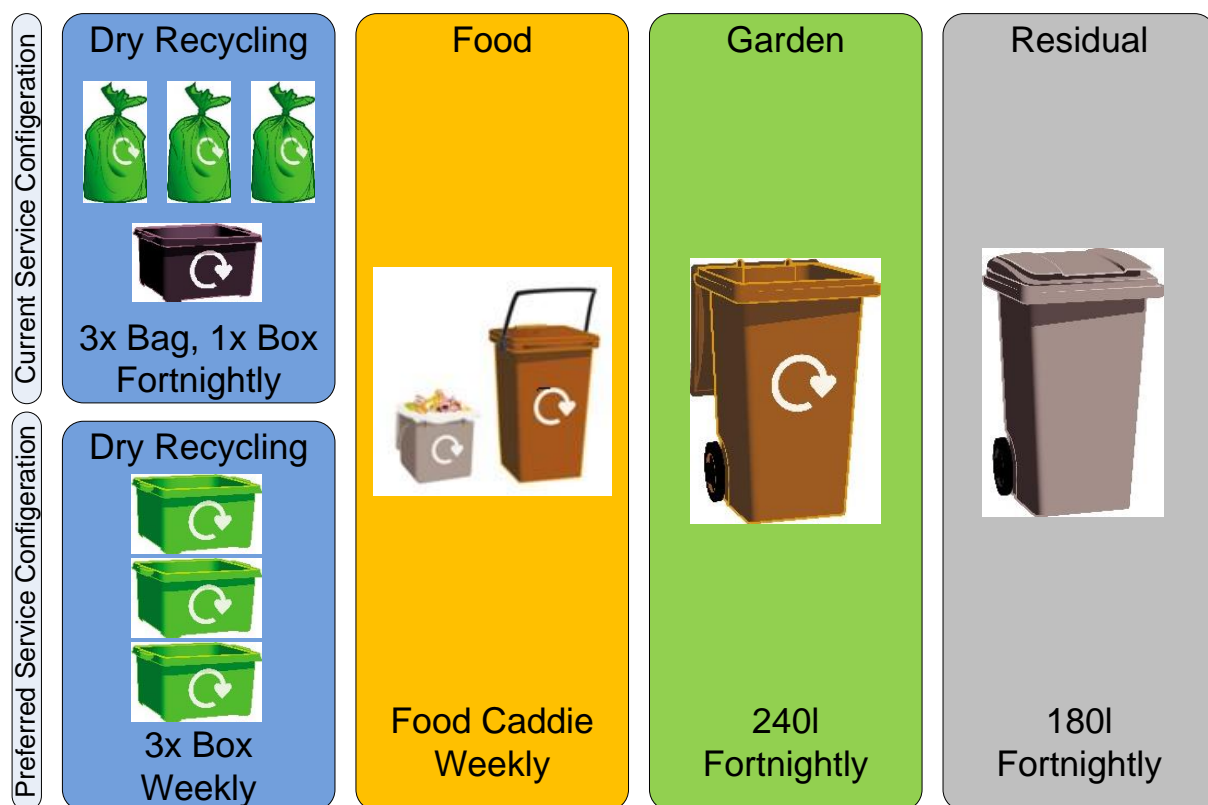
Economia Research & Consulting was commissioned by WRAP to provide support to Newcastle-under-Lyme Borough Council (Newcastle or NuLBC) to enable it to make informed decisions regarding the operational requirements of its planned future domestic recycling and waste collection service.

NuLBC is a district authority within the administrative area of Staffordshire County Council encompassing the towns of Newcastle-under-Lyme, Loggerheads, Madeley and Kidsgrove. It has a population of 123,900 (ONS 2011) living in 54,360 households (WDF, April 2013).

The Council delivers its collection services through a mixture of in-house and outsourced operations. Residual and garden waste is collected by the in-house service provider whilst the council's food waste service is delivered via an out sourced service structure. Acumen Distribution collect glass, cans, paper, plastic and card is collected via a kerbside sort solution. A separate food waste collection service is shared between the Council and the contractor, collecting on alternate weeks: Acumen Distribution collects food waste on the same pass as recycling one week with a separate pass by the Council's dedicated food waste vehicle the following week.

The Council is now looking to harmonise its collection services, bringing all services back in-house. As part of the harmonisation process, the Council has already undertaken a range of work to help it understand how to improve its kerbside collection system, in order to reach at least 60% recycling by 2020, whilst providing a simpler service to residents. This has included assessing a number of different service configuration options against a variety of legislative and operational risks so to arrive at the preferred service configuration as outlined in Figure 1.

Figure 1: Current and preferred service configuration



This report is intended to assist NuLBC Officers and Members in understanding the resource requirements of its preferred service configuration and to gain a greater understanding of the factors that most influence resource requirements and, therefore, costs. It is not the intention for this work to produce a business case for the preferred service configuration or present detailed operational costs. Any cost information presented is intended

to give an indication of the *comparative variance* between options and sensitivities modelled rather than present the actual operational costs.

1.2 Overview of the report structure

The report is structured as follows:

- **Benchmarking:** this section compares the performance of NuLBC with other relevant authorities.
- **Collections modelling:** this section details the methodology and outputs of the collection modelling.
- **Sensitivity analysis:** this section looks at a number of variables to which the resource requirements may be sensitive.
- **Operational considerations:** this section details some operational issues which the Council may wish to consider in implementing the preferred service configuration.
- **Conclusion and recommendations:** this section brings together the key results and recommendations from the modelling.
- **Appendices:** as far as possible the technical detail and statistical analysis has been placed in the appendices.

2 Benchmarking

A benchmarking exercise was undertaken to help us understand how NuLBC's kerbside recycling performance compares to the recycling performance of other similar authorities. As well as helping to understand how the authority is doing, the data collected through this benchmarking, and the data comparisons, have been used to help to predict the capture of materials (quantity) that might be achieved in future for the purpose of service performance modelling, as described below.

Whilst benchmarking can be useful if used carefully, it is by no means a perfect science. Some caution should always be taken when comparing recycling performance across different authorities. A number of interrelated factors will contribute to an individual authority's performance, with these being difficult to unpick from one another. The benchmarking exercise enables us to tease out some of the broad themes in terms of system performance, which, alongside WRAP benchmarking data, analysis of national statistics and our experience elsewhere of these systems, helps us to predict reasonable capture rates and yields to be used in the modelling of NuLBC's future service configuration.

The social demography of an area is the main driver of both the total quantity and composition of the waste, as well as levels of participation in recycling activities. These social factors are then moderated by collection systems and policies. In general, the greater the relative capacity provision and frequency of the recycling service compared to the residual waste service the higher the capture rates. However, communications and enforcement are also important factors that influence recycling performance. It should also be noted that the services to which NuLBC is compared may have been rolled out a number of years ago and do not necessarily represent current good practice.

2.1.1 Nearest neighbour analysis

In order to allow us to undertake a meaningful analysis, comparator authorities were selected using two different methods:

- The Chartered Institute of Public Finance Accountants (CIPFA) Nearest Neighbours (NN) Model¹; and
- ONS calculations as used in the WRAP benchmarking tool.

The CIPFA nearest neighbour model attempts to adopt a scientific approach to measuring the similarity between authorities, taking into account a range of variables that have an impact on demographic profile and the likely demand on different services. It is generally accepted as a robust method of determining comparable authorities.

The model allows the selection of only those variables that are likely to be relevant to the compositions and capture of recyclables. The variables selected include those that are most likely to take social demography into account and are related to deprivation, age profile, rurality, household size and ethnic profile.

¹ <http://www.cipfastats.net/resources/nearestneighbours/profile.asp?view=select&dataset=england>

In carrying out such nearest neighbour analysis there is always a trade-off between comparing only very similar authorities and having enough data to be of any use. Our general approach is primarily to reduce the comparative data set from all English Authorities through the exclusion of authorities for which comparison is meaningless, rather than producing a group of perfect comparators. As such, it is important to reiterate that the benchmarking results should only be used as a general guide.

A total of 69 local authorities were identified for analysis: 65 most similar English authorities from the CIPFA Nearest Neighbour Model and 4 ONS Nearest Neighbour categorisation. In order to draw relative comparators from this group only those authorities with reduced residual collections (i.e. reduced containment and/or frequency) and multi-stream recycling collections were selected. Data was extracted from the most recent audited Waste Data Flow returns (2012/13) for each authority.

2.1.2 Benchmarking results

Table 1 shows the dry recycling tonnage captured for the two relevant recycling systems by benchmarked authorities. Newcastle's dry recycling yields are similar, if a little low, when compared to benchmarked authorities with similar collection systems. Unsurprisingly, authorities with weekly dry recycling collections perform better than those authorities with fortnightly collections with a 7-8% higher capture rate on average. It should be noted that North West Leicestershire's higher performance is likely a result of the collection of hard plastics (pots, tubs etc) and Wrexham's lower performance a result of the collection of cardboard with green waste.

Table 1: Comparison of average dry recycling tonnage between different recycling systems for benchmarked authorities

| Recycling System | Authority | Nearest Neighbour Rank | Yield (kg/hh/yr) | Average |
|--------------------------|--|------------------------|------------------|---------|
| Fortnightly Multi-Stream | Newcastle-under-Lyme | - | 155 | 161 |
| | Carlisle City Council | 6 | 156 | |
| | North West Leicestershire District Council | 15 | 172 | |
| Weekly Multi-Stream | Cheshire West and Chester | 19 | 193 | 175 |
| | Sedgemoor District Council | 62 | 182 | |
| | Wrexham District Council | N/A | 149 | |

These results are similar to what could be expected as a result of increases in participation and recognition due to the changes in scheme type and frequency shown by WRAPs National Benchmarking Project². We would therefore expect that a similar uplift in performance could be achieved by Newcastle switching from fortnightly to weekly dry recycling collections.

3 Collections options modelling

3.1 Methodology

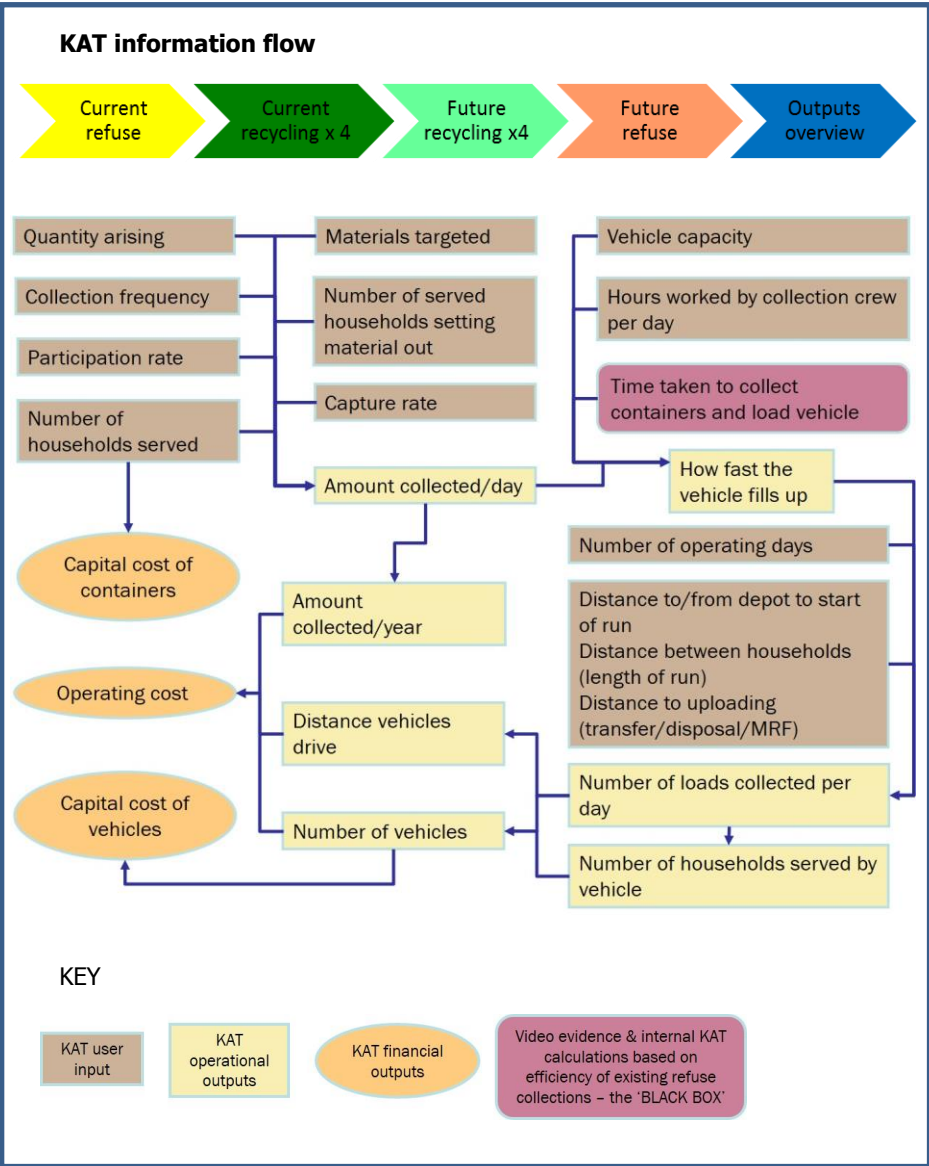
The resource requirements have been modelled using the Kerbside Analysis Tool (KAT), which is a Microsoft Excel based spreadsheet, allowing modelling of a range of refuse, dry and organic kerbside collection scenarios to enable the comparison of options. KAT was developed by Julia Hummel of Eco-Alternatives in 2001 and has been adopted by WRAP as its in-house model of choice for collections options appraisals. KAT has many default values based on extensive observations of kerbside collections and research into vehicles and containers. Default values can be replaced with local data to produce a model of collections reflecting local operating circumstances. KAT's main inputs, outputs and their inter-relationships are shown in Figure 2. KAT models the existing refuse and recycling services and enables up to four new separate recycling services plus waste collection services to be modelled. KAT optimises the number of vehicles and loads based on existing operational efficiencies which it replicates for future services.

² WRAP (2008), *Kerbside Recycling: Indicative Costs and Performance. Technical Annex*, http://www.wrap.org.uk/sites/files/wrap/KerbsideReportAnnexFinal_1.pdf

It provides outputs for the key service parameters: tonnes collected, logistical requirements (vehicles, drivers, loaders, containers) and selected capital and revenue costs. Costs are annualised to allow a one-year cost comparison between the various options. Cost and performance outputs can be given for individual service elements or for the whole service. Specifically, results include data on costs (revenue, capital), service configuration (vehicle, crew size, round size, containers, collection frequency, number of tips), performance (pass rate, participation, capture, tonnes diverted) and cost effectiveness (cost per household and cost per tonne).

KAT will provide average results for a whole authority and was not developed for round routing; this should be undertaken by appropriately trained staff, working in collaboration with operational staff to draw in detailed local knowledge.

Figure 2: KAT overview



3.2.1 Yield Assumptions

Most input assumptions used for the modelling have either been calculated from information provided by Newcastle or from Eunomia’s own data sources and are detailed in Appendix 2. However, the yield assumptions are derived through a specific and carefully considered four-stage process, consisting of:

1. Benchmarking against similar authorities to understand relative performance;
2. Quantifying the impact of individual changes, such as the impact of moving to weekly recycling.
3. Understanding local circumstances.
4. Sense checking results against Eunomia’s internal data and with WRAP’s in-house team.

The yield assumptions in part drive the fill rates and collection times and thus drive the resource requirements of the service. The yields presented in Table 2 represent the central assumptions used in the preferred option modelling (a sensitivity analysis on these assumptions is carried out in section 3.3.4).

Table 2: Preferred option yield assumptions based on an 8% increase in yield from 2013/14 figures

| Overall dry yield (kg/hh/yr) | Amount captured (kg/yr) | Yield (kg/hhd) |
|--------------------------------------|--------------------------------|-----------------------|
| Newspapers and magazines | 3,027 | 58.8 |
| Corrugated card | 568 | 11.0 |
| Non-corrugated card | 896 | 17.4 |
| Plastic bottles | 795 | 15.4 |
| Glass flint | 1,285 | 24.9 |
| Glass brown | 275 | 5.3 |
| Glass green | 1,050 | 20.4 |
| Steel cans | 509 | 9.9 |
| Aluminium cans | 157 | 3.0 |
| Textiles | 78 | 1.5 |
| Overall Dry Recycling Yield | 8,640 | 167.6 |
| Overall food yield (kg/hh/yr) | Amount captured (kg/yr) | Yield (kg/hhd) |
| Food waste | 2,812 | 54.6 |

3.2.2 Modelling Results

Table 3 shows the resource requirements for Newcastle's preferred service configuration. KAT calculates that 14 recycling vehicles would be required for Newcastle's preferred service configuration. This is based on 50% of the vehicles operating a driver plus one loader and 50% with a driver and two loaders and 6.5 hours of the working day utilised for collection³. In addition it is assumed that on vehicles with a driver plus one loader, drivers will contribute 25% of their time to loading and with a driver plus two loaders drivers will contribute 10% of their time to loading.

Note that, based on experience from other authorities, it is often the cardboard stillage that fills up first and determines the need to tip. The useable volume of the cardboard stillage of the vehicles used in the modelling is 4.2m³ and can hold approximately 400kg of cardboard; the effect is that about 70% of the total volume of the vehicle is utilised before a tip is required. These figures represent the average for the whole fleet; individual rounds will differ, e.g. different number of properties served, longer or shorter working day, level of driver contribution to loading and/or different proportions of materials presented.

Table 3: Preferred service configuration resource requirements

| Option | No. of vehicles | No. of tips per vehicle | Average crew size | No. of drivers | No. of loaders | Ave. round size |
|---------------------------------|------------------------|--------------------------------|--------------------------|-----------------------|-----------------------|------------------------|
| Preferred Service Configuration | 14 | 1.0 | 2.5 | 14 | 21 | 740 |

The KAT model is also used to review the infrastructure required for the remaining residual waste. KAT suggests that, due to the switch to a five day week plus the lower amount of remaining residual waste that will be left over once recycling captures increase, the residual waste service fleet can be reduced by one vehicle from five to four.

3.3 Sensitivities

The analysis of the data shows the extent to which collections are sensitive to material volumes and the speed with which the compartments within the vehicle fill up. The aim is to only tip once per day to avoid a second tip

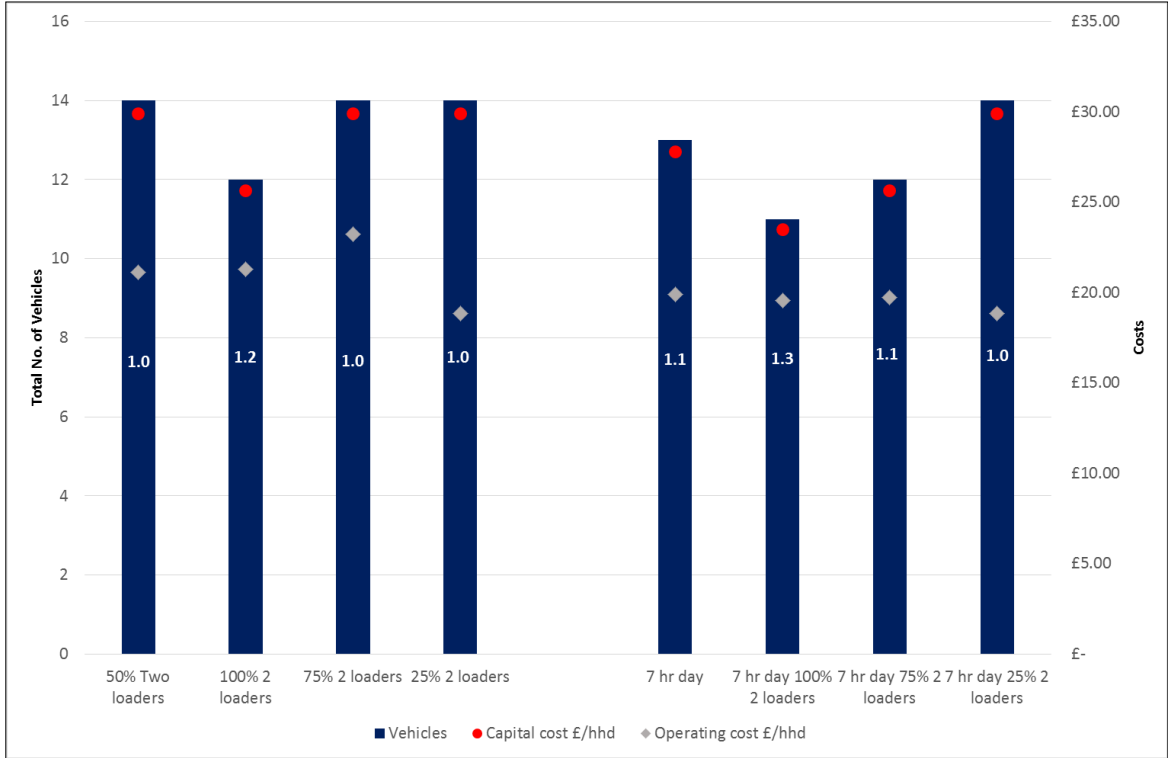
³ This is the time between leaving the depot in the morning and arriving at the depot after the last tip. It does not include activities such as pre-departure vehicle checks, toolbox meetings or refuelling.

of only a small amount of material or two tips of only a partially filled vehicle. This section explores the sensitivity of the preferred service configuration to changes in operational parameters and household performance.

3.3.1 Working day and crew configuration

The impact of increasing the time utilised for collection, within standard contracted hours, by 30 minutes to 7 hours and also increasing the proportion of vehicles with two loaders was considered. The results are shown in Figure 3.

Figure 3. Working day and crew configuration



*Figures in column = number of tips/vehicle/day

The resource requirements of the service are sensitive to the time available for loading the vehicle i.e. the greater the time, the lower the number of vehicles required. An increase in available loading time can be achieved either through increasing the proportion of vehicles that have two loaders or increasing the amount of time utilised for collection within the working day. However, where 6.5 hours of the working day are utilised for collection, resource requirements are only reduced where there are two loaders on all vehicles. This is due to the time it takes to tip and return to the round.

If the amount of time in the working day utilised for collection is increased to 7 hours then the number of vehicles can generally be reduced, except in the scenario where only 25% of vehicles have two loaders. The lower vehicle requirement where all vehicles have two loaders, is off-set by the higher operational costs. This compares with for example, a service with 25% of vehicles with driver plus two loaders that has higher capital costs but lower operating costs.

Whilst this usefully demonstrates the degree of sensitivity to changes in time available for collection and tipping, it is not our view that this level of productivity gain is reasonably achievable. Given that the working week is 37 hours for operational staff, an average collection time of seven hours per day would mean only 20 minutes/day for pre and post departure activities and R&R time or any task and finish incentive to maintain productivity.

The unit costs shown in Figure 3 show the differences, for each sensitivity tested, between capital and operating costs⁴. There is a balance between higher capital costs and potentially lower operating costs⁵. In the scenario

⁴ Note that the costs shown in the table include only limited operational costs using a combination of KAT default costs and costs agreed with Newcastle under Lyme (see assumptions in Appendix 2) for the purposes of comparing sensitivities. The costs do not represent actual expected costs which include other items such as depot costs, management costs and administration.

where 6.5 hours in the working day are utilised for collection, operating costs are similar for both scenarios where 100% and 50% of vehicles have two loaders, but capital costs are much higher for a driver plus two loaders on 50% of the vehicle scenario because two additional vehicles would be required.

In the scenario where 7 hours of the working day are utilised for collection, operating costs are similar for all configurations but capital costs vary significantly. If capital budgets can be secured then the initial results would suggest that one could achieve low operating costs by operating with fewer loaders but investing in more vehicles initially. However if capital budgets are limited then fewer vehicles could be purchased, but all operated with a driver plus two loaders for slightly higher operational costs.

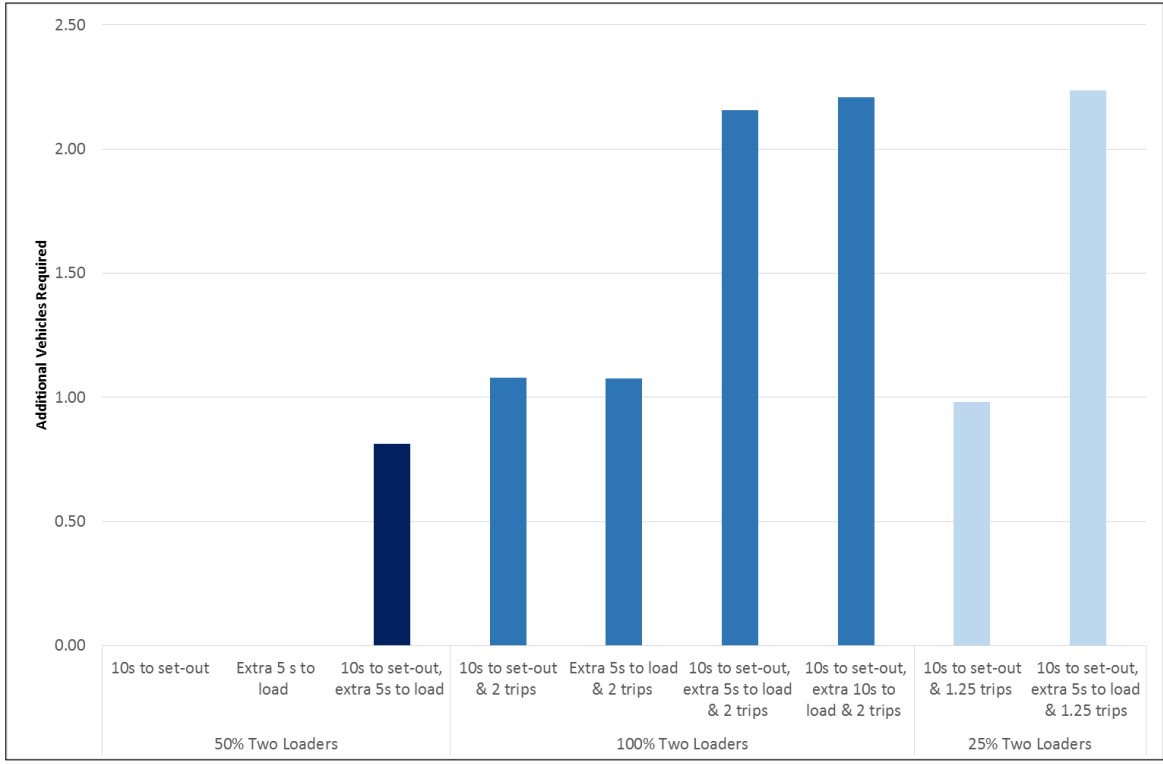
However the potential for use of additional loaders and vehicles, without any change to service configuration, needs to be considered in the light of the points raised above and the sensitivity analysis below to gain a better understanding of the balance between operational and capital costs.

3.3.2 Vehicle loading time

KAT has limited video evidence of four container systems as is planned in Newcastle (3 recycling boxes and 1 food caddie). It is therefore prudent to explore the sensitivity of the timings used for collecting and loading four containers. Timings have already been adjusted based on the assumption that four containers are likely to take longer for operatives to collect from each household and load than three container systems. We have also considered the fact that not all four containers will always be presented by participating households and therefore some set-outs will not require two operative trips to the set out. We have explored the impact of loading time by altering the time taken for a loader to collect and return containers (time taken for a trip to a set out) and time taken for a loader to empty material into the collection vehicle (time taken to load).

Figure 4 and Figure 5 show the additional number of vehicles required for the associated crew configuration due to changes in loading times. Figures are presented as fractions of vehicles to give an indication of the level of the impact, rather than the absolute changes in vehicle numbers suggested by KAT.

Figure 4: Additional vehicle requirements due to loading times (6.5hr collection day)



⁵ Operating costs include a cost for depreciation of vehicles over seven years (Appendix 2).

Figure 5: Additional vehicle requirements due to loading time (7hr collection day)

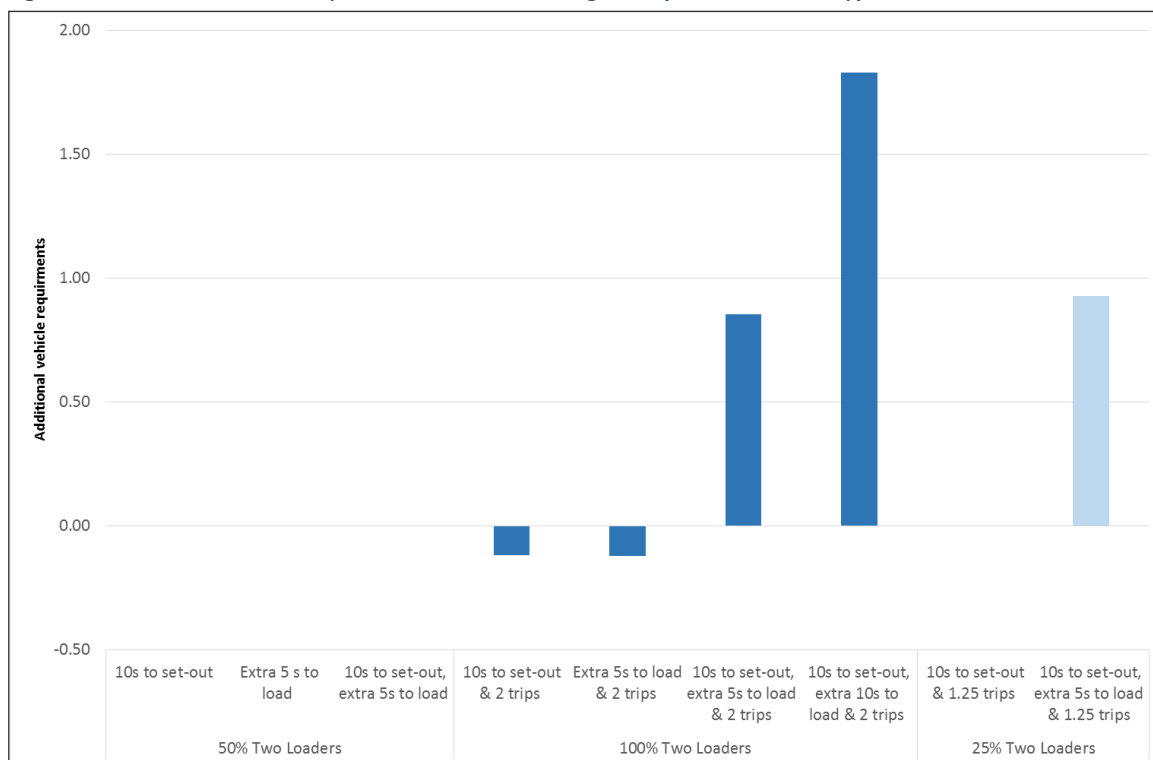


Table 4 shows that changing the timings for loading has the greatest impact on vehicles numbers in the scenario where 100% of the vehicles have two loaders or when loading times are increased significantly for the scenario where 50% of vehicles have two loaders. However, the overall fleet for the scenario where 100% of vehicles have two loaders would still remain smaller than other configurations.

Table 4: Overall fleet size due to changes in modelled loading time

| Configuration | Preferred service configuration | | 10s to set-out | | + 5s to load | | 10s to set-out + 5s to load | | 10s to set-out + 10s to load | |
|------------------|---------------------------------|----|----------------|----|--------------|-----|-----------------------------|----|------------------------------|-----|
| | 6.5h | 7h | 6.5h | 7h | 6.5h | 7h | 6.5h | 7h | 6.5h | 7h |
| 100% two loaders | 12 | 11 | 13 | 12 | 13 | 12 | 14 | 13 | 14 | 14 |
| 50% two loaders | 14 | 13 | 15 | 14 | 14 | 14 | 14 | 14 | 16 | 15 |
| 25% two loaders | 14 | 14 | 15 | 14 | N/A | N/A | 16 | 15 | N/A | N/A |

3.3.3 Tipping times

Time taken for vehicles to tip was varied to replicate the impact of either extended queuing at the depot if all vehicles return at similar times (extra tipping time) or deploying staggered start times to avoid queuing (reduced tipping time). Increasing tipping times reduces the amount of time for actual collections. Figure 6 and Figure 7 show that the time taken to tip has the most influence on resource requirements where vehicles have to tip twice – mainly in the scenario where 100% of vehicles have two loaders, but also in the 7 hour day scenario with 50% of vehicles with two loaders. This is because the amount of time to deduct for available collection time is doubled where there are two tips compared with a one-tip set-up. Likewise reducing the tipping time benefits a two-tip set up most.

If vehicles are only tipping once, then staggered starts may have a greater benefit for the depot operators who otherwise would be faced with emptying the majority of the fleet at the same time at the end of the day. From a collection perspective, if the majority of vehicles are only tipping once, longer queuing times for unloading will not affect actual collections significantly.

Figure 6: Tipping time (6.5 hrs utilised for collection)

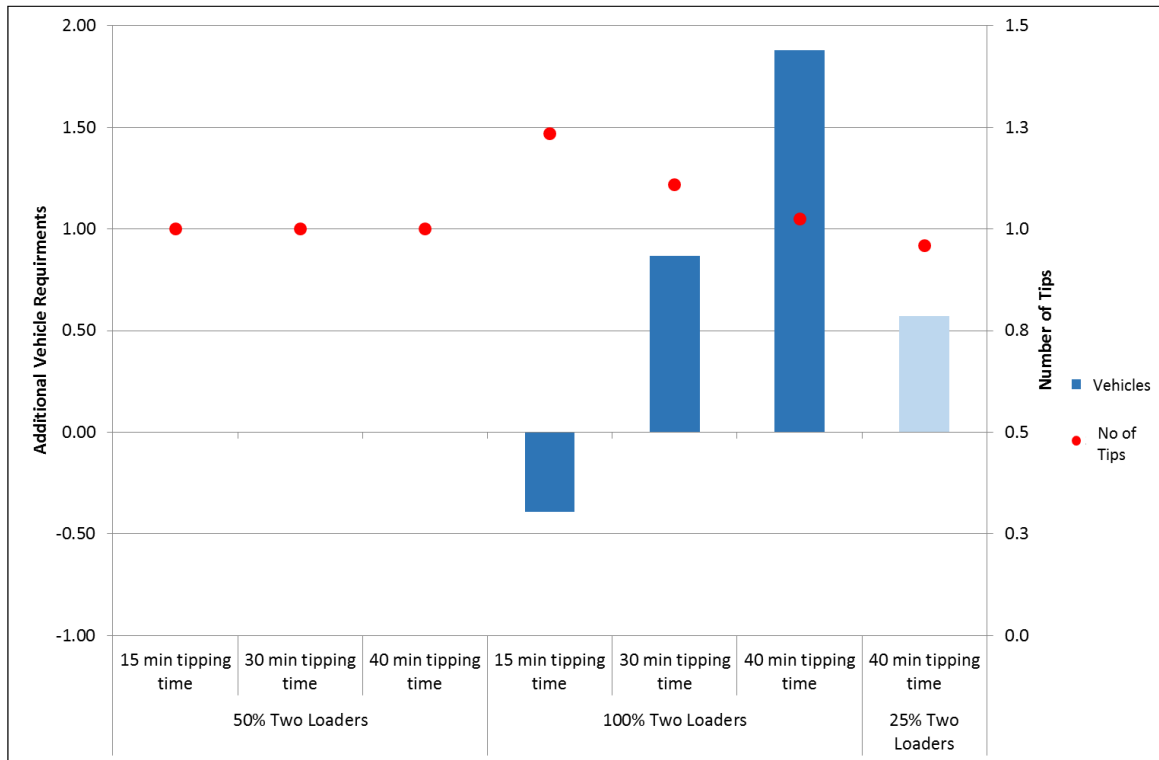
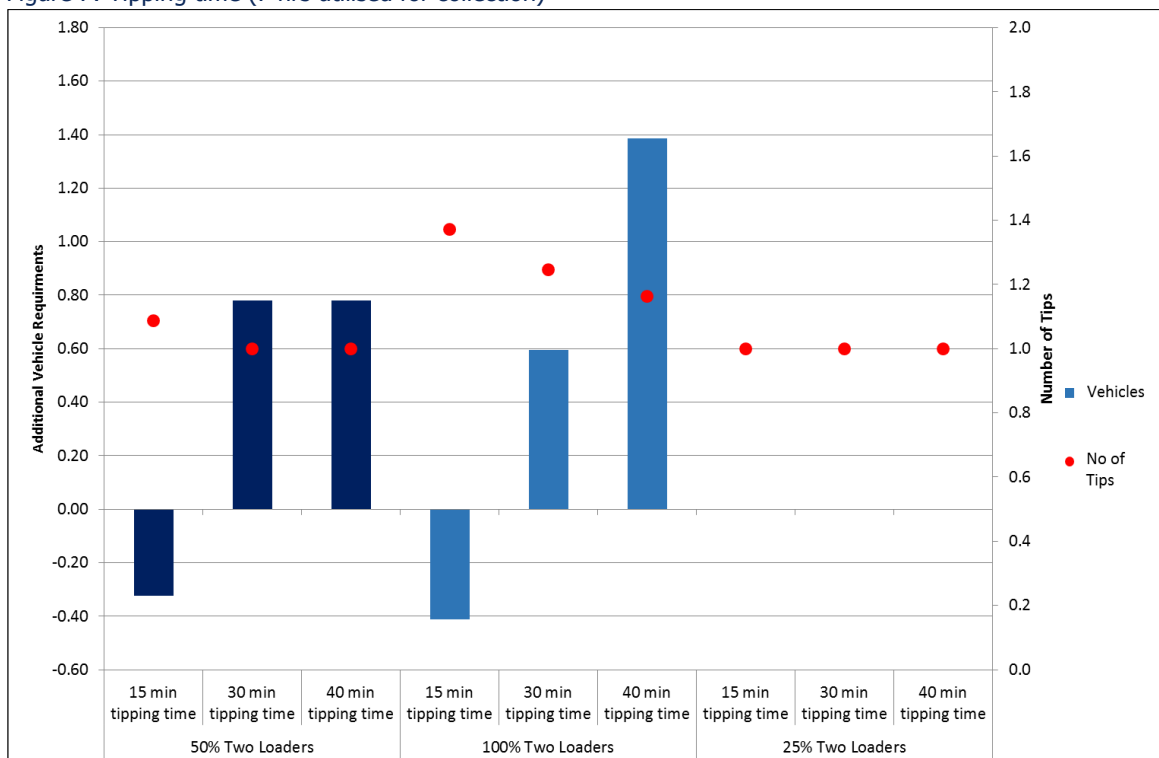


Figure 7: Tipping time (7 hrs utilised for collection)



3.3.4 Increasing yield

As outlined in section 2, the yield assumptions for Newcastle’s preferred service configuration have been based on benchmarking of similar schemes. Participation and set-out rates have not been measured and figures used in modelling the existing services are estimates; future participation and set-out rates are relative increases from

the existing service rather than absolute figures. The preferred service configuration has been tested for a range of higher yields by increasing the participation to reflect yields achieved in benchmarked authorities with similar schemes (see Table 1) and tested for different set-out rates. Table 5 shows the yield assumptions for both 15% increase in yield from the current service (6% increase from preferred configuration yield) to 180kg/hh/yr and a higher 22% increase in yield from the current service yield (11% increase from preferred configuration yield) to 190kg/hh/yr.

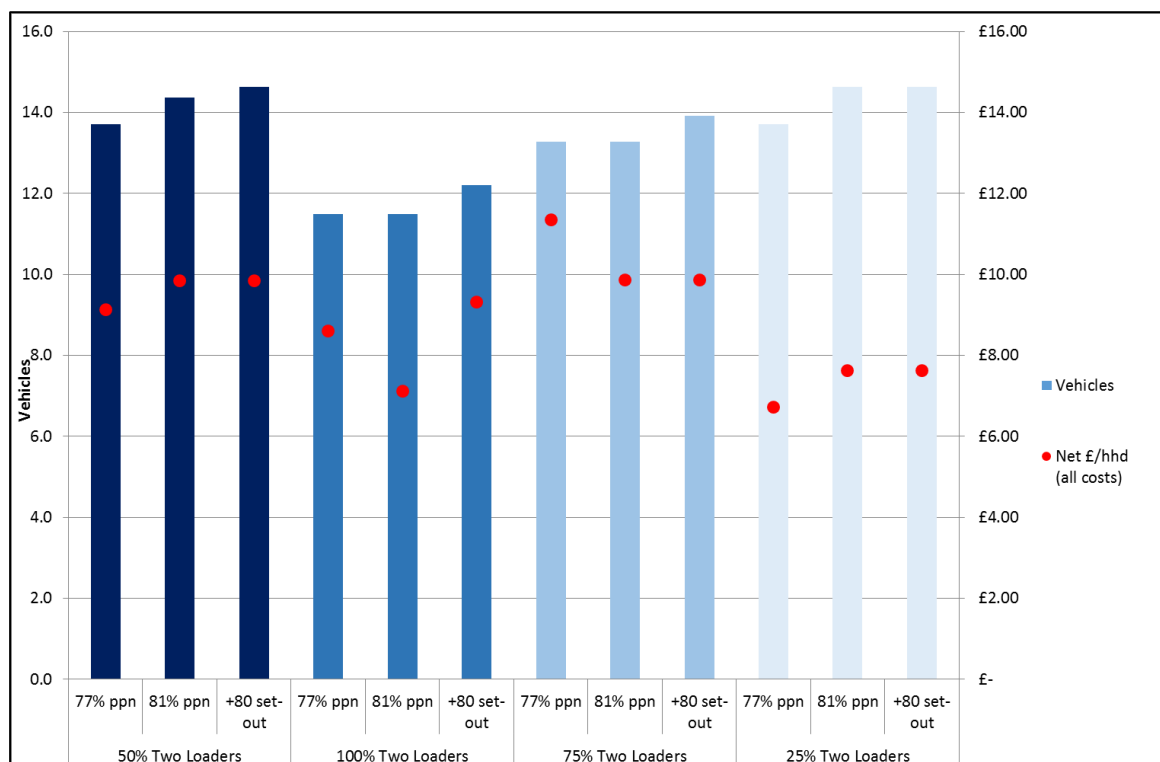
Table 5: Yield assumptions for dry recycling yield increase sensitivity

| Yield Increase from current service | Amount captured (kg/yr) | | Yield (kg/hhd) | |
|-------------------------------------|-------------------------|--------------|----------------|------------|
| | 15% | 22% | 15% | 22% |
| Overall dry yield (kg/hh/yr) | 180 | 190 | 180 | 190 |
| Newspapers and magazines | 3,259 | 3,420 | 63.3 | 66.4 |
| Corrugated card | 611 | 641 | 11.9 | 12.5 |
| Non-corrugated card | 965 | 1,013 | 18.7 | 19.7 |
| Plastic bottles | 848 | 889 | 16.5 | 17.3 |
| Glass flint | 1,371 | 1,439 | 26.6 | 27.9 |
| Glass brown | 293 | 308 | 5.7 | 6.0 |
| Glass green | 1,120 | 1,176 | 21.8 | 22.8 |
| Steel cans | 548 | 575 | 10.6 | 11.2 |
| Aluminium cans | 169 | 177 | 3.3 | 3.4 |
| Textiles | 101 | 106 | 2.0 | 2.1 |
| Total (kg/yr) | 9,285 | 9,744 | - | - |

Figure 8 shows that an increase in yield to 180 kg/hh/yr would require an extra vehicle in all cases except in the following scenarios if set-out does not increase:

- Where 75% of vehicles have two loaders; or
- Where all vehicles have two loaders.

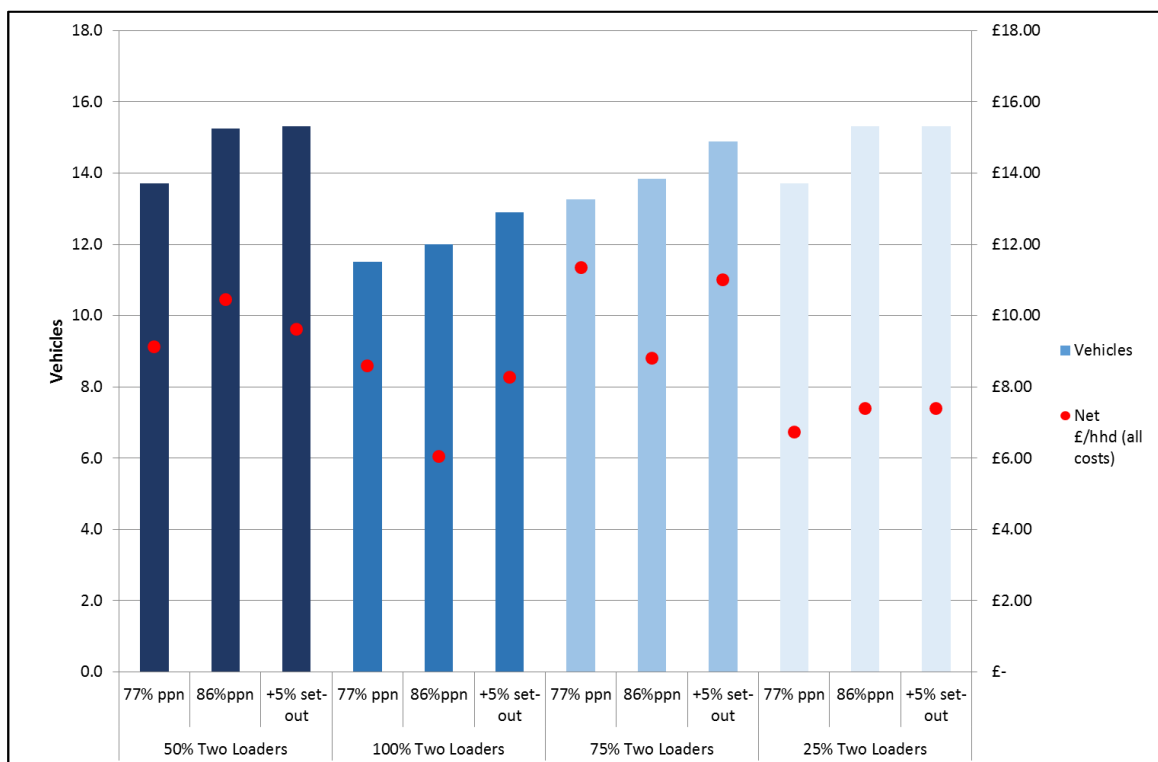
Figure 8: Resource requirements and net costs with 180kg/hh/yr dry recycling capture



Note: participation and set-out figures represent increases above the assumed baseline figures rather than absolute values

Figure 9 shows that increases in yield to 190 kg/hh/yr will require an additional 1.6 vehicles where 50% or less of the vehicles share a driver plus two. Only 0.5 additional vehicles are required where more than 50% of vehicles have two loaders unless set-out increases, in which case, an additional 1.6 vehicles are required: the actual tonnage is not the constraint, it is the time taken to serve the households. This suggests that a service in which more vehicles have a driver plus two loaders is more resilient to changes in uplift than where there are fewer loaders. This would also suggest that it may be possible to start a service with fewer loaders overall and increase the number as yields increase.

Figure 9: Resource requirements and net costs with 190kg/hh/yr dry recycling capture



Note: participation and set-out figures represent increases above the assumed baseline figures rather than absolute values

Residual waste containment volume is considered a key influence on scheme performance. NuLBC has a policy issuing 180 litre refuse bins when replacement bins are requested and therefore will replay the existing 240 litre residual bin stock gradually over time. It is assumed therefore that there is potential for the performance to increase to the higher levels assumed in the sensitivity in the future.

3.3.5 Housing growth

In order to determine the ability of the service to accommodate this growth in housing, the model was run with an increase to 54,100 households served and a dry recycling yield of 190kg/hh/yr. This is equivalent to a 1% increase in housing up to 2020. The results are presented in Table 6. Where the proportion of vehicles with two loaders is greater than 50% one additional vehicle is required; where the proportion of vehicles with two loaders is greater than 50% two additional vehicles are required.

Table 6: Vehicle requirements for increase in number of households

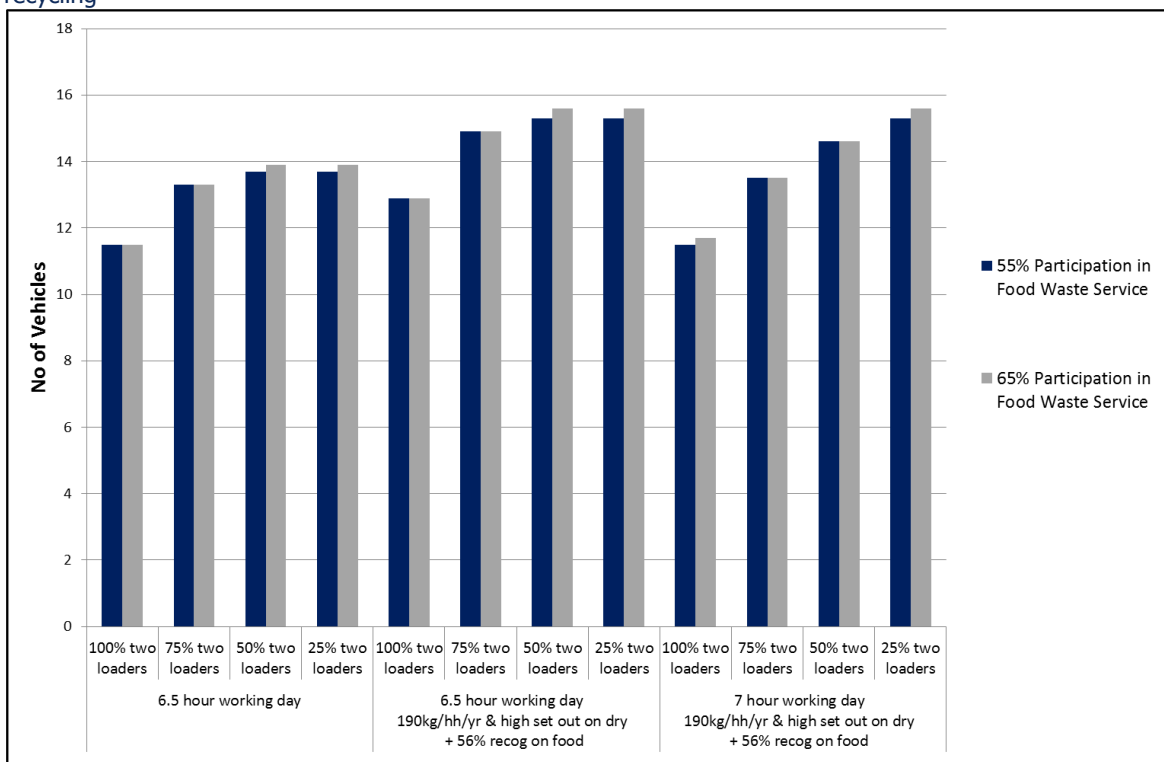
| | 51,800 Households | | 54,000 Households | |
|------------------|-------------------|------|-------------------|------|
| | Vehicles | Tips | Vehicles | Tips |
| 25% two loaders | 14 | 1.0 | 16 | 1.0 |
| 50% two loaders | 14 | 1.0 | 16 | 1.0 |
| 75% two loaders | 14 | 1.0 | 15 | 1.1 |
| 100% two loaders | 12 | 1.2 | 13 | 1.3 |

3.3.6 Food waste

NuLBC already provides residents with a weekly food waste collection and it is unlikely that significant increases in food yield will be seen as a result of a service change to the Council's preferred service configuration. However, current food waste yields are low when compared to other authorities operating comparable services to Newcastle's preferred service configuration. NuLBC is currently running a pilot scheme to providing householders with plastic bags to line their food caddies to determine if this will increase participation and capture. We have therefore explored the impact of increased food waste yields should participation and recognition increase.

Figure 10 shows the results of the effect of increased food capture on the different service configurations and the impact of high food waste captures combined with high dry recycling yields and set out. As discussed previously, generally volume (notably of cardboard), determines when to tip rather than weight. Also, food set-out rates will almost always be lower than set-out rates for dry recycling. Therefore the additional food collected is generally not a constraint and does not significantly affect the resources required to deliver the service.

Figure 10: Vehicle requirements for increased food collection combined with increased yield and set out of dry recycling



3.3.7 Summary

Table 7 presents a summary of the changes in vehicle numbers required for different sensitivities. A lower average and maximum additional vehicle requirement suggests a configuration that is more resilient to the all sensitivities tested i.e. the sensitivities tested will have less impact upon resources required. Accepting that more sensitivity tests were undertaken for certain service configurations, the results suggest that a service configuration with 75% of vehicles having a driver plus two loaders is least sensitive to changes in participation, yield and loading times, followed by one in which 50% have a driver plus two loaders.

When 100% of vehicles have two loaders only 12 vehicles are required. When 75% or fewer vehicles have two loaders, 14 vehicles are required. Therefore in total capital investment costs a driver plus two loaders on all vehicles represents the lowest cost. As described around Figure 3, costs might reasonably be managed by starting with a smaller number of vehicles having two loaders initially and increasing loader numbers as either yields increase or if collections take longer than have been modelled.

Table 7: Summary of sensitivities

| | Proportion of vehicles with 2 loaders | | | |
|--|---------------------------------------|------|------|------|
| | 25% | 50% | 75% | 100% |
| Number of vehicles for basic preferred option configuration | 13.7 | 13.7 | 13.3 | 11.5 |
| Average additional vehicles required above the basic configuration across sensitivities | 0.94 | 0.54 | 0.44 | 0.66 |
| Maximum additional vehicles required above the basic configuration across sensitivities | 3.22 | 2.13 | 1.62 | 2.21 |

4 Operational considerations

4.1 Working patterns

The modelling inputs are all based on having a five-day working week rather than the four-day week currently operated by NuLBC as the Council anticipates the introduction of this change in working pattern with the roll out of its preferred service configuration. Whilst a detailed analysis of the relative merits of working patterns is outside the scope of this work, it's important to be clear that such a change can influence both resource requirements and operational costs of the collection service.

We have seen a number of local authorities in the past switch to a four-day working week similar to that currently operated in NuLBC in order to mitigate the impact of bank holidays on collection services. Whilst this can have some benefits in eliminating the disruption to services following bank holidays, the greatest benefits of operating under a four-day week are seen if it results in a higher proportion of full, or close to full, vehicle tips thus increasing resource efficiencies. However, in the case of NuLBC, vehicles are already tipping when full at the end of the day. Therefore a four-day week with a longer day will result in additional vehicle tips of only partially full vehicles creating inefficiencies, as the time available for collection is not fully utilised. It is also unlikely to reduce the overall vehicle requirements. In addition, there may be operational health and safety considerations that should be taken into account in operating an increased working day (usually approximately 10 hours). There are also obvious impacts on staff productivity at the end of a very long working day and more of the day is likely to be worked in the dark in the winter months. It should also be noted that the benefits of operating a four day week can be achieved through other mechanisms, most notable in the drafting of staff terms and conditions and the use of overtime payment for bank holiday working.

4.2 Routing Considerations

The number of tips will depend primarily on how quickly the recycling vehicle fills up and the efficiency of the utilisation of the compartments as the need to tip shown within this modelling is based on volume rather than tonnage. Detailed route planning will help to identify where two tips are possible, but also adjustments to routes will be required once the service is operational and the volume of different materials on different rounds is identified. It has been found on other services using the types of stillage vehicle proposed by NuLBC that card is the limiting factor. However the proportion of card will vary between rounds and, on those rounds where the proportion of card is lower, it may be possible to increase the round size and still only tip once. It may be prudent for NuLBC to retain at least one of the smaller stillage vehicles to provide a back-up service, particularly when the new service is initially rolled out in order to cover for rounds that are taking longer than anticipated to complete. In addition, NuLBC should consider optimising routes as part of its round planning process; this may result in additional resource savings over and above what has been shown by the results of this work.

Under NuLBC's preferred service configuration, fortnightly collections will continue for both residual and garden waste collections. It is sensible to consider how these services will be structured across the fortnight, for example operating refuse collection across the whole borough one week then garden collections the next or a 50/50 split system alternation the services in each half of the borough as is currently operated. It is unlikely that this will have any significant impact on the resource requirements of the service however there may be some operational benefits to maintaining the current 50/50 split structure of these services e.g. collecting missed bins etc. It is likely that this system has benefits for depot operatives as finish time between services will be staggered, reducing the number of vehicles queuing to tip at the end of the day. It also allows greater flexibility to use resources from each service to manage variations in yields across the two services.

5 Conclusions and recommendations

KAT calculates optimised numbers of vehicles and tips given the amount of time available in the day for loading, tipping and driving. This, in turn, is dependent on the amount of material to collect, the number of properties to serve and the size of the vehicles. Given these factors, most collections consist of one tip, which determines the number of vehicles required.

If the overall loader contribution is increased and the available time for collection is increased marginally then it is possible for a second tip to be undertaken. Consequently KAT calculates that the overall fleet requirement is slightly lower if all vehicles have a driver plus two or if the available time for collection can be increased.

However, as the service is quite sensitive to these timings, small fluctuations have the potential to lead to a requirement for more vehicles. Therefore our modelling initially indicates that NuLBC will require either a fleet of 14 vehicles, with a driver plus two on 50% of the vehicles, or a fleet of 12 vehicles, but with a driver plus two on all vehicles.

However, although a smaller fleet with more loaders may be able to service the authority, small reductions in available collection time (e.g. longer loading and unloading times or longer travel times), may quickly require additional vehicles or leave no spare capacity for breakdowns, delays or population growth. Likewise a fleet of 14 vehicles with only 50% of vehicles with two loaders is operating optimally and provides no spare capacity for growth or spare vehicles using that crew configuration.

The sensitivity analysis suggests that a service in which more vehicles have a driver plus two loaders is more resilient to change in material yields than where fewer vehicles have two loaders. The recommended service configuration is therefore:

- A fleet of 14 vehicles comprising 13 operational vehicles and one spare;
- A minimum of 23 loaders which would enable an average round of 800 properties to be serviced per round and minimise the number of rounds where more than one tip is required.
- Additional capacity can be met by increasing the proportion of vehicles with two loaders and, in the longer term utilising the spare vehicle on standard rounds.

This configuration ensures that the service will accommodate increases in yield and set-out due to improved performance, increases in the number of households served and increases in travel time or tipping time.

In the short term it is recommended that the stillage vehicles used under the existing contract be retained in order to provide services to harder to reach properties or provide a back-up to existing rounds.

Given that some of the rounds require two loads of which one is only a partial load it is recommended that rounds closest to the depot are designed for two tips and others further for one tip.

In our view the authority would benefit from the development of detailed route planning to support this service roll-out and to maximise efficiency.

It is recommended that staggered start times are considered to overcome the issue of the majority of vehicles only tipping once and most likely at similar times at the end of the day. Alternatively, full vehicles could be parked on their return to depot at the end of the day and depot operatives could be employed to work a later shift pattern in order to unload the vehicle fleet.

Appendix 1: Modelling results

Table 8: Working day and crew configuration sensitivity results

| Configuration | Vehicles | | Tips | | Average round size | |
|----------------|-----------|---------|-----------|---------|--------------------|---------|
| | 6.5hr day | 7hr day | 6.5hr day | 7hr day | 6.5hr day | 7hr day |
| 50% 2 loaders | 13.7 | 12.9 | 1.0 | 1.1 | 736 | 792 |
| 100% 2 loaders | 11.5 | 10.4 | 1.2 | 1.3 | 858 | 936 |
| 75% 2 loaders | 13.3 | 11.9 | 1.0 | 1.1 | 736 | 858 |
| 25% 2 loaders | 13.7 | 13.7 | 1.0 | 1.0 | 736 | 736 |

Table 9: Vehicle loading time sensitivity results

| Configuration | | Vehicles | | Tips | | Additional vehicles required | | Average round size | |
|------------------|---|-----------|---------|-----------|---------|------------------------------|---------|--------------------|---------|
| | | 6.5hr day | 7hr day | 6.5hr day | 7hr day | 6.5hr day | 7hr day | 6.5hr day | 7hr day |
| 50% Two Loaders | 10s to set-out | 13.7 | 13.7 | 1.0 | 1.0 | 0.00 | 0.00 | 736 | 736 |
| | Extra 5 s to load | 13.7 | 13.7 | 1.0 | 1.0 | 0.00 | 0.00 | 736 | 736 |
| | 10s to set-out, extra 5s to load | 14.5 | 13.7 | 0.9 | 1.0 | 0.81 | 0.00 | 687 | 736 |
| | 10s to set-out, extra 10s to load | 13.7 | 14.4 | 1.0 | 1.0 | 2.21 | 0.67 | 736 | 687 |
| 100% Two Loaders | 10s to set-out & 2 trips | 12.6 | 11.4 | 1.1 | 1.2 | 1.08 | -0.12 | 792 | 858 |
| | Extra 5s to load & 2 trips | 12.6 | 11.4 | 1.1 | 1.2 | 1.08 | -0.12 | 792 | 858 |
| | 10s to set-out, extra 5s to load & 2 trips | 13.7 | 12.4 | 1.0 | 1.1 | 2.16 | 0.85 | 736 | 792 |
| | 10s to set-out, extra 10s to load & 2 trips | 13.7 | 13.3 | 1.0 | 1.0 | 2.21 | 1.83 | 736 | 736 |
| 25% Two Loaders | 10s to set-out & 1.25 trips | 14.7 | 13.7 | 0.9 | 1.0 | 0.98 | 0.00 | 687 | 736 |

| | | | | | | | | | |
|--|---|------|------|-----|-----|------|------|-----|-----|
| | 10s to set-out, extra 5s to load & 1.25 trips | 15.9 | 14.6 | 0.9 | 0.9 | 2.24 | 0.93 | 644 | 687 |
|--|---|------|------|-----|-----|------|------|-----|-----|

Table 10: Tipping time sensitivity results

| Configuration | | Vehicles | | Tips | | Additional vehicles required | | Average round size | |
|------------------|---------------------|-----------|---------|-----------|---------|------------------------------|---------|--------------------|---------|
| | | 6.5hr day | 7hr day | 6.5hr day | 7hr day | 6.5hr day | 7hr day | 6.5hr day | 7hr day |
| 50% Two Loaders | 15 min tipping time | 13.7 | 12.6 | 1.0 | 1.1 | 0.00 | -0.32 | 736 | 792 |
| | 30 min tipping time | 13.7 | 13.7 | 1.0 | 1.0 | 0.00 | 0.78 | 736 | 736 |
| | 40 min tipping time | 13.7 | 13.7 | 1.0 | 1.0 | 0.00 | 0.78 | 736 | 736 |
| 100% Two Loaders | 15 min tipping time | 11.1 | 10.0 | 1.2 | 1.4 | -0.39 | -0.41 | 858 | 1030 |
| | 30 min tipping time | 12.4 | 11.0 | 1.1 | 1.2 | 0.87 | 0.59 | 792 | 936 |
| | 40 min tipping time | 13.4 | 11.8 | 1.0 | 1.2 | 1.88 | 1.39 | 736 | 858 |
| 25% Two Loaders | 15 min tipping time | | 13.7 | | 1.0 | | 0.00 | | 736 |
| | 30 min tipping time | | 13.7 | | 1.0 | | 0.00 | | 736 |
| | 40 min tipping time | 14.3 | 13.7 | 1.0 | 1.0 | 0.57 | 0.00 | 687 | 736 |

Table 11: Increasing yield sensitivity results

| Configuration | | Vehicles | | Tips | | Additional vehicles required | | Average round size | |
|------------------|-------------|-------------|-------------|-------------|-------------|------------------------------|-------------|--------------------|-------------|
| | | 180kg/hh/yr | 190kg/hh/yr | 180kg/hh/yr | 190kg/hh/yr | 180kg/hh/yr | 190kg/hh/yr | 180kg/hh/yr | 190kg/hh/yr |
| 50% Two Loaders | 70% ppn | 13.7 | 13.7 | 1.0 | 1.0 | | | 736 | 736 |
| | 81% ppn | 14.4 | 15.3 | 1.0 | 1.0 | 0.67 | 1.55 | 687 | 644 |
| | +80 set-out | 14.6 | 15.3 | 1.0 | 1.0 | 0.92 | 1.60 | 687 | 644 |
| 100% Two Loaders | 70% ppn | 11.5 | 11.5 | 1.2 | 1.2 | | | 858 | 858 |
| | 81% ppn | 11.5 | 12.0 | 1.3 | 1.3 | 0.00 | 0.49 | 858 | 858 |
| | +80 set-out | 12.2 | 12.9 | 1.2 | 1.2 | 0.70 | 1.40 | 792 | 792 |
| 25% Two | 70% ppn | 13.3 | 13.3 | 1.0 | 1.0 | | | 736 | 736 |

| | | | | | | | | | |
|---------|-------------|------|------|-----|-----|------|------|-----|-----|
| Loaders | 81% ppn | 13.3 | 13.8 | 1.1 | 1.1 | 0.00 | 0.57 | 736 | 736 |
| | +80 set-out | 13.9 | 14.9 | 1.1 | 1.0 | 0.66 | 1.62 | 736 | 687 |

Table 12: Food waste sensitivity results

| Service configuration | | No additional food | | Additional food | |
|---|------------------|--------------------|-------------|-----------------|-------------|
| | | Vehicles | No. of tips | Vehicles | No. of tips |
| 65% ppn on food | 50% two loaders | 13.7 | 1.0 | 13.9 | 1.0 |
| | 100% two loaders | 11.5 | 1.2 | 11.5 | 1.3 |
| | 75% two loaders | 13.3 | 1.0 | 13.3 | 1.1 |
| | 25% two loaders | 13.7 | 1.0 | 13.9 | 0.9 |
| 190 kg and high set-out on dry 65% ppn & 56% recog | 50% two loaders | 15.3 | 1.0 | 15.6 | 1.0 |
| | 100% two loaders | 12.9 | 1.2 | 12.9 | 1.3 |
| | 75% two loaders | 14.9 | 1.0 | 14.9 | 1.1 |
| | 25% two loaders | 15.3 | 1.0 | 15.6 | 0.9 |
| 190 kg and high set-out on dry 65% ppn & 56% recog 7 hour day | 50% two loaders | 14.6 | 1.0 | 14.6 | 1.1 |
| | 100% two loaders | 11.5 | 1.3 | 11.7 | 1.3 |
| | 75% two loaders | 13.5 | 1.1 | 13.5 | 1.2 |
| | 25% two loaders | 15.3 | 1.0 | 15.6 | 1.0 |

Table 13: Dry recycling and food waste yields

| | Dry recycling yield | | | Additional food | |
|---------------------|---------------------|--------------|--------------|-----------------|------------------------------|
| | 168 kg/hh/yr | 180 kg/hh/yr | 190 kg/hh/yr | 65% ppn | 65% ppn + 56% recognition |
| News & magazines | 3,027 | 3,259 | 3,420 | 3,027 | 3,420 |
| Corrugated card | 568 | 611 | 641 | 568 | 641 |
| Non-corrugated card | 896 | 965 | 1,013 | 896 | 1,013 |
| Plastic bottles | 795 | 848 | 889 | 795 | 889 |
| Glass flint | 1,285 | 1,371 | 1,439 | 1,285 | 1,439 |

| | | | | | |
|-----------------------|---------------|---------------|---------------|---------------|---------------|
| Glass green | 275 | 293 | 308 | 275 | 308 |
| Glass brown | 1,050 | 1,120 | 1,176 | 1,050 | 1,176 |
| Steel cans | 509 | 548 | 575 | 509 | 575 |
| Aluminium cans | 157 | 169 | 177 | 157 | 177 |
| Textiles | 78 | 101 | 106 | 78 | 106 |
| Total dry | 8,640 | 9,285 | 9,744 | 8,640 | 9,744 |
| Food | 2,812 | 2,812 | 2,812 | 3,323 | 3,649 |
| TOTAL kerbside | 11,452 | 12,097 | 12,556 | 11,963 | 13,393 |

Table 14: Average crew loading contribution

| | Proportion of vehicles with two loaders | | | |
|--|---|-------------|-------------|------------|
| | 25% | 50% | 75% | 100% |
| Driver contribution | | | | |
| Driver plus one | 25% | 25% | 25% | 25% |
| Driver plus two | 10% | 10% | 10% | 10% |
| Loader contribution | 100% | 100% | 100% | 100% |
| Average crew loading contribution | 1.53 | 1.68 | 1.82 | 2.1 |

Appendix 2: Assumptions

1 Introduction

The assumptions used in options modelling undertaken for Newcastle under Lyme Borough Council (NuLBC) are outlined in the following appendices. The aim of this appendix is to present assumptions in a clear and concise manner. The majority of assumptions were discussed with Council officers during on-site data collection and baseline modelling. The performance assumptions are based on benchmarking of similar authorities with similar schemes. Full details of the benchmarking exercise are presented in section 2.

Assumptions are presented in table format detailing the source of assumption with short descriptions for how the data has been used in the modelling process.

2 Current kerbside performance

Waste composition for NuLBC was not available, therefore KAT default figures have been applied. Collections tonnages have been based on 2013/14 WDF returns.

| | KAT default | Collected tonnage | Breakdown | Assumed participation rate | Households served | Recognition rate ⁶ | Capture rate ⁷ | Yield (kg/hhd) |
|--------------------------|-------------|-------------------|-----------|----------------------------|-------------------|-------------------------------|---------------------------|----------------|
| Newspapers and magazines | 11.4% | 2,800 | 2,800 | 70% | 55,000 | 81% | 56% | 50.9 |
| Other paper | 4.7% | | | | | | | |
| Corrugated card | 2.1% | 1,354 | 525 | 70% | 55,000 | 81% | 57% | 9.5 |
| Non-corrugated card | 3.4% | | 829 | 70% | 55,000 | 81% | 57% | 15.1 |
| Plastic film | 4.7% | | | | | | | |
| Plastic bottles | 1.8% | 750 | 750 | 70% | 55,000 | 139% | 98% | 13.6 |
| Plastic - other dense | 4.5% | | | | | | | |
| Glass flint | 3.0% | 2,459 | 1,211 | 70% | 55,000 | 133% | 93% | 22.0 |
| Glass brown | 0.6% | | 259 | 70% | 55,000 | 133% | 93% | 4.7 |

⁶ Recognition Rate is the percentage of material diverted by a participating household

⁷ Capture Rate is percentage of material diverted from the total waste stream

| | | | | | | | | |
|--------------------------|----------------|---------------|---------------|-----|---------------|------|------|--------------|
| Glass green | 2.4% | | 989 | 70% | 55,000 | 133% | 93% | 18.0 |
| Steel cans | 1.8% | 617 | 472 | 70% | 55,000 | 84% | 59% | 8.6 |
| Aluminium cans | 0.6% | | 145 | 70% | 55,000 | 84% | 59% | 2.6 |
| Foil containers | 0.1% | | | | | | | |
| Textiles | 2.8% | 41 | 41 | 70% | 55,000 | 5% | 3% | 0.7 |
| Soil and other organic | 2.5% | | | | | | | |
| Food waste | 24.6% | 2,728 | 2,728 | 50% | 51,000 | 51% | 25% | 53.5 |
| Compostable garden waste | 12.4% | 10,201 | 10,201 | 90% | 48,000 | 210% | 189% | 212.5 |
| Other | 16.6% | | | | | | | |
| Total | 100.00% | 20,950 | 20,950 | | | | | |
| Household waste | | 22,633 | 22,633 | | 55,000 | | | |
| TOTAL | | 43,583 | 43,583 | | 55,000 | | | 792.4 |

3 Baseline Assumptions

Operational Assumptions

Table 15: Baseline Operational Assumptions

| Term | Dry | Garden | Food | Refuse | NOTES |
|--|-------------|--|--------|-------------|--|
| Service Assumption | | | | | |
| Number of households served (street level) | 51,800 | 48,000 (875 with additional bin(s)) | 51,800 | 51,800 | |
| Number of flats | 3,200 | 0 | 1,000 | 3,200 | Majority of properties integrated into normal rounds |
| Collection frequency | Fortnightly | Fortnightly | Weekly | Fortnightly | |
| Number of collection days per week | 4 | 4 | 4 | 4 | |

| Term | Dry | Garden | Food | Refuse | NOTES |
|--------------------------------------|---|---|--|---|---|
| Average round size per day | Kerbsider - 1,180 Split RCV - 3,165 | 1,490 | 1,770 | 1,380 | Based on data in RouteSmart summaries |
| Average number of loads/tips per day | 2 | 2 | 2 | 2 | |
| Staff Assumptions | | | | | |
| Number of loaders | Kerbsider: 2 Split body: 3 Stillage: 1 | 26t: 2 15t: 1 | Link Tip: 1 | 26t: 2 15t: 1 | |
| Driver contribution to loading. | Stillages 80% | 15t – 25% | Link Tip: 60% | 15t – 25% | |
| Vehicle Assumptions | | | | | |
| Number of collection vehicles | 5 x 24t kerbsiders (paper, glass, cans & food) 2 x 7.5t stillages (paper, glass, cans & food) 2 x 26t split body RCV 30/70 split (plastic/card) | 3 x 26t RCV 1 x 15t | Green week: 4 x 6.5t Link Tip Blue week: pod on kerbsider | 4 x 26t RCV 1 x 15t RCV | 24t RCV for trade waste provides support to refuse and garden as required 18t vehicle as spare |
| Volume of Vehicle | Kerbsider: 28 m ³ Split body: 21 m ³ Stillage: 10 m ³ | 26 t – 22m ³ 15 t – 15 m ³ | Link Tip: 4 m ³ | 26 t – 22m ³ 15 t – 15 m ³ | Estimated volumes based on payload data provided. |
| Maximum vehicle payload (kg) | Split RCV: 9,940 Kerbsider: 6,720 Stillage: 3,120 | 26t – 10,900 15t – 4,100 | 6.5t – 1,900 | 26t – 10,900 15t – 4,100 | |
| Average maximum | Split RCV: 5,000 | | | | |

| Term | Dry | Garden | Food | Refuse | NOTES |
|---|--|--------|--|--------|---|
| actual payload (kg) | Kerbsider: 6,000 Stillage: 2,800 | | | | |
| Are slave bins used? | Yes for cardboard (7 bags per slave) | No | Yes for green week (15 caddies per slave) | No | |
| Time Assumptions | | | | | |
| Average distance driven per vehicle each week (miles) | Kerbsider – 166 Split RCV - 164 | 202 | 207 | 208 | Used for the calculation of fuel costs Based on data in RouteSmart summaries |
| Average time taken to drive from starting depot to beginning of round. | Kerbsider - 17 min Split RCV – 15 min | 15 min | 15 min | 15 min | Based on data in RouteSmart summaries |
| Average time taken to drive from round to unloading point (one- way) | Kerbsider 17 min Split RCV 15 min | 15 min | 15 min | 15 min | Based on data in RouteSmart summaries |
| Average time taken to unload | 20 min | 10 min | 10 min | 20 min | This is an average time between arriving at the treatment facility and leaving the facility. This includes waiting time. |
| Average time taken to drive from unloading point to the finish depot | 5 min (same location) | 20 min | 20 min | 20 min | |
| Average hours worked by each collection crew per day | Split RCV - 7:40 Kerbsiders – 9:25 | 7:00 | 7:10 | 7:38 | This is the time from leaving the depot in the morning and returning after the final unloading in the afternoon. Based on data in RouteSmart summaries |
| Performance Assumptions | | | | | |

| Term | Dry | Garden | Food | Refuse | NOTES |
|----------------------------------|--|----------------------------|-----------------------------------|--------|---|
| Average set-out rate (%) | 60 – paper, glass, cans 70 – plastic & card | 90 (summer) 25 (winter) | 50 – green week 40 – blue week | 95 | Estimates: no surveys have been undertaken. |
| Average participation rate (%) | 70 | 90 | 50 | n/a | Estimates: no surveys have been undertaken. |
| Average % level of contamination | 0.5% | 1.0% | 0% | n/a | Non-suitable material collected by collection vehicle and carried on the round. |

Financial Assumptions

Note that the KAT model calculates and presents costs automatically. However the costs produced will not form part of the final report as NuL will transfer the operational requirements in to their own financial models. The costs that will be used in KAT are presented below for information only.

Table 16: Baseline Financial Assumptions

| Term | Dry | Garden | Food | Refuse | NOTES |
|---|---|---|--|---|--------------------------------------|
| Containers | | | | | |
| Average unit cost for kerbside container | Blue Box – £2.10 Reusable bag – £1.30 Single use bag – £0.055 (KAT default) | 240 l wheeled bin - £18.00 | Food caddy & bin - £2.50 | 180 l wheeled bin £17.50 | Assumes includes distribution costs. |
| Number and type of containers per household | Blue Box – tins / glass/ WEEE / batteries Green Reusable bag – cardboard Blue Reusable bag – Paper Red single use bag – Plastic (30 bags per year) | 240l brown lidded bin – garden waste only. Additional bins at £36 per year | 25l external caddy & 7l kitchen caddy Food Waste in plastic liner (not provided) | Standard policy is 180l bin 240l bin for families 6 or over. 75% of residents still have 240l and about 500 have 360l | |

| Term | Dry | Garden | Food | Refuse | NOTES |
|--|---|------------------------------------|-----------------------|----------------------------------|---|
| Annual container replacement rate (%) | Blue Box – 2500 (4.5%) Green Reusable bag – 3000 (5.5%) Blue Reusable bag – unknown: assume same as green bag Red single use bag – 30 liners per household | 1500 (3.1%) | 2000 (3.9%) | 3000 (5.5%) | Replacement due to loss or damage |
| Are containers bought outright or lease purchase? | Outright – supplied through contract | outright | outright | outright | |
| Vehicles | | | | | |
| Are vehicles typically bought outright, by lease purchase or hire? | Lease (through contract) | outright | outright | outright | |
| Purchase cost per vehicle | Kerbsider - £112,000 (KAT default) Split RCV - £150,000 Stillage - £38,000 (KAT default) | 26 t - £150,000 15 t - £130,000 | Link tip - £50,000 | 26t - £150,000 15t - £130,000 | |
| Depreciation period/planned lifespan (years) | 7 years | 7 years | 7 years | 7 years | If no financing cost included a straight line depreciation assumed. |
| Annual vehicle running costs per vehicle | Split RCV – 10% of capital costs Kerbsider - 7.5% of capital costs Stillage - 7.5% of capital costs | 10% of capital costs | 7.5% of capital costs | 10% of capital costs | The running costs include oil and maintenance. These are KAT default figures based on vehicle size. |

| Term | Dry | Garden | Food | Refuse | NOTES |
|---|---|--------|------|--------|--|
| Annual vehicle standing costs per vehicle | 5% of capital costs | | | | The standing costs include MOTs and Road Tax. These are KAT default figures based on vehicle size. |
| Fuel cost (£/litre) | £1.01 | | | | |
| Staff | | | | | |
| Driver unit cost | £28,250 | | | | Based on NuL budgets it reflects basic salary, NI, pension and selected on-costs. |
| Loader unit cost | £25,000 | | | | Based on NuL budgets it reflects basic salary, NI, pension and selected on-costs. |
| Supervision cost | 9% of the total crew costs (i.e. drivers + loaders) | | | | KAT default figure |
| Material | | | | | |
| Material income | Paper - £91.77 Glass - £12.50 Cans - £115.50 Card - £55.50 Plastic bottles - £40.50 | | | | |
| Gate fee | Garden waste - £25.14 Food - £56.58 | | | | |
| Recycling credit | £47.30 (3% annual increase) | | | | |
| Other | | | | | |
| Overheads cost | 12% of the total operating costs (i.e. labour, vehicle standing and running costs). | | | | This is KAT default figure |

4 Preferred Option Assumptions

All assumptions for garden waste and refuse collection services will remain the same as the baseline assumptions with the exception for the number of collection days in a week that will switch from four days to five days. Table 17 and Table 18 therefore show assumptions for dry recycling and food waste collection serviced. Sensitivities to be tested are also detailed. Participation, recognition and set-out rates are relative increases on the rates used in the baseline; they do not necessarily represent actual figures that will be obtained.

Operational Assumption

Table 17: Preferred option operational assumptions

| Term | Dry & food | Sensitivity | NOTES |
|--|---|---|--|
| Service Assumption | | | |
| Number of households served (street level) | 51,500 | | KAT will model service to these properties only. |
| Number of flats | 3,200 | | Properties served by bins. Separate round not considered by this exercise. |
| Collection frequency | Weekly | | |
| No. of collection days per week | 5 | | |
| Staff Assumptions | | | |
| Number of loaders | 50% of vehicles 1 loader 50% of vehicles 2 loaders | a) 100% vehicles with 2 loaders b) 75% vehicles with 2 loaders, 25% with 1 loader c) 25% vehicles with two loaders, 75% of vehicles with one loader | |
| Driver contribution to loading. | 10% with two loaders 25% with one loader | | |
| Vehicle Assumptions | | | |

| Term | Dry & food | Sensitivity | NOTES |
|--|---|--------------------------|--|
| Vehicle | Resource Recovery Vehicle (RRV) Stream 1 – Paper Stream 2 – Card Stream 3 – Glass Stream 4 – Cans & plastic Stream 5 – food Stream 6 – Textiles, small WEEE | | |
| Volume of Vehicle | 32 m ³ | | Based on Romaquip vehicle |
| Maximum vehicle payload (kg) | 4,000 | | Based on Romaquip vehicle |
| Time Assumptions | | | |
| Average distance driven per vehicle each week (miles) | 120 | | Used for the calculation of fuel costs. |
| Average time taken to drive from starting depot to beginning of round. | 15 min | | Assumes similar to existing services |
| Average time taken to drive from round to unloading point (one-way) | 15 min | | Assumes similar to existing services |
| Average time taken to unload | 20 min | 30 minutes 40 minutes | This is an average time between arriving at the treatment facility and leaving the facility. This includes waiting time. |
| Average time taken to drive from unloading point to the finish depot | 5 min (same location) | | |

| Term | Dry & food | | Sensitivity | NOTES |
|--|--|---|--|---|
| Average hours worked by each collection crew per day | 6:30 | | 7:00 hours | This is the time from leaving the depot in the morning and returning after the final unloading in the afternoon. |
| Performance Assumptions | | | | |
| Overall dry yield | 167 kg/hh/yr (dry only) 55 kg/hh/yr (food) | | 180 kg/hh/yr (dry) 190 kg/hh/yr (dry) | Higher figures represent higher and top performing similar authorities. Based on benchmarking |
| Average participation rate (%) | Dry 10% increase on existing rates for dry recycling = 77% | Food 5 percentage point increase in participation for food waste = 55% | Recognition and participation will be adjusted to produce higher yields shown above. | Based on benchmarking work. 5% increase due to frequency change 5% increase due to new scheme introduction. |
| Average recognition (%) | 5% increase on existing rates for each dry material (See Section 3 for existing rates) | | | Increase due to frequency change. |
| Average set-out rate (%) | As existing service | | +10% +20% | |
| Average % level of contamination | 0.1% | | | Non-suitable material collected and carried on the round. |

Financial Assumptions

Note that the KAT model will be used to review costs for the sensitivity analysis as they are automatically calculated and presented in KAT. However the costs produced will not form part of the final report as NuL will transfer the operational requirements in to their own financial models. The costs that will be used in KAT are presented below for information only.

Table 18: Preferred option financial assumptions

| Term | Dry | Sensitivity | NOTES |
|--|--|-------------|---|
| Containers | | | |
| Average unit cost for kerbside container | Blue Box – £2.10 Single use bag – £0.055 (KAT default) | | Assumes includes distribution costs. |
| Number and type of containers per household | Box 1 – paper & card Box 2 – glass Box 3 – cans & plastic Kitchen bin – food User supplied bags – textiles, small WEEE | | |
| Annual container replacement rate (%) | Boxes – 4.5% Kitchen bins - 3.9% | | Based on existing rates |
| Are containers bought outright or lease purchase? | Outright | | |
| Vehicles | | | |
| Vehicles bought outright, by lease purchase or hire? | Outright | | |
| Purchase cost per vehicle | £110,000 | | NuL estimate |
| Depreciation period/planned lifespan (years) | 7 years | | If no financing cost included a straight line depreciation assumed. |
| Annual vehicle running costs per vehicle | £5,000 | | Based on figures provided by Conwy |
| Annual vehicle standing costs per vehicle | £1,600 | | Based on figures provided by Conwy |
| Fuel cost (£/litre) | £1.01 | | |

| Term | Dry | Sensitivity | NOTES |
|------------------|---|-------------|---|
| Staff | | | |
| Driver unit cost | £28,250 | | |
| Loader unit cost | £25,000 | | |
| Supervision cost | 9% of total driver & loader costs | | KAT default |
| Material | | | |
| Material income | Paper - £91.77 Glass - £12.50 Cans - £115.50 Card - £55.50 Plastic bottles - £40.50 | To follow | Variations in material income for the sensitivity will be based on benchmarking |
| Gate fee | Garden waste - £25.14 Food - £56.58 | To follow | Variations in material income for the sensitivity will be based based on benchmarking |
| Recycling credit | £47.30 (3% annual increase) | | |
| Other | | | |
| Overheads cost | 12% of the total operating costs (i.e. labour, vehicle standing and running costs). | | KAT default |

www.wrap.org.uk/

**Waste & Resources
Action Programme**

The Old Academy
21 Horse Fair
Banbury, Oxon
OX16 0AH

Tel: 01295 819 900
Fax: 01295 819 911
E-mail: info@wrap.org.uk

Helpline freephone
0808 100 2040