

Further Collections Options Modelling Report

North West Leicestershire
District Council

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Report For

North West Leicestershire District Council

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1.0 Introduction and Background

North West Leicestershire District Council ('NWLDC' or 'the Council') currently run an In-House waste collection and street cleansing service. The authority is currently considering which future potential waste collection methodologies are most suitable going forwards. Eunomia Research & Consulting Ltd ('Eunomia') was commissioned by NWLDC to undertake detailed modelling of possible collection methodologies. As such, this report examines the comparative costs associated with each of the collection methodologies.

In 2023 Eunomia modelled 12 collection options. The project concluded that when the collection options are considered, it appears that NWLDC runs an effective and efficient waste collection service. The report noted that whilst there is scope to improve upon the collection system (namely introducing food waste), major changes may not provide drastic benefits. This having been said, it appears that members prefer the future use of either Quatro bins, stackable boxes, or wheeled bins – all of which would necessitate a service change.

This project builds on the previous report to determine the preferred container solution prior to making any changes to the collection methodology.

1.1 Developments Since The 2023 Report

1.1.1 The Collection of Food Waste

In August 2024 NWLDC members made the decision to introduce the separate collection of food waste. The introduction of a food waste collection service was originally within scope of this project and hence considered in the cost modelling of each of the options. As the Council has now made the decision to introduce the separate collection of food waste, it was agreed that the food waste collection service should no longer be considered and has since been removed from the cost modelling of each of the options. For the avoidance of doubt however, consideration of the food waste service has not been removed from the qualitative assessment (Section 3.0). The reason for this is that the qualitative assessment was undertaken by NWLDC officers and moderated prior to the formal decision to introduce food waste. Eunomia did not want to amend the moderated scores of the NWLDC officers unilaterally.

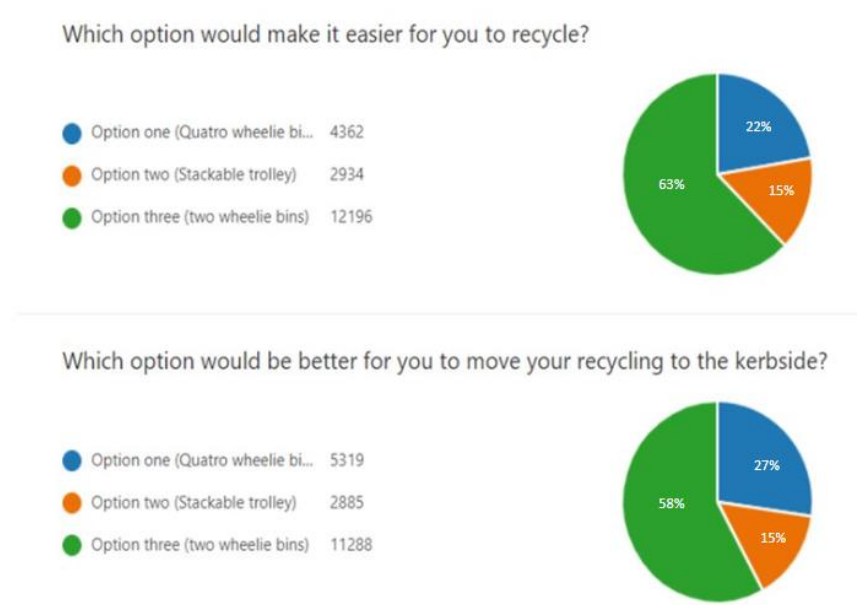
1.1.2 A Summary of The Residents Container Survey

Since the 2023 report Eunomia was commissioned to undertake for the Council, the Council has run a survey asking residents to provide their views on the three recycling container options (Quatro bins, stackable boxes and wheeled bins). The survey ran from Monday 14th February until Sunday 14th April 2024. Residents were also encouraged to write to the Council via a council tax leaflet. In total, nearly ~20,000 residents responded to the survey, which represents a significant proportion of the population and shows that this topic is of great interest to residents.

Of the written responses residents seemed to prefer the Quatro bin and two wheeled bins - each being the most preferred option by 40% of the respondents (there were 15 written responses in total).

On the other hand, two wheeled bins was the most preferred option by online respondents when asked 'which option would make it easier for you to recycle' and 'which option would be better for you to move your recycling to the kerbside'. In the online survey 63% of respondents said that the two wheeled bin would make it easier for them to recycle, and 58% said that it would also be better for them to move their recycling to the kerbside. A breakdown of the responses from the online survey can be found in Figure 1-1.

Figure 1-1: Responses from Online Survey



1.2 Options Modelled

The four options which were modelled as part of this project can be found in Table 1-1.

Table 1-1: Future Options Modelled - Overview

Option 1: Two Stackable Trolleys		Option 2: Quatro Bins	
			
Option 3: Two Wheeled Bins (Fibres and Containers)		Option 4: One Wheeled Bin (Comingled)	
			

The fourth option was included due to feedback from residents during the resident survey, where residents queried why a comingled option was not being considered. However, currently under the Environment Act this comingled option would not be compliant. More information and detail on each of the options modelled can be found in Section 2.2 and further consideration of the Environment Act implications are provided in Sections 5.1.

The report is broken into the following sections:

- Section 2.0 outlines the detailed collections options modelling that was undertaken to understand the potential benefits and pitfalls of different collection methodologies. This includes the financial results of the modelling.
- Section 3.0 outlines the overall quantitative and qualitative assessment undertaken of each of the collection options assessed, focussing upon a range of assessment criteria. This results in an overall 'score' for each of the collection options, with this approach being based on Eunomia's extensive public procurement experience.
- Section 4.0 summarises the pros and cons of two of the preferred options.
- Section 5.0 outlines the key service change considerations and timeline.
- Section 6.0 summarises the key findings from this report.

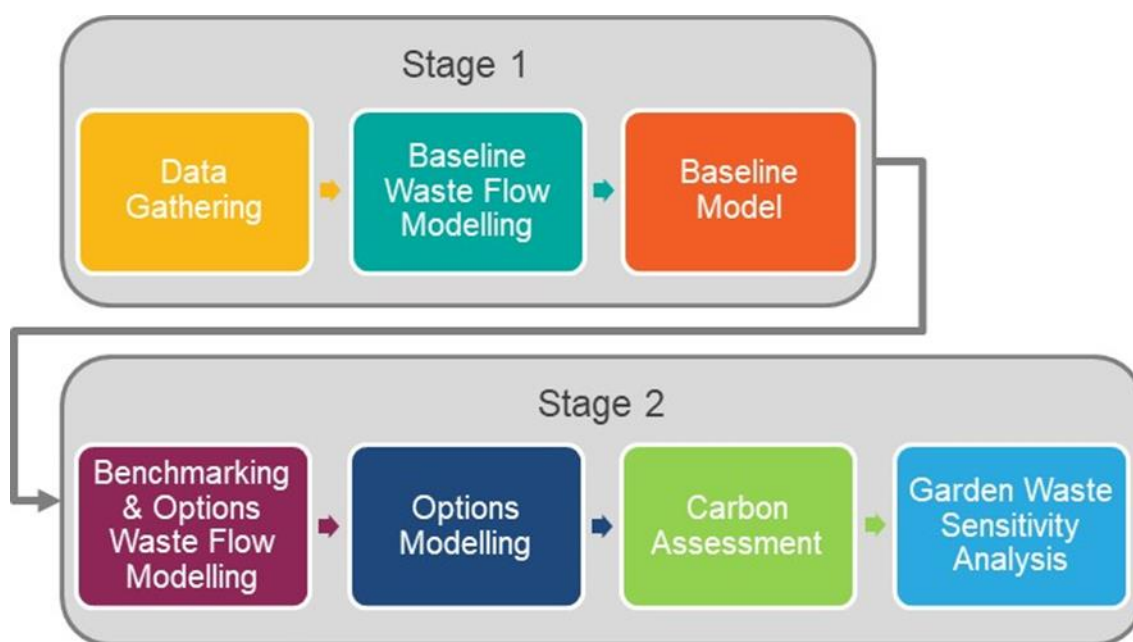
2.0 Collection Options Modelling

This section of the report details the approach taken and the results of the collection options modelling work. The modelling seeks to quantify the relative costs of each option compared to a baseline scenario in which the current collection system remains (but sees a new fleet being purchased).

2.1 Methodology

This section of the report provides a summary of the scope and approach taken by Eunomia (outlined in Figure 2-1) to model the future collection options and sensitivities for NWLDC.

Figure 2-1: Overview of Approach to Collection Options Modelling



2.1.1 Stage 1 – Baseline Modelling

Data gathering: Details on the data used and the key modelling assumptions applied in the baseline model are provided in the Appendix A.1.0.

Baseline waste flow modelling: Using data provided by NWLDC and existing WasteDataFlow data held by Eunomia it was possible to build a waste flow model for NWLDC for the years 2021/22; the latest year for which comprehensive data was available. It is necessary to generate an accurate waste flow model that reflects the waste arisings in each waste stream around type accurately, so that the resource modelling appropriately reflects the current waste collection service design.

Using the data provided, it was possible to determine the tonnages generated by households (100,591 tonnes) broken down into residual, dry recycling, garden and food waste. In addition to this, residual waste and co-mingled plastic compositions were provided by NWLDC. These compositions were assumed the same across all property types.

Baseline model: A 'baseline' model was designed to represent the current service as closely as possible. Authority-specific inputs to the model include information on geography, number and type of households, current services and service performance, resources, and waste composition. These inputs were calibrated using known outputs (which in modelling terms includes the numbers of crew and vehicles used to deliver the collection services) as well as factors such as productivity, pass rates, and set out rates (where known). The baseline model accurately reflects:

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

2.1.2 Stage 2 – Alternative Collection Options Modelling

Benchmarking: The current service was benchmarked against similar authorities to provide context on how NWLDC currently performs. The likely performance of each alternative scheme is then driven by data available from comparable authorities. The outputs from this analysis provided the basis for predicting the waste flow changes for each option. This is summarised in the Appendix A.1.0.

Waste flow modelling: Using the waste flow model developed in Stage 1, waste flow scenarios could be created for each of the alternative options. The changes to food waste, dry recycling and residual waste yields witnessed when comparable authorities made the equivalent changes were applied to standard access properties to produce revised yields.

Options modelling: Eunomia's 'Hermes' collection model has been used to calculate the performance and costs associated with future collection options and scheme configurations.

The modelling does not include the following costs, as these are influenced heavily by implementation methodology decisions which NWLDC would need to make for each option and there is no industry standard way of undertaking these activities:

- Transition/implementation costs for service changes, including bin delivery/exchange.
- Household communication costs, both on-going and in relation to service changes.
- Spare vehicles, overheads (supervision and management) or back-office staff.

2.2 Collection Options Modelled

2.2.1 Baseline Service

The current service operated by NWLDC for standard access rounds is outlined in Figure 2-2. A breakdown of the service is as follows:

- Fortnightly residual waste collections from 240-litre wheeled bins using 26t Refuse Collection Vehicles (RCVs).
- Fortnightly multi-stream dry recycling collections of paper, glass, and plastics and metals. Materials are presented separately using a combination of bags and 55-litre boxes. Dry recycling is collected using side kerbsiders, which are depicted in Figure 2-3.
- Fortnightly card and garden waste collections collected using split-back (70/30) RCVs. Card is collected in the smaller compartment and garden waste in the larger compartment.
- There is currently a weekly separate food waste trial to 4,155 households using 7.5t RCVs.

Communal properties are co-collected on the same round as standard access properties.

Rural properties' waste is collected together on a separate round using a 70/30 split-back RCV with a pod. In week 1, residual, cardboard and glass are collected together (residual in the large compartment and glass in the pod) and in week 2, garden waste, plastics and cans, and paper are collected together (garden waste in the large compartment and paper in the pod).

Figure 2-2: Current Service

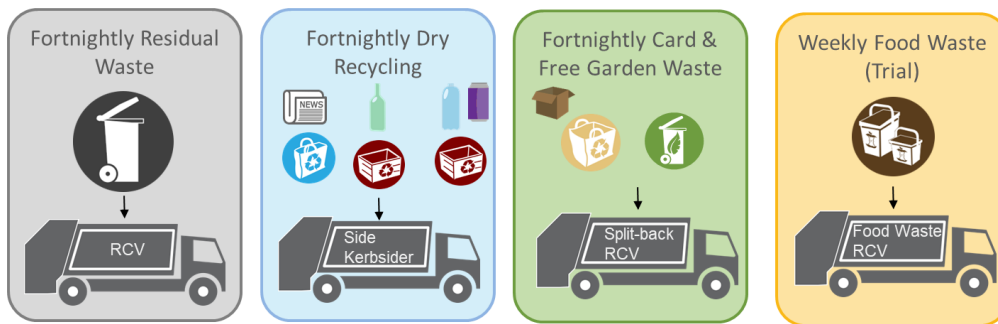


Figure 2-3: Side Kerbsider used by NWLDC



2.2.2 Future Options Modelled

As mentioned in Section 1.2 four options were modelled. This included:

- **Option 1: Two stackable trollies** collected fortnightly on a RRV;
- **Option 2: Quatro bins** collected fortnightly using Quatro recycling;
- **Option 3: Two wheeled bins** collected fortnightly using a splitback RCV; and
- **Option 4: One wheeled comingled bin** collected fortnightly using a single-chamber RCV.

With regard to Option 4, the council should carefully consider the legislative uncertainty surrounding whether this option will be compliant with existing legislation. This is explored further in Section 5.1.

2.2.3 Key Considerations

Several considerations were identified as key aspects that could impact the results of the cost modelling. This included:

- the cost of the containers;
- the implementation of a Deposit Return Scheme (DRS);
- the Simpler Recycling proposals;

- the availability of capital funding for food waste collections;
- the availability of revenue funding for food waste collections; and
- the percentage of contamination and recycling.

More information on how each of these key aspects could impact the results of the cost modelling can be found below in Table 2-1.

Table 2-1: Modelling Considerations

Consideration	Option 1: Two Stackable Trolleys	Option 2: Quatro Bins	Option 3: Two Wheeled Bins (Fibres and Containers)	Option 4: One Wheeled Bin (Comingled)
Cost of Containers	More expensive than wheeled bins, however cheaper than Quatros.	Most expensive container option	Second cheapest container option	Cheapest container option
Impact of the Deposit Return Scheme (DRS)	The DRS will remove a large amount of recyclable materials from the Council's waste streams (recycling and residual waste). This results in a loss of material income from high-valuable items e.g. aluminium cans.			
Simpler Recycling	<ul style="list-style-type: none">- Additional materials will need to be collected at the kerbside e.g. plastic film and cartons (carton trial underway).- Mandatory food waste collections (food trial underway).- Stipulations on the type of recycling collections and indication of minimum residual waste collection frequencies.			It is unknown if the new government will write Simple Recycling into legislation. Without doing so, comingled is not compliant as of March 2026. More detail on this in Section 5.1.
Contamination & Recycling %	Lowest contamination rate.	Joint highest contamination rate.	Joint highest contamination rate.	Joint highest contamination rate.

2.3 Collection Option Results

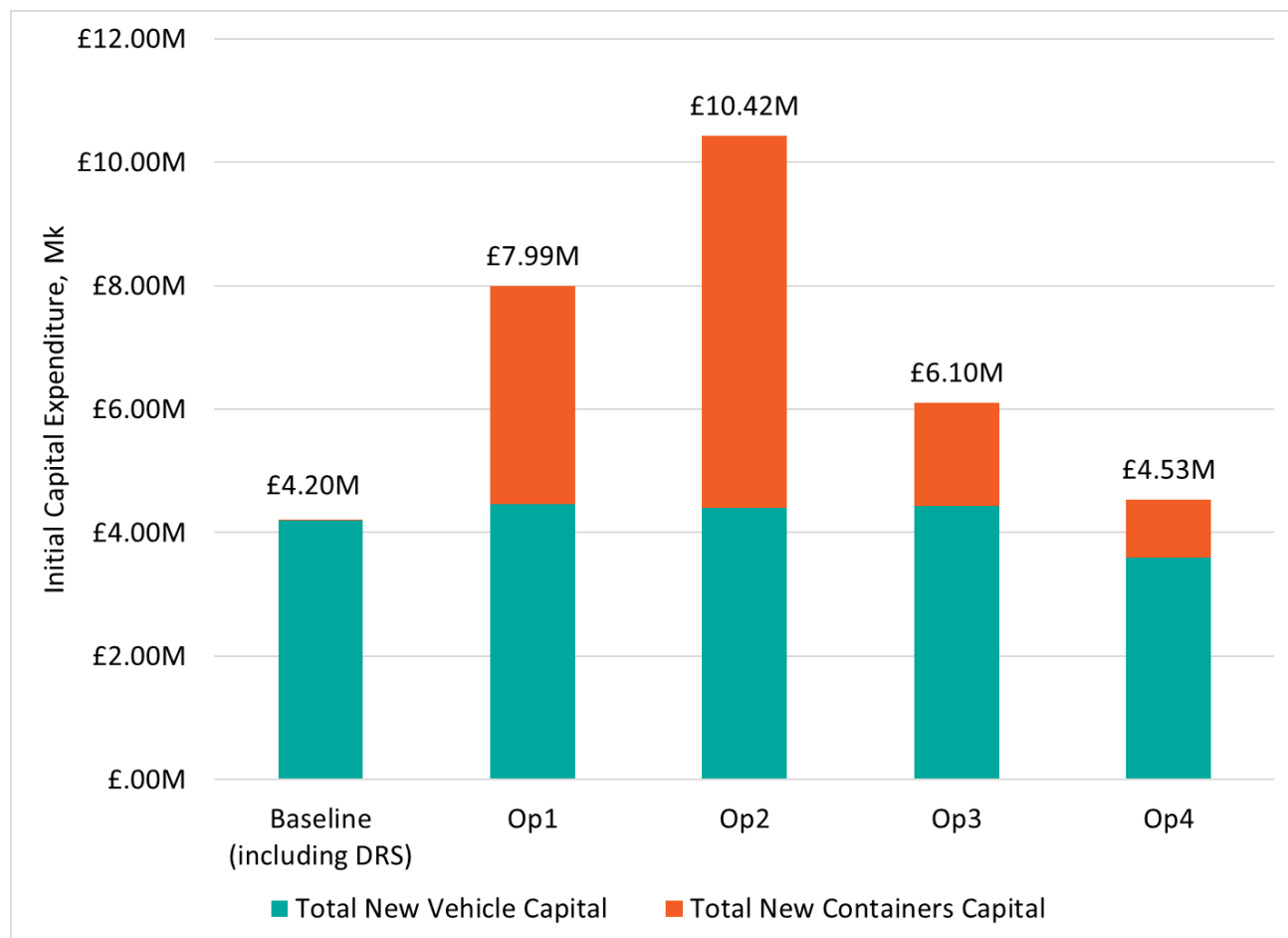
2.3.1 Capital Costs

A summary of the capital costs of each option are presented in Table 2-2, and a detailed breakdown can be found in Figure 2-4. Capital costs include total new vehicle capital and total new container capital expenditure. Vehicle capital and container capital costs have not been annualised as it is expected that NWLDC would purchase these assets vehicles via outright purchase. The baseline carries capital expenditure to represent a replacement of the current fleet.

Table 2-2: Capital Costs Summary

	Baseline Incl. DRS	Option 1 Two Stackable Trollies	Option 2 Quatro Bins	Option 3 Two Wheeled Bins (Fibres and Containers)	Option 4 One Wheeled Bin (Comingled)
Total Capital	£4.20m	£7.99m	£10.42m	£6.10m	£4.53
Marginal to Baseline, £k	-	£3.79m	£6.22m	£1.9m	£0.33m
Rank	1	4	5	3	2

Figure 2-4: Capital Costs Detailed Breakdown



As the current fleet needs replacing, capital expenditure is required across all options. The baseline option is the cheapest since new containers are not required. In future options, Option 2 is the most expensive, largely due to its container costs. The two wheeled bin option (Option 3) lies in the middle, reflected by its rank of three. Generally, an increase in capital expenditure is driven by container purchase costs rather than new vehicle costs. One exception is the commingled option, which costs just £330k more compared to the baseline. This is because there are savings in the vehicle purchasing costs, since only 26T RCVs are needed. These are cheaper than other vehicles, e.g. splitback RCVs and Quatro vehicles.

2.3.2 Annual Revenue

A summary of the annual revenue costs for each option are detailed in Table 2-3 and Figure 2-5. A detailed breakdown of these costs is included in the Appendix 0. These costs include the following:

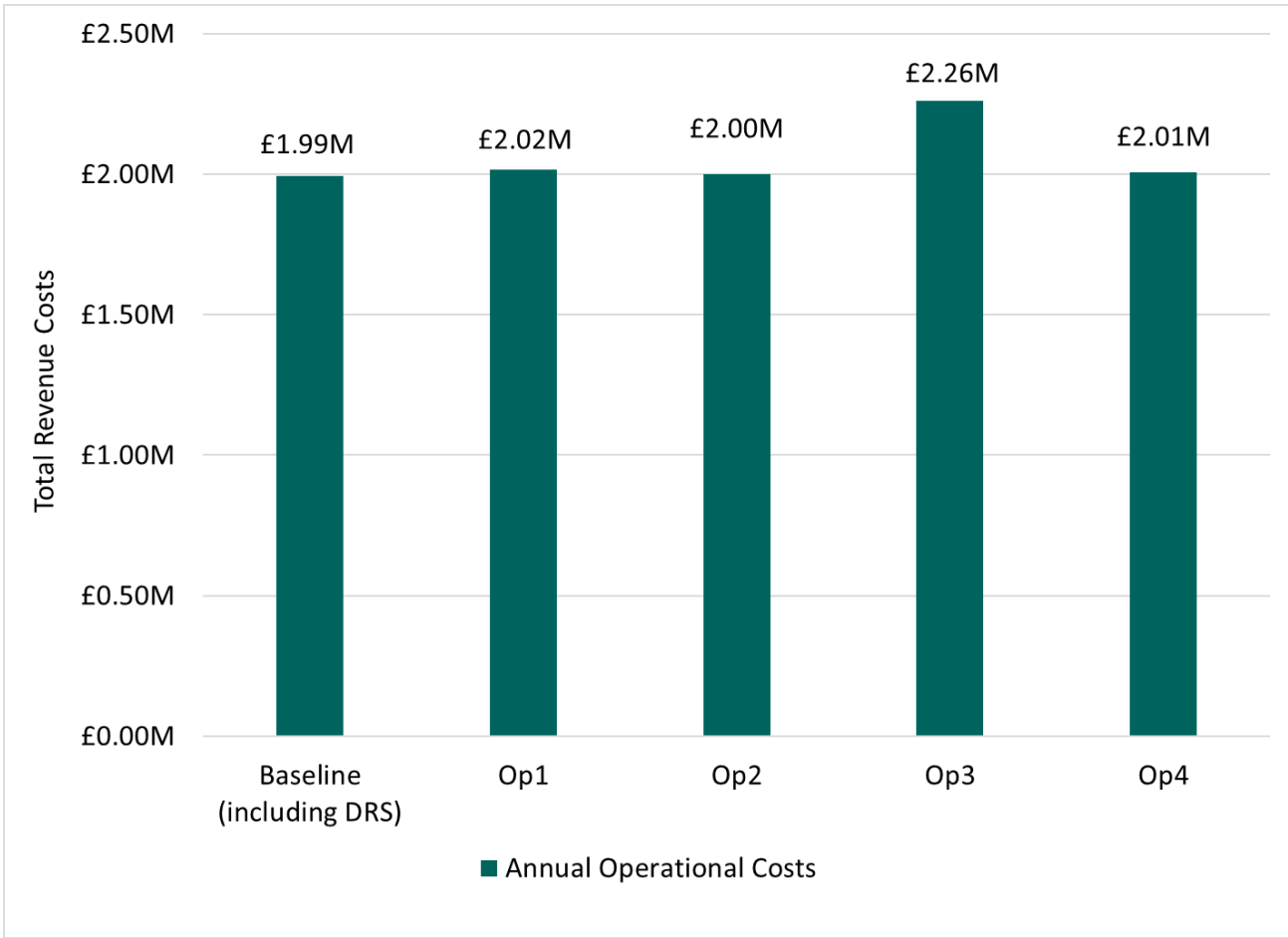
- Vehicle running costs;
- Container replacement costs;
- Staff costs;
- Income from food waste treatment credits;
- Income for sales of dry recycling materials;

- Garden waste income from additional containers; and,
- WTS operation costs (FTE and plant).

Table 2-3: Annual Revenue Costs Summary

	Baseline Incl. DRS	Option 1 Two Stackable Trollies	Option 2 Quatro Bins	Option 3 Two Wheeled Bins (Fibres and Containers)	Option 4 One Wheeled Bin (Comingled)
Total Capital	£1.99m	£2.02m	£2.00m	£2.26m	£2.01m
Marginal to Baseline, £k	-	£0.03m	£0.01m	£0.27m	£0.02m
Rank	1	4	2	5	3

Figure 2-5: Annual Revenue Costs



There are two main factors which reduce revenue cost:

- Fewer vehicles, which in turn means less staff; and
- More material separation.

Annual revenue costs are similar for all options. The clear outlier in terms of revenue cost is Option 3. Due to the reduced material separation for twin stream collections, dry recycling income decreases. This results in the higher annual revenue cost. Interestingly, the reduced material separation and dry recycling income also occurs for the commingled option, but it is offset by the lower number of vehicles.

2.3.3 Combined Costs

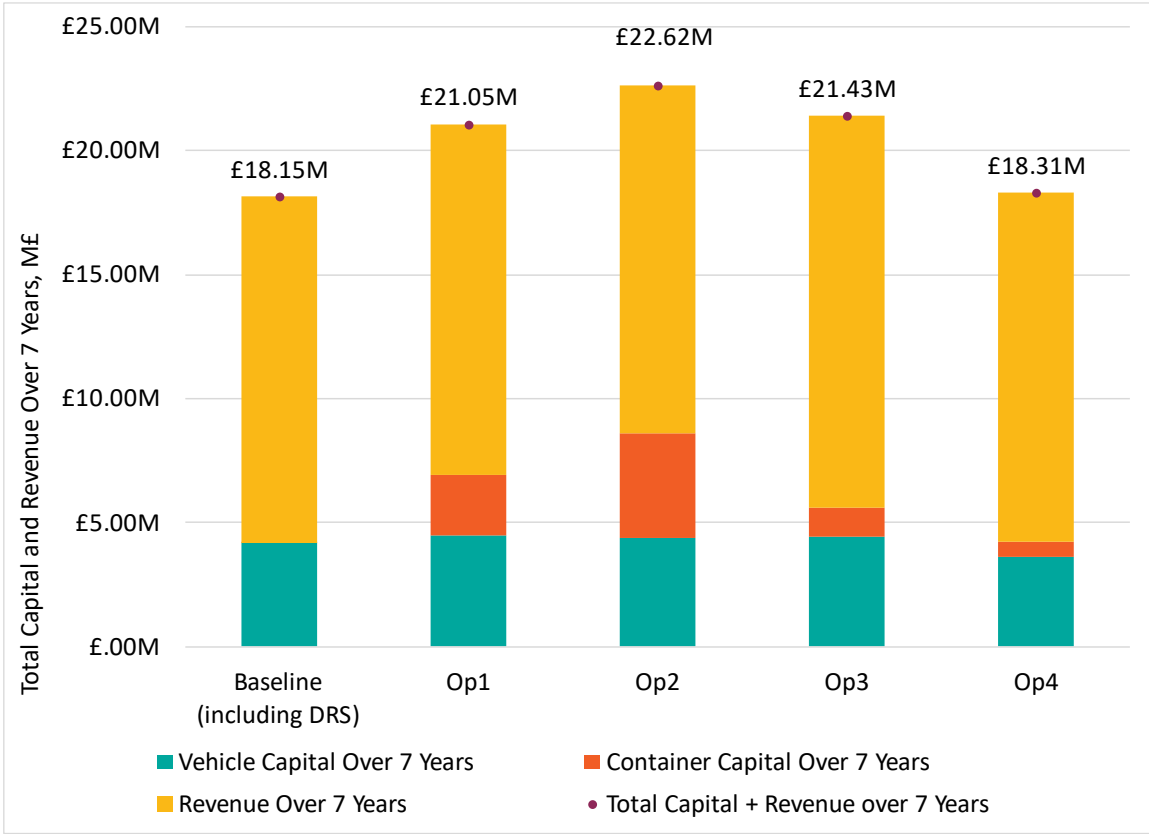
A summary of the combined costs of each option over 7 years can be found in Table 2-4, and detailed breakdown can be found in Figure 2-6. For clarity, these costs cover the following:

- All vehicle capital purchases which are made in year one. It is assumed that there is no replacement of vehicles within this time frame.
- 7 years of container purchase capital costs. The purchase cost of containers has been annualised over 10 years, with 7 years of annualised costs included here.
- 7 years of annual revenue costs, as detailed in Section 2.3.2.

Table 2-4: Total Costs Over Seven Years Summary

	Baseline Incl. DRS	Option 1 Two Stackable Trollies	Option 2 Quatro Bins	Option 3 Two Wheeled Bins (Fibres and Containers)	Option 4 One Wheeled Bin (Comingled)
Total Capital	£18.15m	£21.05m	£22.62m	£21.43m	£18.31m
Marginal to Baseline, £k	-	£2.90m	£4.47m	£3.28m	£0.16m
Rank	1	3	5	4	2

Figure 2-6: Combined Costs Over Seven Years



All the future options are more expensive than the baseline. The commingled option (Option 4) is similar to the baseline, costing just £150k more. Due to the significant cost for new Quatro containers, Option 2 is the least economical. The two wheeled bin option (Option 3) has higher revenue cost but lower container capital over seven years, whereas the opposite happens for kerbside sort. Option 1 and 2 are subject to material sales fluctuations, which are external factors, whilst Options 3 and 4 are not subject to this price fluctuation as all material income has been taken away from these options.

3.0 Quantitative and Qualitative Assessment

Recognising that there are wider considerations other than simply cost, such as recycling and carbon performance associated with the options, a holistic qualitative and quantitative assessment was carried out on the options to give due consideration to these aspects. Eunomia assessed each option against a range of qualitative and quantitative criteria which each had an associated weighting. This section of the report presents the results of the quantitative and qualitative analysis undertaken for each option. This approach is based upon Eunomia's extensive experience of undertaking public procurements and returns an overall 'score' for each option.

The criteria and weighting selected within the context of this project can be found in Table 3-1 and were agreed and approved by the Council.

Table 3-1: Scoring Criteria

Quantitative	%
CAPEX Cost Change	8.5%
OPEX Cost Change	16.5%
Impact on Recycling Rate	10.0%
Climate Change Impact	10.0%
Social value - local job creation	5.0%
Public Acceptability	10.0%
Total Quantitative	60%
Qualitative	Weighting
Implementation Risk (mobilisation and first three months following the service change)	12.5%
Deliverability	7.5%
Impact upon the Workforce	5.0%
Operational Risk (post the initial 3-months after the service change)	5.0%
Flexibility and Opportunities (inc. performance and innovation)	10.0%
Total Qualitative	40%
Total	100%

For each category, the changes associated with the modelled options were scored. These scores were weighted for each of the criteria listed above and summed. This resulted in a quantitative score and a qualitative score, as well as an overall score for each option. The results of the quantitative and qualitative assessment can be found in Table 3-2. In addition, the detailed assessment model can be found in Appendix xxx.

It should be noted that this assessment was carried out when food waste was a consideration. Some scores and assessment may have therefore taken into account the addition of a food waste collection service. Eunomia has not amended the qualitative scores since the moderation session as we did not want to unilaterally alter the agreed Council stance.

Table 3-2: Assessment Results

	Option 1	Option 2	Option 3	Option 4
Option	Two Stackable Trollies	Quatro	Two Wheeled Bins	Comingled
Quantitative Score	31%	36%	38%	41%
Qualitative Score	20%	12%	26%	26%
Total	51%	48%	64%	66%

Key findings: As a result of this assessment, Option 3 and Option 4 appear the most favourable options for NWLDC's consideration.

However, there are concerns regarding whether Option 4 complies with legislation.

4.0 Pros and Cons of The Preferred Options

As found by the quantitative and qualitative assessment in Section 0, Options 3 and 4 appear to be the most favourable options for NWLDC to consider. To support the Council in reaching a decision, this section explores the pros and cons of Options 3 and 4, a summary of which can be found in Table 4-1.

Table 4-1: Pros and Cons of Option Three and Four

	Positive	Negative
Option 3: Two Wheeled Bins	<ul style="list-style-type: none"> • Use of fairly standard vehicles – fleet resilience • Flexibility of service and accommodating future changes • Manual handling benefits for staff (alongside training) 	<ul style="list-style-type: none"> • Requirement for multiple containers • Procurement of substantial number of vehicles & lead times • Potentially difficult negotiation with county • Second most expensive option. • Loss of material income • Loss of control with regards to recycling with LCC determining where the recycling is taken.
Option Four: Comingled	<ul style="list-style-type: none"> • Ease of system from a resident and crew perspective • Use of very standard vehicles – fleet resilience • Cheapest option • Manual handling benefits for staff (alongside training) 	<ul style="list-style-type: none"> • Loss of material income • Procurement of substantial number of vehicles & lead times • Potentially difficult negotiation with county • Less flexible service for future changes • Possibly more assisted collections due to weight of bins • Loss of control with regards to recycling with LCC determining where the recycling is taken. • <u>Questions regarding the compliance with legislation</u>

5.0 Service Change Considerations and Timeline

Recycling and waste collection services (alongside street cleansing) tend to be the only service(s) that every resident in a district regularly uses. Hence, changing the way recycling and waste is collected and managed requires serious consideration by the Council given the political and operational complexities involved. In this section we have outlined the key consideration that should be reflected on by the Council, and a high-level timeline indicating when key activities should be undertaken.

5.1 Important Considerations

Below we have highlight two key considerations that the Council should bear in mind when making any future service changes.

5.1.1 Leicestershire County Council's Disposal Contract

NWLDC is currently in a favourable position with regards to material sales from their existing collection system. At present, the separate collection of materials provides an income to the Council, and this subsequently presents a zero-cost position to Leicestershire County Council ('LCC') who are the disposal authority. Should NWLDC wish to move away from their existing collection system, this would require an amendment to the Council's contract with LCC, which currently has a two-year break clause should LCC wish to enforce that.

Eunomia understands that NWLDC has had informal discussions with LCC on this matter and to date, the response has been favourable. LCC has indicated that they would be willing to allow a break period which is shorter than the two-year maximum timeframe and raised no significant concerns about the possible change to the collection system. During this discussion, LCC advised NWLDC that entering the material sales market as an individual council may not prove beneficial, and they would be better served by allowing LCC to process their materials as part of their existing contracts which would be done at no cost to NWLDC. This is for a number of reasons, including, but not limited to:

- LCC advised there is little money to be made by NWLDC as the markets can be very volatile. Additionally, LCC advised that due to NWLDC's size, they would not be able to leverage as beneficial prices LCC.
- Contracts would need to be negotiated and NWLDC would need to factor in management time and costs for the contracts (though it should be noted that NWLDC currently manages the material sales for the recyclable collected).
- The depot is not set up to handle the management of the waste.

In their discussions with NWDLC, LCC verbally stated that they do not mind which option NWLDC decides to progress with. However, it is worth noting that by agreeing to LCC processing the Council's materials, there is a risk that the disposal point may change in the future. LCC would be in a position to dictate to the Council where they must take materials, which could have a material impact upon the resourcing requirements should the alternative disposal location be further away. The Council has had no formal response from LCC, so there is the risk that they could reconsider their stance.

5.1.2 Legislative Uncertainty

Section 57 of the Environment Act requires that, from 1st April 2026, councils should prioritise source separation of dry recycling, subject to a test of practicability. This means that currently, under the

Environment Act, Option 4 would not be compliant. There is also the risk that Option 3 may not be compliant depending on how strictly the government enforces the Act, though we would note that this option does separate fibres from glass, which is shown to protect the quality of material collected, which the Act is looking to achieve.

Under the Act, Ministers may make regulations to create an exemption to the requirement to separate certain materials *"if satisfied that doing so will not significantly reduce the potential for recyclable household waste or recyclable relevant waste in those waste streams to be recycled or composted."*

In line with this Ministerial discretion, the previous government indicated that it proposed to use the ministerial power to create an exemption to allow *"the co-collection of any combination of recyclable plastic, glass, metal, and paper and card together in one bin in all circumstances, without the need for a written assessment"*; and to allow *"food and garden waste to be co-collected in one bin from households and non-household municipal premises"*. This was proposed under Simpler Recycling¹.

The regulations to create the exemption have not yet been made, and for the exemption to take effect, they would need to be made by the new government. There has been no announcement to indicate whether the new government proposes to take forward the proposed exemptions or not. Until the new government has made its position clear, there is a risk that it takes a different view from its predecessor and decides not to create the proposed exemptions. If the new government does not create the proposed exemption for dry recycling, an authority deciding to move to a comingled recycling system now may find that, when it next reviews its system, it will need to switch to a different, more source separated model in order to comply with the Environment Act. This is a large risk for NWLDC and should be an important consideration when making any decision – especially when considering the introduction of comingled recycling (Option 4). Twin stream recycling (Option 3) still has an element of separation between materials; however, it still does not comply with the separation required outlined under the Environment Act.

An element which also feeds into this decision is the 2026 deadline. Should NWLDC commit to a course of introduction comingled collections prior to this, or even transition to this new system beforehand, an argument may be able to be made that changing back would not then be practicable. However, this may not protect NWLDC from future changes, for example when a new fleet needs to be purchased.

5.1.3 Vehicle and Container Procurement

The Council should also note that within the next few years (when the Council will be progressing the service change implementation project), there will be an increase in the number of councils carrying out service changes focussed on the introduction of a food waste service – as a result of government legislation. Due to this, the length of time needed to procure containers and vehicle is anticipated to be longer than normally required. The Council should also note that if Option 2 is taken forward then the length of time required for container procurement may be slightly longer as only one company – Quatro – currently manufactures these containers.

5.2 Timeline

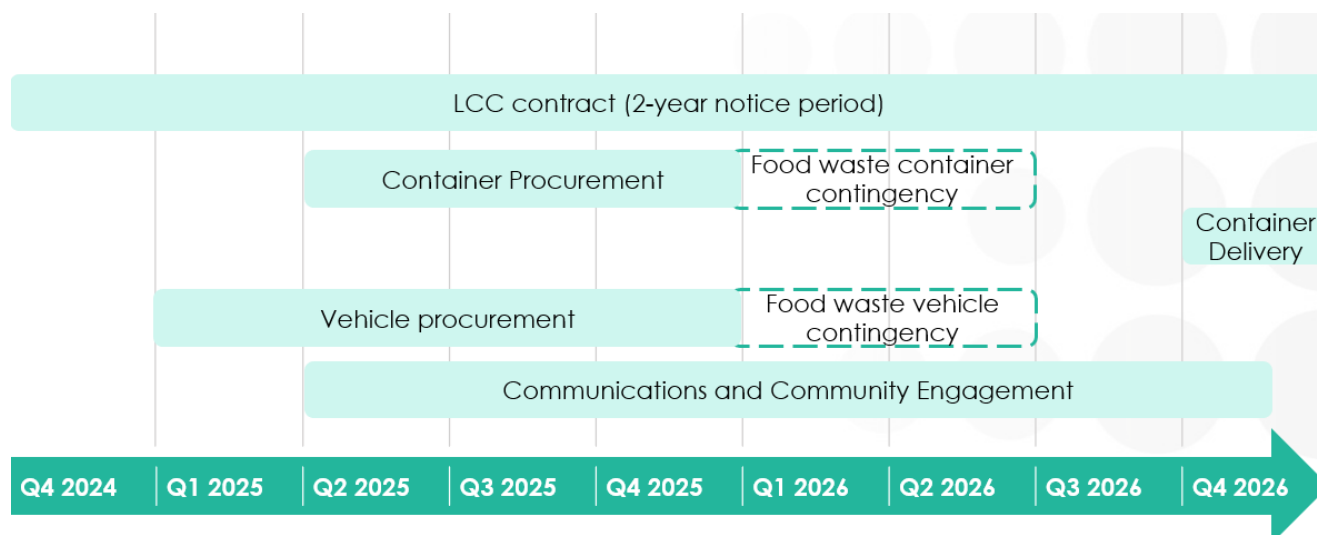
An indicative timeline for any service change is outlined below in Figure 5-1. This timeline considers the following key considerations (the majority of which are discussed in detail in Section 5.1):

- Leicestershire County Council's two-year contract notice period;

¹ Simpler Recycling Consultation Outcome – Government Response. Available at: <https://www.gov.uk/government/consultations/exemptions-and-statutory-guidance-for-simpler-recycling-in-england/outcome/government-response>

- Container procurement;
- Vehicle procurement; and
- Communications and community engagement.

Figure 5-1: Service Change Timeline



The Council should also note that during this time period there may be an increase in the number of councils carrying out similar changes and hence the length of time needed to procure containers and vehicle may be slightly longer than anticipated. The Council should also note that if Option 2 is taken forward then the length of time required for container procurement may be slightly longer as only one company – Quatro – currently manufactures these containers.

The details provided in Figure 5-1 are for illustrative purposes only, though we hope they give an indication to the Council of the time requirement that should be accounted for prior to undertaking the service change. Given the resourcing requirement, NWLDC may wish to consider seeking external support from technical consultants who have extensive experience of delivering and supporting councils through such processes. Eunomia have supported numerous London boroughs through similar implementation exercises in recent years (e.g. LB Redbridge, LB Enfield) and would be happy to discuss this with NWLDC should this support be of interest.

6.0 Conclusion

The collection options appraisal conducted for NWLDC aimed to explore various changes to the dry recycling container arrangements. All prospective options took into account the impacts from the introduction of a DRS for beverage containers in the UK which would divert a significant volume of plastic bottles and metal drinks cans from the residual waste and dry recycling streams, as well as other legislative implications such as the collection of additional materials at the kerbside (e.g. plastic film and cartons).

The results presented in this report detail the cost implications of each option, split between capital and revenue costs. The assessment undertaken went beyond simply considering the financial implications however and considered a wider range of both quantitative and qualitative assessment criterion (which can be seen in Table 3-1). When all of these assessment criteria were considered and scored, the weighted 'score' indicated that Options 3 and 4 were the most favourable options for the Council to consider (as continuing with the baseline position has been deemed politically unacceptable). This is shown again in Table 6-1.

Table 6-1: Assessment Results

	Option 1	Option 2	Option 3	Option 4
Option	Two Stackable Trollies	Quatro	Two Wheeled Bins	Comingled
Quantitative Score	31%	36%	38%	41%
Qualitative Score	20%	12%	26%	26%
Total	51%	48%	64%	66%

Despite Options 3 and 4 appearing the most favourable, we feel it is important to reiterate the interaction of these options with the Environment Act (as detailed above in Section 5.1.2). The key takeaway is that at the time of writing this report, Option 4 would not comply with the Environment Act, as the Act requires councils to prioritise source separation of dry recycling, subject to a test of practicability. The previous government's indication that they would allow comingling of recyclable materials were not made, and so do not provide an allowance for this transition. The new government have provided no indication where they stand on this matter. It is also worth noting that there is also a risk that Option 3 may not be compliant depending on how strictly the government enforces the Act, though we would note that this option does separate fibres from glass, which is shown to protect the quality of material collected, which the Act is looking to achieve.

Ultimately, this will be a political decision with the Council will need to consider carefully prior to moving ahead. Given the importance of this decision and the interaction with the Environment Act, Eunomia would advise the Council to seek legal advice on this matter as Eunomia's views does not represent formal legal advice and this is something which Eunomia cannot provide.

Appendix

A.1.0 Collection Options - Modelling Assumptions

A.1.1 Baseline Operational Assumptions

This section provides detail of the key operations and logistical assumptions associated with household numbers, depot and tipping locations, and participation in each waste collection service and the resourcing requirements for each waste service within NWLDC.

A.1.1.1 Household Data

The baseline household data modelled is given in Table A 1.

Table A 1: Modelled Household Data

Description	Residual	Dry Recycling	Garden Waste	Food Waste Trial (since Nov-19)
Standard Access	46,663	46,663	46,663	4,155
Communal	2,200	2,200	-	-
Rural	1,260	1,260	1,260	-
Total Households	50,123	50,123	47,923	4,155

A.1.1.2 Depot and Tip Locations

The depot and tip data are shown in Table A 2. There was no modelled change to the depots and tips in future options. It is assumed that the transfer station is able to accept multiple streams of recycling, and food waste where multiple streams of recycling are collected.

Table A 2: Depot and Tip Locations

Service	Depot/Tip Name	Postcode	Tipping Time (mins)
Depot	Linden Way Depot	LE67 3JY	-
Tip - Residual Waste	Biffa Newhurst	LE12 9BU	10

Tip - Dry Recycling	Linden Way Depot	LE67 3JY	10
Tip - Garden Waste	Lount Composting	LE65 1SD	10

A.1.1.3 Working Arrangements

The modelled work arrangements for standard access rounds are given Table A 3. Work Content is the time 'out' on the round making collections and driving to and from the depot/tip. It does not account for beginning of day duties, break times and end-of-day duties.

Rural property rounds work content is assumed at 5hrs 30mins.

Table A 3: Working Arrangement Assumptions

	Refuse	Recycling	Garden	Food Trial
Contracted Weekly Hours	37	37	37	37
Days per Week	4	4	4	4
Task and Finish	yes	yes	yes	yes
Shift Start Time	06:00	06:00	06:00	06:00
Morning Depot Duties	15 mins	15 mins	15 mins	15min
Paid Break	None	None	None	None
Unpaid Break	30 min	30 min	30 min	30min
End of Day Depot Duties	15 mins	15 mins	15 mins	15min
Shift End (Actual, rather than Contracted)	14:00	15:15	15:15	12:30
Average Hours of Overtime per Week	0	0	0	0
Driver helping to load, % of the Time	yes, 15%	yes, 15%	Yes, 15%	Yes, 50%
Work Content, hrs	7hrs 45mins	8hrs 15mins	8hrs 15mins	5hrs 30mins

The resourcing requirements are outlined below and remain unchanged in future options modelling:

- Driver + 1 for separate Food Waste rounds;
- Driver + 1 for Rural rounds;
- Driver + 2 or 3 for Garden Waste (3 for 4 months of high season); and,
- Driver + 2 for all other rounds in all options

A.1.1.4 Set Out Rates

The set-out rates for each waste stream in the baseline for NWLDC are outlined in Table A 4. These have been assumed from the data request.

Communal bins are always available for collection, even if not full and therefore set out rates are assumed at 100%.

Table A 4: Modelled Set Out Rates

Service	Containers	All Properties	Rural Properties
Residual Waste	180L Bin	97%	80%
Dry Recycling	55L Red Box	89%	70%
Dry Recycling	Yellow Sack	91%	75%
Dry Recycling	Blue Sack	75%	50%
Dry Recycling	Carrier bag - textiles	9%	0%
Dry Recycling	Batteries/mobile phones	17%	0%
Garden Waste	GW Bin	71%	30%

A.1.1.5 Round Data

The round data assumptions used to build the baseline model are given in Table A 5. The modelled number of rounds is modelled in a way that closely models the number of frontline vehicles required for the service using the assumptions used elsewhere in the model.

Table A 5: Round Data Assumption and Baseline Outputs

	Number of Vehicles	Modelled Number of Rounds	Modelled Number of Tips	Modelled Work Content
Residual	5.25	5.18	2	7:45
Dry Recycling	6.00	5.94	2	8:15
Garden/Card	5.00	4.65	2	8:15
Rural	1.00	1.00	1	5:30

A.1.2 Baseline Cost Assumptions

A.1.2.1 Material Prices

The modelled gate fees and treatment costs used in the baseline cost model are given in Table A 6.

Table A 6: Material Prices and Treatment Costs for Collected Waste Streams in the Baseline

Waste Stream	£/t	Source
Paper	-£122.50	22/23 Council data
Card	-£110.25	22/23 Council data
Plastics (before DRS)	-£319.25	22/23 Council data
Textiles	-£100.00	22/23 Council data
Glass	-£86.00	22/23 Council data
Aluminium	-£1,165.00	22/23 Council data
Steel	-£149.17	22/23 Council data
Food Waste	-£91.37	22/23 Council data
Residual	£0.00	22/23 Council data
Garden	£0.00	22/23 Council data

A.1.2.2 Staff Costs

The modelled staff costs are given in Table A 7. These costs were supplied by NWLDC and remain unchanged in all future options modelled.

Table A 7: Modelled Staff Costs

Description	Salary	NI	Pension	Sick Cover	Holiday Cover	Other	Annual TOTAL
Driver	£25,752	£2,420	£6,032	£4,298	£3,242	£165	£41,908
Driver FW	£23,173	£2,045	£6,225	£3,868	£2,917	£148	£38,375
Loader	£20,597	£1,671	£5,483	£2,089	£2,433	£309	£32,581

A.1.2.3 Vehicle Costs

The vehicle costs associated with baseline vehicle requirements are given in Table A 8. It is assumed that a replacement of the baseline service, would require the purchase of an entire new frontline fleet and would be acquired by outright purchase by NWLDC.

Table A 8: Baseline Vehicle Costs

Description	Operational Lifetime (years)	Total Capital Cost per Vehicle	Maintenance	Insurance	Annual Road Fund Licence
26t RCV	7	£239,792	£2,742	£826	£303
26t 70/30 Split-back	7	£282,019	£2,742	£826	£303
Side Kerbsider	7	£215,689	£2,742	£826	£303
26t 70/30 Split-back with Pod	7	£296,400	£2,742	£826	£303

A.1.2.4 Containment Costs

A range of different containers are used by households to contain waste in NWLDC. Table A 9 highlights the range of containers used, the capital cost per unit and the proportion that require replacing annually.

Table A 9: Baseline Containers Used and Costs

Container Type	Cost/unit	Replacement Rate (%)
55 L Red Box	£6.69	46.86%
Blue Bag	£1.74	7.81%
Yellow Bag	£2.04	12.76%
Kerbside Caddy	£6.36	5.00%
180L Wheeled bin	£17.00	2.64%
240L Wheeled bin	£18.86	4.34%
240L GW bin	£18.86	3.10%

A.1.3 Future Option Cost Assumptions

A.1.3.1 Material Prices

Material prices and treatment costs for all material streams in future options is given in Table A 10.

Table A 10: Material Prices and Treatment Costs for Future Options

Waste Stream	£/t	Source
Cartons	-£90.00	Ace UK (including haulage)
Plastic Film	£43.10	Let's Recycle 22/23 average prices
Plastics (post DRS)	-£220.00	Assumption due to good value PET removed from the mix
Mixed Paper & Card	-£67.10	Let's Recycle 22/23 average prices
Mixed Containers/Commingled	£0.00	Council

A.1.3.2 Vehicle Costs

Cost assumptions for vehicles used in future options is detailed in Table A 11. These costs have been gathered through Eunomia's market research with vehicle providers.

Table A 11: Vehicle Costs for vehicles Used in Future Options

Description	Operational Lifetime (years)	Total Capital Cost per Vehicle	Maintenance	Insurance	Annual Road Fund Licence
12t RRV	7	£216,000	£2,742	£826	£303
Quatro	7	£325,000	£2,742	£826	£303
26t RCV with Pod	7	£260,832	£2,742	£826	£303

A.1.3.3 Containment Costs

Containment costs assumptions and replacement rates for containers used in future options is given in Table A 12. These costs have been gathered through Eunomia's market research with container providers.

Table A 12: Container Types, Costs and Replacement Rates for New Containers in Future Options

Container Type	Cost/unit	Replacement Rate (%)
Triple Stack	£37.00	4.34%
360L Quatro Bin	£125.00	4.34%
660L Quatro Bin	£275.00	4.34%
240L wheeled bin	£18.86	6.98%

A.1.3.4 WTS Costs

The operational assumptions for the operation of the WTS in the baseline and future options is given in Table A 13. It is assumed that staff costs for FTEs at the site are the same as loaders, as detailed in A.1.2.2.

Table A 13: WTS Costs and Assumptions

WTS Resource	BL	Op1, Op2a-d,Op2f	Op4a-b
WTS Streams	<ul style="list-style-type: none">• Glass• Paper• Card• Plastics & Cans	<ul style="list-style-type: none">• Glass• Paper• Card• Plastics & Cans inc. plastic film and cartons	<ul style="list-style-type: none">• N/A
FTE	2	4	0
Baler, Consumables, Licence, JCB's	Yes		No
Sorting Machine	Yes		

A.2.0 Waste Flow Modelling and Benchmarking

A.2.1 Baseline Tonnages

The baseline tonnages assumed in the modelling are given provided in Table A 14. These tonnages have been derived from Waste Data Flow data. These are kerbside households' tonnages and do not include tonnages from HWRCs.

Table A 14: Baseline Tonnages

Material	Tonnes 2021/22
Paper	1,089
Card	2,352
Glass	3,185
Aluminium	166
Steel	300
Plastic	1,094
Textiles	11.3
Batteries	4.9
Mobile Phones	0.072
Total Dry Recycling	8,202
Food Waste	207
Garden	10,295
Residual Waste	22,778
Total	41,482

A.2.2 Impact of DRS

Based on compositional data supplied NWLDC and assumptions for the percentage of material targeted by DRS taken from Zero Waste Scotland anticipated targetable materials, the following impacts of DRS are anticipated for the residual waste and dry recycling streams.

These diversions are applied to all future options.

Table A 15: Anticipated DRS Diversion Rates

Beverage Container	Tonnes 21/22	% DRS Targeted	% DRS Capture Rate	Diversion of DRS Material (Tonnes)	DRS Yield (kg/hh/yr)
Dry Recycling					
PET Plastic Bottles	421	100%	90%	379	7.6
Aluminium - cans	177	93%	90%	148	3.0
Ferrous - cans	311	14%	90%	39	0.8
Total	909	-	-	566	11.3
Residual					
PET Plastic Bottles	361	100%	90%	325	6.5
Aluminium - cans	191	93%	90%	160	3.2

Ferrous - cans	301	14%	90%	38	0.8
Total	853	-	-	523	10.4

A.2.3 Plastic Film and Carton Yields

There is no available case study evidence of what captures might be expected for plastic film, but as a material which is difficult to handle and often contaminated by food waste, the capture rates are not expected to be high.

The capture rate for cartons was based on capture rates achieved by authorities with a similar recycling rate than NWLDC.

These yields, given in Table A 16, are applied to all future options.

Table A 16: Plastic Film and Cartons Capture Rates Modelled

Material	Yields in Residual Waste 21/22 (kg/hh/yr)	Capture Rate (%)	Total Yield for Future Options (kg/hh/yr)
Plastic Film	8.56	15%	1.28
Cartons	2.88	60%	1.73

A.2.4 Benchmarking

This section describes the approach taken to benchmarking performance. It should be noted that although the benchmarking is useful in informing our judgement in relation to predicted future yields, it is by no means a perfect science. A number of interrelated factors, which are difficult to unpick from one another, contribute to an individual authority's performance. The benchmarking exercise merely enables us to tease out some of the broad themes in terms of system performance of these systems which, in Eunomia's experience, helps inform the yields to be modelled for the different collection options.

A.2.4.1 Benchmarking Group

Where possible, the impact of service change is drawn from similar authorities operating comparable collection systems. The benchmarking group is determined from analysis that compares authorities using socio-economic and demographic criteria from England, Scotland and Wales. The most similar authorities to NWLDC are shown in the table below.

Benchmarking ideally uses data from the 30 most similar authorities and looks up to 50th when authorities with relevant collection systems are limited. Where there are no authorities operating collection systems being benchmarked in the benchmarking group, we must look more widely at available case studies.

Table A 17: Similar Authorities to NWLDC (1 = Most Similar)

Rank	Authority	Rank	Authority
------	-----------	------	-----------

0	North West Leicestershire	26	Bassetlaw
1	Chorley	27	West Lancashire
2	Selby	28	Blaby
3	Flintshire	29	Braintree
4	South Ribble	30	West Lindsey
5	Hinckley & Bosworth	31	Rugby
6	South Derbyshire	32	Kettering
7	High Peak	33	Melton
8	Huntingdonshire	34	Sedgemoor
9	Gedling	35	Forest of Dean
10	Newark & Sherwood	36	Staffordshire Moorlands
11	South Kesteven	37	Chelmsford
12	Stafford	38	Central Bedfordshire
13	Amber Valley	39	Shropshire
14	Warrington	40	Newcastle-under-Lyme
15	Daventry	41	Gwynedd
16	North Warwickshire	42	Calderdale
17	Shetland	43	North Lincolnshire
18	East Staffordshire	44	Tewkesbury
19	Charnwood	45	Lichfield
20	Colchester	46	Broxtowe
21	The Vale of Glamorgan	47	Maidstone
22	North Kesteven	48	Cheshire East
23	East Northamptonshire	49	North Hertfordshire
24	South Gloucestershire	50	Breckland
25	Erewash		

A.2.4.2 Data

Waste tonnage data used for benchmarking was sourced from local authority WasteDataFlow (WDF) returns for 2020 (Scotland) or 2020/21 (England and Wales). This was the most recent year of data available unaffected by the Covid-19 pandemic, which affected waste arisings. Waste collection system information, such as number of households and collection systems in place, for each local authority was collated from WRAP's LA Portal for the same year.

A.2.4.3 Assumptions

This exercise is designed to compare the performance of street-level properties, as only these property types are targeted by restrictions to residual waste capacity. To isolate street-level property performance, tonnage data was adjusted to exclude waste arising from communal properties. Where it

was necessary to widen the group of comparators, data was also adjusted to account for 'missing materials' in order to draw comparisons.

Street-Level Versus Communal Performance. By removing communal bins tonnage from the average, we are able to determine the performance of street-level properties and directly compare the performance of the properties that will be affected by the service change.

- The residual yield for households with communal bins was calculated for each authority based on an average occupancy rate of 1.8 people per communal household according to ONS data.
- The dry recycling yield was assumed to be 50% of that for kerbside properties based on WRAP analysis of pilot schemes and published research by WRAP.²
- A figure of 26 kg/hh/yr was modelled for food waste yields from communal properties, based on research by WRAP.⁴

Adjusting for Missing Materials. Where a similar authority has a collection system of interest but is missing a material or has an additional material, recycling yields were adjusted based on WasteDataFlow averages of yields within the comparator group for Midlothian, so the same range of materials are included for each authority. In this case, average yields for glass and mixed plastics were added to yields for authorities which do not collect these materials.

A.2.4.4 Results – Changes to Dry Recycling Systems

WRAP research from 2015, indicates that, in isolation, a change of recycling collection system (either from reduction of collection frequency or from changing the collection system) does not necessarily cause a change in yield of target materials collected. It was assumed dry recycling yields (excluding contamination) would not change because of a change to the dry recycling system.³

When examining changes in contamination of the dry recycling system, it is usually expected that collecting dry recycling in a co-mingled wheeled bin sees the highest contamination rate. On the other hand, where dry recycling is presented in a kerbside box, or bag, as part of a multi-stream collection, the contamination rate is generally much lower. In this case, the operator has visual access to the presented waste and could reject it if contamination is present.

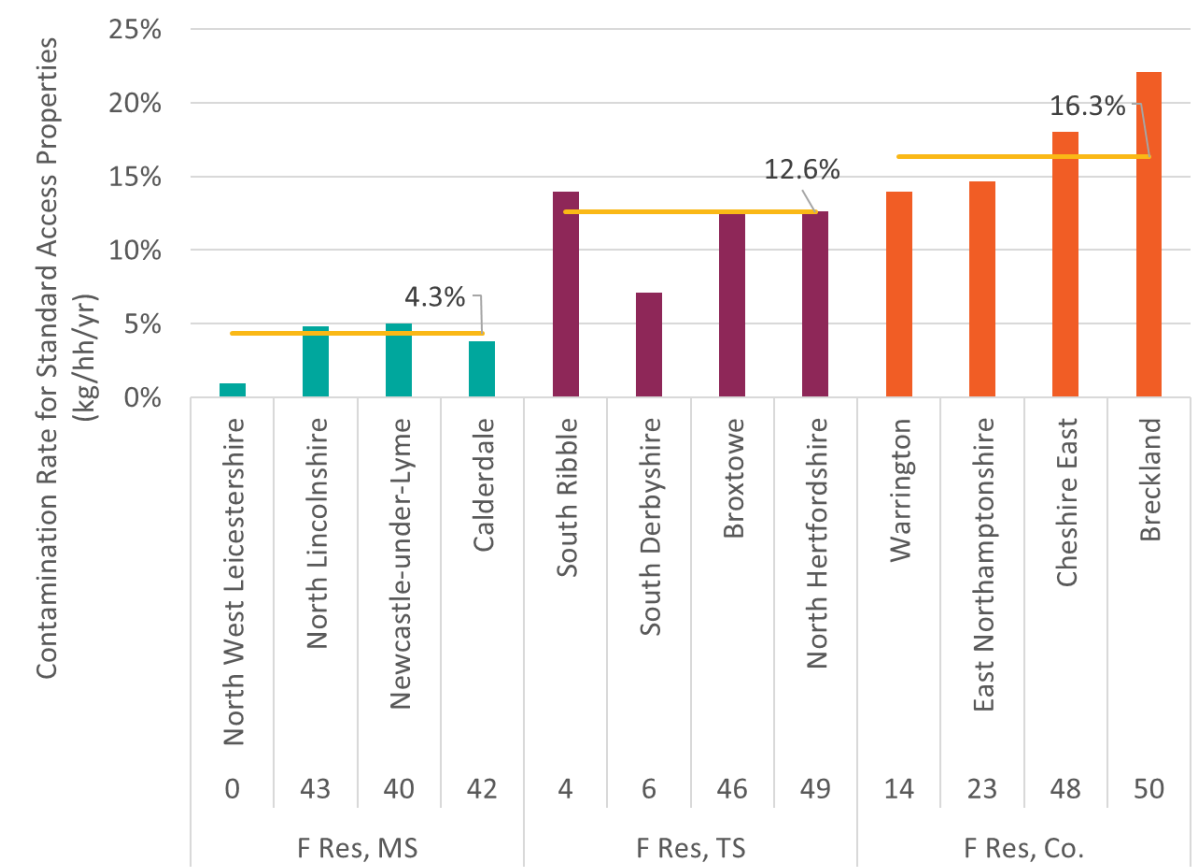
Current contamination of NWLDC dry recycling is at 0.9%, however the median contamination for similar authorities operating a multi-stream collection system was 4.3%. It is from this 4.3% that changes to contamination when moving from multi-stream to two-stream collections are assessed.

Median contamination rates for authorities operating two-stream dry recycling collections is 12.6%, a n 8.3% increase from the median multi-stream contamination level. It is assumed that in future modelled options, two-stream contamination would be 9.2% (0.9% plus 8.3%).

Options that use a Quatro bin are assumed to have the same contamination performance as two-stream options.

Moving from a two-stream system to a co-mingled collection system indicates that contamination would increase from 12.6% to 16.3%, a 3.7% increase. Therefore, it is assumed that for co-mingled future modelled options, contamination would be 12.9% (9.2% plus 3.7%).

Figure A 1: Contamination Changes from Changes to Dry Recycling System



A.3.0 Collection Options – Evaluation Qualitative Assessment

The results from the quantitative and qualitative assessment can be found here:



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A.4.0 Breakdown of Results

The tables below outline the breakdown of capital costs into vehicles and containers for each option:

Table A-2: Cost of purchasing vehicles

	Baseline Incl. DRS		Option 1 Two Stackable Trolleys		Option 2 Quatro Bins		Option 3 Two Wheeled Bins (Fibres and Containers)		Option 4 One Wheeled Bin (Comingled)	
Vehicle Type	No. of vehicles	Cost	No. of vehicles	Cost	No. of vehicles	Cost	No. of vehicles	Cost	No. of vehicles	Cost
26T RCV	6	£1,439k	9	£2,158k	9	£2,158k	9	£2,158k	15	£3,597k
26T 70/30 splitback	5	£1,410k	1	£282k	-	-	7	£1,974k	-	-
Side kerbsider	6	£1,294k	-	-	-	-	-	-	-	-
12T RCV	-	-	8	£1,728k	-	-	-	-	-	-
Quatro	-	-	-	-	6	£1,950k	-	-	-	-
26T RCV with pod	1	£296k	1	£296k	1	£296k	1	£296k	-	-
Total	18	£4,439k	19	£4,464k	17	£4,404k	17	£4,428k	15	£3,597k

Table A-3: Initial cost of purchasing containers

[illegible]

Triple stack	-	-	95,326	£3,527k	-	-	-	-	-	-
360L quatro bin	-	-	-	-	47,663	£5,958k	-	-	-	-
660L quatro bin	-	-	-	-	218	£60k	-	-	-	-
Total	-	-	95,326	£3,527k	47,881	£6,018k	98,396	£1,674k	49,593	£935k

Table A-4: Annual cost of replacing containers

	Baseline		Option 1		Option 2		Option 3		Option 4	
	Incl. DRS		Two Stackable Trollies		Quatro Bins		Two Wheeled Bins (Fibres and Containers)		One Wheeled Bin (Comingled)	
Container	No. of contr's	Cost	No. of contr's	Cost	No. of contr's	Cost	No. of contr's	Cost	No. of contr's	Cost
55L red box	46,413	£311k	1,743	£12k	1,181	£8k	-	-	-	-
Blue bag	3,821	£7k	98	£0.2k	98	£0.2k	-	-	-	-
Yellow bag	6,396	£13k	314	£1k	161	£0.3k	-	-	-	-
140L wheeled bin	-	-	-	-	-	-	88	£1k	-	-
180L wheeled bin	3,415	£58k	3,415	£58k	3,415	£58k	10,069	£171k	3,415	£58k
240L wheeled bin	-	-	-	-	-	-	107	£2k	3,462	£65k
240L garden waste bin	1,532	£29k	1,532	£29k	1,532	£29k	1,532	£29k	1,532	£29k
180L communal bin	11	£0.2k	11	£0.2k	-	-	28	£0.5k	11	£0.2k

240L communal bin	58	£1k	58	£1k	43	£1k	77	£1k	58	£1k
1100L communal bin	4	£0.4k	4	£0.4k	4	£0.4k	4	£0.4k	4	£0.4k
Triple stack	-	-	6,654	£246k	-	-	-	-	-	-
360L quatro bin	-	-	-	-	3,327	£416k	-	-	-	-
660L quatro bin	-	-	-	-	15	£4k	-	-	-	-
Total	61,650	£419k	13,829	£347k	9,776	£517k	11,905	£206k	8,482	£154k

