Kitchen Waste Composting Trial

END OF TRIAL REPORT JUNE 2007

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Executive Summary

Lancashire Environmental Fund funded the project under the Landfill Tax Credit Scheme (now Landfill Communities Fund). The project is titled 'Kitchen Waste Composting Trial' and has been set up as a partnership between LEF, Lancashire County Council and Preston City Council.

The project was inspired by a kitchen waste collection scheme established in Monza, Northern Italy by a gentleman called Enzo Favoino. The Lancashire Kitchen Waste Composting Trial (which will be referred to as 'the project' from this point onwards) was set up to explore the collection and composting of domestic food waste in an urban setting. A number of dimensions were explored:

Social Aspects

- Measuring participation, tonnage and contamination
- Exploring cultural and religious issues that affect recycling in an ethnically diverse community

Operational Aspects

- Collection and other logistical details
- Design and use of storage containers and vehicle
- Effects of using liner bags

Technical Composting Aspects

- In-vessel composting
- Compost quality and feedstocks required
- End uses
- Navigating legislation, especially Animal By-Products Regulations 2003

Dissemination

- Dissemination of information regarding the project to the wider waste management industry.

The initial planning stage of the project was undertaken before the Animal By-Product Regulations (ABPR) 2003 came into force. Project funding was provided for two years, and this has covered the majority of the costs associated with the collection and composting of the food waste. A project officer was funded for the duration of the project and included 2 months pre and post-operational phases. The target area for the project has been a densely populated area of 7569 terraced houses in the Deepdale area of Preston.

The social and operational components of the scheme have been highly successful. Collections have been efficient and popular. Participation began at around 56% and in some areas has been measured to be as high as 77%. Contamination was initially high but reduced to a very low level in a short space of time. Over 850 tonnes of food waste has been collected over the two years of the project. The varying amounts of waste produced by households with different cooking habbits have also been quantified. A religious obligation towards recycling is just one of many cultural aspects that has been identified as a key issue during the project.

The operational aspects of the project have been shared widely. Over 200 visitors including collection staff, managers and elected members from other local authorities, and consultants from many aspects of the waste management industry have seen the scheme first-hand. Collections are considered to be highly efficient and external studies of the collection methods applied in the project are increasing. The operational benefits of collecting bagged waste are now far better understood by the partnership.

Despite best endeavours by the partnership, ABPR 2003 was not achieved and therefore the project was not able to produce its own compost fit for purpose. Even so, by

going through the process of attempting to achieve ABPR 2003, the partnership has consequently learned a great deal about the technology involved in in-vessel composting of food waste. The main lesson learnt has been around the quality and type of waste inputs required for in-vessel composting systems. After using many different types of bulking agent or matrix to try and secure stable temperatures within the unit in accordance with ABPR 2003, it was not until week 58 of the project that food waste began to be fully diverted from landfill. Preston City Councils Parks Department who maintain flowerbeds around the city, used the compost produced during the accreditation process.

With full ABPR 2003 accreditation almost obtained, a previous issue that had gone un-noticed came to light. The issue was around the drainage and waste management licensing and was considered to be uneconomical to address so late in the project. An alternative ABPR 2003 approved composting facility was identified, and by changing operations to this new local composting service a significant cost saving was realised.

Using the new local waste management company from January 2007 enabled the project to contribute to a feedstock that then produced compost used within both the agricultural and horticultural industries. The company based in Hutton, Preston is called TEG™ Environmental.

The project took the decision to make the VCU and associated equipment available for a community group to use. Using the Lancashire Community Recycling Network the equipment was offered to the entire community network in Lancashire. Groundwork East Lancashire put a proposal forward to use the VCU to compost green waste collected from Burnley Borough Council's Parks and Ground Maintenance Department and the local Housing Association as well as from Burnley's football ground, Turf Moor. Groundwork was hoping to get its scheme in place in January 2008.

Background

The Landfill Directive requires that by 2013, nationally the amount of biodegradable waste sent to landfill must be halved compared to the amount landfilled in 1995. According to Defra, biodegradable food waste comprises of 17% of the weight of a household bin, removing this waste from the landfill stream presents logistical, social and technical problems.

Lancashire County Council wanted to be ahead of the game with regards to removing organics from the waste stream, and after seeing a very inspirational presentation by Enzo Favoino about how Monza, Northern Italy manage their organic stream of waste the kitchen waste project was devised. Lancashire County Council asked for a partner from one of the 12 collection authorities in Lancashire, and Preston City Council grabbed the opportunity to be part of such a pathfinding project.

The proposed project mirrored the Italian scheme as closely as possible; hence it became known as the 'Italian Job'. The similarities included the kind of containers, the technology used and the population type. There were a couple of UK slants, in the Italian scheme the collections occurred every couple of days, due to the weather and housing type, but for logistic reasons the Preston project operated on a weekly collection frequency. Landfill Tax credits were secured through Lancashire Environmental Fund in 2002, supported by a contribution from Lancashire County Council and Preston City Council. The collection and processing element of the project ran for two years, May 2005 to May 2007. In addition the project officer was employed for a total of 28 months, 2 months before the collections started, and 2 months after the collection finished. The project officer's time was used to put the finishing touches to the project prior to the launch and to wrap the project up and hand it over at the end; this has proven to be extremely effective.

The project suffered a number of set backs before its launch in May 2005. One set back was the construction of the new split-level Household Waste Recycling, where the processing facility was to be located. The site was due to be completed before the food waste project was scheduled to start and included provisions for processing food waste. However, due to various delays, which included a full investigation into the reports of Great Created Newts and a Roman Road on the proposed site, the area where the processing facility was to be located was constructed first.

Further to the construction set back, the project was devised before the introduction of the ABPR in 2003 and some aspects of the original project had to be re-designed in order to comply with new regulations. Examples of project design changes include the addition of a reception building at the composting facility and the need for further windrow treatment of the processed food waste at another nearby facility. The chosen technology, the same as that used in Italy, was already sourced by Lancashire County Council before the ABPR 2003 was in place, but assurances from the company providing the processing equipment were that the technology would be able to meet the processing parameter set within the ABPR 2003.

As design changes were not factored in to the original project, both the additional building and the requirement for secondary treatment introduced another dimension to the project, which had a knock on effect on the budget. As a result of the changes to the original the design (which was agreed well before ABPR 2003) planning permissions had to be re submitted, which led to further delays.

The project sought to investigate ways of collecting food waste from houses in an urban setting where houses had no gardens. The partnership chose an area of Preston that did not currently receive an organics collection; the area with a mixture of predominately high-density housing with no gardens ('Coronation Street' is a useful imagery to describe this area) and new suburban developments some with gardens. The diversity of the population in the project area was seen as another advantage to studying this area. The diverse communities included people with a South Asian ethnic origin and also university students. The literature had to reach a wide range of residents. An extremely visual leaflet was produced, with supporting text repeated in a number of languages.

The Collection Scheme

Collections Overview

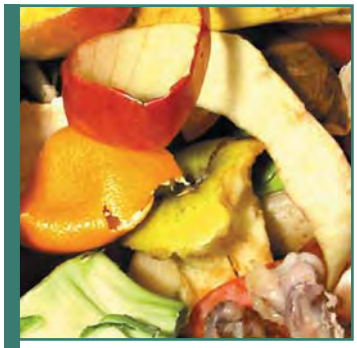
The project required householders to separate food waste into a 7 litre kitchen caddy lined with special compostable bags made from cornstarch. A larger 25 litre outside container was used to store full bags, and was set out on the kerbside every week. Bags and containers were provided free to householders by the project. A driver and one assistant carried out collections with a specially designed vehicle.

A full time Food Waste Project Officer supported, promoted and monitored the collection of food waste. Literature for the project used graphical messages supplemented with plain English and with Urdu and Gujarati highlights. *(Appendix One)*

The project covered one refuse round - 7569 houses in the Deepdale/Tulketh area of Preston. *(Appendix Two)*

90% of the houses covered by the project were terraced properties without gardens. Census information did not accurately cover a round area, but ethnic diversity varied between 8% and more than 52% in these wards. Car ownership was around 60% and owner occupancy approximately 65%. There is also a significant number of students in the project area.

A questionnaire *(Appendix Three)* carried out in May 2006 showed that of the respondents, 85% lived in a terraced house with little or no garden.



Launching a New Collection Scheme

Preston planned to extend their alternate week collections (AWC) system into the inner urban half of the city in May 2005. For the Deepdale/Tulketh areas the food waste project was an integral part of the change.

Prior to the launch, meetings in places of worship and community groups were used to introduce the new scheme. A Recycling Officer with knowledge and language from a South Asian ethnic background helped to forge strong links with harder to reach parts of the community and worked closely with the Food Waste Project Officer.

Two weeks before the new alternate week collection scheme started a letter was delivered to all households to explain the changes in recycling and refuse collections. The stark imagery was intentional, using the authority of a council notice.

Less than a week before the first collection, every domestic household in the target area was given a small caddy, large caddy, two rolls of bags and an instruction leaflet. No opt-outs were offered or accepted. Anyone using a domestic wheeled bin was included in the scheme.

On Monday, 16 May 2005 the first collections of food waste took place.

Collection Performance Overview

After the first week participation was estimated at over 50% and on average around 1.5 tonnes of food waste was collected every day. Initially, contamination was poor in more demographically diverse communities. Plastic bags, packaging and tin foil were visible through the liner bags in up to 40% of containers set out in some areas.

After a few weeks contamination had been virtually eradicated through the application of 'doorstepping' and rejection slips, and the set out rate was measured to be around 56%.

Initially each participating household set out weekly on average between 3kg and 5kg of food. By the end of the project participation had settled to around 40%. Demographics were seen to have a strong effect on participation and tonnage and there were almost no seasonal effects.

Contamination

To protect the quality of the end product the food waste input was carefully managed. The support of the collection crew in identifying and rejecting containers with a contamination issue was vital. When waste was contaminated the collection crew left a rejection slip, *(Appendix Four)* indicating to the householder what the problem was. Rejections varied with demographics but were up to 40% in areas with more ethnic diversity. All households that were rejected received a follow up visit from the Project Officer. After one month, rejections in the worst areas were down to 10%, and contamination ceased to be an issue after a few months.

The first few weeks required intense doorstep activity by the Project Officer assisting collections, ensuring the crew could work without interruption and enabling householders to have someone from the project to talk to.

Packaging remains the most common contaminant. There was an occasion when hypodermic needles were found inside a liner bag. Collection crews were reminded of existing risk mitigation procedures and working practices. Other unusual items collected included a dead pet Iguana, Category 1 Sheep entrails and cutlery, the latter presumed to be an accidental inclusion. Such incidents were one-offs. Several householders asked if they could include rodent bedding, which would compost well, but this had to be discouraged because of licensing requirements for the processing of the food waste.

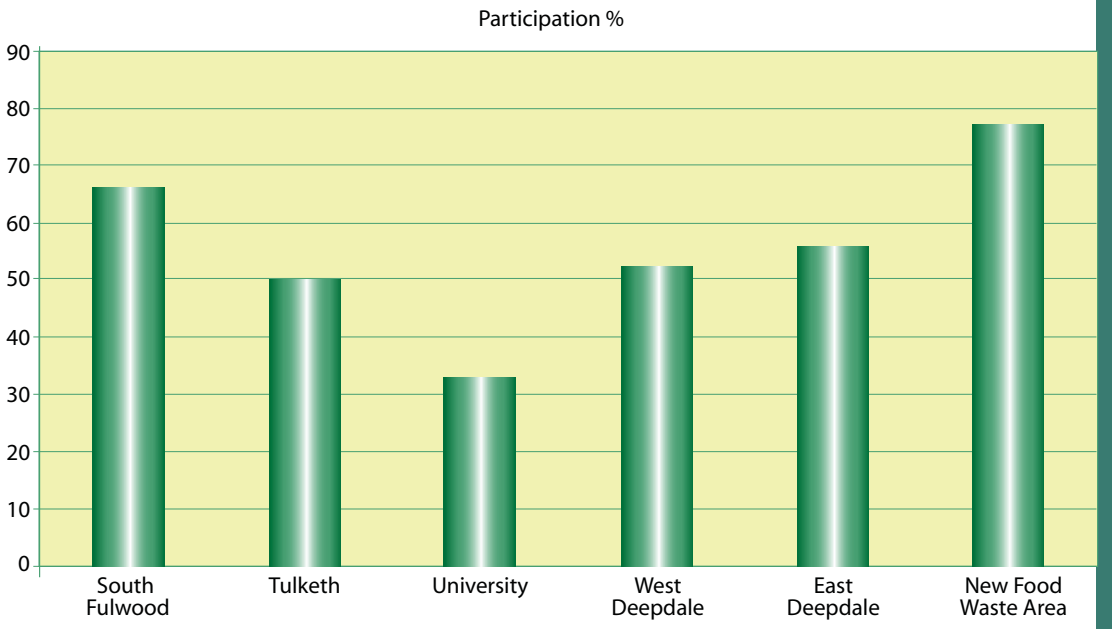
Literature was changed after an aggressive customer demanded the crew accept his 'kitchen' waste. This issue is mirrored elsewhere with stories of lawnmowers in 'garden' waste. The term 'kitchen waste' is in fact jargon to a householder and is best avoided; instead it is best to refer to it as 'food waste'.

From the outset the project strategy was to sacrifice tonnage if necessary to guard against contamination. The quality of the waste collected has never been compromised and technicians involved in the processing of the food waste have considered it better than they anticipated.

Participation

Participation was found to be high in the initial stages of the project where people embraced the new initiative. After several months participation stabilised and doorstep conversations revealed that participating households would now not be without any aspect of the scheme.

Participation studies have been carried out throughout the project to establish if there are any differences in participation across the project area. Samples were taken in different areas and at different times. Initially, the overall average of 56% was seen to vary across the project area. Initial participation was measured in detail between July and August 2005, after the project had bedded in.



Monday

The area that is collected on a Monday in South Fulwood was around 66% participation. This is a car owning, owner-occupier, very few flats, partly suburban area, and 50% having small gardens and receiving a green waste collection from Preston City Council.

Tuesday

Tuesday's area around Tulketh is perhaps a little less affluent, principally high density housing with no gardens and on street parking. Participation here was slightly less at around 50%.

Wednesday

The area around the university is collected on a Wednesday. This area is less affluent, and home to students and other people renting their accommodation. 33% participation was the lowest recorded and one explanation might be the lack of 'attachment' residents feel to their community. The university attracts many students from very affluent backgrounds in Far East Asia and cultural and language obstacles may be adding to this lack of cohesion. Any migrant population introduces issues with re-educating new occupants.

Thursday

This collection area is west of Deepdale is a mixed population generally less affluent than the Tuesday area but is a similar type of housing. This area also has a more defined community of families with a South Asian background. 52% participation was recorded over the first summer.

Friday

Eastern Deepdale is half the size of the others and has a strong Muslim and Hindu community. The housing is the same as the Tuesday and Thursday areas. Around 55% participated at the start of the scheme, but this had fallen by around 7% by the first winter.

Participation was measured in more detail in December 2005 and January 2006 in the Friday area where tonnage had been seen to be falling, from 52% participation in the summer down to 45%. Anecdotal evidence and doorstep calls suggested that some people did not bother to request more liner bags and ceased participating when they ran out.

The questionnaire circulated to randomly selected households and further participation monitoring in basket trial area carried out in May/June 2006 showed that of the households that responded 85% said that they set out every week.

To promote an easier way to get more liner bags a postcard was delivered to non-participants *(Appendix Five)*. Tonnages stabilised and the crew said the postcards did retain participation. These postcards were very successful in reducing costs and improving the service. Pre postcards there were 138 calls per month to Preston City Council's Help Line requesting more bags, and it was taking time to inform the crew to make a delivery. There were only 8 such calls following the introduction of postcards and customers were receiving bags there and then. Although Householders, when questioned either via doorstepping or the questionnaire stated that they set out food every week, when a quantitative weight analysis was completed in May/June 2006 it showed that in fact there is a difference between households who participate and households who present waste weekly. The quantitative weight analysis found that more people took part on the recycling week, this could be because they take part fortnightly, using their refuse bin on the other week or they keep their food waste for two weeks. These findings were further supported by the results of a questionnaire carried out in May 2006. By the end of the project tonnage had remained fairly stable, however, some households were participating less compared to the start of the project. When surveyed in May 2007 some areas were still participating well, 94% being observed in some

streets. There was some evidence of a neighbourhood effect (keeping up with the Jones) as households participating seemed to be clumped together, even along an otherwise empty street. Overall participation was in the region of 40% but this was measured over the Easter Holiday period, so it may not reflect the true picture as people could be on holiday and the children would be at home.

When set-out was measured more than an hour in front or behind the collection crew it was 20% lower than when measured along side the crew. Once the crew established a regular working pattern, householders relied upon this routine and only set out when the collection crew was due. It was not uncommon to see a householder waiting at the door for the crew to return an emptied caddy. Therefore, in order to measure set out effectively it must be carried out alongside the crew.

Driving Participation

Observations by WRAP and discussions with colleagues in Italy and Norway suggest that 98% participation is possible. This is achieved by having a very strict enforcement policy and any residual refuse bin found to contain putrescibles is rejected, thus enforcing recycling. When comparing with international recycling rates, there are many other drivers that can influence the rates including pay-per-throw, a longer history with recycling, and less cynical attitudes towards the local authority in general.

The issues with achieving ABPR 2003 meant that the project did not want to push participations by using the local media until a fully accredited system was in place. Also as the project was limited to a small area of Preston a citywide campaign was not seen as the most effective use of resources.

Doorstepping was seen to be an effective method to drive participation; households visited during the project were more likely to have a long-term commitment to the project. At the end of the project (May 2007), households that have been doorstepped were observed as still participating.

When householders were asked why they did not take part these are the commonly offered excuses:

"I was not given, or do not have, the containers."

"I ran out of bags."

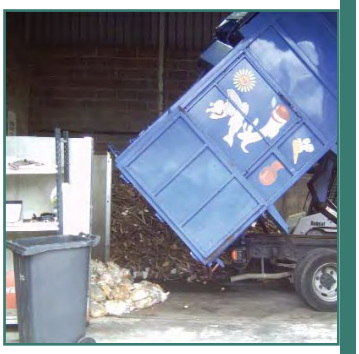
"It will smell."

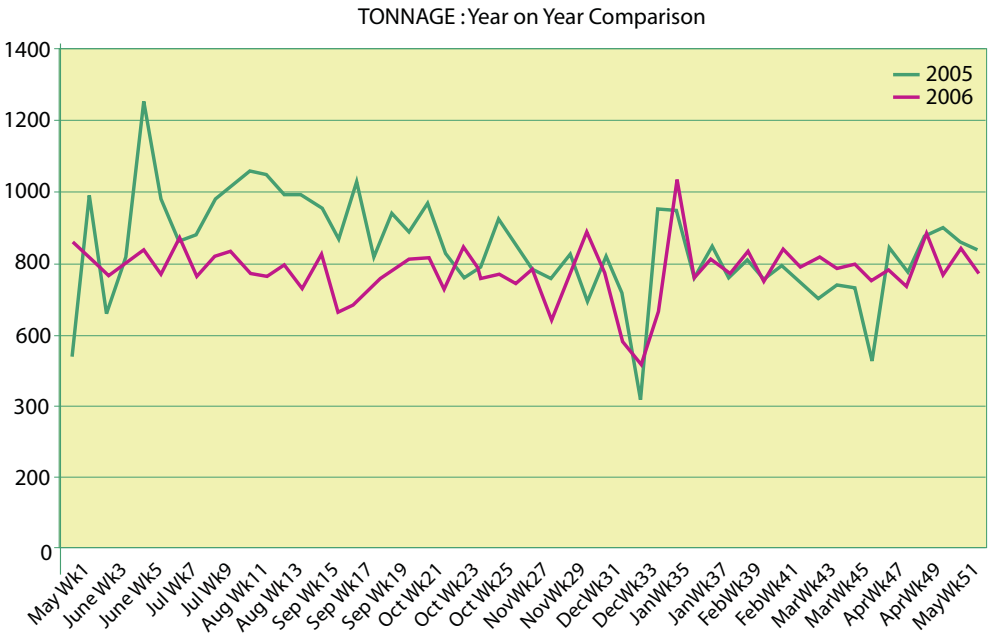
Literature did not seem to have an effect on participation levels. Monitoring before and after any questionnaire and leaflet were distributed showed there was little or no increase in participation. Although transversly following the distribution of the project newsletter, requests for liner bags did increase. Suggesting that only people already involved in the scheme were reading the newsletter.

Tonnages

Although there were slight variations the tonnage of food collected each week remained stable, and shows very little seasonal variation. 440 tonnes were collected in the first year and 405 tonnes in the second year.

The chart shows the main variations in tonnage captured were relating to the beginning of the project during the "honeymoon period", both Christmas periods when the service was disrupted and in March 2006 when a Local Authority strike took place.





For the 7569 houses involved tonnage averaged at 1.13kg a week per house, but it should be remembered that around half of all these houses were not participating. This effectively doubles the tonnage to 2.26kg that can be expected from a participating household. The following formula may help when comparing schemes.

Weekly Tonnage/No. Houses in scheme/Participation in percent = KG per House per week

On the ground monitoring of actual container weights was carried out several times, particularly during July/August 2005, and twice in 2006. Each time the Project Officer weighed over 70 containers that had been set out for collection. It was found that in a suburban semi-detached area, an average of 3kg per participating household was being set out a week, but in a terraced area with a far more diverse ethnic background, where food is more often prepared from fresh ingredients and meals are perhaps more often eaten as a family around a table, the average rose to 5kg per week.

During these surveys the heaviest set out recorded was over 17kg and during a five-week survey this particular house never offered less than 10kg for collection.

Before the project was launched a mini-trial, with 12 households over a two week period was carried out during this trial 4.5kg per week was recorded. The majority of these 12 houses were observed to have a South Asian ethnic background.

Please note: We are aware of an inaccuracy in tonnages recorded at the composting facility. The project used the weigh platform built into the SEKO shredder/blender; this unfortunately was recording 20% to 25% under. A factor of 1.2 has been applied to the appropriate figures. Once the processing swapped to TEG™ Environmental, in January 2007, a calibrated weighbridge was being used, this backed up the theory that the weight platform was under reading.

When the food waste was not collected, for example at Christmas, or when the Council staff were on strike in April 2006 around half of the waste

was recovered the following week, suggesting some people were prepared to keep food waste for a second week.

Householders must have become more aware, and ashamed, of the food they were throwing away. This is hard to prove, but unprompted comments by households suggested it is so. One householder said they have halved the food waste they were wasting the previous year.

The habits and attitudes towards food in a household greatly affect food waste. Older generations and families from ethnic backgrounds often use more fresh foods and set out more peelings, scraps from preparing food and fresh food that have perished. Households that eat principally ready meals had less food waste but more packaging.

Seasonality did not seem to affect the tonnage greatly although it did affect the content, more salads in summer and pumpkins in November!

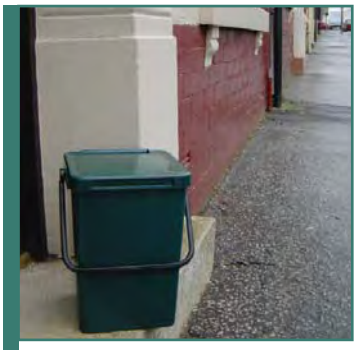
Customer Satisfaction

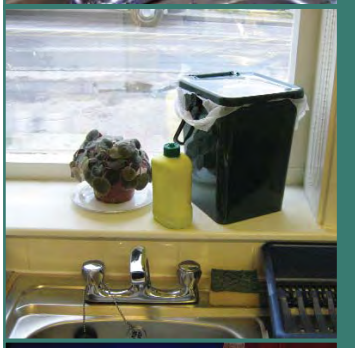
A questionnaire was sent out in Spring 2006 to nearly 800 houses, 16% of which were returned and almost all fully completed. On the whole 67% of respondents rated the collection service excellent and a further 24% rated it as fair. 97% of the respondents thought that the service should continue, of those 83% thought it should definitely continue. Of the households that responded 67% said that meals were eaten in the home at lunchtimes including weekdays, and 83% of the households responded either always or mostly (more than 5 times a week) prepared their food from fresh. Observations for the crew concluded that on average every household uses three liner bags a week, the questionnaire supported this theory as 76% of household who responded used three or more bags a week.

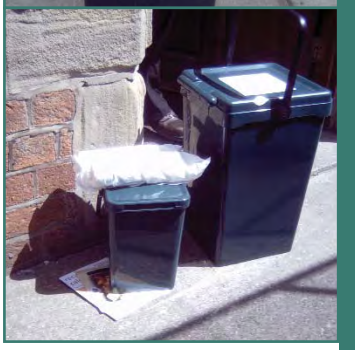
The majority of enquires about the project arrived either by email or via Preston City Council's Call Centre, every one was dealt with by the Project Officer. The main issues included missed collections, non delivery of additional/new containers and in the first few weeks comments on the hard line which was taken on contamination.

Missed collections were limited, and it was often due to the householder setting out late. The crew aimed to return to collect missed collections as soon as possible. Non delivery of additional liner bags was a problem. It was found that some of the call centre operators were not using the correct process. Now callers are asked if they would like to leave a note out instead, asking the collection crew to leave more bags behind, this proved to be far more effective.

In the first few weeks the project received two written complaints about the rejection slip. After discussions with householders the slip was redesigned and the process for issuing slips amended.







Collection System

Containers

Prior to the project a mini-trial was under taken, 12 residents tested two different kitchen caddies and one type of outside container over a two-week period.

The kitchen caddies tested are as follows:

Basket caddy

- Needs a cornstarch liner bag
- Promotes water loss by transpiration/evaporation
- Wide aperture

Closed caddy

- Can be used with or without a liner
- Lockable lid

Householders marginally preferred the closed container, in particularly the security provided by a lockable lid for both indoor and outdoor containers.

Although the basket caddy did help reduce moisture it is dependant on liner bags, which if the project ceased to provide in the future, would mean the basket would be redundant, also it did not have the lockable lid.

The patnership decided that a 7 litre closed caddy with a liner bag would be used inside.

The outdoor container tested was a 25 litre closed container with lockable lid, it was found to be the right size.

On the whole the containers were appropriate. The only issue found was that after only a few weeks 10% of the handles of the 25 litre container came off, the plastic pin which holds the handle on would pop out, so a moulded lug would have been a better option. This was resolved and the projects supplier no longer uses this particular model.

Doorstepping and the questionnaire revealed that as the indoor caddy is tall and thin it tends to be kept next to the pedal bin in 75% of kitchens surveyed.

Midway through the project baskets donated by BioBag™, and baskets and bags donated by Saipac™ were trialed. These had a lockable lid. Doorstep monitoring revealed that householders preferred this design of caddy; its shape being easily accommodated within a kitchen, on windowsills or on a countertop, as well as on the floor.

Householders did need to be persuaded of the benefits of a basket, initial reaction to a food waste container with holes in was not positive. However doorstepping evidence gathered during the trial suggested that the wider opening of the basket encourages plates to be scraped directly into it, where the narrow neck caddy means this is a fiddlier task and the food might be sorted and some lost. When a direct comparison in terms of weight was made, in May/June 2006, with the 70 households with baskets against 70 households using the closed container system, the tonnage was no difference, despite the water lose associated with the bag/basket system.

Issuing Kit to Households

All households in the target area were given a 7 litre kitchen caddy, 25 litre outside caddy, 2 rolls of liner bags (Approx 9 months worth of bags) and the supporting information. Only half of the households provided with the collection system take part so 50% of the collection equipment was lost- something that all schemes have to accept. An opt in scheme was never raised, opt in schemes on the whole are viewed to be not as successful. For example the Isle of White operate an opt in scheme and have distributed their collection system to less than a 1/3 of the island. The Preston project therefore had to stand the loss of containers and bags and with hindsight only one roll of liner bags should have been issued. It is understand that BioBag™ can now supply 'starter rolls' of 25 or even 10 bags and this could have saved the project significant

funding if such an approach had been taken initially. Participating households were re-supplied with rolls of 52 bags on demand directly from the collection vehicle. This is an effective and efficient method of distribution.

The project found that various aspects influenced the need for extra containers including new housing developments, higher turnover of occupants (rented areas, student flats) and also any doorstepping activity, which can drive participation. For example in September 2006 doorstepping to 927 properties in the trial area generated requests for 86 small caddies, 83 outside caddies and 149 bio bag rolls. Therefore, the project roughly estimates that 2% extra stock per year of kitchen caddies and 10% extra of outside containers is needed to cover doorstepping activities.

Liner Bags

Liner bags were supplied free to participating households, they cost £1.39 plus vat per roll of 52. The Project was the sole provider and was, therefore, able to take control of the type of bags people used, economies of scale were achieved through bulk purchasing.

On average 3 bags per household were used every week. Even a smaller household was observed to still set out three partly filled bags (some householders, like to remove waste regularly thoughtout the week).

The project used a bag with handles ('T-shirt' style), which is 16 microns thick, on a roll of 52 supplied by Bio-bag™ in Leyland. The bags are made from Mater-Bi™, a film made from cornstarch by Novamont™ in Italy. Mater-Bi is fully compostable.

Each roll was individually wrapped, costing 1p more than a paper band, but were then relatively damp-proof and easier to store for several months.

A trial using different designs of bags, including ones without handles supplied by SaiPac™, suggests that householders prefer the handles to tie full bags up with. They cost slightly more but are easier to handle, and hold as much if not more volume than a straight cut bag with no handles. Bags from both suppliers composted well in either composting facility.

Using bags was cleaner for customers and crew. The questionnaire revealed that 90% of respondents said that it was relatively free of bad smells. On the whole household containers and the vehicle remained surprisingly clean during use. During summer 2005 a small number of customers complained about maggots in the 25 litre outdoor containers. It was discovered that flies would lay eggs wherever they can, close to the smell of food if no actual food is available, even on the plastic around the lid of a container with food inside. A maggot fact sheet, based on an idea by Broxstowe Council, was developed *(Appendix Six)*. Despite hot weather only three complaints were received in the Summer of 2006.

Food waste has a high proportion of water, up to 80%, which can make composting difficult and collecting it means you are transporting more water than food waste. Materbi™ is designed to transpire moisture through the liner bags so that food waste can start to dry out. This works more effectively in a 'vented' basket. The project tested this theory in March 2006, a bag of vegetable and fruit peelings lost 10% by weight in a 12 hour period. Interestingly there was very little weight loss from then on. Effective moisture reduction can help the composting process, but this would also mean a loss in tonnages collected.

The liner bags still allow the crew to easily check for contamination because when they are damp they are translucent. Using the bags helped to keep both the containers and vehicle remarkably clean and odour-free. The 16-micron bags withstand any rough handling during collections. Rips and spillages are very rare, less than 0.1% and are often caused by contaminants

or a sharp stalk not noticed by collection crew. Using 'T-shirt' style bags, where the handles are tied enables the crew to easily pull the liner bag out and either carry it to the vehicle, or to the next house to collect more and either carry both to the vehicle, or decant the content into one container. This method of collection saved time by not having to return emptied containers back to the doorstep. In warmer weather a greater number of bags became too decomposed to carry and therefore containers were carried and tipped out instead.

The questionnaire revealed householder opinions on what they would do if the free supply of liner bags stopped.

- 33% said they would continue by wrapping food in newspaper.
- 19% said they would buy bags locally (less than £5 a roll was suggested).
- 2% said they would buy bags by mail order, if only slightly more expensive.
- 13 % said they would continue without any liner.
- 31% said they would cease recycling food waste.
- 1% suggesting they would use a plastic bag as a liner, even though every opportunity has been taken to highlight that plastic cannot be accepted.

The project found that bagged food waste did not settle, even in transit. This had an impact on vehicle design, and in hindsight a tall thin compartment would work well with a bin-lift, like the vehicles used by the Isle of Wight scheme. Hand loading bags through the side doors reduces the 'sandbagging' so wide loading apertures should be a part of any vehicle design.

The Vehicle

The project wanted to use an electric vehicle, but was unable to source one with the required specification. A 7.5 tonne Mitsubishi Cantor chassis, with a body built by Lancashire Tipper, to fulfil the ABPR 2003 requirements, was selected as an alternative. Consideration of the potential payload and the restricted space available for turning and tipping in the reception building at the composting plant had to be considered. Although Preston City Council used large 'kerbsider' vehicles successfully in the same area the manoeuvrability of the food waste vehicle proved advantageous.

The body was designed with the following features for ease of use and to comply with ABPR 2003 and operating guidelines:

- Enclosed tipping body
- Door seals
- Catch tray and taps for leachate
- Hooks and straps for carrying slave bins
- Side hopper added to the bin-lift
- Side loading doors on both sides
- A box to hold spare rolls of liner bags (added later)
- Hand washing facility

Although the body of the vehicle was extremely robust it was heavy and after further discussions with the manufactor, later designs from the same manufacturer were lighter.

The payload is determined by the total weight of the vehicle, crew, body and bin lift deducted from the total capacity of the Vehicle. Therefore, 5160kg deducted from 7500kg gives a payload of 2340kg. The vehicle must never weigh more than its total weight of 7500kg.

An onboard device gave the driver a rough indication of total weight but as a precaution the driver used to tip twice a day. A review with the vehicle manufacturer found that the payload was more than the crew thought. In January 2007 when operations moved to TEG™ Environmental the crew started to receive accurate daily records from a calibrated weighbridge. This gave the driver more confidence in judging his payload. As a result the crew only tipped once a day. If the driver thinks the load will exceed the payload of 2340kg he automatically tips twice, this occurred at Christmas when householders had more than one week between collections.

The crew developed a variety of loading methods to suit different occasions:

- The side hopper was used most on busy main roads, working quickly from one side of the road.
- The two side doors were used extensively and are especially useful when clearing both sides of a quiet side road at once.
- The slave bins were used for inaccessible areas. They are also adopted if the driver travels to a more remote collection, or a street with low participation while the labourer clears a regular street.

Too much use of the bin lifts can cause problems. Bagged waste does not settle so to maintain a well-balanced payload the crew had to load by hand through the side doors whenever practical.

When considering which method to adopt in any one street the crew had to consider many variables:

- The time it takes to remove and replace bins from the rear of the vehicle.
- Time sending them up on the bin lift.
- The distance between containers (participation and housing type).
- On-street parking (which hampers hand loading).
- How full each container will be.
- Accessibility (urban developments with no street, gradients etc.).
- Traffic (esp. other collection crews).

The crew constantly adapted their strategy on a street-by-street basis.

Crew

The crew consisted of one non-HGV driver and one crewmember, this format worked well for rapid collection times. Their operating hours were 7.00am to 3.00pm, Monday to Friday the same as the other waste collection operatives. The greasiness of food waste makes smooth rubber gloves useless so the crew were issued with textured gloves. P3 facemasks were made available for use when tipping off at the processing facility operated by the project.

Some Councils who contacted the project were concerned that collecting food waste might be smelly and unpopular with the crews. The project's crew actually volunteered for this task and some of the crewmembers said that waste food is more palatable than general refuse.

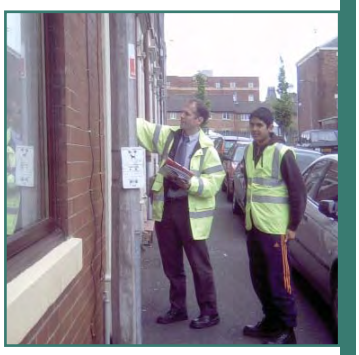
The driver was required (as part of ABPR 2003) to jet wash the vehicle at least twice a week.

Communications Strategy

Overview

As this project only served a minority of households within Preston any wide scale communications outside the project area were inappropriate for promoting the scheme. Also, until the project had full accreditation it could not claim that the food waste was being diverted from landfill. For these reasons media attention was localised and low key. However, our work in sharing our knowledge with the waste management industry as a whole was extensive. The project tried a number of different methods of communicating and came up with some points to consider *(Appendix Seven)*.

Face to Face



The project embraced the challenge of communicating with hard-to-reach parts of the community and established that Face-to-Face communication together with multi-cultural awareness; empathy and pleasant attitudes were vital. Preston's recycling team included a member of staff fluent in Urdu and Gujarati, whose knowledge and language skills proved to be invaluable. Some ethnic languages may be spoken but were not often written or read. The project invested a considerable amount of time before the launch talking with community groups and at places of worship. Mosques supported the 'good deed' to our environment message. Children responded well to environmental messages, providing a good link to the "busy parents" audience. Events for Muslim women were rare and only female staff could attend.

Written

All the literature produced had simple clear messages presented in an appealing way. Pictures were used instead of words to highlight the key points; this helped to address the multi-lingual audience. Plain English was supplemented with Gujarati and Urdu, two languages important locally. The project found that even "kitchen waste" was misleading and so now refer to it as food waste.

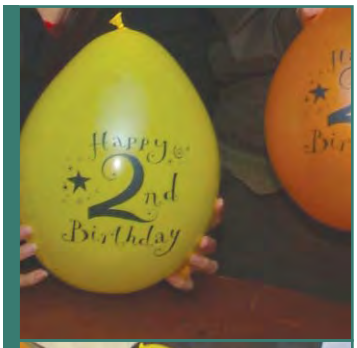
A questionnaire was developed in May 2006, and delivered by hand to residents in a 10% random sample of streets. 16% of the 840 forms were returned within a month. 92% of the returned forms were either fully complete or had up to two questions blank. It was observed that areas with higher ethnic residences returned the fewest forms.

Annual newsletters were produced to remind the residents of the scheme, with a view to increasing participation. They also thanked the residents for taking part and giving them some feed back about the project, promotional activities, awards won and helpful hints and tips *(Appendix Eight)*. The second newsletter was used to promote the 2nd year anniversary celebration for the project, more details given later in this report.

Events

To celebrate two years of the project an event was organised to thank residents for taking part and to tell people what was going to happen in the future. Five lucky residents won the chance to attend the event, observe the collection crew in action and visit the processing plant at TEG™ Environmental. The project newsletter, which was produced annually, was used to advertise the event and residents were asked to fill in the reply slip and leave it in their bin, the collection crew then collected the reply slips and the lucky winners were drawn out of the 'hat'. In addition to the residents the officers and Councillors who have supported this project were also invited, there was even a birthday cake in the shape of a caddy. Unfortunately, the event did not generate the publicity the project had hoped as the Preston City Council Councillor resigned the next day and the photograph could no longer be used.

On the whole the communication strategy adopted by the project was extremely effective and has been mirrored by other authorities to similar success.



The Composting Operation

Overview

ABPR 2003 sets out various parameters, this trial decided to use the two-stage barrier system for composting of meat-included food waste. The first stage was in-vessel composting meeting 60°C for 2 days with a maximum particle size of 400mm, and then the second stage was open windrow meeting 60°C after each turn, turning 3 times every two days. The in-vessel technology selected by the project was a Vertical Composting Unit (VCU) supplied by VCU Europa (VCUE). The facility was situated less than two miles from the collection area, at Ingol Household Waste Recycling.

The compact purpose built plant included:

- A reception building to receive food waste and store woody waste.
- A shredder/blender.
- A small skid-steer loader.
- A single chamber VCU and its associated feed conveyors.
- A harvesting conveyor leading to a 16 yard skip.
- A bunded area drained to a septic tank.
- A one way access system for deliveries.
- Wheel wash area, all vehicles required disinfecting on exit.
- Disinfectant footbaths for pedestrian traffic.
- A 100kva electricity supply was required to power the VCU (this was run off a generator until a permanent supply was installed).

Operating Procedure

This section covers the findings of the operations of the VCU composting facility at Ingol Household Waste Recycling Centre and does not relate to the composting facility at TEG™ Environmental.

The VCU is a 9-metre high fully enclosed chamber. A matrix of food waste and bulking agent is fed into the top via an incline conveyor. The matrix moves down the chamber, as the matrix is taken out of the bottom and more added in at the top. The whole system is passively aerated; air diffuses through the loose open structure of the matrix to assist in the composting process of the food. A small fan draws air from the top of the chamber to facilitate this. Food waste is up to 80% water and needs a drier, more structured material to permit aeration and reduce water content.

Bulking Agent

Originally it was planned to use green waste from Preston's Parks Department, however, during the commissioning of the VCU the 'Green' waste collected by Preston's Parks Department was rejected by the VCU technician. Their experience of such waste, collected in an open skip, was that it often contained too much contamination, i.e. large stones or boulders, which could damage the teeth of the SEKO shedder/blender. A supply of Pre-shredded tree prunings from Preston City Council's tree gangs was used, but this did not have enough structure and did not draw enough water out of the food waste. Drying it out could help to solve the issue, but there was not enough space inside the reception building to store it for the 3-week drying period.

Dry post-consumer wood (scrap wood from Lancashire County Council's Household Waste Recycling Centres) of various shred sizes was dry enough and created enough structure, by using this style of bulking agent the temperatures reached those required under the ABPR 2003. There was an unanticipated cost of £5 per tonne plus transportation costs for this 'waste' stream, furthermore there was a limited supply. The glues and preservatives in post-consumer wood waste were not considered to be a risk by VCU experts, however, they remained concerned about the mechanical risks in this bulking agent (nails, glass). Chemical analysis of the VCU output material did not detect toxic elements. However, its high proportion of chipboard, MDF and other panel products tended to crumble making the final product full of uncomposted woody fines.

This supply ran out in December 2006, the alternative used caused the temperatures to crash. At the same time issues with the drainage on the site came to light, which is covered in more detail later in the report. As a result the processing was then contracted to TEG™ Environmental.

Food Waste

The basic composition of the food waste was meat, bread, cooked food scraps and a fairly high proportion of raw fruit and vegetable peelings. Much of the food waste was in surprisingly good condition; therefore pathogens were not high at this point, as compared to other municipal waste and, as discussed, the contamination level in the food waste delivered was very low.

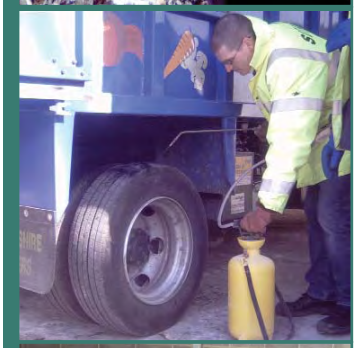
The food waste was high in fats, and often had a Ph as low as 3, therefore very acidic so lime was added to balance the Ph. Adding lime at a rate of about 20kg/tonne was an additional cost to the project. The lime was measured into a bag made from compostable material and dropped into the shredder before mixing.

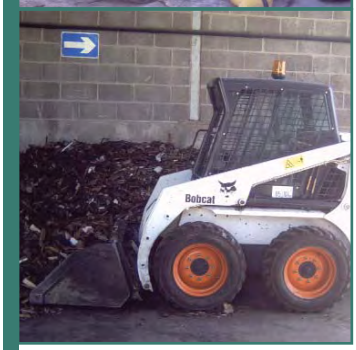
Delivery of the Food Waste

Food waste was delivered directly to the composting facility at Ingol Household Waste Recycling Centre and tipped into a designated bay inside the reception building. Under the waste license for the site all food waste delivered had to be processed within 24hrs of delivery. In practice it was loaded into the VCU for processing within four hours. All vehicles entering the site were disinfected before leaving the' dirty' area, and similarly for pedestrian traffic disinfectant footbaths were provided.

Loading the VCU

Before loading, material had to be harvested out to provide space for the new matrix. A small skidsteer loader (Bobcat S130) was used to add food waste, bulking agent and lime to the SEKO shredder-blender.
The shedder/blender had a basic weigh platform, which was used to record the weight of the food waste and basic tonnage slips were produced. As discussed previously this proved to be inaccurate by 20%-25% lower than the actual. On average the optimum mix ratio by weight was 50% food waste to 50% bulking agent (including the lime). The mix was then shredded and blended, in the SEKO to achieve the required particle size (400mm) before it entered the feed conveyor system. At the top of the chamber the mixture fell from the end of the feed conveyor and a spinning arm helped to spread the matrix evenly. To achieve optimum composting the Chamber had to be kept full at all times. To establish the time it took for the material to pass through the VCU chamber, markers were placed in the top of the chamber, when the markers came out the other end the time taken was recorded; after several attempts it was established that it varied from 3 to 9 days depending on the amount of feedstock.





ABPR 2003 Requirements for Two Stage Composting

First Barrier Treatment

A minimum of 60 degrees for two consecutive days had to be maintained in order to kill off any pathogens. 3 temperature probes located within the chamber wall recorded constant temperature measurements. Once the matrix had been through the VCU it had to be sampled before being transported to a second barrier treatment facility.

Second Barrier Treatment

Harvested material was stored in a large skip and transported to SITA's Clifton Marsh waste facility, located just outside Preston. The second barrier treatment took place on a dedicated and separately bunded concrete pad. The material was bulked into batches - roughly a fortnight's worth of material. Each batch was made into a windrow that had to reach 60ºC after each turn; it was turned mechanically every two days on three occasions. The temperatures were recorded using a handheld temperature probe. A further sample of the material was taken and tested for pathogens.

Site Requirements

To operate under the ABPR 2003 there were several requirements on site that had to be in place as well as the process having to meet the above requirements. These requirements include traffic management, a one-way system where vehicles move from the clean to the dirty area. These areas had to be clearly sign posted and have disinfection facilities for both the vehicle and pedestrians moving across these areas. This system of works had to be assessed by the State Veterinary Service. As the project used two sites, to process the food waste, both sites had to adhere to the requirements set. When the State Veterinary Service assessed both sites they were happy with the provisions in place.

End Product and End Users

The compost produced was very woody in nature, with a very low density, further more there was a higher level of heavy metals than some standards require. For example the boron content was higher than normal, but there are applications that suit this, for example Oil Seed crops. This dry woody compost was ideal for Preston City Councils' Parks Department who used it in bulk on flowerbeds around the city. The compost was similar in structure to horse manure, especially useful for breaking up heavy soils it was manually forked into the earth, and the Parks Department reported that it was far more pleasant to work with than traditional manure. There are other uses that particularly suit a soil improver that retains water and has a slow release of its nutrients - for example pots and hanging baskets. Turf growers may have found benefits in our product and as they would have required large bulk deliveries this would have been useful to explore, but the supply of this almost unique growing product ended as soon as it began. Although we did have product to test it was decided not to conduct any detailed growth trials at this stage in the project.

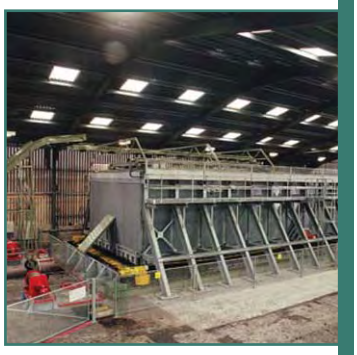
Composting Operational Performance

The project expected to have full ABPR 2003 accreditation within 3 months, if the processing had run smoothly and the temperature achieved from the outset then ABPR 2003 would have been achieved within three months. Sustaining the required temperature was a major stumbling block, which meant it took over 14 months before the accreditation process could be started. Had it been known how long it would take to get accreditation the project may have considered other options.

This had several knock on effects; cost of disposing the semi processed material and the potential negative media attention as the food waste was not being diverted from landfill. The partnership was concerned about the lack of progress with achieving ABPR 2003 and extensive meetings were held with VCUE to find a positive way forward. When the project opted for a VCU, assurances had been given that it was proven technology, but in practice it operated at the edge of the ABPR 2003 parameters.

The project was disappointed with the lack of support from the VCUE Technical team. During the project there have been several problems with the performance of the VCU and in each case VCUE were contacted for help and advice, although they did make suggestions in each instance the actual solutions were sometimes a long time coming. One of the issues that came to light was that the material at the core of the column was not heating up to the required temperatures. The material was found to be heavily compacted preventing airflow and therefore no metabolic process (composting) could take place, and as a result no heat was being produced.

The project met with senior management from VCUE, where they presented their plan to tackle the performance issues. VCUE acknowledged that performance of the unit had been unacceptable and formally presented their plan to remedy the lack of temperatures. The cause of the compaction and compression problem at the centre of the chamber was the rotating spreader, which distributes matrix as it enters the top of the chamber. The spreader appeared to be acting as a screw and compressing the centre of the column. A temporary modification was made to the shape of the spreader using plywood to prevent excessive material falling directly into the centre of the



unit and becoming compacted. This proved effective and a new design of spreader was devised, prototyped and constructed. The new spreader was fitted and for the first time this project managed to achieve and maintain the required temperature. The bulking agent used at this point was extremely dry to help achieve this. Unfortunately the supply of this bulking agent was limited, the replacement was not dry enough and the temperature crashed in December 2006, in the final stages of the accreditation process.

Animal By-Product Regulation Compliance

In June 2006 representatives of the State Veterinary Service and VCUE agreed an action plan for achieving ABPR 2003. The VCU at Ingol (barrier 1) and the windrow system at Clifton Marsh (barrier 2) were assessed. The first four batches of material met all the requirements including testing negative for the pathogens. These are tested at an independent laboratory organised by the State Veterinary Service. The material received certification from State Veterinary Service for positive release in June 2006. This was the first milestone an interim step prior to full ABPR 2003 accreditation, which would be awarded after further monitoring. Further monitoring was scheduled for October, November and December. Under positive release the material could be handled like other composts. Full accreditation means that the process is subject to lower levels of monitoring.

By December 2006, when the operation of the plant ceased, temperature readings taken before the change in bulking agent were meeting the ABPR 2003 requirements. The State Veterinary Service was satisfied that the unit was maintaining temperatures in accordance to ABPR 2003.

Although the processing was an ongoing issue this was not the reason why the plant was shut down, it was in fact a site issue that only came to light in the latter stages of the project. The drainage system servicing the area where the skip containing the first barrier material was located did not lead to the foul drainage system but to the surface water drainage system. This was unacceptable under both the waste management licence and ABPR 2003, the compost at this stage was still deemed 'contaminated' and any leachate was running directly to a surface drain. To remedy this would have cost in the region of £10,000, this coupled with the temporary closure of the plant meant it was un-economical at this point in the project to do the work and continue processing. Despite mixed feelings about shutting the plant so close to achieving accreditation the partnership accepted that this part of the trial had come to an end but valuable lessons had been learnt.

To continue the project an alternative processing facility was sourced; a local waste management company had been used when the VCU had been shut down for repair. After a brief discussion a contract was entered with TEG™ Environmental, this serviced the project until 16 May 2007 and will continue to do so until January 2008.

After the food waste was redirected to TEG™ Environmental and the project's composting facility was shut down the project took the decision to make the VCU and associated equipment available for a community group to use. Using the Lancashire Community Recycling Network the equipment was offered to the entire community network in Lancashire, and although there was a number of interested organisations only one had the infrastructure in place to be able to utilise the equipment on offer. Groundwork East Lancashire put a proposal forward to use the VCU to compost green waste collected from Burnley Borough Council's Parks and Ground Maintenance Department and the local Housing Association as well as from Burnley's football ground, Turf

Moor. Groundwork is intending hoping to get this scheme in place in January 2008. Groundwork were considering using the facility to process commercial green waste if the capacity was available. VCUE dismantled the unit and relocated it to Overtown Farm, Cliviger in July 2007. Groundwork will negotiate directly with VCUE when installation is required.

Waste Management Compliance

Although the Household Waste Recycling Centre is owned by Lancashire County Council, SITA UK, who operates the site on the County Council's behalf, and hold the waste management licence. The license that covered the processing element of the site required bio-aerosol monitoring, which would have taken place initially every month then at 6 monthly intervals if no issues were detected. There was no standard parameter for bio-aerosol emissions but the Environment Agency issue recommended levels. So it was monitored against the parameters set within the license and although the results did not exceed these, they did exceed those recommended levels set by the Environment Agency. The project commissioned a number of point source assessments to establish the most likely cause of the high readings. High readings were detected when the food waste was being tipped off and when the shredder blender was in use. These results did not stop operations onsite but there were a number of precautions that needed to be added to the safe systems of work, including the rule that all operators must wear P3 mask at all times, extending to the collection crew when they were tipping off the food waste. Also when the SEKO shedder blender was in operation the lid had to be kept closed. Although the levels were high on the actual composting pad the levels had significantly reduced when samples were taken at a number of different distances away from the composting pad.

Health and Safety Considerations

The Waste Management Industry does not have an enviable safety record. There are many precautions and considerations that impact on all recycling schemes and this report does not attempt to cover them fully. The following are a few helpful hints that need to be considered when looking at health and safety procedures in relation to this type of project.

Collections

- As with most waste collections the food waste operatives should be provided with the necessary PPE including trousers with ballistic protection.
- A procedure to deal with 'sharps' should be in place and any households where a risk is recorded or perceived should be noted. The project had an incident of hypodermic needles in a food waste bag, but broken food jars are slightly more common.
- Procedures outlining collection methods should be in place and considerations could include how to effectively and safely clear from both sides of a given street at once.
- The staff responsible at the processing facilities will need to brief collection crews on their procedures for tipping off, including any general conduct on site, they also may require the collection crew to use P3 facemasks when tipping off, these are to guard against 'farmers lung' caused by bio-aerosol emissions.
- The use of gloves for this type of collection is essential but smooth rubber gloves are ineffective when in contact with fat or grease. More expensive textured gloves do not become as slippery when in contact with food.
- Although working with food waste did not require any addition inoculations Preston City Council offered to pay the full cost of inoculations such as Tetanus and Hepatitis B, should its collections staff request them from their GP.
- Hand washing facilities and wipes are vital on a food waste vehicle. A dustpan and brush needs to be available for minor spillages.
- Additional outdoor containers should be available to ensure householders do not overload them. Health and Safety guidelines may also affect decisions on container size.
- Even though householders could use their smaller kitchen caddy instead of their larger outside caddy, some still might need assistance. Ensure these households are on the councils 'Assist List' of households that need help from the crew because of some disability.

Doorstepping

- A lone working procedure should be in place and followed in all cases and the required PPE and identification should be used.
- Panic alarms, mobile phone tracking and other systems are available, but Police experts encourage that you rely more on your own instincts - whenever necessary simply making an excuse and walking away from any situation that you feel uncomfortable about.

Composting Process

- Depending on the process being used, take advice from the supplier of the facility.
- General guidance for working in a waste management facility would apply. These would include wearing the appropriate PPE, including any face masks if provided, ensure the flow of waste follows the site requirements and all vehicles are disinfected before leaving the 'dirty' area, further more any pedestrians using the site must also use a footbath prior to leaving the site. Hand washing facilities should be available for all site users.

Dissemination

Visitors

The interest in the project started immediately. The first authority to visit came within a couple of weeks of the launch. The project had over 200 interested parties visit the scheme within its two years. 50 people saw the project as part of a tour for Preston City Councils Beacon Day, but the majority of visitors have been in small groups, involving officers, crew and householders.

Presentations

The waste management industry has shown a great deal of interest in the project, presentations have been given to the CIWM, WRAP, The Soil Association, London Remade and others. Preston City Council's European twin-cities work included showcasing recycling and the food waste project was of significant interest to the Moroccan and French counterparts.

Consultancy

The project has been invited onto the panel of Defra's Brook Lyndhurst project looking at food waste behaviours. Numerous researchers and consultants contacted the project to share information and ideas.

Any organisations who contacted the project received the interim report, produced after year one in 2006 and a pack of information including:

- A short video showing the collection crew working and exploring some of the points about collection efficiencies, liner bags and vehicle design.
- A cost-modelling spreadsheet that is easily adapted/expanded for differing scenarios.
- A table and explanatory notes on communications planning.

Awards

The project was awarded 'Best Local Authority Initiative' by Letsrecycle.com, and also won a Gold in the Green Apple awards. The assessors who awarded Beacon Status to Preston City Council's Waste & Recycling Team in March 2006 mentioned the innovative nature of the scheme and it's communication strategy.

Media Relationship

In the trial area the project formed an integral part of an alternate weekly collection (AWC) system implemented across Preston. Although reaction when the overall AWC scheme was first introduced was intense the project never had any negative press. Media coverage was limited due to waiting for the processing facility to achieve ABPR 2003 accreditation. This was shown to be a sensible precaution, as other unsuccessful schemes have left themselves open to criticism.

A full list of organisations that expressed an interest in the project is included in *(Appendix Nine)*. On a number of occasions a number of different individuals from the same organisation visited or contacted the project, also a number were repeatedly in contact with the project.

Cost Analysis

The project budget was set before ABPR 2003 and was designed to provide processing facilities. Due to both ABPR 2003 and delays in implementation the focus of the budget changed. The table overleaf shows the actual expenditure for the project over the 28 months; this includes all the processing, collection, infrastructure and promotional costs and any additional unforeseen costs. *(Appendix Ten)* lists the suppliers to the project, who were consulted over the products we used and current costing.

This funding enabled the project to achieve the following:

- Provide a separate kitchen waste collection to 7569, high-density non-garden and garden properties.
- On average it achieved 40% participation producing 3kg of food waste per week from each participating household.
- Collected 850 tonnes of food waste of that 365 tonnes was composed in accordance with ABPR 2003.
- Produced 180 tonnes of ABPR 2003 accredited compost, which was used by a local school and in flowerbeds around Preston Town.
- Shared good practice with over 200 individuals.
- Developed an innovative leaflet, principally pictorial.

Cost Saving Ideas

- Do not have a dedicated project officer, and either use existing staff or buy in doorstepping at the beginning to help with the smooth delivery of the scheme, this could cost in the region of £6000.
- Not providing bags would save money, you can either not promote their use from the start asking people to wrap food or line the bins with newspaper if they wish, or ask householders to purchase their own. This could effect participation and capture rates and if you are asking householders to buy their own then there must be a good network of local suppliers of the bags.
- Using an established ABPR 2003 accredited processing facility, although the gate fee seems high it would save the costs and limit the risk associated with running the plant yourself.

EXPENDITURE	
Composting Process	
The project used the internal loan system available through Lancashire County Council to purchase the VCU and associated equipment at a total cost of £182,000. Lancashire County Council secured an extra £83,000 from Defra and off set it against the total cost if the equipment, so the internal loan was £99,000. The project claimed the cost of the repayments against the internal loan for two years.	£49,261
Operating costs of the processing plant for the first 19½ months, using SITA UK Limited as the main contractor.	£96,202
Provision of a generator until a permanent electrical supply was available	£18,634
Using a local waste management company, TEG™ Environmental for 4½ months	£8,019
SUB TOTAL	£172,116
Project	
Promotion and awareness raising, including leaflets and newsletters.	£4,400
Collection costs, including crew of driver plus 1 and vehicle running cost.	£92,156
Collection vehicle with bin lift leasing cost.	£12,000
Project Officer (28 months).	£57,050
SUB TOTAL	£165,606
Collection System	
Initial purchase of kitchen caddies and outside container.	£39,081
Liner bags.	£62,820
Distribution of the collection system.	£3,795
Containers and bags purchased to trial different container types.	£4,390
SUB TOTAL	£110,086
Contingency	
Any other equipment or services that needed to be purchased inline with running the composting facility.	£11,902
Any other equipment or services that needed to be purchased inline with using TEG™ Environmental.	£0
Addition cost incurred on the collection.	£31
Addition cost on the composting facility (incl maintenance and insurance).	£1,574
Promotion and awareness raising.	£430
Decommission and relocation of the VCU.	£10,354
SUB TOTAL	£24,291
TOTAL EXPENDITURE	£472,100

The project is a partnership between Lancashire Environmental Fund, Lancashire County Council and Preston City Council. Each partner has supported the project financially. In addition Lancashire County Council was able to secure £83,000 grant income from Defra towards the purchasing cost of the VCU and associated equipment, thus reducing internal loan charges to the project.

Cost Evaluations

Based on 7569 households, collecting 850 tonnes during the two-year project, with a participation rate of 40%.

Activity	Cost
Cost per household per year	£31.47
Cost per Tonne	£555.41
Cost per participation household per year	£78.68

Conclusions

Background

The design of the scheme closely mirrored an Italian scheme with a UK slant. Although the project has been successful and the initial concept is highly relevant today, modifications to the original project design would have been benificial. For example the project should have used an independent processing facility from the start. More are now available as the industry has developed rapidly over the last few years.

The 'big bang' effect, introducing a full recycling service including moving to an alternate week collection system in one go, proved to have an extremely positive effect on participation. Initial figures showed a participation rate of 56%, which levelled out at around 40%. Residents in the target area felt that the food waste project gave them an opportunity to 'get rid' of their food waste weekly within a fortnightly collection system.

The project adopted an innovative approach to communication in response to the diversity of ethnic backgrounds and languages in this area. The project focused on producing extremely visual, and almost word-free literature; the key text was repeated in several different appropriate languages. Minority languages may sometimes be spoken but not read, so written translations should not be relied upon. The cultural diversity of the target area added an important dimension to the project. Extensive doorstepping in the initial months helped to drive participation up and limit contamination. It also gave the householders an opportunity to talk openly about the project and their experience. Face to face communication worked particularly well with minority communities, although again language could be a barrier in some instances. Staff and volunteers with a multi cultural background are invaluable in this situation.

Collections

The project expected the collection to be the most difficult element of the project; it has in fact proven to be least problematic. The main attribute to this is the crew, the project was fortunate to have the same crew members for 95% of the time, adding detailed knowledge, which has been fundamental to the delivery of the project. The crew were actively involved and were not afraid to share their views with the Project Officer. As well as ensuring the highest possible quality of service, a regular crew could pre-empt problems. The project found that in an urban setting the target area could easily be cleared of food waste by a small vehicle with one driver and one crew member due to the proximately of the houses and a close network of streets.

The vehicle used was bespoke; it had a variety of loading options for maximum efficiency, around 3.6 meters of space per tonne, fully enclosed body to prevent leachate and was compact to maximise manoeuvrability both on the street and at the processing facility. A smaller vehicle would not have the payload capacity and would have had to tip twice a day, increasing time taken to complete the daily round.

The dual container system, 7 litres kitchen caddy and a 25 litres outside container, proved extremely effective. Lockable lids gave the householder reassurance that nothing could get into the containers, especially the outside container. A squatter indoor container was trialed in a small area and it was found to fit more neatly on a kitchen worktop. Some households needed two outdoor containers and some just use the indoor caddy to present their waste. As with any scheme there is always an element of wastage and therefore additional stock should have been factored in at a rate of approx 10% every year.

The project found that the bags with handles ('T shirt' style), although slightly more expensive, are better than those without handles. Customers tested both styles of bags, ones with and without handles and found that those without handles were not easy to pull out of a caddy, and were more difficult to tie. The bags with handles can be tied securely and enabled the collection crew to handle the bags more effectively. The project was advised to use either 18 or 20 micron thick bags to prevent tearing when being handled but after conducting a mini trial, it was found that a 16-micron thick bag was sufficient for a weekly food waste collection. The use of liner bags helped with the perception of hygiene and capture rates. In both composting processes the bags composted perfectly, there was no trace of them at all; this was an initial concern from both VCUE and TEG™ Environmental.

On average 3kg every week can be expected from a participating household, this could be as much as 5kg where cooking involves fresh un-prepared ingredients (ethnically diverse households are more likely to prepare food from fresh). The project did not experience much seasonal variation in the tonnage collected, although the type of food waste collected did vary. Observations showed that in summer a greater proportion of salad waste was evident, and in November there was a significant number of pumpkins! The total tonnage collected during the two years was 850 tonnes although only 365 was diverted from landfill and processed in accordance to ABPR 2003.

The projects hard line on contamination from day one proved successful, and although contamination was observed initially it was soon reduced to less than 1%. In areas with more ethnic diversity, the rejections were as high as 40% at first but ceased to be an issue after a few months. The crew played a key role in controlling contamination; rejection slips were issued to every householder with a contaminated bin. If the crew were challenged they were also able to explain to the householder why their bin was not taken. The Project Officer also visited each householder whose food waste was not taken to give a reason why and explain the importance of not contaminating the food waste in the future.

Waste says a lot about people and food was no exception. How and what people eat could be deduced from the food waste they produced. Whenever people prepare fresh food there is a marked increase in the amount of food waste produced. It also contained a high proportion of peelings as well as scraps. However, people who principally use ready meals (pre-packaged convenience foods) have little or no preparation waste or food scraps. They do, however, have more packaging waste that could be recycled. Ready meals, especially those, which are frozen, are less likely to become waste than fresh perishable foods, as they have a longer shelf life. These food types are more likely to end up in the refuse bin still in their packaging. To take this a step further, the project has also been able to draw conclusions about how a meal is shared; "plated-up" meals tend to create less waste than a meal with shared dishes. This is due to a tendency to over produce food such as rice.

Working closely with the asian community through the mosque network, it was understood that wasting food is not acceptable, so many people were putting left over food out for the birds. This was causing problems with vermin, the project gave them an acceptable option for getting rid of their food waste while fulfilling a religious requirement. Therefore resulted in less food being left out for birds (and vermin).

Officers found that 'playing down' the project was frustrating and to some extent hampered communication with the public. However similar schemes have received criticism in the press over collecting food, but failing to divert it from landfill. This happens as part of setting up a composting facility and working towards ABPR 2003. Only in the final stages of accreditation can you claim to be diverting waste from landfill. The project also thought that the general media was an unsuitable method to convey information to the target area about the scheme, as this is only a very small proportion of the total coverage. A project newsletter was found to be a good alternative, although you may only inform people who are already participating.

Composting Process

The project processed 365 tonnes inline with ABPR 2003 producing approx 180 tonnes of compost, in a relatively short period. If the VCU had been in full operation from the start the project would have been able to process the 850 tonnes collected producing approx 400 tonnes of compost. The compost produced was used by Preston City Councils Park Department on flowerbeds through out the city.

In hindsight operating an in-vessel composting unit, with no real experience and taking on the full risk of adhering to ABPR 2003 was very ambitious. During the inception of the project the operation of a specialised composting unit was deemed feasible, as the parameters required were mainly waste management requirements, which was within Lancashire County Council's experience. The introduction of new legislation added another dimension, of which no one had any true experience. VCUE assured the project that this piece of kit could fulfil that requirement and meet the parameters stipulated with in ABPR 2003. The project should have at this point re-evaluated the original concept of the project.

Communication

The project chose to move away from a traditional local authority approach to communication and tried to use a more pictorial method which proved extremely effective, (as the area has a wide range of ethnic diversity.) Coupled with the presence of a full time Project Officer, who actively doorstepped and promoted the project locally, issues were nipped in the bud. Had the processing been online from the start the project would have invested a lot more time and effort in promoting the scheme to the wider waste management industry, it did seem at times that the project was in fact shying away from any publicity. In hindsight more doorstepping, residual waste anaylsis and exploring some of the issues raised would have given the project more dimension to its findings.

Dissemination

The project attracted a lot of interest from both public and private sector experts. It has assisted many others looking at implementing a similar scheme. The project has helped to drive the industry's thinking and innovation in this new and rapidly developing work area.

A list of the many and varied bodies of people that the project has helped is shown in *(Appendix Nine.)*

Appendix Section
Appendix One

The Initial Leaflet Sent to All householders

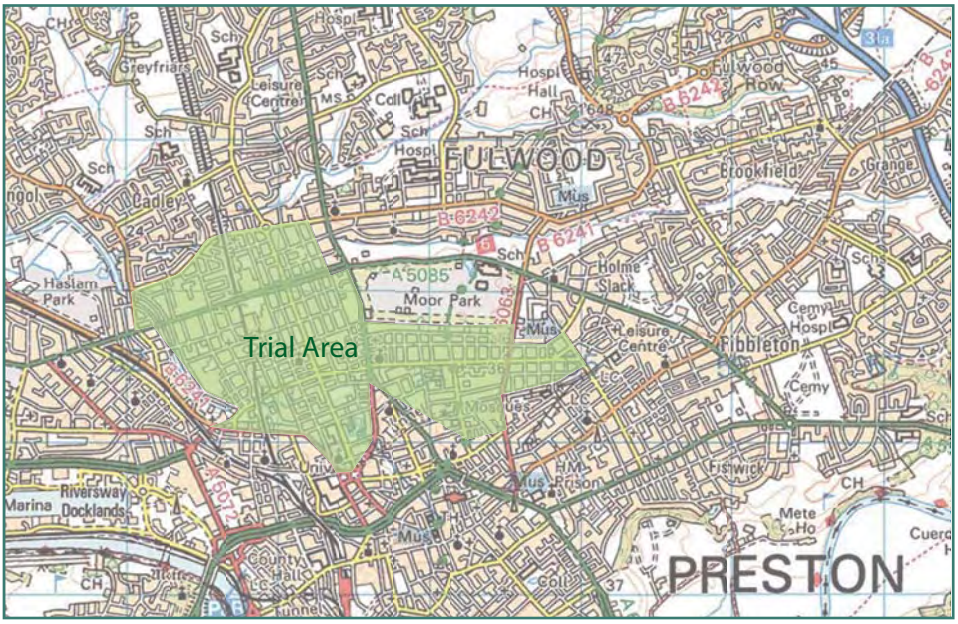
The leaflet is very pictorial to convey the message well to a community rich in ethnic diversity. Key messages were translated into two locally recognised languages, Urdu and Gujarati.

Note: Earlier versions referred to 'Kitchen Food Waste' but after confusion the word Kitchen was dropped.

External Cover

Internal cover

Appendix Two



Appendix Three - Postal Survey Results - Food Waste Recycling Questionnaire		
ABOUT YOUR HOUSE		
What kind of house do you live in?	Results No.	Results %
Flat or Rooms	0	0%
Terraced House	111	85%
Town House or Maisonette	4	3%
Semi or Detached House	16	12%
Do you have any garden?		
No garden at all	40	31%
A yard with some greenery	56	43%
Small garden	27	21%
Larger Garden	7	5%
ABOUT YOUR RECYCLING		
How often do you put your FOOD Waste container out for collection?		
Every Week	109	85%
Most Weeks	11	9%
Rarely	2	2%
Never	6	5%
How often do you put your OTHER recycling out for collection?		
Every Recycling Week	114	88%
Most Recycling Weeks	14	11%
Rarely	0	0%
Never	2	2%
How important is this new Food Waste scheme?		
It should definitely continue	106	83%
It would be better if it continued	18	14%
It would be better if it was withdrawn	1	1%
It should definitely be withdrawn	3	2%
How would you describe the standard of the Food Waste Collection Service from Preston City Council?		
Excellent	86	67%
Fair	31	24%
Some room for improvement	9	7%
Poor, unacceptable	2	2%
ABOUT YOUR MEALS		
How many children, 12 years and under, live in your house?		
children	0.4	on average
0	97	79%
1	13	11%
2	8	7%
3 or more	5	4%
How many Adults and children over 12 years live in your house?		
Adults	0.4	on average
1	34	29%
2	57	49%
3 or more	25	22%

Food Waste Recycling Questionnaire continued		
ABOUT YOUR MEALS		
Are lunchtime meals eaten in your house on weekdays?	Results No.	Results %
Yes	86	67%
No	42	33%
How often do you prepare meals from FRESH ingredients?		
Every meal	29	22%
Most meals (5 times a week or more)	80	61%
Some meals (once or twice a week)	18	14%
None (mostly prepacked food)	4	3%
ABOUT THE LINER BAGS		
How many of our special liner bags do you use each week?		
Bags a week	2.71	on average
more than 4	12	11%
around 3	73	65%
less than 2	28	25%
This trial uses liner bags, which are supplied free. What would you consider doing if they were not free in future?		
Continue, by wrapping food waste in newspaper	48	33%
Continue, buying you own bags locally (less than £5 a roll)	28	19%
Continue, buying your bags by mail order (about £5 a roll)	3	2%
Continue, without lining the small caddy?	19	13%
No longer recycle you food waste.	44	31%
Options amended by respondent to "Continue, using Plastic Bags"	2	1%
ABOUT THE GREEN CONTAINERS		
Where in your kitchen would you prefer to keep the small caddy?		
On the worktop	21	16%
On the floor	71	55%
Inside a cupboard	8	6%
Outside the back door	29	22%
Is the small kitchen caddy a suitable size?		
Too big	8	6%
About right	111	87%
Too small	8	6%
Is the Large container a suitable size?		
Too big	9	7%
About right	109	88%
Too small	6	5%
Have both green containers kept you food waste secure?		
Yes	118	94%
No	8	6%
...and relatively free of bad smells?		
Yes	112	90%
No	12	10%

Appendix Four

Rejections Note Left by the Crew

The note below was revised after the issues around contamination were known. The aim was to be more graphical.

House.....

Preston City Council

Sorry!

ONLY FOOD

can be taken from your green container

No Plastics bags

No Tin foil

No Rubbish

If you need advice please call us 01772 906905

آپکے غذائی کوڑے کی سبز بن میں غیر غذائی کوڑا پایا گیا ہے۔
اگر آپ کو معلوماتی کتابچے کی ضرورت ہے تو برائے مہربانی
ہم سے رابطہ کریں۔

o ખાસ નોંધ કરશો- તમોએ જે ઘરનો કચરો જુદી બેગમાં નાખવો જોઈએ તે રસોડાના -કિચનના- કચરામાં કદાચ ભૂલથી નાખી દીધો હોય જે અમોને મળ્યો છે.
o જો તમોને વિગતવાર માહિતીની લિફલેટ જોઈએ તો અમોને જાણ કરો.

Appendix Five

Postcard Used to Request More Bags

This postcard was delivered to households to inform them that replacement liner bags can be requested and are supplied from the collection vehicle.

Preston City Council

Lancashire County Council

Lancashire Environmental Fund
Supported by Lancashire County Council

Do you need more liner bags for your kitchen caddy?

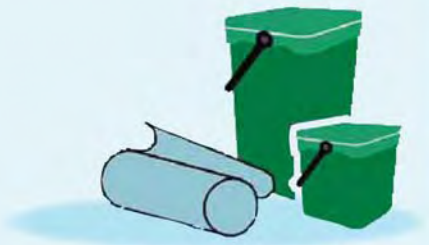
Keep this card with your liner bags. When you have only a few bags left fill in your address on the reverse of this card and leave it out for us with your green container. We will leave you a roll of bags.

You don't have to ring us, but if you need a container or advice you can contact us on: 01772 906905. Or e-mail: cleansingadmin@preston.gov.uk

www.preston.gov.uk

Design and Print Centre, Preston City Council. GRA00329

Please leave a roll of liner bags at:



Leave this card outside with your green container - do not post

Appendix Six - Maggot Fact Sheet

Maggot Fact Sheet

Don't just bin it SORT IT!

How to prevent maggots in your bin

TAKE CARE OF YOUR WASTE ADVICE SHEET

How to Avoid Flies & Maggots

There are many things that we can do to help prevent flies being attracted to and breeding in our bins.

All meat, fish and dairy waste should be wrapped and effectively secured to stop flies laying their eggs before rubbish is placed in the bin. Wrapping waste in newspaper and then a supermarket carrier bag provides a very effective barrier. However this is only one example of wrapping, use whichever method is best for you.

Don't leave food out in the kitchen. Eat, cook and store food properly, or place it wrapped in the bin as soon as possible. However it is important to remember that flies may lay eggs on food even before it has reached the bin.

Dog faeces are also a common spot for flies to lay eggs. Dog owners can help to prevent maggots and flies in their bin by bagging and tying any faeces well before putting them in their bin.

To control flies further you could hang up an insecticidal strip in the kitchen, or store your bin a shaded area.

Looking After Your Rubbish Bin

If you do get maggots you could pour a bleach solution over the contents of your bin. After it has been emptied to try and prevent maggots in the future clean and disinfect your bin well. There are a number of reputable wheelie bin cleaning companies in the area.

It is important to keep your bin clean and ensure that the lid is always properly closed. Wheelie bins are specifically designed to keep insects out once the bin lid is closed. If a bin is left open containing unwrapped food it is likely that flies will enter.

If you are struggling to close your bin lid on two weeks worth of waste, providing that you are fully participating in all recycling schemes you maybe eligible for a larger bin. If you feel that you fit into this category please do not hesitate to contact us for an application form.

The Kitchen Bin

The easiest way to sort your rubbish from your recyclables is to separate as you go. Many people find it convenient to have two kitchen bins, one for recyclables and one for rubbish.

A kitchen bin with a sealable lid and liner is ideal for the temporary storage of rubbish. It is important though, not to allow food waste to remain in this bin too long. Tie all kitchen bin liners with a knot before placing them in your grey wheelie bin.

Your kitchen recycling bin should not need a plastic liner as everything in this bin should be clean for your own safety.

It is recommended to clean and disinfect both bins at regular intervals.

The Life Cycle of the Fly

The common house fly, lays its eggs in rotting, moist material. They are attracted by the odours of decomposition. Some will feed, others will mate and some females will deposit their heavy loads of eggs. The major external factor affecting the life cycle of a fly is temperature. Maggots develop slower at lower temperatures and more rapidly at higher temperatures. In hot weather they can hatch within 8 to 20 hours. The maggots emerge from the eggs and they immediately feed on, and grow in, the material where the eggs were laid. These larvae are 3 to 9mm long and creamy white in colour.

When the maggots are full-grown, they crawl away to a dry, cool place near breeding material, and transform into the pupae stage. They emerge as adult flies and the cycle restarts. Six or more generations of fly eggs may hatch in a single summer, resulting in a large number of flies.

If you have any further queries please do not hesitate to contact us on:

01772 906905

neighbourhoodservices@preston.gov.uk

Preston City Council

Appendix Seven
Communication Strategy

Before scheme	Wider media is inappropriate for local only schemes
	Face to face talks most appropriate i.e. mosques and local groups etc.
	The official Local Authority Approach
	Enforcement
	Media on wider schemes refer to food
	Local language, pictorial leaflet
	Labels on containers
	Pictures on labels
	House numbers on labels
	Integrate with other calendars
	Local shops, bus stops
During scheme	Rejection slips, using pictures and ticks
	Doorstepping
	Questionnaires/informal opinions
	Postcards to inform Householders of bags replenishment
	Actively deal with any objections
	Congratulations to persuade Householders to carry on
	Newsletters every 6 months
	Fasting calendars
	Local champions, opinion formers

Appendix Eight

April 2007 Newsletter

External Cover

Internal cover

Appendix Nine - List of Organisations Interested in the Project

Organisation	Council/Consultant or Private sector	Organisation	Council/Consultant or Private sector
Aberdeen City Council	Council	Manchester City Council	Council
Abitibi-Consolidated Recycling Europe	Private sector	Manchester Recycling Consortium	Council
Alpheco Ltd	Private sector	Massey Truck Engineering	Private Sector
Bath & NE somerset	Council	Matt Pumfrey	Consultant
Bedford City Council	Council	MEL	Consultant
Blackburn with Darwen Bor'o Council	Council	Merseyside Waste Disposal Authority	Council
BOB Recycles	Private sector	Mike Hibbert	Consultant
Bolton MBC	Council	Myerscough Collage	Council
Bradford BOCS	Council	Nottingham City Council	Council
Brighton and Hove City Council	Council	Novamont, Italy	Private Sector
Calderdale Borough Council	Council	NW Recycling Forum	Council
Chorley Council	Council	Oadby and Wigson	Council
Community project in Skipton	Council	Oldham MBC	Council
Composting Association Conference	Council	Organic Resource Agency Ltd	Consultant
Conwy Council	Council	Pendle Borough Council	Council
Craven District Council	Council	Peterborough Borough Council	Council
Cumbria County Council	Council	Powys Council	Council
CWM Environmental	Council	Remade Scotland	Council
Cwm Harry Trust, Newtown, Wales	Council	Reporter from LetsRecycle.com	Consultant
Danny Powell, Skipton	Consultant	Resource Futures	Consultant
Dublin (RPS Consultancy)	Council	Resource Recovery forum	Council
Ealing Borough Council	Consultant	Sece	Council
Eden DC, State Vets, EA, Trading Stds	Council	Sefton Borough Council	Council
elcrp-recycling	Council	Serco	Consultant
Ends Report	Council	SITA	Private Sector
Essex County Council	Council	Solus PR	Private Sector
Ethical Solutions	Consultant	South Glostershire	Council
Eunomia	Consultant	South Lakeland District Council	Council
Garth Radio	Private sector	South Shropshire County Council	Council
Greater London Housing Association	Council	St Helens MBC	Council
Groundwork East Lancashire	Council	Staffordshire Moorlands District Council	Council
Invercylde Council	Council	Straights	Private Sector
James Fulford	Consultant	Sutton Coldfield lecture	Council
Jersey and Ortec	Council	Swap-web	Consultant
Jonathan Marsh	Private sector	Tameside MBC	Council
Keely Borough Council	Council	Taylors vehicle manufacturer	Private Sector
Keenan Recycling	Private sector	Tewsbury Borough Council	Council
Lancaster City Council	Council	The Little Wasters	Council
Leeds City Council	Council	University of Central Lancashire	Private Sector
Leicshire County Council	Consultant	The Royal Borough of Kensington & Chelsea	Council
Linktip	Private sector	Veolia Environmental Services (UK)	Private Sector
London Borough of Camden	Council	Wales Environmental Trust	Council
London Borough of Enfield	Council	West Dunbarton Council	Council
London Remade	Council	Westminster City Council	Council
Lund University (Sweden)	Consultant	Wirral MBC	Council
Luton City Council	Council	WRAP	Consultant

Appendix Ten - List of Suppliers Used During the Project

Supplier	What They Supplied	Address	Telephone Number and E-mail Address
Bio-bag Ltd	Compostable Corn Starch liners, trial baskets	Comet Road Moss Side Industrial Estate Leyland PR26 7PF	01772 641348 biobag@btconnect.com
City Distributors	Leaflet distribution	179 Kent Street Preston PR1 1PH	01772 887551
Lancashire Tippers	Built tipper body to our design	Haslam Mill Chorley Old Road Bolton BL1 3AS	01204 493750
Peter Ridley Waste Systems	Indoor and outdoor caddies	Crown House Gt Glemham Saxmundham Suffolk England IP17 2DJ	01728 663395 office@peterridley.co.uk
RCD leafleting	Distribution of leaflets	Unit 4 Hamer Vale Buckley Road Rochdale OL12 9BF	01706 759420
Sai-Pac (UK) Ltd	Latching Baskets, potato starch bags, containers	Poly House 88 Park Road Ilford Essex IG1 1SF	0208 553 4050 info@saipac.com
SITA UK	Composting, transportation, shredding wastes etc	4 Tustin Court Portway Preston PR2 2YQ	01772 325505
TEG Environmental Ltd	Composting service provider	Houston House, 12 Sceptre Court Sceptre Point Preston PR5 6AW	01772 314100
VCUE	VCU in-vessel composting unit	Unit 48 222 Kensal Road London W10 5BN	020 8969 8930 www.vcutechnology.com

Appendix Eleven

List of some of the comments from Householders and Waste Management Industry Representatives

Comments from Householders

"Bags brilliant, not leaking, awkward on worktop, want to try basket?"

"It is a good deed would like liner for 25L, regular drops too."

"Rang in missed bin. Smells less on floor! Like AWC."

"A very good scheme, would not lose it."

"An excellent service-Not one missed collection from it's introduction-Helpful operatives-"

"A first class scheme."

"Collections are not always done-Bins are sometimes missed in the summer months-Flies are great problem even when the bins are securely closed definite increase in the number of flies in the house and outside around the large green container."

"If the bin bags split when bin men empty them-They don't pickup what has been dropped it is just left in the street/rd-This is not acceptable and should be looked into at once."

"Green bins should be emptied fully sometimes bits left in-In summer & hot weather bad smells & flies occur-Recycling boxes should be emptied weekly as they got too full every other week-But no space for extra tubs."

"As many others in small terraced houses I have plants that need pruning etc. and I have a hedge between my house next so lots of hedge cutting in summer-I would like to be able not to waste this but as we do not have small brown bin there is nothing I can."

"Food waste box-small box for kitchen smells too much. The scheme needs rethinking. The small caddy gets in the way in the kitchen so it is kept outside."

"Having a small kitchen the caddy takes up space and can start to smell especially in warm weather. Cats knock over the caddies; it would be better if we could put it in the grey bin."

Comments from Waste Management Industry Representatives

"We were delighted with your presentation and feel that you added real value. The feedback on your presentation has been excellent and you have been given an overall feedback score of 4 out of 5. Delegates commented on your speech as useful, interesting and relevant and the only improvement they would like to make would be to give you more time to speak as they wanted to know more (but that's our fault for limiting your time!)

K.Gilbraith. London Remade

"Much of what we saw that day went on to form our own food waste collection trials ...(in Preston) its the enthusiasm of the team behind it that makes ideas work on the ground and actually deliver and this was very evident on the open day last Autumn. Where we benefited was by having over 18 months to plan, to learn, to adapt and in short to use your hard work as a template and in this respect if you hadn't been so obliging and generous with your time, views and hard facts I don't think our confidence levels would have been so high!"

S. Watson, Bedfordshire CC

"I must compliment you on the excellent quality of your communication and engagement with your customers, the use of so many pictures in leaflets and the rigorous cost and performance monitoring which you carry out. These were all very useful for us to observe and be informed by."

V.Hunt, Consultant to Leics CC

"Our visit on Monday was ideal - real chance to see containers in action. That was the main objective for the day - to better understand how crews use the containers, look at shortcuts to intended functionality, etc. We are very keen to ensure that containers are totally fit for purpose, and that feedback from users is taken on board in terms of product evolution. This was great opportunity to bounce around further ideas regarding container evolution."

T Musgrove , Director of National Accounts. Straight Plc

"I'm happy to report that following your advise we are now successfully completing a separate waste food collection to 7000 properties. Having "walked the streets" of Preston with you and your colleagues together with my Technical team we feel more able to cascade operational procedures to the new crew on the new collection round. I feel, having seen it first hand, to be more confident in being able to deliver specific instructions and advise accordingly."

J Lord. Calderdale DC

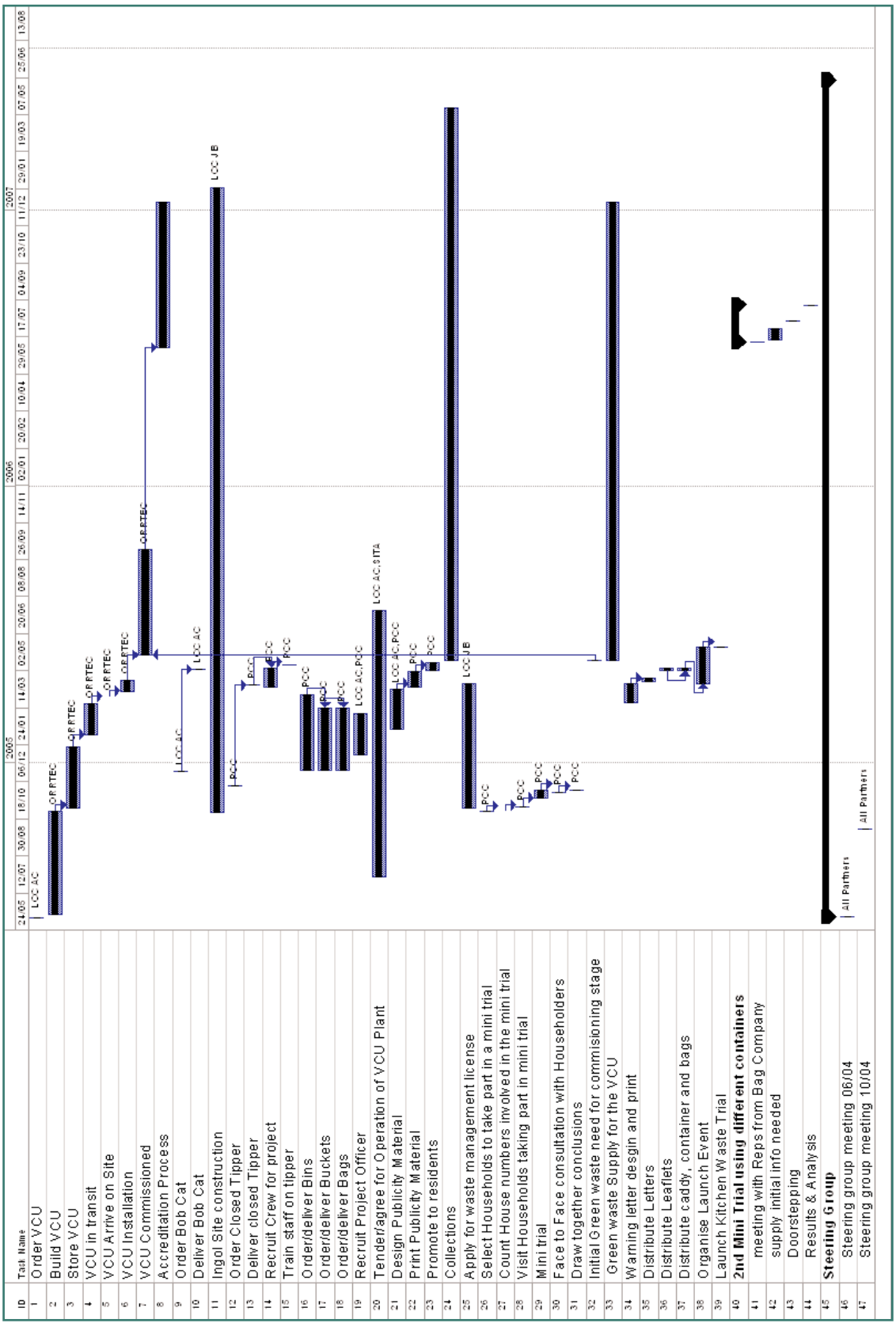
"On the back of visiting you and the new Waste Strategy priorities food waste has moved right up our agenda."

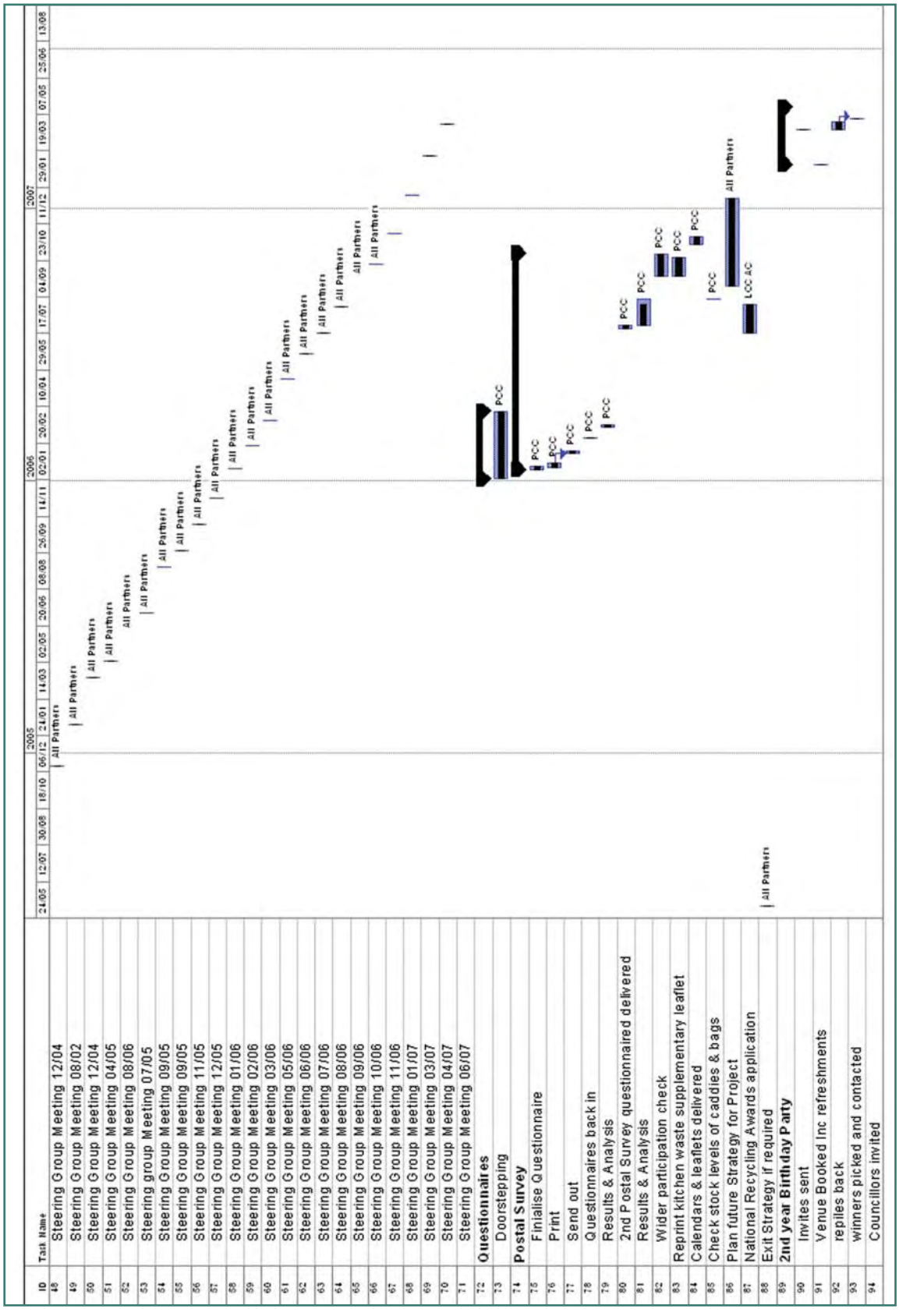
P.Florentine. Craven DC

"I would like to thank you and your team once again for all of your assistance as part of the ROTO25 scoping study. The information you provided us with regarding the practical aspects of actually operating a kitchen waste collection scheme, plus the opportunity to watch your team in action, was of inestimable value to us in designing what WRAP hopes will be the next industry standard kitchen waste collection vehicle. This has, and continues to be, a most challenging project, so your knowledge and enthusiasm for the work you undertake was one of the high points of our research. Thank you."

J Carruthers, Director. Ethical Innovatory Solutions Ltd

Appendix Twelve The Project's Work Programme

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2006
2007
24/05
12/07
30/08
18/10
06/12
24/01
14/03
02/05
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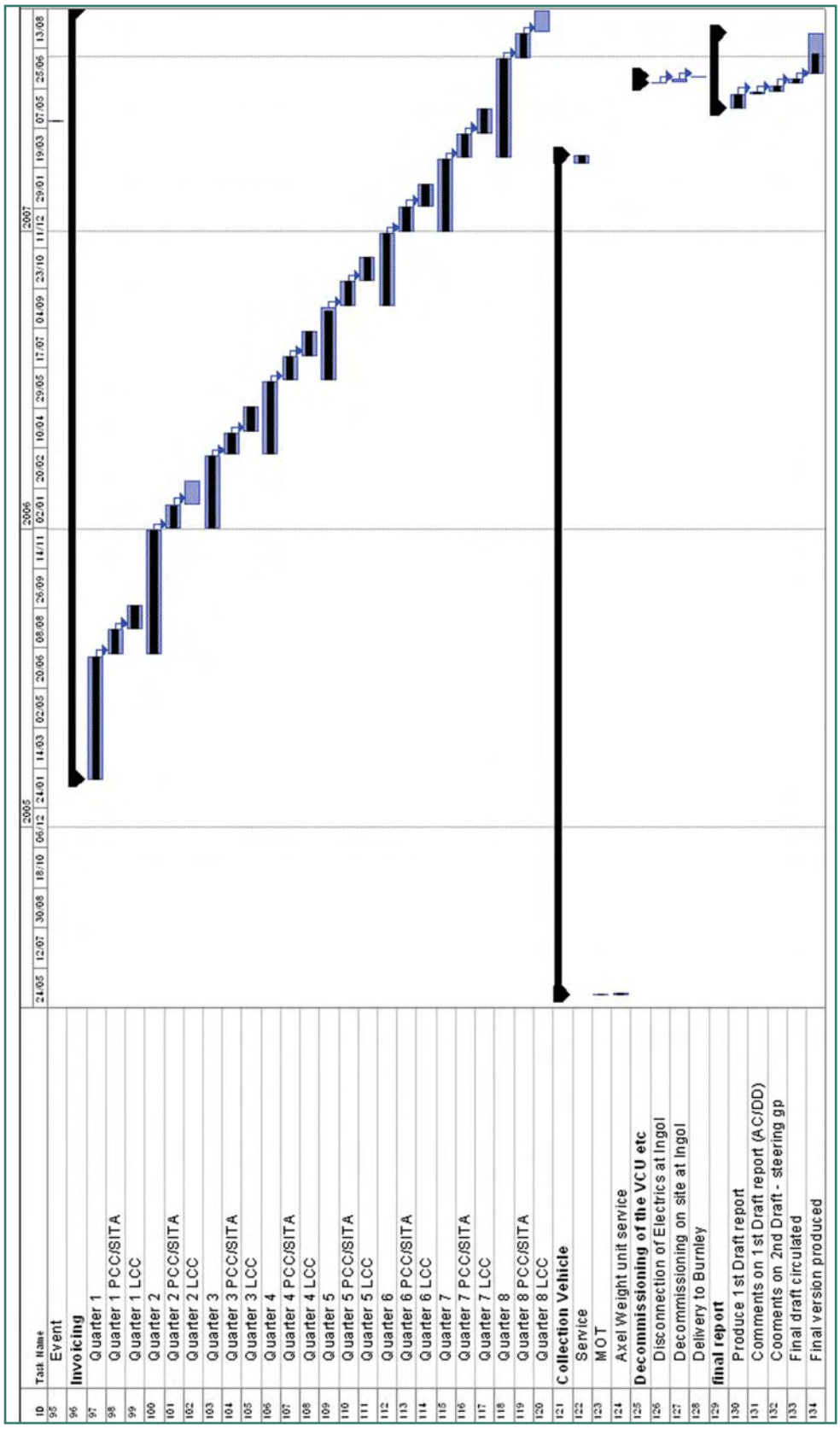
08/08
26/09
14/11
02/01
20/02
10/04
29/05
17/07
04/09
23/10
11/12
29/01
19/03
07/05
25/06
13/08
48 Steering Group Meeting 12/04
49 Steering Group Meeting 08/02
50 Steering Group Meeting 12/04
51 Steering Group Meeting 04/05
52 Steering Group Meeting 08/06
53 Steering group Meeting 07/05
54 Steering Group Meeting 09/05
55 Steering Group Meeting 09/05
56 Steering Group Meeting 11/05
57 Steering Group Meeting 12/05
58 Steering Group Meeting 01/06
59 Steering Group Meeting 02/06
60 Steering Group Meeting 03/06
61 Steering Group Meeting 05/06
62 Steering Group Meeting 06/06
63 Steering Group Meeting 07/06
64 Steering Group Meeting 08/06
65 Steering Group Meeting 09/06
66 Steering Group Meeting 10/06
67 Steering Group Meeting 11/06
68 Steering Group Meeting 01/07
69 Steering Group Meeting 03/07
70 Steering Group Meeting 04/07
71 Steering Group Meeting 06/07
72 Questionnaires
73 Doorstepping
74 Postal Survey
75 Finalise Questionnaire
76 Print
77 Send out
78 Questionnaires back in
79 Results & Analysis
80 2nd Postal Survey questionnaired delivered
81 Results & Analysis
82 Wider participation check
83 Reprint kitchen waste supplementary leaflet
84 Calendars & leaflets delivered
85 Check stock levels of caddies & bags
86 Plan future Strategy for Project
87 National Recycling Awards application
88 Exit Strategy if required
89 2nd year Birthday Party
90 Invites sent
91 Venue Booked Inc refreshments
92 repiles back
93 winners picked and contacted
94 Councillors invited
All Partners
PCC
LCC AC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96 Invoicing
97 Quarter 1
98 Quarter 1 PCC/SITA
99 Quarter 1 LCC
100 Quarter 2
101 Quarter 2 PCC/SITA
102 Quarter 2 LCC
103 Quarter 3
104 Quarter 3 PCC/SITA
105 Quarter 3 LCC
106 Quarter 4
107 Quarter 4 PCC/SITA
108 Quarter 4 LCC
109 Quarter 5
110 Quarter 5 PCC/SITA
111 Quarter 5 LCC
112 Quarter 6
113 Quarter 6 PCC/SITA
114 Quarter 6 LCC
115 Quarter 7
116 Quarter 7 PCC/SITA
117 Quarter 7 LCC
118 Quarter 8
119 Quarter 8 PCC/SITA
120 Quarter 8 LCC
121 Collection Vehicle
122 Service
123 MOT
124 Axel Weight unit service
125 Decommissioning of the VCU etc
126 Disconnection of Electrics at Ingol
127 Decommissioning on site at Ingol
128 Delivery to Burnley
129 final report
130 Produce 1st Draft report
131 Comments on 1st Draft report (AC/DD)
132 Coments on 2nd Draft - steering gp
133 Final draft circulated
134 Final version produced
2005
2006
2007
24/05
12/07
30/08
18/10
06/12
24/01
14/03
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20/02
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17/07
04/09
23/10
11/12
29/01
19/03
07/05
25/06
13/08

Notes

Notes

For more details please contact
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www.lancswasteinfo.com

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