Waste Regulations Compliance

Report for Thurrock Council

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Report for Susan Reddick, Waste & Recycling Contracts Manager, Thurrock Council

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Executive Summary

E.1.0 Approach

Eunomia Research & Consulting has prepared this report for Thurrock Council ('the Council') to provide a review of its compliance with the Waste England and Wales Regulations 2011 (as amended) ('The Regulations'). This piece of work, focuses on the requirements regarding separate collection of recycling under Regulation 13.

A good deal remains uncertain regarding how the Waste Regulations should be interpreted or how they will be enforced. There is no English statutory guidance on how to determine whether separate collection is "necessary" or "practicable", and guidance produced by the Welsh Government has no direct force in England.[1] The Environment Agency is beginning to make clear its approach to enforcement of this legislation, but it remains to be seen how active it proposes to be in its role. No third parties have yet disclosed an intention to seek to clarify the requirements of the law by pursuing legal action against authorities.

However, in order to address this uncertainty a "Route-map" has been prepared by WRAP and others to assist authorities in interpreting the law, and this document has been followed in preparing the subsequent analysis. This report presents the findings of an options appraisal using Eunomia's waste collection modelling tool developed specifically to carry out assessments under this legislation, to examine whether separate collections of four streams of dry recycling (glass, metal, paper and plastic) are necessary and practicable in the sense prescribed by the law.

Eunomia has interpreted the results and provided advice on a course of action that we believe represents the Council's best option to demonstrate compliance without precipitately making changes to its established collection system.

E.2.0 Separate Collections

From 1st January 2015, all waste collectors in England and Wales will be required to collect glass, metal, paper, and plastic ('the four materials') in separate streams where doing so is both necessary and technically, economically and environmentally practicable

[1] Welsh Government (2014) *Statutory Guidance on the Separate Collection of Waste Paper, Metal, Plastic and Glass*, December 2014, http://wales.gov.uk/docs/desh/publications/141217-statutory-welsh-guidance-on-separate-collection-of-waste-v2-en.pdf

(TEEP). Effectively, “necessity” and “practicability” are two tests that, if met, mean that separate collection is required.

The Council currently collects the four materials weekly in one stream. The Council therefore, needs to consider whether it is necessary and practicable to collect materials separately. The Council is, however, in the process of developing a change to its waste and recycling service. It is exploring the possibility of retaining co-mingled recycling collections but switching to alternate weekly collections. Whilst we have retained the current collection system as our modelling baseline against which other options are compared, the economic and environmental performance of the proposed new service (modelled as Option 3) is also used as a point of comparison, since this is the approach that defines the costs and performance that the Council anticipates in future.

E.2.1 Necessity Test

The analysis carried out indicates that separate collection of the four materials:

- when compared with the baseline service is likely to increase the quantity of recycling collected, meaning that in the terms set out in the law, separate collection is necessary in order to *facilitate* recovery; but
- when compared with the proposed alternate weekly service (Option 3) is not likely to increase the quantity of recycling collected, meaning that in the terms set out in the law, separate collection may not be necessary in order to *facilitate* recovery.

Based on typical yields for different recycling systems, therefore, separate collection is predicted to result in higher recyclate yields than Thurrock’s current collection method, but lower yields than Option 3. The SITA MRF at Tilbury would be used under both the current system and Option 3. Our analysis indicates that separate collection is likely to lead to an improvement in the purity of most materials compared with MRF outputs. The Council has been unable to obtain detailed output contamination and quality data from the MRF, and is therefore not in a position to provide evidence to show that its outputs meet some of the more challenging definitions of “high-quality”. However, there is an argument that there are definitions of “high quality” that the materials produced by the MRF would meet. If the Council opts for one of these definitions of “high quality”, then in the terms set out in the law, separate collection would not be necessary in order to *improve* recovery.

If the Council were to continue with its current service, it would have to conclude that separate collection is ‘necessary’, and therefore proceed to look to the practicability test as its primary method of demonstrating that co-mingled collection complies with the law. If the Council were to decide to implement Option 3, it would be able to argue that it is not necessary to separately collect to increase the quantity or quality recycling.

E.2.2 Practicability Test

The analysis carried out indicates that separate collection of the four materials is:

- technically practicable, since it has been implemented and operated by authorities in many ways similar to Thurrock; and
- environmentally practicable, since the options appraisal indicates that kerbside sort would deliver carbon savings compared with both the current service and (to a lesser extent) the proposed service (Option 3).

However, the situation economic practicability argument is complicated by the proposed service change, the Council's options regarding how to sell separated material and the potential for kerbside sort collections to allow changes to how organic waste is managed:

- Weekly separate collection combined with fortnightly residual waste collection would be 16.4% cheaper than the current service, if the Council were to simply deliver separate materials to its current MRF.
- However, on this approach to materials marketing, separate collection would be 10.2% more expensive than Option 3.
- If the Council were instead able to achieve higher material prices by marketing materials itself after bulking them in an enhanced depot, separate collection would be only 6.7% more expensive than Option 3 – although the Council would then bear the economic risk were there a significant decline in material prices.
- If the Council were to take the opportunity of introducing weekly kerbside sort collections to move to a separate collection of food waste instead of the current mixed food and garden waste service, it might be possible to make additional savings by (a) processing garden waste more cheaply and (b) diverting additional food waste from the residual stream. Our modelling suggests that, were this done successfully, the resulting system could be only 2.1% more expensive than Option 3 (assuming materials delivered to the MRF) and 4% cheaper than Option 3 if market prices were achieved for recyclate.

Clearly, the Council's position is complex, making the question of economic practicability difficult to resolve. However, there are some conclusions that can be drawn:

- If the Council takes the view that it could afford to continue its current level of expenditure on waste collections, separate collection is clearly economically practicable so long as it sits alongside fortnightly residual collections.
- However, if the Council is already committed to finding the level of savings from waste services that we estimate that Option 3 might deliver, there is an argument that, on its own, separate collection is not economically practicable, since it would significantly exceed this cost.
- Separate collection could, however, be delivered at a cost lower than Option 3 if it were combined with separate food waste collection, enabling more food waste to be diverted and garden waste to be treated at a lower cost.

The test of economic practicability focuses on the comparative operational net cost of different collection methods. However, in considering the timing of any change of collection system, other economic factors should also be taken into account. While the modelling suggests separate collection may be 'economically practicable', the report

raises significant doubts regarding whether it is financially feasible in the short term based on the following findings:

- If the Council were to break its contract with the MRF in order to obtain full market prices for its separately collected material, it is likely that there would be a significant cost to doing so.
- The Council operates an in-house service and will therefore need to meet the capital costs of the new vehicles and containers that a new collection system would entail. Whilst it is already contemplating a service change, a move to less frequent co-mingled collections would not necessitate acquiring a new type of vehicle. Although some value could be realised from existing assets that were no longer required, the transition to separate collection might mean disposing of vehicles outside the currently planned timescale. Separate collection would mean incurring greater vehicle capital costs, and perhaps incurring costs sooner than currently planned, which might be financially problematic. Without access to capital finance, a transition to separate collection would have to be delayed, or delivered by alternative means.

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1.0 Introduction

Eunomia Research & Consulting (Eunomia) has prepared this report for Thurrock Council ('the Council') to provide a review of its compliance with the Waste England and Wales Regulations 2011 (as amended) ('the Regulations'). [2, 3]

This report sets out the results of an options appraisal to examine whether separate collection of one or more additional waste streams is required by this law.

1.1 Regulatory Background

Regulation 13 states that from 1st January 2015, all waste collectors in England and Wales will be required to collect glass, metal, paper, and plastic ('the four materials') in separate streams where doing so is both necessary and technically, economically and environmentally practicable (TEEP).

Effectively, "necessity" and "practicability" are two tests that, if met, mean that separate collection is required. There is no statutory guidance on how to determine whether separate collection is "necessary" or "practicable", and guidance produced by the Welsh Government has no direct force in England.[4]. However, WRAP, the London Waste and Recycling Board, and Waste Network Chairs commissioned Eunomia to prepare a "Route-map" to assist authorities in interpreting the law.[5] The Environment Agency has signalled that it will take account of the Route-map as part of its regulatory approach.[6] The advice in this report is therefore closely based on the approach set out in the Route-map.

1.2 Waste Collections in Thurrock

The Council's current kerbside collection system is delivered in house and for the majority of households comprises:

- a weekly residual waste collection from 240L wheeled bins;
- a weekly co-mingled recycling collection from 240L black wheeled bins; and
- a weekly food and garden waste collection from 240 bin.

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[2] UK Government (2011) *The Waste (England and Wales) Regulations 2011*, 28th March 2011

[3] UK Government (2014) *The Waste (England and Wales) (Amendment) Regulations 2012*, 1st October 2012

[4] Welsh Government (2014) *Statutory Guidance on the Separate Collection of Waste Paper, Metal, Plastic and Glass*, December 2014, http://wales.gov.uk/docs/desh/publications/141217-statutory-welsh-guidance-on-separate-collection-of-waste-v2-en.pdf

[5]WRAP, and LWARB (2014) *Waste Regulations Route-map*, April 2014

[6]Environment Agency (2014) *Separate Collection of Recyclables: Briefing Note*, June 2014

- a weekly food waste collection from communal food waste bins.

The Council does pays a gate fee for the treatment of residual waste, but and rather lower fees per tonne of dry recycling and mixed food and garden waste.

The Council also provides the following waste services:

- a charged household bulky waste collection service;
- a household waste recycling centre;
- a small number of bring sites;
- a charged commercial waste collection;
- a clinical waste collection; and
- litter and street cleansing services.

Each of these forms of collection potentially falls under the requirements of the Regulations in respect either of the waste hierarchy or of the requirement to separately collect certain materials. However, this report focuses on the regular kerbside collections that account for the great majority of the waste the Council collects.

1.3 About This Report

This report comprises:

- an explanation of the modelling methodology used in this report (Section 2.0);
- an examination of whether separate collection of the four recyclable materials specified in the law (glass, metal, paper, plastics) is necessary in Thurrock (Section 3.0);
- an examination of whether separate collection of the four recyclable materials specified in the law (glass, metal, paper, plastics) is practicable in Thurrock (Section 4.0); and
- recommendations regarding the Council's way forward (Section 5.0).

2.0 Options Appraisal Methodology

The Waste Regulations Route Map indicates that in order to carry out the necessity and practicability tests, an options appraisal may be required in order to determine the likely costs and outputs of a separate collection system. Eunomia has followed this suggested approach in order to examine the implications of the tests.

2.1 Our Approach to Collection Options Appraisal

Eunomia's 'Practicability and Necessity' model (PAN) has been used to calculate the performance and costs associated with different kerbside waste collection scheme configurations for the Council. This model has been developed specifically to cost-effectively compare collection systems in relation to the requirements of the Regulations. Whilst it is a relatively simple model, it relies heavily on assumptions and an approach that are common to other such options appraisal tools.

In the model, a 'baseline' was created to represent the Council's current service. The aim of the baseline is to reflect the resources and logistics of the expected model as accurately as possible, so that it serves as a reliable foundation for testing various alternative collection options. Authority-specific inputs to the baseline include information regarding the Council's number and type of households, current services and service performance, resources, and waste composition. Known inputs (from the perspective of the model these include; tonnages of each material type collected, numbers and types of households offered the service) are calibrated to known outputs (which in modelling terms includes the numbers of crew and vehicles used to deliver the collection services).

Put simply, the baseline model should accurately reflect the Council's:

- recycling composition and tonnages;
- demographic characteristics (household numbers, population, housing types);
- travel logistics (distance, pass rate); and
- current vehicle and container types and costs.

This creates a sensible basis from which to establish the change in resource requirements for different potential future service configurations, ensuring that the Council's specific constraints are properly reflected.

The likely performance of new schemes is then driven by comparing the authority's collection pass rate with an expected value based on data available from other authorities operating similar schemes, and factoring in the extent of urban and rural collections within the authority. This pass rate factor is then used to generate expected pass rates for alternate collection approaches. This dictates the expected level of resources needed to undertake collections.

The model automatically builds up the costs associated with the baseline and future schemes based on unit cost data extracted from a database. The numbers of vehicles, containers, and crew required are multiplied by the unit costs to derive an overall cost for the baseline and each future scheme option in turn.

Alongside this, separate standard assumptions are made regarding recycling compositions and yields and within different collection systems and frequencies. These are combined with material, vehicle and crew financial information, using the Council's own data wherever possible, in order to calculate expected net system costs.

In order to compare each option on a like for like basis, it is assumed that capital costs (e.g. vehicles, containers, depot investments) are amortised over their expected lifetime with an interest rate of 2.5%, regardless of whether in practice the Council adopts this approach to accounting for these items. The model therefore includes the annualised costs of these items, but does not focus on the initial capital outlay that the Council might need to incur to put the service in place; or the remaining value of assets the Council may already hold, treating costs incurred in the past as sunk. The model for the Council does not include costs such as spare vehicles, supervisors, depot costs, overheads, and internal recharges.

The model for the Council does not include costs such as spare vehicles, supervisors, depot costs, overheads, and internal recharges. Since the total baseline cost is not being developed in the scope of this project, only relative costs are reported in the results sections below.

2.2 Options Modelled

Since the law concerns separate collection, the current service system is modelled in comparison with a weekly kerbside sort system, excluding and including separate food collections. The Council are currently in the process of developing a new service model, the current option under development is modelled in Option 3 for comparative purposes, alongside, a weekly and fortnightly two stream option. The options are defined in Table 2-1.

Table 2-1: Options Modelled: Kerbside Collections

Option	Dry Recycling	Food Waste	Garden Waste	Residual Waste
Baseline – Fully Co-mingled (Weekly)	Weekly 240L wheeled bin	With garden	Weekly 240L wheeled bin	Weekly 180L wheeled bin
Option 1 – Kerbside Sort (food and garden combined)	Weekly 240L wheeled bin and 55L box	Same as baseline	Same as baseline	Fortnightly 180L wheeled bin
Option 2 – Kerbside Sort (separate food)	Weekly 240L wheeled bin and 55L box	Weekly caddy (23L external, 7L internal)	Fortnightly 240L wheeled bin (service charge)	Fortnightly 180L wheeled bin
Option 3 – Co-mingled (Fortnightly)	Fortnightly 240L wheeled bin	None	Fortnightly 240L wheeled bin (service charge)	Fortnightly 180L wheeled bin
Option 4 – Two-Stream, Fibres/Containers (Weekly)	Weekly 240L wheeled bin and 55L box	Same as baseline	Same as baseline	Fortnightly 180L wheeled bin
Option 5 – Two Stream, Fibres/ Containers (Fortnightly)	Fortnightly 240L wheeled bin and 55L box	None	Fortnightly 240L wheeled bin (service charge)	Fortnightly 180L wheeled bin

It should be noted that the stillage vehicles modelled in the separate collection options are assumed to collect plastic and cans in a single compartment. It is in principle possible to obtain a vehicle with separate compartments for these two materials; however, in practice this is rarely done, since plastic and cans are able to be separated without

unduly complex equipment and to a standard that is acceptable to end markets. A small-scale sorting line is priced into the modelling for kerb sort options.

2.3 Environmental Model

The PAN model also contains assumptions derived from the Environment Agency's WRATE model regarding the CO_2 emitted and saved through:

- the collection and reprocessing of recycling; and
- the benefit derived from avoiding the need for virgin materials

to provide a proxy for the overall environmental impact of different collection systems. This enables the environmental practicability of different collection options to be considered.

3.0 Necessity Test

This section addresses the 'necessity test', and seeks to establish whether separate collection of waste streams is, in the words of the Waste Regulations, "necessary to ensure that waste undergoes recovery operations in accordance with Articles 4 and 13 of the Waste Framework Directive and to facilitate or improve recovery". If separate collection is not necessary, the law does not require it.

There is no definition of "facilitate" or "improve" given in the Waste Framework Directive, the Regulations or any guidance document. However, the Waste Regulations Route Map advises that:

- "Facilitate" means to make possible or easier. If a measure "facilitates" recovery, it might be expected to result in the amount of material recovered rather than sent for disposal being increased.
- Recovery is "improved" if it achieves better results. Recovery may therefore be "improved" if:
    - more waste is recycled rather than subject to other recovery; and/or
    - more of the recycling is "high quality".

The current system in Thurrock features fully co-mingled collections of the four materials (glass, metal, paper and plastic) and does not therefore directly comply with the Waste Regulations' default requirement that the Council collects the four materials separately from all other materials from January 2015.

3.1 Facilitating Recovery

If a separate collection system *facilitates* recovery, the *quantity* of material expected to be recycled should increase when it is implemented. The Council has not undertaken any estimate of the quantity of recycling which a kerbside sort system might collect. There is little evidence based on the experience of other authorities to believe that separate collection would deliver a greater quantity of the four materials collected co-mingled at

the kerbside. The expected tonnages of recycling collected as a result of each option in PAN are set out in Table 3-1.

Table 3-1: Dry Recycling Collected in Each Option (tonnes/year)

Material	Baseline – Fully Co-mingled (Weekly)	Option 1 – Kerbside Sort (food and garden combined)	Option 2 - Kerbside Sort (separate food)	Option 3 – Co-mingled (Fortnightly)	Option 4 – Two-Stream, Fibres/ Containers (Weekly)	Option 5 – Two Stream, Fibres/ Containers (Fortnightly)
Co-mingled	11,524	-	-	12,804	-	-
Mixed Containers	-	-	-	-	5,943	5,402
Mixed Paper and Card	-	-	-	-	7,438	6,762
Paper	-	5,256	5,256	-	-	-
Card	-	1,637	1,637	-	-	-
Glass	-	3,417	3,417	-	-	-
Plastic	-	936	936	-	-	-
Steel	-	624	624	-	-	-
Aluminium	-	219	219	-	-	-
Total Recycling Collected	11,524	12,088	12,088	12,804	13,380	12,164
Contamination and Process Losses	535	-	-	535	621	564
Total Recycled	**10,989**	**12,088**	**12,088**	**12,269**	**12,759**	**11,600**

Weekly kerbside sort would be anticipated to yield around 1100 tonnes/year more than the current baseline, net of contamination. This increase comes despite the increased frequency of collections for the kerbside sort options. The lowest yield is anticipated from the current service. Option 3 has the second highest yield, this is the service model the council is currently considering developing. In comparison, separate collection would

be anticipated to yield around 180 tonnes/year less than a comingled, fortnightly collection. This is a likely result fortnightly refuse collections, increasing recycling rates.

The Regulations state that separate collection is required if it is necessary in order to *facilitate* recovery. The Route Map explains that this can be understood to mean that separate collection is required if it could be expected to yield an increase in the volume of material collected. Our findings indicate that a reasonable system of separate collections could be expected to *facilitate* recovery. However, if the Council were to adopt a comingled fortnightly collection service, could help facilitate recovery, and therefore separate collection may not be necessary to increase the quantity of recyclate collected.

3.2 Quality of Material

If a separate collection system *improves* recovery, the *quality* of material expected to be recycled should increase when it is implemented. In common with many other authorities, the Council has not previously made a detailed assessment of the quality of the recyclate that would result from different collection systems. The Council currently collects all materials co-mingled which may reduce the quality of the material from the MRF.

The Waste Framework Directive makes it clear that the aim of separate collection is to deliver high quality recycling; however, it is less clear regarding what constitutes 'high quality'.

There are several possible definitions of 'high quality recycling' that the Council might consider:

1) Article 11 of the Directive appears to define 'high quality' in terms of "the necessary quality standards for the relevant recycling sectors". This can be understood in three main ways:
   a. Some have argued that any recyclable material for which an off-taker can be found must of necessity meet the standards of some part or other of the recycling sector. Therefore, all recycling is high quality – only if recyclate is so poor that it cannot be recycled at all would it fail to qualify.
   b. If the Council's material attracts premium prices, this might be indicative of it being high quality.
   c. Alternatively, the Council could compare the purity of its MRF outputs with the input specifications of UK reprocessors.[7] Materials that meet the reprocessors' standards could be deemed to be high quality. This is a lower-risk approach, but sets a standard that many MRFs seem likely to find it difficult to meet.
2) Section 4.3.4 of the Commission's guidance on the Waste Framework Directive relates "high quality" to the standards achieved through separate collection. It

[7]Resource Association *Recycling Quality Specifications*, accessed 5 August 2014, http://www.resourceassociation.com/recycling-quality-specifications/

gives two somewhat different statements, advising that separate collection is not necessary if:

a. "the aim of high-quality recycling can be achieved just as well with a form of co-mingled collection". This suggests that co-mingled collection can be used only if the resulting material can be recycled in just the same way as separately collected material, i.e. there is no use to which it cannot be put that separately collected material could be; and
b. "subsequent separation can achieve high-quality recycling similar to that achieved with separate collection". This suggests that some minor differences in the recycling achieved may be permissible.

One of the key determinants of quality is the end use to which material is put. The Council has been provided with a general statement regarding the outputs from Tilbury MRF, which indicates that all products are fed into a closed loop process and all material are sold on the spot market. It is not clear how it is established that material sold onto the spot market is all fed into closed loop processes, and the statement would be more robust if it were supported by more detailed evidence regarding end destinations. However, if the Council is able to establish that a large proportion of material enters closed loop processes this would be a strong indication that definitions 2)a and 2)b.

The Council holds a detailed monthly record of the composition and reject rate of the material it delivers to the MRF. The current reject rate is 4.6%, which provides an indication that the quality of the co-mingled recyclate *collected* under the current system is good.

In order to properly assess whether separate collection is necessary in order to enable recycling that meets definition 1(c of "high quality" the Council would need to obtain an assessment of the quality of the final recyclate outputted from the MRF so that this can be compared with the likely purity of a separate collection system. Our efforts to obtain this information from other MRF facilities have not met with success and it appears that it is not something that is currently reported. However under recent amendments to the Environmental Permitting Regulations (the so-called 'MRF Regs'), larger MRFs will be required to undertake regular sampling of their output streams. [8] It should therefore be possible for the Council to obtain information regarding output purity from the MRF in the near future, and the Council should make clear that it would like to receive this information as soon as possible.

In the short term, it is possible to use reasonable estimates of the output purity as the basis for an assessment. The figures we deem most applicable to the Council's collections appear in bold in Table 3-2**Error! Reference source not found.**. The table also contains two quality criteria – the typical performance of separate collection and the reprocessor quality standards specified by the Resource Association. Where the MRF

[8] HM Government (2014) *The Environmental Permitting (England and Wales) (Amendment) Regulations 2014*, 10th February 2014, http://www.legislation.gov.uk/uksi/2014/255/pdfs/uksi_20140255_en.pdf

output is expected to meet or exceed the standard, it is highlighted in green; where it contains more contamination than the standard, this is highlighted in red.

Table 3-2: Contamination Rates Used in Model

Material	Typical MRF[9]	Quality Criterion: Separate Collection[10]	Quality Criterion: Reprocessor Specification[11]
News and PAMs	**9.8%**	1.1%	1.0%
Paper	**15.8%**	0.9%	3.0%
Card	**12.0%**	4.1%	3.0%
Glass	**10.4%**	0.4%	1.0%
Mixed Plastic	**15.8%**	2.9%	6.0%
Aluminium	**2.5%**	1.0%	3.0%
Steel	**6.2%**	3.0%	N/a

If the current co-mingled material outputs are similar to the averages they would fall below the expected quality of separate collection in all cases, and below the Resource Association specifications for all materials other than aluminium.

The Council may wish to obtain actual MRF output data to allow a reassessment of whether the material meets the quality criteria set out in Table 3-2.

Unless the MRF outputs prove in practice to be very pure, the Council could only conclude that separate collection would not *improve* recovery if it were to rely on a definition of "high quality" such as 1) a or b above; or, if it can establish that a high proportion of material feeds into closed loop recycling, the more challenging definition 1)c.

3.3 Conclusions

On the basis of the modelling undertaken and the information provided by the Council:

[9] Enviros Consulting (2009) *MRF Quality Assessment Study*, Report for WRAP, November 2009

[10] Zero Waste Scotland (2014) *Contamination in Source-separated Municipal and Business Recyclate in the UK 2013*, March 2014, http://www.zerowastescotland.org.uk/sites/files/zws/Contamination%20in%20source-separated%20municipal%20and%20business%20recyclate%20in%20the%20UK%202013%20240314.pdf

[11] Resource Association *Recycling Quality Specifications*, accessed 5 August 2014, http://www.resourceassociation.com/recycling-quality-specifications/

- it appears likely that a separate collection system combined with fortnightly residual waste collections would increase the amount of recycling collected, when compared to the baseline, but would be outperformed by a co-mingled fortnightly service alternating with residual waste (Option 3). Separate collection is therefore not "necessary" (in the technical language of the Regulations) to *facilitate* recovery of the four materials, provided that co-mingled collections are accompanied by fortnightly residual waste;
- depending on the view taken on the definition of "high quality recycling" it appears that separate collection may not necessary in order to *improve* recovery; but
- Additional information on the end destinations and uses of material from the Tilbury MRF-and specific output contamination data, if available in the future, may allow the Council to establish that its material meets additional definitions of "high quality" and increase its confidence that separate collection is not necessary in order to *improve* recovery.

There is a clear indication at this stage that separate collection may not be necessary to facilitate or improve recycling if the Council were to instead adopt Option 3. However, the Council may also wish to review whether separate collections would be practicable.

4.0 Practicability Test

Even where the separate collection of material is necessary in order to facilitate or improve recovery, it is only required under the law where it is deemed to be practicable. The Practicability (TEEP) Test examines whether separate collection would be technically, environmentally and economically practicable. It must be practicable in all three respects in order for it to be required. However, for something not to be practicable is a 'high hurdle'.[12] It is not the same as it being difficult or inconvenient.[13]

4.1 Technical Practicability

The European Commission guidance on the Waste Framework Directive says that:

> *"'Technically practicable' means that the separate collection may be implemented through a system which has been technically developed and proven to function in practice." (Section 4.3.4)*

[12] Defra, Letter to Local Authority Bodies on the Separate Collection of Waste Paper, Metal, Glass and Plastic, October 2013, p2. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/250013/waste-seperate-collection-201310.pdf

[13] Compare UK Recyclate Ltd and Others v Secretary of State for Environment, Food and Rural Affairs and Welsh Ministers, Royal Court of Justice, Case No. CO/6117/2011, paragraph 18

There is an interplay between technical and economic practicability. Many technical issues with separate collection – for example, concerns regarding access or the storage space householders have available – are capable of being addressed, provided that sufficient resources are dedicated to the task.

Thurrock previously operated a limited kerbside sort collection system, where glass and paper were separately collected. Although this is not a direct parallel with a system in which all four materials are collected separately, it strongly indicates that kerbside sort would be technically practicable in principle, especially given the history of more extensive kerbside sort collections being operated in both urban and rural settings.

It is recognised that any change of collection system will require a level of effort, and will mean both residents and householders familiarising themselves with a changed approach. However, the inconvenience of changing system and the need to train staff in its operation cannot in themselves make separate collection fail the technical practicability test – authorities often successfully change collection systems, and many operate a kerbside sort system.

A single co-mingled bin is widely perceived as more convenient for householders than a system in which materials must be sorted into two or more bins. The Waste Regulations Route Map advises that, in itself, the anticipated reaction of residents would not be a sufficient reason to deem separate collection not to be practicable, in part because the Waste Framework Directive explicitly seeks to "move towards a European recycling society", which suggests that a change in societal attitudes is envisaged.

The concept of "bin blight" has gained traction, particularly as regards areas where there is very limited space for residents to store bins. However, none of the options examined in the options appraisal necessitate more than two recycling containers, and each is used by many authorities. In each case, the containers are available that would not increase the current bin footprint. It is therefore difficult to argue that, in themselves, these factors make separate collection impracticable.

Co-mingled collections tend to progress more quickly than kerbside sort collections , since in the latter case operatives must spend time manually separate waste. However, this issue could potentially be addressed through route planning: by optimising collection rounds so as to avoid slow moving vehicles in particularly busy areas at certain times, the Council may be able to overcome the problem of increased congestion. Tackling congestion in this way would most likely cause some decrease in collection efficiency as it would limit routing possibilities, and could therefore lead to increased operational costs. However, this would make it an issue of economic, rather than technical practicability.

The Council will also naturally be concerned as to whether kerbside sort collections would raise health and safety risks for staff. Whilst this is a valid concern, it is difficult to argue that kerbside sort collections are so risky for staff as to make the practice technically impracticable. Numerous other authorities use the kerbside sort collection system and have not found themselves subject to particular health and safety concerns. The issue of how to minimise risks associated with kerbside sort collections has been

examined by the Health and Safety Laboratory, and whilst a number of areas of good practice were identified, no indication was given that this form of collection carried unacceptable risks.[14]

4.2 Economic Practicability

The European Commission guidance on the WFD says that:

> *"'Economically practicable' refers to a separate collection which does not cause excessive costs in comparison with the treatment [including recycling] of a non-separated [co-mingled or residual] waste stream, considering the added value of recovery and recycling and the principle of proportionality." (Section 4.3.4)*

'Economically practicable' does not therefore mean 'the cheapest option'. Separate collection will be economically practicable so long as the cost is not excessive, or disproportionate to the benefits. Except where any extra costs of separate collection are very small or very large, assessing 'proportionality' is not straightforward. It may not be sufficient to show, for example, that the extra costs would marginally exceed the current waste budget. It may even be proportionate to consider cuts to other discretionary expenditure in order to meet the legal obligations regarding separate waste collection.

4.2.1 Modelling Results

Eunomia has used its collection options appraisal tool in order to assess whether separate collection of is economically practicable. The results of the economic modelling are set out in Table 4-1.

[14] Health and Safety Laboratory (2006) *Manual Handling in Kerbside Collection and Sorting of Recyclables*, 2006, www.hse.gov.uk/research/hsl_pdf/2006/hsl0625.pdf

Table 4-1: Financial Performance of Collection Systems (£s)

Material	Baseline – Fully Co-mingled (Weekly)	Option 1 – Kerbside Sort (food and garden combined)	Option 2 - Kerbside Sort (separate food)	Option 3 – Co-mingled (Fortnightly)	Option 4 – Two-Stream, Fibres/ Containers (Weekly)	Option 5 – Two Stream, Fibres/ Containers (Fortnightly)
Vehicles[15]	1,449,077	1,279,937	1,143,281	888,366	1,383,713	1,046,649
Staff	2,056,185	2,066,144	1,827,757	1,201,931	1,980,030	1,201,931
Additional Depot Costs	-	50,000	50,000	-	-	-
Receptacles[16]	581,923	624,165	680,989	581,923	624,165	624,165
Material Income (Tilbury)[17]	165,596	-573,306	-573,306	183,995	-26,170	-23,791
Organics Processing	630,827	630,827	553,665	312,888	630,827	312,888
Residual Treatment	4,199,156	4,132,311	3,914,679	4,370,307	3,968,984	4,442,638
Net Cost (at Tilbury prices)	**9,082,763**	**8,210,077**	**7,597,065**	**7,539,410**	**8,561,548**	**7,604,479**
Material Income (market)[18]	165,596	-1,027,955	-1,027,955	183,995	-286,490	-260,445
Net Cost (market)	**9,082,763**	**7,855,429**	**7,067,934**	**7,364,928**	**8,301,229**	**7,193,343**

The modelling undertaken shows that the lowest cost would be achieved through the introduction of Option 2, provided that expected material incomes could be achieved and a cheaper outlet found for separate garden waste. Kerbside sort with mixed garden

[15] Vehicle costs in all options take account of the amortised capital cost of the vehicles used, allowing comparison on a like for like basis.

[16] Receptacle costs in all options take account of both the replacement cost and the amortised capital cost of the containers used, allowing comparison on a like for like basis. In cash terms, the Council's spend on replacement bins will be much lower.

[17] Material incomes assume all dry recycling is delivered to Tilbury MRF.

[18] Material incomes for separately collected materials assume expected market rates.

and food collections (Option 1) is less expensive than the baseline service, but significantly more expensive than alternate weekly co-mingled collections (Option 3) on either set of material price assumptions.

These findings make the question of economic practicability somewhat complex to resolve. Looked at in isolation, the separate collection of dry recyclables would impose an additional cost on the Council, compared with alternate weekly co-mingled collections. Only if the opportunity is taken to collect food waste separately on the separate collection round, resulting in the diversion of additional food waste and allowing garden waste to be treated by a less costly process would separate collection be the cheapest option over all. Clearly, the requirements relating to separate collection of dry recyclables cannot in themselves mandate a change in the way organic waste is collected. However, it is important to consider optimised collection systems, and it could be argued that altering the organics system might form part of the optimisation of kerbside sort. In the absence of definitive guidance, it is difficult to state that either approach would be unreasonable.

However, if the Council proposes to argue that separate collection is not economically practicable, it would need to evidence not just that there would be additional expense and financial risk under separate collection, but that this would represent an excessive operational cost.[19] This entails consideration of the balance between the costs and the benefits (including the environmental benefits) of separate collection; and of the Council's financial position, which will have a considerable bearing on whether it could reasonably meet any additional costs. All of the options appear to represent a saving against the baseline, and the Council would need to carefully consider whether it could evidence that only the cheapest option was affordable.

Alongside the operational costs of different collection models, the adoption of a kerbside sort system in place of the co-mingled system might result in transitional costs such as recruiting staff, setting up new materials contracts and legal and compensation costs associated with halting or amending the current MRF contract. The Council may wish to identify these costs. We would recommend that operational costs should always be viewed separately from transition costs in assessing economic practicability. However, it appears legitimate for an authority to recognise that, operationally, kerbside sort might be economically practicable, whilst taking the view that contractual, infrastructural or capital considerations make change impossible in the short term.

The Council has confirmed that Tilbury MRF is able to accept separately collected materials, and therefore separate collection could be implemented without the need for the contract to be terminated. The prices the Council would receive if it were to send separately collected materials to the MRF have been included in the model, but at these prices separate collections are more costly than Option 3. However, these prices are

[19] European Commission (2012) *Guidance on the Interpretation of Key Provisions of Directive 2008/98/EC on Waste*, June 2012, http://ec.europa.eu/environment/waste/framework/pdf/guidance_doc.pdf

significantly lower than expected market values. In deciding whether to accept Tilbury's prices or whether to instead market its own materials the Council could legitimately look to weigh the additional potential income against any costs it might incur in exiting the contract.

As the Council operates an in-house collection service, the net capital outlay required to update the existing vehicle fleet, may in the short term, make a change of collection system problematic.

Economically, kerbside sort collections seek to balance an investment in additional collection vehicles and staff costs against a saving in sorting costs and higher material incomes. As a result of its additional investment, the economics of kerbside sort are more heavily dependent on securing good material incomes than, typically, is a co-mingled collection. If the Council were to opt to market their separately collected materials, this would expose the Council to a degree of financial risk associated with future material values, from which it might be shielded if it were to supply separately collected materials to its current MRF. In comparison with Option 3, if market values were to fall by 10% Option 1, would be 8.3% more expensive, but Option 2 would remain cheaper unless a fall of 30% was to occur.

4.2.2 Conclusions

On the basis of the modelling undertaken and the information provided by the Council:

- it appears that separate collection options are available that are cheaper than the baseline service. However, separate collection would only be cheaper than an alternate weekly co-mingled system (Option 3) if (a) the Council opts to market its own materials instead of delivering them to its current MRF, and (b) it is able to take the opportunity to make savings on organic waste processing;
- the Council cannot therefore straightforwardly argue that separate collection would represent the 'excessive cost' that guidance indicates makes separate collection not economically practicable;
- while allowing that, looking just at dry recycling, there are forms of co-mingled collection that outperform separate collection financially, given that separate collection would still be cheaper than the baseline, the Council would need to establish that the cost was not affordable in order to show that separate collection was not economically practicable;
- aside from the operational cost considerations, the Council may be able to argue a change of collection systems is problematic as result of the need for capital expenditure on vehicles and containers, or the costs of exiting its contractual arrangements with the MRF in order to access market prices for separately collected recyclables, will entail incurring substantial transitional costs.

The Council may wish to reach a view on the extent of any additional knock-on costs (e.g. additional litter and street cleansing costs) that should be factored into the economic assessment of either collection system. However, such costs would need to be substantial and highly plausible in order to make a clear difference to the results of the economic modelling.

4.3 Environmental Practicability

The European Commission guidance on the WFD says that:

> *"'Environmentally practicable' should be understood such that the added value of ecological benefits justify possible negative environmental effects of the separate collection (e.g. additional emissions from transport)." (Section 4.3.4)*

A system will therefore be environmentally practicable if the benefits from increased or improved recycling outweigh any negative impacts. However, this test is likely to be met by almost any recycling collection system, since the benefits achieved through recycling should almost always outweigh the environmental impacts of its collection and processing.

4.4 Modelling Results

The results of the environmental modelling are shown in Table 4-2.

Table 4-2: Environmental Benefit of Collection Options (Tonnes of CO_2e/yr)

	Baseline – Fully Co-mingled (Weekly)	Option 1 – Kerbside Sort (food and garden combined)	Option 2 - Kerbside Sort (separate food)	Option 3 – Co-mingled (Fortnightly)	Option 4 – Two-Stream, Fibres/ Containers (Weekly)	Option 5 – Two Stream, Fibres/ Containers (Fortnightly)
Dry Recyclables	5,378	7,184	7,184	6,004	7,458	6,780
Organics	502	502	1,127	388	502	388
Transport	-124	-92	-77	-72	-108	-72
MRF	-225	-	-	-250	-116	-105
Net Carbon Benefit	**5,531**	**7,594**	**8,233**	**6,070**	**7,736**	**6,990**

As anticipated, each collection system meets the minimum practicability requirement of its costs being outweighed by its benefits. The greatest net benefit comes from kerbside sort, including a separate food collection service (option 2), yielding 48.8% more net carbon benefit per year than the current baseline service. Option 1 also has a significant net carbon benefit of 37.3%. Both separate collection systems also have significantly higher annual carbon benefits than Option 3: Option 1 by 25% and Option 2 by 36%. This greater net environmental benefit is due to the higher purity of the separately collected material, the savings from not using a MRF and (in the case of Option 2) the increased quantity of organic waste captured and treated.

4.4.1 Conclusions

The results of the modelling show that separate collection is environmentally practicable, and that each of the separate collection options outperforms co-mingled approaches by a substantial margin.

5.0 Recommendations

5.1 Overview

At present, a good deal remains uncertain regarding how the Waste Regulations will be enforced. The Environment Agency has begun to outline its approach to enforcement, but has not yet indicated how active it proposes to be in its role as the enforcement body for this legislation; nor have any third parties disclosed an intention to seek to clarify the requirements of the law by pursuing legal action against authorities.

As a result, there is a risk that some authorities may act in anticipation of enforcement action that may not in practice be forthcoming; there is also a risk that some authorities may do too little, and find themselves subject to attention from either the Environment Agency or third parties that results in them needing to make changes under pressure. For authorities that have followed the Waste Regulations Route Map process and acted on the findings, the likelihood of these risks emerging is in all probability low, although the impact of enforcement, and the need to make change in some haste, may be high.

Our recommendations here are intended to set out a course of action that the Council can pursue that will help to minimise these risks. Authorities that have set out a clear path towards compliance will have a reasonable position to rely on if challenged regarding their approach to the Regulations, but can avoid taking action that may be precipitate, and in the Council's situation this may be an advisable course of action.

5.2 Necessity Test

The analysis carried out indicates that separate collection of the four materials:

- combined with fortnightly residual waste collections would increase the amount of recycling collected, when compared to the baseline, but would be outperformed by a co-mingled fortnightly service alternating with residual waste (Option 3). Separate collection is therefore not "necessary" (in the technical language of the Regulations) to *facilitate* recovery of the four materials, provided that co-mingled collections are accompanied by fortnightly residual waste; and
- is likely to lead to an improvement in the purity of most materials compared with current MRF outputs. However, there is an argument that there are definitions of "high quality" that the materials produced by the MRF would meet and so in the terms set out in the law, would not be necessary in order to *improve* recovery.

Due to recent amendments to the Environmental Permitting Regulations, it may be that output quality data will become available for the MRF in the near future. The Council

may wish to revisit the necessity test when this is the case to establish whether there are additional definitions of “high quality” that it can demonstrably meet.

5.3 Practicability Test

The work conducted in the course of this project strongly indicates that separate collection in Thurrock is:

- technically practicable, since kerbside sort collections have been implemented in authorities similar Thurrock; and
- environmentally practicable, since separate collection with a separate food collection service lead to a 48.8% net carbon benefit compared with the baseline and also outperforms alternate weekly co-mingled collections.

The question of whether separate collection is economically practicable is rather more complex to answer due to the particular circumstances of the Council. On an accruals basis, separate collection outperforms the current collection system. However, looked at in isolation, the separate collection of dry recyclables would impose an additional cost on the Council, compared with alternate weekly co-mingled collections (Option 3), whether it delivers separated recycling to its current MRF or obtains higher prices on the open market. Only if the opportunity is taken to collect food waste separately on the separate collection round, resulting in the diversion of additional food waste and allowing garden waste to be treated by a less costly process would separate collection be the cheapest option over all.

However, since separate collection represents a saving against the baseline, and is cheaper than many other options, the Council would need to carefully consider whether it could evidence that only the cheapest option was affordable.

However, there is an argument that separate collection may not be feasible in the short term based on the findings that:

- in order to access market prices for separately collected materials, the Council may have to exit its MRF contract, which would be likely to mean incurring a cost; and
- the Council would need to meet the capital costs of the new vehicles and containers that a new collection system would entail. Whilst it is already contemplating a service change, a move to less frequent co-mingled collections would not necessitate acquiring a new type of vehicle. Although some value could be realised from existing assets that were no longer required, the transition to separate collection might mean disposing of vehicles outside the currently planned timescale. Separate collection would mean incurring greater vehicle capital costs, and perhaps incurring costs sooner than currently planned, which might be financially problematic. Without access to capital finance, a transition to separate collection would have to be delayed, or delivered by alternative means.

APPENDICES

A.1.0 Appendix 1: Key Assumptions

A.1.1 Material Incomes

Table A-1: Material Incomes Modelled

Material	Tilbury Material Income per Tonne (£)	Market Material Income per Tonne (£)
Mixed Paper and Card	-15	-50
Paper	-90	-90
Card	-70	-70
Glass	25	-15
Plastic	-40	-150
Steel	-40	-125
Aluminium	-40	-780
Garden Waste (Windrow)	33.91	
Food Waste	52.78	

A.1.2 Breakdown of Material Incomes

Table A-2: Modelled Income per Material

Material	Baseline – weekly Co-mingled	Option 1- Kerbside Sort (weekly)	Option 2 – Kerbside Sort with Food (weekly)	Option 3 – Two Stream with Glass Separate (Fortnightly)	Option 4 – Two Stream, Fibres/ Containers (Fortnightly)
Commingled	11,960	-	-	-	-
Commingled excl. glass	-	-	-	7,827	-
Mixed Containers	-	-	-	-	5,046
Mixed Paper and Card	-	-	-	-	6,316
Paper	-	4,891	4,891	-	-
Card	-	1,523	1,523	-	-
Glass	-	3,180	3,180	2,937	-
Plastic	-	871	871	-	-
Steel	-	580	580	-	-
Aluminium	-	204	204	-	-

A.1.3 Carbon Factors

Table A-3: Breakdown of Carbon Factors (Tonnes of CO2 emitted/saved)

Material/Activity	CO_2 Impact
Single Stream	-0.49
Containers Only	-0.92
Mixed Paper & Card	-0.34
Glass	-0.20
Plastic	-1.17
Steel	-1.83
Aluminium	-8.70
Food Waste	-0.16
Garden Waste	-0.42

Note: All figures are based on savings per tonne of virgin material replaced, except as indicated.

A.1.4 Breakdown of Receptacle Costs

Table A-4: Unit Costs per Receptacle Type

Receptacles	Unit Cost (£)	Replacement Rate (%)	Total per Annum(£)
240L Bin	19.00	4.0	3.00
55L Box	2.90	8.0	0.65
23L Kerbside Caddie	3.00	8.0	0.67
5L Kitchen Caddie	1.10	5.0	0.27

A.1.5 Vehicle Costs

Table A-5: Detailed Costs per Vehicle Type

Vehicle Type	Unit Cost (£)	MPG	Total Annualised Cost (£)
Refuse RCV	146,000	4	38,007
Recycling RCV	146,000	4	38,007
Recycling Split RCV	160,000	4	41,589
Garden Waste RCV	146,000	4	38,007
Recycling RRV	90,000	10	23,228