LONDON BOROUGH OF BARNET

FOOD WASTE BEHAVIOUR CHANGE PROJECT – HOUSES

MAY - OCTOBER 2015



Introduction

The introduction of a separate food waste recycling collection service for all street-level properties in October 2013 has seen significant gains in the amount of food waste collected by the London Borough of Barnet for treatment rather than disposal. At present Barnet collects approximately 100 tonnes of food waste per week, compared with an estimated 200 tonnes per year with the previous mixed organics collection. However an estimated 20,000 tonnes of food waste is still disposed of in residents' residual waste bins per annum.

A waste composition analysis found that food waste comprised of 35.46% of residual waste from houses in November 2014 and 43.82% in April 2015, and that we currently capture only around a quarter of the available food waste for recycling. In addition, the graph below shows that there is a gradual downward trend in the tonnage of food waste being collected over time.

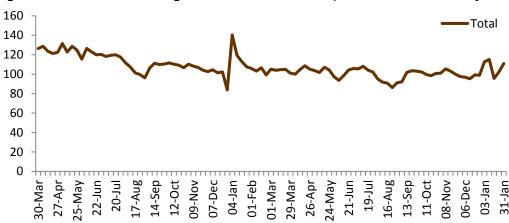


Figure 1: Food waste tonnage collected at kerbside (March 2014 – January 2016)

The council took part in a behaviour change project with the West London Alliance, working with consultants Impower. One of the council's projects focused on food waste recycling at houses in order to understand what interventions might be effective in changing residents' behaviour and improving participation and capture of food waste. It was intended that other participating boroughs would also carry out a waste behaviour change project, however this has not taken place and Barnet's is the only waste project that has been implemented.

The project included the following elements:

- Citizens' Panel questionnaire survey to understand residents' barriers to participation in the food waste recycling service – May 2015
- Food waste participation and usage monitoring May/June 2015 ("pre-project monitoring")
- Design of interventions to be piloted based on results of all the above
- Interventions piloted for 8 weeks from 7 September 30 October 2015 by Street Scene Delivery Unit

Survey on barriers to participation

Barnet's Citizens' Panel was surveyed to gain an understanding of attitudes towards food waste recycling and barriers to participation. Impower distributed a survey to 2000 members of the Citizens' Panel and received 400 responses. When analysing these results it has to be considered that those that responded were likely to already have an interest in food waste recycling and therefore the results should not be seen as a representative view of residents in Barnet overall. The key findings from the survey were:

- 65% stated that they recycle some or all of their food waste
- 43% of non-recyclers have never recycled any food waste
- 55% of non-recyclers thought about food waste recycling but decided against it
- 87% are aware of food waste recycling awareness is not the key barrier
- Fears of vermin and smell are major reasons for people deciding not to recycle their food waste
- 57% claim that they have never had an outside food waste bin
- Placing the food caddy next to the general waste bin leads to greatest rates of desired behaviour
- Recyclers are not always sure what food waste items can be recycled
- 56% of recyclers are very satisfied with the food waste recycling service
- 60% of recyclers believed that more than 75% of people on their street recycle their food waste
- 68% of recyclers believe that food waste recycling helps the environment
- 55% of recyclers believe that food waste recycling helps reduce council tax spending
- 78% of recyclers believe that up to a quarter of household waste is food waste
- 72% of recyclers and 44% of non-recyclers felt that free compostable liners could encourage more food waste recycling

Participation and usage monitoring

From 13 to 29 May 2015, 730 households' participation in the separate food waste collection service was monitored by service supervisors to enable the Recycling & Waste service to understand the level of usage of the service. The monitoring covered houses, converted houses and small flat blocks but not larger blocks of 6 or more flats, which do not currently have a food waste collection service. The 6 roads monitored were selected based on applying CAMEO demographic typology. It was found that the overall baseline participation rate (based on participation at least once over three weeks) for food waste recycling was 41.37%.

Design of Interventions for pilots

Using the data obtained from the pre-project monitoring, and the results from the Citizens' Panel survey, six interventions were devised for the 730 households. Each intervention was piloted on one street. The six interventions are set out below:

Table 1 - Interventions

Intervention/pilot	Street	Leaflet provided
Letter to residents explaining free liners are available at	Watling	generic leaflet
local library	Avenue	
Letter to residents and a delivery of free liners	Long Lane	generic leaflet
Letter to residents explaining where liners are available to	Wentworth	generic leaflet
purchase	Avenue	
Stickers on residual waste bin and letter to residents	Princes Park	generic leaflet
explaining larger outside food waste containers can be	Avenue	
requested for free		
Stickers on top of residual waste bin	Brunswick	generic +
	Park Road	specific leaflet
Generic leaflet alone - to be used as a reference group	Salisbury	generic leaflet
	Road	-

Following the implementation of these interventions, the households were monitored again over an eight week period from 9 September to 30 October 2015 to assess their impact.

Participation and Usage monitoring methodology

Each household was monitored over eight consecutive weeks. Participation was monitored by recording whether residents placed out their food waste bin each week. When the data was

collated, it was split into three monitoring blocks in accordance with WRAP monitoring guidelines which recommends monitoring should be completed over three week period. The first two weeks of the 8 week trial period were used as a grace period for residents to become accustomed to the changes and to give them time to buy or collect liners where applicable. The analysis for this report was based on comparisons between the pre-project monitoring and monitoring during weeks 3-5 and weeks 6-8.

As well as recording participation, the usage (or "fill rates") of food waste bins was also recorded to enable an estimation of any change in assumed tonnage (irrespective of whether participation had increased or not). This assessment is important as it has more of a bearing on the effect of food waste recycling on the council's disposal/treatment costs and recycling rate than pure participation.

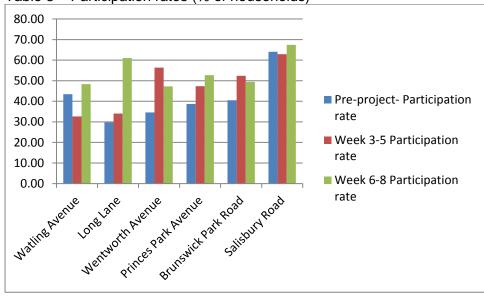
Results

Table 2 – Participation rates for interventions

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Street	Total no. of h/holds sampled	Pre- project- No. of participat -ing h/holds	Pre- project- Participat -ion rate	Intervention	Week 3-5 - No. of participat- ing h/holds	Week 3-5 Participat- ion rate	Week 6-8 - No. of participat- ing h/holds	Week 6-8 Participat- ion rate
Watling Avenue	184	80	43.48%	Letter, free liners available at local library + generic leaflet.	60	32.61%	89	48.37%
Long Lane	141	42	29.79%	Letter, a delivery of free liners + generic leaflet.	48	34.04%	86	60.99%
Wentworth Avenue	55	19	34.55%	Letter, information explaining where liners are available to purchase + generic leaflet.	31	56.36%	26	47.27%
Princes Park Avenue	93	36	38.71%	Letter about larger food waste containers, stickers on residual waste bin + generic leaflet.	44	47.31%	49	52.69%
Brunswick Park Road	168	68	40.48%	Stickers on residual waste bin + specific leaflet	88	52.38%	83	49.40%
Salisbury Road	89	57	64.04%	Generic leaflet, reference group	56	62.92%	60	67.42%

Table 2 above sets out the data for participation in each of the monitoring periods (preproject, weeks 3-5, weeks 6-8), and the percentage rates for participation are shown below in Table 3.







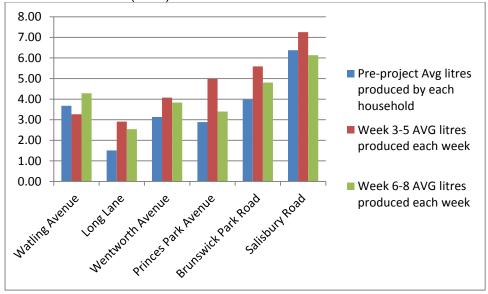


Table 4 shows the average litres of food waste presented per household per week in each of the monitoring periods on each road. This data provides the basis for estimations of the tonnage captured for recycling.

Table 5 - Overall Participation rate

Monitoring Period	No. of participating households	Participation rate
Pre-Project	302	41.37%
Weeks 3-5	327	44.79%
Weeks 6-8	393	53.84%

The average overall participation rate for all households in this study across all monitoring periods was 49.32%. Overall participation across all roads and interventions rose by 12.47% between the pre-project monitoring and weeks 6-8, which suggests that interventions had some positive impact.

Table 6 - Total number of overall users

Street	Total no. of households sampled	Overall No. of participating households across 8 weeks (participating at least once)	% Overall participating across 8 weeks (participating at least once)
Watling Avenue	184	96	52.17%
Long Lane	141	98	69.50%
Wentworth Avenue	55	37	67.27%
Princes Park Avenue	93	66	70.97%
Brunswick Park Road	168	106	63.10%
Salisbury Road	89	63	70.79%

Table 6 shows the number and percentage of households who participated at least once across the eight weeks. Participation figures suggest that people are aware of food waste recycling and in some cases may have been prompted into trying it by the interventions but they haven't continued to participate, this is in line with the Citizen's Panel survey findings.

Participation analysis

Free liners at library

Following analysis by the council's Insight Team, Watling's Avenue intervention was ranked highest in terms of the number of different customer segments the intervention had a positive impact on as well as the duration of the effect. However only 20 of the 184 eligible households at Watling Avenue (11%) collected free liners from the library. The participation rate in weeks 6-8 increased by a modest 5% compared to the pre-project participation rate, which also suggests that the provision of free liners at the library did not prompt a large number to try food waste recycling. Some households that collected liners must have already been recycling as the percentage increase in participation is lower than the percentage of households that collected liners. However some may not have chosen to collect free liners as they already had them or it was easier for them to buy them elsewhere, for example with their weekly shop.

Delivery of free liners

Free liners provided to households on Long Lane appeared to have little effect on participation in the earlier monitoring period (despite households having the liners in hand from the very start of the 8-week monitoring period). There was then a significant increase in participation (31%) in the last monitoring period, and it is not clear why this would be the case.

Explaining where liners are available to purchase

Wentworth Avenue had a reasonable increase in participation (12.7%, comparing the preproject rate with weeks 6-8) - this could be linked to an observed increase in liner usage, possibly prompted by the leaflet and letter.

Stickers and larger outside food waste containers

The increase in participation in Princes Park Avenue (14%) could be attributed to the stickers on bins as residents are reminded to recycle their food waste every time they use their residual waste bins, however other measures at this road included a letter and leaflet. The offer of a larger bin has not delivered any significant improvement in participation as only five households requested this out of a possible 93 households. Princes Park Avenue has a high Jewish demographic and during the period in which this road was monitored, several Jewish religious events took place, Yom Kippur, Sukkot, Shemini Atzeret and Simchat Torah. This may have temporarily increased participation in this road.

Stickers and specific leaflet

The increase in participation in Brunswick Park Road (8.9%) could be attributed to the stickers on bins, as residents are reminded to recycle their food waste every time they use their residual waste bins. There was also an increase in the set-out rate. The provision of a specific leaflet in Brunswick Park Road explaining what happens to food waste may have helped people to understand the process better and provided some motivation to participate.

Reference group (leaflet only)

The reference group at Salisbury road saw a small increase in participation (3.3%) which could be attributed to the letter and leaflet they received. It should be noted that the letters sent to all roads mentioned that the council would be monitoring participation, and this may also have increased participation across some or all roads to some extent.

Table 7 _	Frequency	of food	wasta	narticination	10/2 of	f households)
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Street	1	2	3	4	5	6	7	8
Stieet	week	weeks						

Watling Avenue	11%	5%	7%	3%	5%	8%	13%	NA
Long Lane	23%	11%	6%	9%	6%	11%	2%	1%
Wentworth Avenue	25%	5%	4%	4%	4%	5%	5%	15%
Princes Park Avenue	27%	14%	5%	10%	3%	3%	3%	5%
Brunswick Park Road	10%	5%	5%	5%	4%	11%	13%	11%
Salisbury Road	7%	2%	1%	6%	3%	9%	19%	24%

The above table shows how often households used the food waste service across the eight weeks rather than monitoring blocks.

114 households (out of a total of 730) used the service just once across eight weeks which equates to 15.62% of all households. Only 78 households used the service on all weeks monitored, which equates to 10.68% of all households. Despite an increase in overall participation only two households of the 141 on Long Lane participated on all eight weeks this equates to 1%, and this was the worst performing street. In comparison the best performing street was Salisbury Avenue which saw 28% of households participating every week.

This analysis would suggest there is intermittent participation across the majority of service users. Intermittent participation could be due to people not requiring a collection every week, perhaps due to being smaller households, eating out, realising how much waste they produce and seeking to reduce it, feeling they do not have enough food waste, or failing to remember to use the service as a matter of course.

Table 8 - Set out rates

Street	Pre-project set out rate	Week 3-5- Set out Rate	Week 6-8- Set out Rate	Average Set out Rates
Watling Avenue	29.53%	28.26%	30.98%	29.62%
Long Lane	15.13%	24.35%	27.66%	26.00%
Wentworth Avenue	30.30%	33.33%	33.94%	33.64%
Princes Park Avenue	23.66%	26.52%	26.16%	26.34%
Brunswick Park Road	30.95%	42.46%	37.90%	40.18%
Salisbury Road	53.56%	54.68%	52.06%	53.37%

Table 8 shows set out rates for each street and monitoring block. Set out rates are based on how many households presented their bins on a given single week.

The set out rate is much lower than the participation rate (which is based on participating at least once over three weeks). This suggests that people may have tried food waste recycling once but many are not putting their food waste out every week. This may be due to the belief that food waste creates smell, mess and attracts vermin which was a common barrier to participation highlighted in the Citizen's Panel survey. It may also be due to people forgetting to buy bags or place their bins out.

The Citizen's Panel survey also identified that there are a number of residents who are unaware of what can go in their food waste bin, and this will lead to certain amounts of food waste being placed in the residual waste bin and therefore reduced need to put out the food waste bin every week, and this could be reflected in the set out rate. Some may have increased their awareness of food waste recycling due to the interventions and therefore decided to compost their food waste at home, meaning they have less food waste and therefore don't fill it every week, through this is not reflected in sales figures for the council-promoted compost bins.

In some areas for example Salisbury Road the set out rate has dropped since pre participation, this may potentially be due to increased communications on the matter leading to people realising how much food they are wasting and therefore reducing their consumption. Another reason for the set out rate reducing could be that communication was not prolonged throughout the trial meaning that people did not have sufficient reminders or reinforcement to change their behaviours

On the other hand the set out rate has increased in a number of areas, notably Long Lane and Brunswick Park Road.

Table 9 – Liner usage among participating households

Street	Pre-Project No. of Households using liners	Pre- Project liner use rate	Week 3-5 - No. of Households using liners	Week 3-5 liner use rate	Week 6-8 - No. of Households using liners	Week 6-8 liner use rate
Watling Avenue	57	30.98%	52	28.26%	70	38.04%
Long Lane	31	21.99%	41	29.08%	81	57.45%
Wentworth Avenue	16	29.09%	27	49.09%	25	45.45%
Princess Park Avenue	23	24.73%	31	33.33%	40	43.01%
Brunswick Park Road	38	22.62%	56	33.33%	65	38.69%
Salisbury Road	47	52.81%	49	55.06%	49	55.06%

Table 9 shows that liner usage increased at all locations. Only two locations were provided with free liners and therefore the remaining locations must have bought their liners. The one intervention which was implemented across the board was a leaflet. This could suggest that some residents needed reminding of food waste recycling (via the leaflet and letter) and this

prompted them to buy liners for themselves. Liner usage did increase in areas which received free liners, however if patterns follow the trends since October 2013 then it is likely that once free liners run out, participation will fall.

Tonnage analysis

Table 10 shows the assumed tonnages per household for each street for each of the monitoring periods, and shows that percentage change between the pre-project and week 6-8 periods. Tonnages were modelled based on fill rates for the food waste bins, and using bulk density calculations from WRAP to estimate the equivalent tonnage. Most roads showed increased fill rates and tonnages as set out below.

Table 10 - Tonnage per household

Street	Pre-project Tonnage produced by each household	Week 3-5 - Tonnage produced by each household	Week 6-8 - Tonnage produced by each household	% increase between preproject and week 6-8 tonnage
Watling Avenue	1.07 kg/h	0.95 kg/h	1.24 kg/h	+15.8%
Long Lane	0.44 kg/h	0.84 kg/h	0.74 kg/h	+68%
Wentworth Avenue	0.91 kg/h	1.18 kg/h	1.11 kg/h	+21.9%
Princess Park Avenue	0.84 kg/h	1.45 kg/h	0.99 kg/h	+17.8%
Brunswick Park Road	1.15 kg/h	1.62 kg/h	1.39 kg/h	+20.8%
Salisbury Road	1.85 kg/h	2.10 kg/h	1.78 kg/h	-3.7%

^{*}Tonnage assumptions are based on WRAP bulk density report

Free liners at library

There was a relatively low level of increase in tonnage of 15.8% between the pre-project period and weeks 6-8.

Delivery of free liners

The largest tonnage increase (68%) has been at Long Lane. Tonnage rose in weeks 3-5, but this increase was not sustained into weeks 6-8. It is important to note that tonnage in this road started from a very low base, with the worst tonnage performance of all the roads in this study. There was therefore more potential for improvement than at other roads. Tonnage in Long Lane still remained a lot lower than at other roads at the end of the study, therefore it may be interesting to consider whether the same intervention would have had as big an impact in one of the other better performing pilot areas.

Explaining where liners are available to purchase

Both participation and tonnage figures showed an increase up to weeks 3-5 followed by a decrease. The increase between the pre-project period and weeks 6-8 was 21.9%, a modest level of improvement.

Stickers and larger outside food waste containers

Princes Park Avenue's participation rate increased at each monitoring period. However tonnage increased in weeks 3-5 and then decreased again in weeks 6-8. The increase between the pre-project period and weeks 6-8 was 17.8%, a relatively low level of improvement.

Stickers and specific leaflet

Both participation and tonnage figures shown an increase up to weeks 3-5 followed by a decrease. The increase between the pre-project period and weeks 6-8 was 20.8%, a modest level of improvement.

Reference group (leaflet only)

Tonnage decreased, though not to a statistically significant level.

Summary of outcomes

The key outcomes and an assessment of cost/benefits are set out in table 11 below.

Table 11: Summary of key outcomes, costs and benefits

Table 11. v		omes, costs and benefits			
Street	Participation and tonnage changes (pre-project compared with weeks 6-8)	Cost of implementation borough-wide to all street-level properties	Saving	Analysis & Commentary	Feasibility
Watling Avenue - Letter, free liners at library + generic leaflet.	Participation +5% Tonnage +15.8%	Assumes 11% of 102,000 street level properties will claim liners: 11% = 11,220 HH's ESPO average cost of liners per 1000 = £16.46 2 liners per week= £19,206 cost p/a OR 3 liners per week= £28,810 cost p/a Distribution to 14 libraries - within existing resources. Letter/leaflet - print and distribution to 102,000 households c.£10k cost TOTAL cost = £29,206 to £38,810	0.17kg/hh/wk tonnage increase = 99.18 tonne p/a Menu Pricing from April 2016 = £14.68 differential between food to residual vs food to recycling. 99.18 tonnes x £14.68 = £1,455 saving p/a	Only 11% of residents collected the free liners from the library - provision of free liners did not prompt a large number to try food waste recycling, and there is no evidence that those who claimed liners were new participants. This intervention is not cost effective based on current evidence.	

Long Lane - Letter, delivery of free liners + generic leaflet.	Participation +31% Tonnage +68%	Provision of liners to all 102,000 street level properties: ESPO average cost of liners per 1000 = £16.46 2 liners per week= £174,607 Distribution = £51,000 Total = £225,607 cost p/a 3 liners per week = £261,911 Distribution = £76,500 Total = £338,411 cost p/a Letter/leaflet – print and distribution to 102,000 households c.£10k cost TOTAL cost = £235,607 to £348,411	0.30kg/hh/wk tonnage increase = 1591.2 tonnes p/a Menu Pricing from April 2016 = £14.68 differential between food to residual vs food to recycling. 1591.2 tonnes x £14.68 = £23,358 saving p/a	Minimal effect on participation in the earlier monitoring period (despite households having the liners in hand from the start of the 8-week monitoring period). Significant increase in participation in the last monitoring period - not clear why this would be the case. Tonnage in this road remains a lot lower than at other areas. The overall impact is not sufficient to justify the very high cost of implementing this intervention borough wide. The cost will far exceed the potential benefits.	
Wentworth Avenue - Letter, explaining where liners are available to purchase + generic leaflet.	Participation +12.7% Tonnage +21.9%	Minimal extra costs eg. an extra page for additional liner information in service leaflet or letter. Letter/leaflet – print and distribution to 102,000 households c.£10k cost TOTAL cost = minimal assuming leaflet is to be provided	0.20kg/hh/wk tonnage increase = 1,060 tonnes p/a 1,060 tonnes x £14.68 = £15,560 saving p/a	The tonnage has increased moderately. Although this is seen as successful it could be incorporated into present and future communications and therefore does not need to be implemented separately.	

Princes Park Avenue - Stickers on residual bin + generic leaflet and larger outside food waste containers	Participation +13.9% Tonnage +17.8%	Number of HH's assumed to request larger bin = 5,271 HH's 5271 x £16.00 (cost of bin) = £84,336 + 100 spare bins = £85,936 bin cost 102,000 stickers = £2,567.60 1 team of 2 people and 1 driver placing stickers = £325 per day. 1 team can stick 600 stickers a day 102,000/600 = 170 team/days. 170 x £325 = £55,250 Van= £18 rental per day x 170 days = £3,060 + fuel £58,310 sticker cost (one off cost) Letter/leaflet – print and distribution to 102,000 households c.£10k cost	0.15kg/hh/wk tonnage increase = 795 tonnes p/a 795 tonnes x £14.68 = £11,670 saving p/a	Participation increased overall over time. While tonnage also increased at the beginning of the trial, towards the end of the trial the tonnage reduced significantly. This can be attributed to a decrease in tonnage produced by the 5 households over time. The offer of larger bins was not popular and they appear not to have had an impact. Only 5 households (out of a possible 93 households) requested a larger 140litre bin. This road also had stickers placed on refuse bins. The tonnage change here was lower than in the road where only stickers were provided.	
Brunswick Park Road - Stickers + specific leaflet	Participation +8.9% Tonnage +20.8% Tonnage has increased in line with participation	TOTAL cost = £154,246 102,000 stickers = £2,567.60 1 team of 2 people and 1 driver placing stickers = £325 per day. 1 team can stick 600 stickers a day 102,000/600 = 170 team/days 170 x £325= £55,250 Van= £18 rental per day x 170 days = £3,060 + fuel £58,310 cost (one off cost) Letter/leaflet - print and distribution to 102,000 households c.£10k cost TOTAL cost =£68,310	0.24kg/hh/wk tonnage increase = 1,272 tonnes p/a 1,272 tonnes x £14.68 = £18,672 saving p/a	The is a more viable intervention based on the pilot, in terms of cost/benefit, as it had one of the better tonnage impacts. It is still an expensive intervention though this would be a one off cost. There may be alternative methods of implementation which could reduce the cost. The provision of a specific leaflet explaining what happens to food waste may have helped people to understand the process better	

				and provided some motivation to use the service. This element could easily be integrated into future communications.	
Salisbury Road - Generic leaflet, reference group	Participation +3.3% Tonnage -3.7%	Letter/leaflet – print and distribution to 102,000 households c.£10k cost	N/A	This was the reference group, which was performing well prior to the trial and showed no significant change.	

Summary of findings:

- Participation figures and the Citizens Panel survey responses suggest that residents are aware of food waste recycling to some extent, and
 in some cases may have been prompted into trying it by the interventions but have not continued to participate.
- Participation is intermittent across many service users. 15.62% of all households used the service just once across eight weeks. Only 10.68% (78 households) used the service on all weeks monitored.
- Interventions based around provision of liners or signposting to liners showed only a moderate tonnage or participation benefit. The offer of larger bins was only taken up by a small number of households. Stickers generated a modest increase in tonnage and participation, and compared to the other interventions this is a relatively low-cost intervention, though its potential long term benefits are unknown at present.
- Liner usage increased at all locations. As only two locations were provided with free liners, the remaining locations must have bought their liners. This may suggest that some residents needed reminding of food waste recycling through the leaflet which was provided in every road, and this potentially prompted them to buy liners for themselves.

Proposed next steps

The following actions are proposed as next steps.

- Post-project questionnaire to pilot area households asking residents what has helped and what else would help to engage them in the food waste recycling service. This survey will be distributed by end of March 2016 and the results will be analysed.
- Request that West London Alliance partners consider their own food waste trials, to enhance learning by all partners.
- Consider possible trial of one or two of the above interventions across a wider area or collection round, taking into account the costs and methods available for monitoring.
- Consider communications campaign to relaunch the food waste offer to those residents who are not participating but may be persuaded.

Appendix 1 – Communications materials

Generic leaflet



Specific leaflet (additional to the above Generic leaflet)



Sticker for refuse bins

