

DEFRA

Waste Implementation Programme

Local Authority Support Unit

Waste Composition Audits

2004/2005 Programme

Entec

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Waste Composition Audits

Introduction

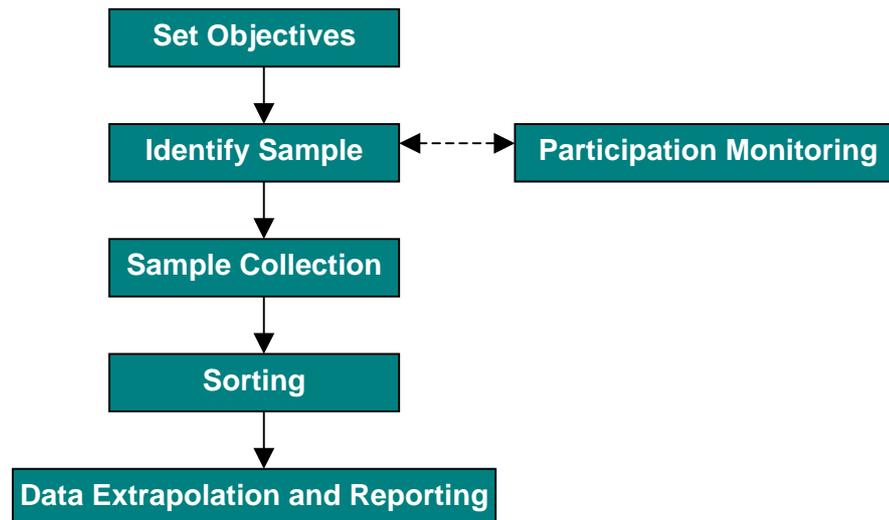
In the autumn of 2004, DEFRA assigned Entec (through LASU's Direct Consultancy support framework) to assist a number of Local Authorities across England with waste composition audits. These audits were designed to categorise household waste from regular collections and bring facilities (Civic Amenity and Recycling Centres).

The outputs provided valuable background information on the types of waste being generated within the local area and have been used to inform:

- Waste procurement projects
- Kerbside Collection Performance
 - The effectiveness of current kerbside collection schemes
 - The reasons behind non participation in kerbside collection schemes
 - Allowing focus of communication strategies on a particular ACORN category to help improve waste recycling
 - Levels of Contamination within green waste
- The development of further kerbside collection schemes
 - Introduction of new recycling schemes for the residents of certain localities within a district that show a high participation potential;
 - the inclusion of biodegradable wastes to assist with LATS targets.
- Assist with Strategy Development

Each of the studies undertaken by Entec under the DEFRA 2004/05 programme has been undertaken in accordance with DEFRA's guidance document.¹ In summary, the tasks involved in a waste composition audit are:

¹ Waste Composition Analysis – Guidance for Local Authorities 2004.



Barriers to Improving Performance

The logistics of setting up the sampling exercise and selecting the correct sample, in terms of both size and representation is no easy task but is the key to providing meaningful, representative and flexible data suitable for a range of future uses. The following barriers were highlighted whilst undertaking audits for the 2004/05 programme.

Objectives of Study

The objectives of the audit in terms of what the results will be used for **define the level of detail and level of accuracy** required. For waste procurement projects, this may require input from potential contractors, or for the development of kerbside schemes, input from education/campaigns officers. A lack of consultation time and management of individual requirements is a common problem and leads to criticism of the audit results.

Timing of Audits

The timing of audits greatly influences the outcome of a waste composition study. Timescales requested by the authorities are not always possible to adhere to particularly when these are close to events that affect waste composition e.g. directly after Christmas (when waste composition is likely to be abnormal).

The time allowed for sample identification is often underestimated. As with all projects, preparation is key to project success. Allowing insufficient time at the preparation stage can lead to unrepresentative results or the need for re-sampling causing project delays.

Information pertaining to households and collection rounds

It is critical that the household profile and collection arrangements for the authority are understood. Every household in a local authority will behave slightly differently with regard to waste management habit. A waste composition audit is unable to capture waste from each individual household and therefore a sample must be developed that includes for all of the

household types within the authority and can be extrapolated to represent the overall household waste composition. Although household types can be readily identified for sampling, **the audit needs to be informed by what service is provided to each of those households and when this would normally be collected (day and rough time)**. The availability of up to date accurate data is not always available leading to a risk of missed collections and inaccurate results. The format of data can also lead to delays in sample identification. A number of authorities hold no electronic data on rounds and routes. To be able to match demographic profiles with rounds, data has to be entered manually into spreadsheets so that data interrogation and manipulation is possible.

Householder Behaviour

The introduction of kerbside collection schemes means that there is a variation in residual waste composition between households that do and do not participate. This has to be taken into consideration to avoid the output from the study being an inaccurate representation of the authorities waste composition.

Co-operation of Council staff and Sub-contractors

Problems and delays can occur where parties involved in the audit do not fully understand why the audit is taking place and exactly what is involved.

Identification of Appropriate Sorting Categories

Once the waste has been collected, it is critical that it is sorted into materials categories that relate to the output requirements of the audit. For example, an authority may select many secondary sorting categories aimed at identifying specific materials to be targeted by a new kerbside collection scheme. The more secondary sorting categories are selected, the smaller the sample size and the less accurate the results will be once extrapolated.

Understanding the Audits Results

Statistically, the smaller the sample size, the less accurate the results and the greater the margin for error. Typically a waste composition audit will survey less than 1% of households in a district. The accuracy of the output is often misunderstood by authorities and can lead to the development of major waste treatment facilities based around projections relating to one audit and one material stream.

Overcoming These Barriers

From the studies undertaken within the 2004/05 programme, advice can be given on how to overcome the barriers discussed above.

Objectives of the Study

Sufficient time has to be allowed to ensure that **all parties** likely to benefit from the results of the audit are **included in its development**.

Timing of Audits

Guidance² recommends that in order to gain a true representation of waste arisings, a waste audit needs to **take account of seasonal variations** in waste composition. For example, a study undertaken in winter is likely to record much less green/garden waste than a study undertaken in summer months. Seasonal studies are therefore required that avoid, as far as possible, specific times of increased waste generation e.g. Christmas (paper and card), Valentines Day (green waste), holiday periods (where tourism is a major economic factor).

Information Pertaining to Households and Collection Rounds

The audits need to be designed to ensure a fair representation of households in an area with regards to geography, demographics, lifestyle, etc. ACORN is a geo-demographic classification tool that classifies each household in the UK, based upon significant social factors, consumer behaviours, etc into 5 categories, 17 groups and 56 types.

In broad terms, the 5 ACORN categories are:

1 - Wealthy achievers 2 - Urban prosperity 3 - Comfortably off

4 - On moderate means 5 - Hard pressed

This ACORN data has to be purchased specifically for the study and is available at 3 different levels: Street level, Postcode level and Individual Property level. It is vital that the authority provides at least an example of the format of their collection rounds data at commencement of the study, since the level of ACORN data purchased must be comparable with the format of the collection rounds. Many authorities are now able to provide this data in GIS format (comparable with individual household data), but some develop their rounds manually so can only provide street level data.

The **provision of electronic data** from authorities helps to speed up the sample design and provides a greater level of accuracy. Ideally, this data would include information about waste collection dates and times (as well as which householders are participating in the recycling schemes).

Householder Behaviour

The issue of participation in a kerbside scheme reflecting an unbalanced view of the authorities waste composition is dealt with by undertaking **a participation study** prior to the sorting exercise. This allows for the identification of specific households for sampling and for samples of residual waste from both groups to be analysed separately.

In most cases, householder behaviour relating to participation in recycling schemes is unknown. For some studies in the 2004/05 programme, a comprehensive assessment of set-out and participation rates for each of the kerbside recycling schemes operating within a collection authority was undertaken, either by Entec or by the authority. Guidance on completing such studies is available from WRAP³.

² Waste Composition Analysis – Guidance for Local Authorities 2004

³ Waste Resource Action Programme www.wrap.org.uk

Co-operation of Council staff and Sub-contractors

Issues regarding co-operation can be resolved early in the study by **holding a briefing session for all parties** likely to be involved in the audit. This will include the consultant, Director of waste for the authority, waste officers, education/campaigns officers and sub-contractors/operators of facilities affected.

Identification of Appropriate Sorting Categories

A generic list of primary and secondary sorting categories is provided within DEFRA guidance⁴. This can be augmented to take account of specific needs, such as material size/grade, or materials to be targeted by a new kerbside collection campaign. However an authority must **be realistic about how accurately minor material types will be represented** within the results and the additional time required to undertake the sorting exercise. Discussion of individual needs between the consultant undertaking the audit and the authority will help to identify which materials can reasonably be added.

Understanding the Audit Results

It is important that the audit report identifies the limitations of the data it contains and that these are clearly understood by all users of the report. This will prevent the misinterpretation of results and reliance on data for which the degree of accuracy is low.

What Not to Do

A lack of data on an authorities waste composition, or data that does not reflect the impact that recent efforts in recycling and material diversion have had on residual waste composition is limited in value. It should not be used as a basis for strategic or operational decisions within an authority as it does not accurately represent the influence of waste management activities. Up to date and flexible information however provides valuable data that can be used to inform a number of important decisions (as listed within the Introduction of this report). During a waste composition study, there are a number of issues that can prevent the study from providing effective results. These include:

- **Lack of Communication.** Poor communication can lead to misunderstandings by all parties on the purpose of the study and the requirements of the output.
- **Time Constraints.** Do not underestimate the time and resource required, both from the authority and the consultant, to develop and set up the study. Also, do not schedule a waste composition study around events that affect waste composition
- **Lack of information on Householder behaviour.** A participation study can greatly increase the accuracy of the results.
- **Lack of up-to-date collection rounds data.** Inaccurate data will cause missed collections during the study and affect the accuracy of the results.

⁴ Waste Composition Analysis – Guidance for Local Authorities 2004.

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- Selection of Realistic sorting categories. Select waste categories that are useful to the authority and prevent recording data on insignificant waste streams that will provide data of little meaning. This will cost more in terms of time and finance.

Conclusions

As stated above, the logistics of setting up a waste audit is a time consuming and detailed exercise that should not be underestimated. As with all data related projects, **the accuracy of the output from these studies is dependent on the accuracy of the input**. The outputs of the audits must also be considered in the context in which data has been collected. The audits are of waste collected from single points in time, using essentially bulked samples. It is important that any conclusions take this limitation into account. The outputs from these audits are used to inform high level strategic and operational changes within an authority, and caution must be used to ensure the limitations of the data are known.

References

Entec's waste composition projects for 2004/05 have been directed by Francis Crozier supported by a Project Management team that included: Darren Perrin, Waqar Bhatti, Ian Warby, Geoff Sampson, Alison Leavens & Linda Ovens.

Entec

Windsor House
Gadbrook Business Park
Gadbrook Road
Northwich
Cheshire
CW9 7TN

<http://www.entecuk.com>



Waste Implementation Programme
Local Authority Support Unit
Ashdown House
123 Victoria Street
London
SW1E 6DE

<http://lasupport.defra.gov.uk/>