Surrey Waste Partnership

Waste (England and Wales) Regulations 2011 (amended)

Compliance assessment

Waverley Borough Council

Introduction

New regulations are coming into force which aim to promote high quality recycling and move us towards becoming a recycling society.

The Waste England and Wales Regulations 2011 (as amended) (the 'Waste Regulations') require any organisation that collects waste to:

- Comply with the waste hierarchy
- Collect paper, metal, plastic and glass by separate collection (i.e. separate containers for different materials), by January 2015, unless:
    - It is not necessary to 'facilitate or improve recovery' and,
    - It is not technically, environmentally and economically practicable to do so

Failure to comply with the Waste Regulations could result in a judicial review of an authority's collection systems, possibly resulting in:

- Payment of damages & legal costs to the claimant (likely to be a reprocessor or group of reprocessors)
- Compliance, stop and/or restoration notices from the Environment Agency

The Waste Regulations are complicated and there is much uncertainty around how to comply with them. Defra have not provided any guidance, however a WRAP led consortium of local government networks have produced a 'Route Map'[1] to help local authorities assess their compliance with the regulations. This has been described by the Environment Agency as good practice.

Surrey Waste Partnership (SWP) has used the Route Map as a basis for assessing the compliance of each Waste Collection Authority (WCA) with the Waste Regulations. Surrey County Council (SCC) undertook the compliance modelling using data supplied by participating WCAs.

This report presents the results of the compliance modelling for Waverley Borough Council (WBC).

[1] Available here: http://www.wrap.org.uk/content/requirements-waste-regulations

Methodology

The Route Map advocates using three key 'tests' to see if an authority is complying with the Waste Regulations. These are the:

- Waste hierarchy test – to test if each material collected by the WCA is being managed as far up the waste hierarchy as possible
- Necessity test – to test if each of the four key materials (glass, metal, paper and plastic) needs to be collected by separate collections in order to 'facilitate or improve recovery'
- Practicability test – to test if separate collections are technically, environmentally and economically practicable for each of the four key materials

There are many overlaps between the tests advocated by the Route Map, particularly around economic and environmental impacts. We have therefore undertaken comprehensive modelling work for WBC which compares the economic and environmental impacts of:

- Its current waste collection system
- An optimised comingled collection system
- An optimised separate collection system

The results of the modelling have produced data which tell us if the current system or an optimised comingled system is compliant under each test when compared against optimised separate collections (which act as the benchmark for compliance).

The modelling takes a whole system approach, looking at the economic and environmental impacts right from the provision of bins through to the reprocessing of materials into new products. Figure 1 summarises the main areas where costs (in £ to the WCA and SCC) and environmental impacts (total CO_2 equivalent) were estimated during the modelling.

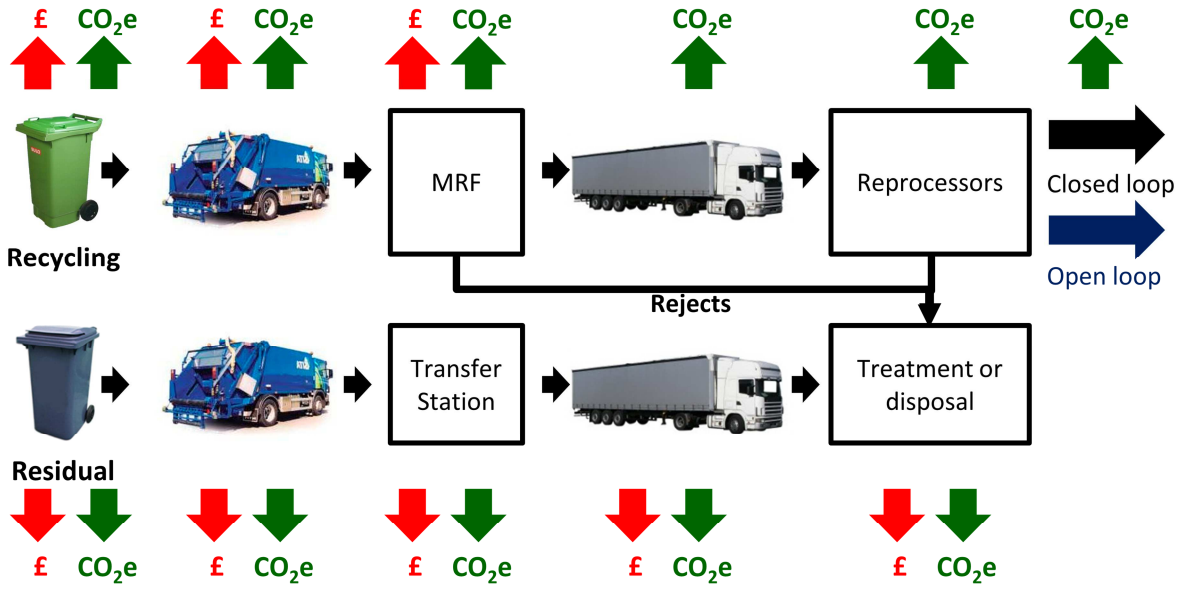

Figure 1: Summary of the variables modelled for a fully comingled collection system

The modelling was done by adapting two existing models:

- WRAP's Kerbside Assessment Tool (KAT) to model collection costs
- DEFRA's greenhouse gas emissions tool to model environmental impacts

Current collection system
WBC's current collection system collects the following waste streams using specific vehicles:

1. Fortnightly comingled collections of paper, cardboard, plastics (bottles and pots/tubs/trays), glass, metal (cans/tins) with separated food in split bodied RCVs.
2. Refuse (fortnightly) with separated food in RCVs with food pods.

Actual data from the year 2013/14 for the current collection system was provided by WBC and used to model the system's impacts in the following way:

- KAT was used to determine the collection cost of the current system, the tonnages of each material going for recycling or disposal and the fuel consumption. The fuel consumption was used to estimate the environmental impact of collection.
- Gate fee information for the MRF, material reprocessors and residual waste treatment facilities was combined with tonnage information from the previous stage to calculate the management cost of the waste materials. The environmental impacts of these facilities were calculated using energy consumption figures (per tonne) for each facility, where available. Suitable figures from similar facilities were used where actual figures were not available.
- Onward transport routes and methods were combined with tonnage and fuel consumption data from the previous stage to estimate the environmental impact of onward transportation
- Finally, DEFRAs greenhouse gas emissions factors were used with emissions data from primary research to determine the environmental impacts of reprocessing materials at their final destination

Optimised collection systems
The optimised collection systems were modelled in the same way as the current system but with the following key changes:

- Upper quartile recycling rates from a WRAP database were modelled for each type of optimised system
- Both optimised systems operate on a 'single pass' basis with all materials including food collected on the vehicle
- For the optimised comingled system, the same collection vehicles and frequencies were modelled as used by the current system
- For the optimised separate system, a kerbsider vehicle with food compartment was modelled. Recyclable collections were weekly because of the relatively small size of the recyclables boxes, but residual collections were fortnightly.
- For both systems the final destination of each material was modelled as being the nearest reprocessor that did closed-loop recycling

Boundaries of the assessment
The assessment was undertaken for WBC's core collection rounds only, as these represent by far the largest part of its waste collection service. It was not done for any other collections.

Outputs
The outputs of the modelling for the current system and both optimised systems were used in the three Route Map tests to assess compliance against the Waste Regulations.

Results

Necessity test
The necessity test is intended to determine if separate collections are required to 'facilitate or improve' recovery, i.e. deliver more 'high quality recycling'. The Route Map says that high quality recycling can be defined as closed-loop recycling i.e. reprocessing a material back into a product of similar quality to what it was originally.

The purpose of this test is, therefore, to determine the tonnages of material sent to closed loop recycling by each system. For the avoidance of doubt these tonnages do not include waste material removed as rejects along the way at sorting and reprocessing facilities. Table 1 shows the results of this assessment.

Table 1: Tonnes of material sent to closed loop recycling

Material	Current	Separate	Comingled
Paper	6,721	5,795	6,734
Glass	0	1,410	0
Metal	417	369	431
Plastic	834	1,371	1,543
Total	**7,972**	**8,945**	**8,707**

The current collection system produces the least closed-loop recycling overall. This is mostly because:

- WBC currently has low capture rates for plastic, these are modelled to be much higher under the other two systems
- From the data provided for the current system, it was unclear if any of the glass from WBC's MRF was sent to closed-loop recycling, so it was assumed that it was all sent to open-loop (the same assumption was used for the optimised comingled system)

The separate collection system sends the second-most material to closed-loop recycling overall, which is predominantly because a proportion of its glass goes to closed-loop recycling, which is not assumed to happen under the other systems. It also sends a larger proportion of the other materials to closed-loop recycling as there are no MRF rejects, however this is tempered by the fact that it captures a lower tonnage of some materials than the other systems.

The optimised comingled system sends the most closed-loop material to recycling for all materials except glass (which is all assumed to go to open-loop recycling). This is because this system captures the highest tonnage of each material, even accounting for the fact that some of this is lost as rejects at the MRF.

Discussion

The necessity test requires an answer to the question: 'for each material, is separate collection necessary to facilitate or improve recovery?' The results in Table 1 suggest that, when compared to the current system; separate collections are necessary for glass and plastic but not paper and metal. However, this is not a fair comparison as the separate system is based on achieving optimised capture rates for each material. A fairer comparison is with the optimised comingled system, which also achieves optimised capture rates. This comparison suggests that separate collections are not necessary for paper, metal or plastic, because they produce less closed-loop recycling. However they are necessary for glass, assuming that all glass from the MRF goes to open-loop recycling.

TEEP test

If separate collections pass the necessity test for any of the materials the Route Map suggests that a TEEP test should be undertaken.

The TEEP test determines if separate collections are practicable technically, environmentally and economically. Separate collections should be introduced if they pass all aspects of the TEEP test, but a failure on any one of the criteria means that they are not required.

Technical

It has been assumed that separate collections are technically practicable as they are successfully operated in many authorities throughout England which have a wide-range of geographies. There may be a small number of difficult to reach properties in Waverley where separate collections might not be possible but these have not been included as part of the test, which focuses on the core kerbside collection.

Environmental

The environmental impact of each system has been calculated for all key materials and the remaining residual waste, from production of the waste through to reprocessing or final disposal. The results are shown in Table 2 in terms of CO_2 equivalent emissions.

Table 2: Annual environmental impacts (CO_2e) of collection and management

Collection system	Production and treatment	Transport	**Total**	Average/tonne
Current	59,366,421	1,458,203	**60,824,624**	2,088
Separate	63,344,162	762,593	**64,106,755**	2,201
Comingled	56,753,076	1,391,388	**58,144,464**	1,996

The results in Table 2 show that separate collections have the highest environmental impact of the three systems. This is because separate collections recycle the least material, meaning that more material becomes residual waste which has a much higher environmental impact.

The optimised comingled system recycles the most material which is the main reason why it the lowest overall environmental impact. It also assumes that recyclables are sent to the closest closed-loop reprocessor resulting in lower impacts from haulage than the current system. However, Table 2 shows that the difference this causes is small because transport emissions are relatively insignificant when compared to emissions from production and treatment.

The current system has the median environmental impact.

From looking at the totals, we can conclude that optimised separate collections are not environmentally practicable when compared to either the current system or an optimised comingled system.

Economic

The economic test compares the costs of each system in terms of collecting and managing the four key materials and the remaining residual waste.

The costs are modelled on a 'cost to the taxpayer' basis and include costs incurred by both WBC and SCC. Recycling credits are not included as they are a cost neutral financial mechanism that is a financial transfer between two authorities. Table 3 shows a summary of the costs for each system with a split between collection and management to provide some indication of where costs are incurred.

Table 3: Annual costs of managing each material

Collection system	Collection	Management	Provision of containers	**Total**
Current	£2,306,141	£2,069,836	£708,214	**£5,084,192**
Separate	£3,020,524	£2,019,028	£617,000	**£5,656,552**
Comingled	£2,306,316	£1,981,306	£672,605	**£4,960,227**

Table 3 shows that a separate collection system is estimated to be by far the most expensive of the three; £572,000 more than the current system and £696,000 more the optimised comingled system.

An interesting pattern is observed in the detail of the results. For collection costs only, the current and optimised comingled systems are far cheaper than optimised separate collection. This is due to the larger number of vehicles that are required to operate separate collections. However, separate collections perform well for management costs as a result of gaining income for many of the recyclables collected, whereas under the comingled systems a gate fee must be paid to have these mixed recyclables sorted. This difference is tempered though by the separate collections having larger quantities of residual waste to manage.

Despite being very similar systems, optimised comingled costs less than the current system, because it captures more material and therefore has less expensive residual material to manage.

It is important to note that, according to the Route Map, economically practicable does not necessarily mean the cheapest option, and separate collections could still be practicable (when compared to comingled) if the cost is not excessive or disproportionate

to the benefits. However, as separate collections appear to have no environmental benefits over the other two systems, and are significantly more expensive, it could be strongly argued that separate collections are not economically practicable in this case.

Summary of the TEEP test
The sections above indicate that, while optimised separate collections are likely to be technically practicable, they are not environmentally or economically practicable when compared to either the current system or the optimised comingled system.

Waste hierarchy test
Unlike the necessity and TEEP tests, the waste hierarchy test applies to all materials collected by a WCA and the law is already in force now i.e. rather than 1 January 2015.

Under this test, each material collected by the WCA is assessed to check it is managed as high as reasonably possible on the waste hierarchy[2], and that any departures from the hierarchy are suitably justified. Departures from the hierarchy can be justified by any of the following principles: environmental protection, technical feasibility, economic viability, protection of resources, human health or social impacts.

To undertake the hierarchy test, we must first set a 'reasonable' hierarchy position for each material that is collected. Prevention is the ideal position, and both WBC and SWP are actively seeking to prevent waste materials arising via communication campaigns and the lobbying of central government and waste producers. After prevention, the next highest reasonable hierarchy position was chosen and compared against the actual position on the hierarchy where the waste is being managed under the current system. Any departures from the hierarchy were then justified where possible. The results of this test are shown in Appendix 1.

Appendix 1 shows that all materials, including the four key materials, are either being managed in compliance with the waste hierarchy or are justifiable departures.

Conclusions

The results of this assessment indicate that separate collections could be necessary to facilitate the high quality recycling of glass, but not the other key materials. However, they are neither economically or environmentally practicable when compared to either the current system or an optimised comingled system. The current system also appears to be operating in accordance with the waste hierarchy. Therefore this report does not recommend any changes to the format of the current collection system to ensure compliance with the Waste Regulations.

However, it may be worthwhile giving further consideration to glass (where separate collections may be necessary under the necessity test). To ensure full compliance, a further system, where glass is collected separately, could be modelled with the results compared against the other systems.

It is also important to note that WBC would benefit from increasing the current system's capture of the four key materials to the levels modelled for the optimised comingled system. This is because:

[2] Guidance on the waste hierarchy available here: https://www.gov.uk/government/publications/guidance-on-applying-the-waste-hierarchy

- More plastics would be recycled by the current system than by optimised separate collections, strengthening the case for Waste Regulations compliance.
- £88,000 per year could be saved through reduced management costs.

On-going compliance

The Route Map is clear that 'assessing whether you comply with the law is not a "once and for all" task' and reassessment must take place when key factors change, such as:

- The availability of recycling techniques and accessible facilities for materials that are currently difficult to recycle
- The cost of vehicles
- The cost of staff, recyclate values and the costs of energy recovery or disposal.
- Collection, treatment or vehicle contracts coming to an end

WBC must keep an eye on variables such as these and reassess compliance when necessary using the best available data and modelling tools.

Another key variable that WBC must consider in the near future is the availability of new data on the quantities of contamination in MRF outputs as a result of the MRF regulations[3]. WBC will need to check that the levels contamination reported by their MRF operators is similar to the levels included in the Waste Regulations modelling. Re-modelling may be required if the differences are significant. The first quarter MRF sampling results should be available in January 2015.

SWP is currently revising its joint waste strategy which includes actions to ensure ongoing compliance with the Waste Regulations. Performance against these actions will be checked at least annually as part of the strategy monitoring process, so all partners will be required to consider the need for a Waste Regulations reassessment on a regular basis in order to demonstrate compliance with the strategy.

[3] Available here: http://www.legislation.gov.uk/uksi/2014/255/pdfs/uksi_20140255_en.pdf