



Bin Tagging Program

Kerbside Behaviour Change

June 2016

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1.0 Introduction

Encouraging householders to source separate materials into the correct bin at the kerbside is a significant challenge for waste management practitioners. Using a combination of tools and strategies, the Bin Tagging Program has been designed to improve kerbside source separation. This successful Program originated in South Australia and was piloted in WA in 2015.

WALGA received funding from the Waste Authority, through the Waste Avoidance and Resource Recovery Action, to continue implementing a behaviour change campaign that reduces contamination and increases recovery from the kerbside system. Commonly referred to as 'Bin Tagging,' this Program supports Strategic Objective 5 of the WA Waste Strategy: 'Creating the Right Environment' (2012). This Report provides information on the roll out of the Program and final results.

2.0 Background

In 2014, WALGA was allocated funding by the Waste Authority to implement a community engagement and enforcement program that increased the recycling rate from kerbside collections and reduced contamination.

WALGA undertook research into the key recycling / public awareness campaigns operating in Australian jurisdictions. The following campaigns were identified and evaluated to identify approaches that could be used in Western Australia:

- Get it Right on Bin Night (VIC)
- Love Food Hate Waste (NSW)
- Do the Right Thing, Use the Right Bin (QLD)
- Recycle Right – Bin Tagging (SA).

From the Programs considered, the Bin Tagging Program from South Australia was selected for use in WA, due to its impressive results in reducing contamination rates in the recycling bin and increasing recycling rates.

3.0 Pilot Program: Longitudinal Results

To determine the efficacy of the South Australian Program in a WA context, a Pilot Program was undertaken in the Cities of Joondalup, Kwinana and the Town of Cambridge. These Local Governments represent cross section of the metropolitan area. The pilot program aimed to inspect approximately 2,000 households in each Local Government area. Over 5 fortnights in February – April 2015, auditors checked waste and recycling bins in designated areas, collecting data on the materials in bins and providing residents with feedback on their source separation performance.

In February 2016, WALGA and the Local Governments involved in the original Bin Tagging Pilot Program undertook follow up audits to gauge the long term impacts of this approach. A sample of approximately 400 households from the original 2,000 households were audited from each Local Government area. The results from this sample provide a picture of the ongoing success of the Bin Tagging Program at improving recycling behaviour.

Reviewing the contamination rates for the recycling bin, Town of Cambridge showed a slight decrease in uncontaminated recycling bins from 68.75% to 66.2% of bins, City of Kwinana showed a slight increase in the number of uncontaminated recycling bins from 55.5% to 57.45% and City of Joondalup essentially maintained the same contamination rate.

In City of Kwinana, 295 households were sampled and results demonstrated that change to the community's waste management behaviour had been ongoing following the original Pilot Program. In the initial audits, the rate of correct recycling for this sample of households was 30.1%. Over the course of the Pilot, the rate of correct recycling increased to 55.5%. One year later, these households had continued to maintain a higher rate of correct recycling at 57.4%.

369 households were sampled in the City of Joondalup. In the initial audits, the rate of correct recycling for this sample of households was 44.7%. Over the course of the Pilot, the rate of correct recycling increased to 55.1%. One year later, these households had continued to maintain a higher rate of correct recycling at 55.3%.

In Town of Cambridge, 414 households were sampled. In the initial audits, the rate of correct recycling for this sample of households was 59.7%. Over the course of the Pilot, the rate of correct recycling increased to 68.7%. One year later, these households had continued to maintain a higher rate of correct recycling at 66.2%.

Since the bin tagging was completed in 2015, the Local Governments have undertaken varying levels of promotion / engagement on waste management. Town of Cambridge has continued its high profile newspaper campaign and active community engagement. Kwinana and Joondalup have continued their usual level of activity. Kwinana utilising the Recycle Right branding and resources.

WALGA and the Local Governments will consider auditing these same areas in early 2017 to see what longer term impact the bin tagging has had.

4.0 Program Rollout: Bin Tagging 2016

The 2015/16 Strategic Partnership Agreement between the Waste Authority and WALGA was finalised in December 2015. This necessitated a quick turnaround on the roll out of the Program.

4.1 Options and Eol

Expression of Interest (Eol) Forms were circulated to all Local Governments in late 2015. The response from Local Government was substantial, with 18 Local Governments registering their interest in taking part in the Bin Tagging Program.

The Eol presented two options to Local Governments, Option 1 was to receive assistance from WALGA and funding from the Waste Authority for the Bin Tagging Program. 15 Local Governments submitted EOI's for Option 1.

Option 2 was designed to provide Local Governments with an opportunity to access the bin tagging artwork and systems which WALGA has developed to implement the Program in

their Local Government areas. This Option leverages the investment made by the Waste Authority, by allowing Local Governments to utilise collective resources and branding. The City of Cockburn was the first Local Government to use this approach in trialling a three bin system for 1,200 households in the suburb of Hamilton Hill.

In order to select the five Local Governments to take part in Option 1 of the Bin Tagging Program for 2015/16, WALGA and the Department of Environment Regulation reviewed the Eols using the following considerations:

- Geographic distribution - seeking to trial the approach in the non-metropolitan area, and across different Regional Councils
- Type of collection system - seeking to undertake bin tagging on different systems (for example, an organics collection)
- Demographics – seeking to again use the approach across a broad demographics basis.

The Local Governments that were successful in securing assistance through Option 1 were the Towns of Bassendean and Mosman Park, Cities of Cockburn and Joondalup and the Shire of Capel.

WALGA played a substantial role in coordinating and implementing the Program for these Local Governments. This included:

- Developing the Bin Tagging artwork for each Local Government: The overall messages were similar for Joondalup, Mosman Park and Bassendean, however there were some variations. The Tags for the Shire of Capel were completely different as they focused on the contents of the waste and organics bins, as opposed to waste and recycling bins.
- Hiring and training of auditors: the majority of auditors implementing the Program were sourced by WALGA. Training occurred to facilitate consistent approaches.
- Preparation of materials and resources for each audit: this included preparing sufficient tags for each audit, as well as data entry forms and other resources such as duct tape.
- Data collection and entry: collection of data in the field, as well as data entry and analysis.
- Provision of generic materials: these materials included general points for use in the media, communication with staff and Councillors and letters to residents with taped bins.

5.0 Bin Tagging Results: Waste and Recycling Collection Systems

The overall results that were achieved through the bin tagging for waste and recycling are shown in Table 1 (Bassendean), Table 2 (Joondalup) and Table 3 (Mosman Park).

	Fortnight			Fortnight (%)		
	1	2	3	1	2	3
Number of properties	844	937	1075	-	-	-
Waste Bin						
Recycling in Waste Bin (R)	338	319	262	51%	46%	34%
No Contamination (NC)	319	498	507	48%	71%	66%
No Bin (NB)	175	219	289	21%	23%	27%
Overfull Bin (O)	19	22	27	3%	3%	4%
Emptied	0	20	17	0%	2%	2%
Recycling Bin						
Recycling in Bags (B)	91	113	85	15%	18%	12%
No Contamination (NC)	262	388	435	44%	62%	64%
No Bin (NB)	255	313	392	30%	33%	36%
Overfull Bin (O)	42	82	35	7%	13%	5%
Taped Bins	-	-	22	-	-	2%

Table 1: Summary of Results – Bassendean

	Fortnight			Fortnight (%)		
	1	2	3	1*	2	3
Number of properties	845	826	826	-	-	-
Waste Bin						
Recycling in Waste Bin (R)	312	284	192	48%	47%	31%
No Contamination (NC)	327	322	421	51%	53%	68%
No Bin (NB)	189	210	203	22%	25%	25%
Overfull Bin (O)	40	23	34	6%	4%	5%
Emptied	11	10	1	1%	1%	0%
Recycling Bin						
Recycling in Bags (B)	140	103	67	23%	18%	11%
No Contamination (NC)	257	314	384	42%	56%	66%
No Bin (NB)	229	263	243	27%	32%	29%
Overfull Bin (O)	45	31	33	7%	6%	6%
Taped Bins	-	-	19	-	-	3%

Table 2: Summary of results - Joondalup Team 1.

	Fortnight			Fortnight (%)		
	1	2	3*	1	2	3*
Number of properties	869	869	828	-	-	-
Waste Bin						
Recycling in Waste Bin (R)	242	199	0	46%	39%	-
No Contamination (NC)	295	324	0	56%	63%	-
No Bin (NB)	325	355	0	37%	41%	-
Overfull Bin (O)	9	0	0	2%	0%	-
Emptied	20	0	0	2%	0%	-
Recycling Bin						
Recycling in Bags (B)	89	65	67	17%	13%	15%
No Contamination (NC)	340	383	334	64%	78%	76%
No Bin (NB)	341	376	387	39%	43%	47%
Overfull Bin (O)	26	8	8	5%	2%	2%
Taped Bins	-	-	25	-	-	6%

Table 3: Summary of Results - Mosman Park.

*Note: There is an anomaly for the week three data, as observations were not recorded for the waste bin.

5.1 Correct Recycling

The initial correct recycling rates varied between the Local Governments, with both Bassendean and Joondalup in the low 40% to begin with and processing to mid-60% by the third fortnight. In both areas correct recycling increased by at least 20%. Mosman Park started with a higher correct recycling rate and only increased the correct recycling rate by 10%.

Joondalup Team 1 showed the greatest increase in correct recycling rates, moving from 42% to 66% (24% improvement). Bassendean showed the next greatest change in the correct recycling rates, moving from 44% to 64% - a 20% improvement. Mosman Park had a modest increase in correct recycling, as many of the areas audited were already achieving a higher level of correct recycling. Initially, 64% of households in Mosman Park were correctly recycling, this increased to 76% over the course of the Program, an improvement of 10%.

This change in behaviour is consistent with the Pilot Program, the lower the initial correct recycling rate the greater the percentage increase. If the initial correct recycling rate is higher, the percentage gain will be less.

Bassendean and Mosman Park only had small decreases in bagged recyclables, while Joondalup had a much greater decrease. Again this seems to demonstrate, the worse the initial behaviour, the greater the change will be. Overfull bins varied between the Local Governments with Bassendean having the most overfull bins and Mosman Park the fewest.

The amount of recycling bins taped shut varied between the Local Governments, with Mosman Park having the greatest percentage of taped bins and Joondalup the greatest overall number. To assess if there was a correlation between non-presentation of recycling

bins and the bins being taped shut the data for those households was reviewed, the results were fairly consistent with about 40% of the bins taped not presenting their recycling bin in at least one of the preceding fortnights.

5.2 Waste and Recycling Bin Presentation Rates

The presentation rates of the different Local Governments for waste and recycling bins varied, as shown in Table 4. However a common theme was that recycling bins are presented less frequently than waste bins. This is consistent with the pilot program – the only exception was in Town of Cambridge where 140L waste bins were provided. This seems to indicate there is a strong correlation between small waste bins and consistent, fortnightly, presentation of recycling bins.

Over the course of the Program both waste and recycling bin presentation rates decreased, this was also observed in the pilot. It is speculated that this decrease in presentation is due to changing daylight hours – with it getting light later, people are less likely to put their bins out early.

In assessing the extent to which the service is being used it is important to examine how many households are putting their recycling bin out fortnightly. The analysis of a similar sample size for each Local Government area showed that a significant proportion of households were not putting their recycling bin out every fortnight – between 49% and 34%. Joondalup had the highest percentage of fortnightly recycling bin presented with 66%, followed by Bassendean with 52.5% then Mosman Park at 51%.

	Bassendean	Joondalup	Mosman Park
Waste bin presentation (% change)	21% - 27% (6% change)	22% - 25% (3% change)	37% – 41% (4% change) – over 2 fortnights
Recycling bin presentation (% change)	30%- 36% (6% change)	27%-29% (2% change)	39% – 47% (8% change) – over 3 fortnights

Table 4: Comparison of waste and recycling bin presentation rates.

6.0 Bin Tagging Results: Waste, Recycling and Organic/Greenwaste Collection Systems

The results from the Local Governments that have completed the Program are outlined in this section for Capel (Table 5) and Cockburn (Table 6). The Program for these Local Governments was different as their service offering include organics and greenwaste collection, as well as waste and recycling collections. As the systems are so different, a comparison between them is not included.

	Fortnight		Fortnight (%)	
	1	2	1*	2
Number of properties	1410	1348	-	-
Waste Bin				
Recycling in Waste Bin (R)	287	646	69.5%	74.7%
No Contamination (NC)	79	123	19.1%	14.2%
No Bin (NB)	178	157	12.6%	11.6%
Overfull Bin (O)	42	56	10.2%	6.5%
Emptied	819	326	58.1%	27.4%
Garden Waste in Bin (G)	8	38	1.9%	4.4%
Food Waste in Bin (F)	176	398	42.6%	46.0%
Compostable Bags (CB)	1	2	0.2%	0.2%
Full Bin	160	363	38.7%	42.0%
1/8	3	4	0.7%	0.5%
1/4	33	64	8.0%	7.4%
1/2	65	143	15.7%	16.5%
3/4	102	206	24.7%	23.8%
Organics Bin				
Organics in Bags (B)	90	119	13.2%	19.7%
Rubbish in bin (R)	41	24	6.0%	3.3%
Plastic in bin (PL)	104	73	15.3%	9.6%
Nappies (N)	6	26	0.9%	3.4%
Miscellaneous Contamination (M)	22	20	3.2%	2.6%
Compostable Bags (CB)	73	89	10.7%	11.7%
Organics in Newsprint (NP)	16	15	2.4%	2.0%
No Contamination (NC)	476	368	70.0%	60.9%
No Bin (NB)	613	589	47%	49%
Overfull Bin (O)	4	5	0.6%	0.8%
Bin Emptied	117	155	8%	25.7%
Bins Taped	33	17	4.9%	2.8%
Full Bin (F)	90	54	13.2%	8.9%
1/8	168	113	24.7%	18.7%
1/4	181	229	26.6%	37.9%
1/2	126	102	18.5%	16.9%
3/4	71	74	10.4%	12.3%

Table 5: Summary of Results – Capel.

6.1 Correct Use of the Organics Bin

The Bin Tagging undertaken in the Shire of Capel had some implementation issues, including miscommunication with the waste collection contractor which resulted in bins being collected prior to the bin tagging being completed.

The overall statistics for organics bins that were presented shows a decrease in correct recycling behaviour – from 70% to 60.9% of the households. However, the low presentation rates and organics bins being emptied prior to auditing does affect the accuracy of this data.

For households where the organic bin was presented each fortnight correct source separation behaviour increased from 69% to 86% by the end of the Bin Tagging. The result from those households was much better than the overall correct behaviour - 60%. In this case indicating that consistent feedback does correlate with correct separation behaviour. This outcome is different to the analysis for the metropolitan recycling service, which indicated that consistent feedback for both fortnights did not mean the households would have a greater than average correct recycling rate. The causal factor for this difference may be the relatively recent introduction of the organics service and the level of education that has been undertaken. Recycling services, conversely, have been in place for a significant time period.

6.2 Waste and Organics Bin Presentation Rates

Figure 1 shows the non-presentation rates of both waste and organics bins for households. The presentation rate was relatively consistent across the two fortnights. This is different to the metropolitan Local Government data on presentation rates, which showed a steady decrease in bin presentation over the course of the audit. However, the non-presentation rates for the organics bins are somewhat greater than non-presentation rates for waste or recycling in the metropolitan Local Governments.

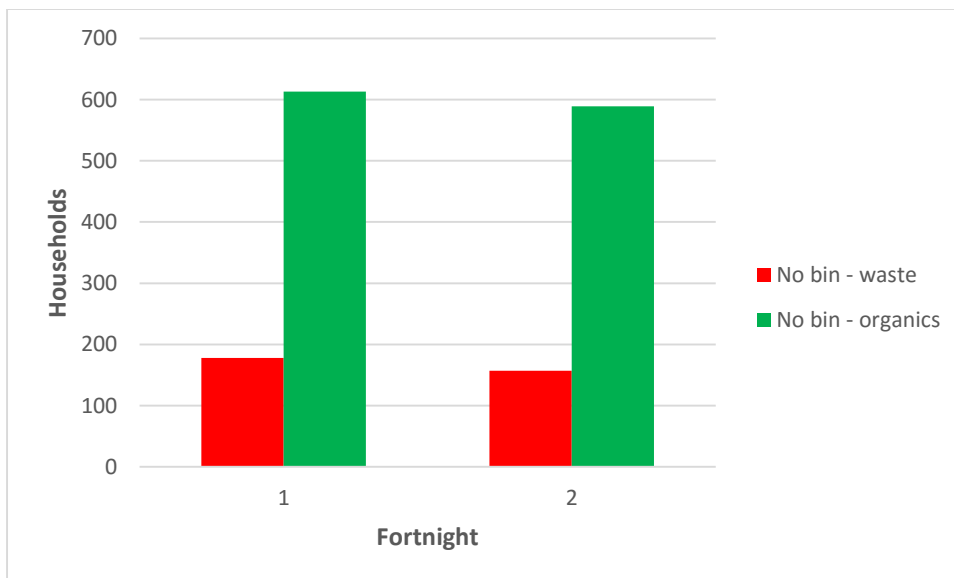


Figure 1: Capel non-presentation rates for waste and organics bins.

In order to gain a better picture of behaviour from households which had received on both fortnights, regarding the content of their organics bin, a sample of 292 households was analysed. Of the sample, 99 households were removed as they had either been missed by auditors in week 1 or 2, or had their bin emptied in one of the weeks.

Of the remaining 193 households:

- 58 households (30%) had presented their organics bin on both fortnights
- 76 households (40%) had not presented their organics bins on either fortnight
- 59 households (30%) had not presented their organics bin on one of the fortnights.

Figure 2 shows the data from the 30% of households which consistently presented their organics bins. 60% were correctly using their bin both weeks, 26% rectified their behaviour following the first set of feedback and overall, by the second fortnight 86% were displaying correct behaviour. 9% of households changed from correct use to incorrect use and the final 5% incorrectly used their bin both fortnights. Analysing the data from the 30% of households which presented their bin on one of the fortnights, the majority showed positive behaviour (76%). Figure 3 provides a breakdown of the behaviour.

The results for households where the bins were presented each fortnight showed overall correct behaviour by 86% of households, much better than the general statistics 60%. In this case indicating that consistent feedback does correlate with correct separation behaviour. This outcome is different to the analysis for the metropolitan recycling service, which indicated that consistent feedback for both fortnights did not mean the households would have a greater than average correct recycling rate. The causal factor for this difference may be the relatively recent introduction of the organics service and the level of education that has been undertaken. Recycling services, conversely, have been in place for a significant time period.

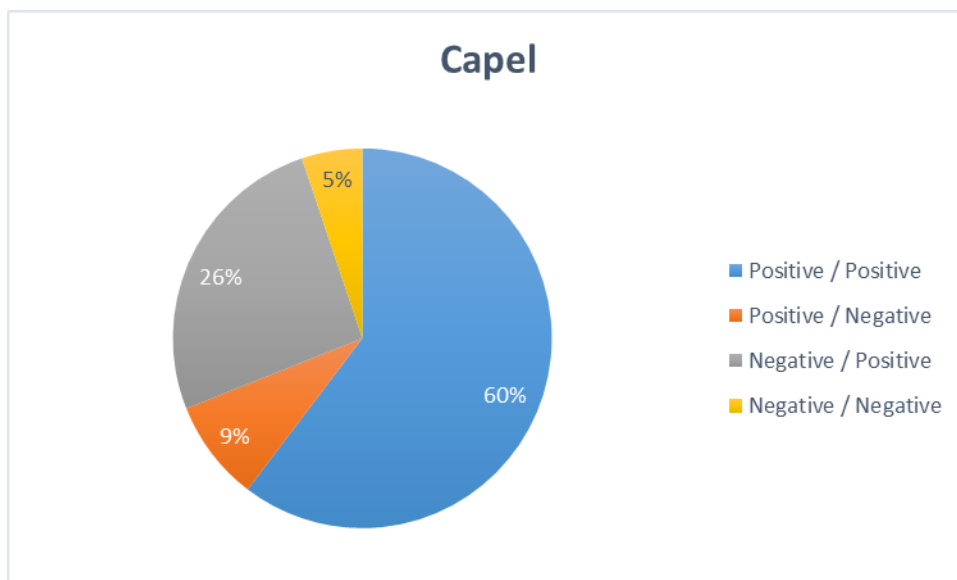


Figure 2: Feedback provided each fortnight to Capel households that consistently presented organics bins (30% of households).

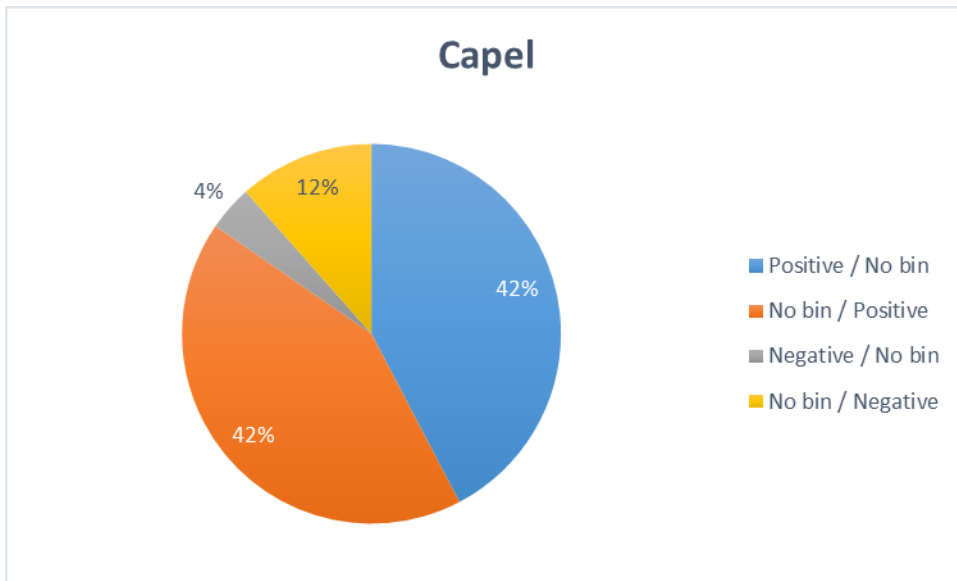


Figure 3: Feedback provided each fortnight to Capel households that presented their organics bins on at least one occasion (30% of households).

	Baseline	Week				(%)	Week (%)			
		1	2*	3	4	Baseline	1	2	3	4
Number of properties	395	513	559	590	571	-	-	-	-	-
Waste Bin										
Recycling in Waste Bin (R)	186	182	172	196	190	52%	45%	39%	42%	43%
Greenwaste in Waste Bin (G)	4	4	5	1	5	1%	1%	1%	0%	1%
Textiles in Waste Bin (T)	1	12	7	3	5	0%	3%	2%	1%	1%
No Contamination (NC)	118	184	240	259	237	33%	46%	55%	56%	53%
No Bin (NB)	40	111	121	125	125	10%	22%	22%	21%	22%
Overfull Bin (O)	0	3	9	4	3	0%	1%	2%	1%	1%
Contamination Level	352	390	341	350	369	-	-	-	-	-
Taped	0		12	2	7			3%	0.4%	1.6%
Recycling Bin										
Recycling in Bags (B)	3	22	13	10	9	1%	6%	3%	2%	2%
No Contamination (NC)	288	316	353	417	378	97%	84%	88%	94%	91%
No Bin (NB)	98	137	156	147	154	25%	27%	28%	25%	27%
Overfull Bin (O)	5	7	9	15	4	2%	2%	2%	3%	1%
Contamination Level	11	95	79	36	53	-	-	-	-	-
Taped	0		4	1	1			1%	0.2%	0.2%
Greenwaste bin	Baseline	1	2*	3	4	Baseline	1	2	3	4
Number of properties	395	513	559	590	571	-	-	-	-	-
Recycling in Green Bin(R)	0	9	-	2	-	0%	4%	-	1%	-
Foodwaste in Green Bin (F)	1	6	-	1	-	1%	3%	-	0.4%	-
No Contamination (NC)	159	203	-	235	-	87%	87%	-	91%	-
No Bin (NB)	212	279	-	333	-	54%	54%	-	56%	-
Overfull Bin (O)	1	4	-	4	-	1%	2%	-	2%	-
Contamination Level	30	60	-	29	-	-	-	--	-	-
Taped	20		-	3	-	11%		-	1%	-

Table 6: Summary of Results – Cockburn.

6.3 Correct Recycling

Cockburn had a very high correct recycling rate compared to other metropolitan Local Governments. At the end of the previous audit 97% of households were correctly recycling, this dropped slightly to 84% at the beginning of this audit but increased to 91% over the course of the audits – a 7% increase. These results show that repeated visits to households can increase the correct recycling behaviour, also given Cockburn have weekly recycling the more regular reminders of correct behaviour may also have an impact.

6.4 Correct Use of Greenwaste Bin

In Cockburn, the baseline data indicated that 87% of householders were correctly using their greenwaste bin. This increased to 91% of the households (presenting their greenwaste bin) correctly using their bin. Such a high rate of correct use, can be directly attributed to the intensive engagement efforts of auditors during the roll out of the trial organics collection service.

6.5 Waste, Recycling and Greenwaste Bin Presentation Rates

Figure 4 shows the presentation rates of waste, recycling and greenwaste bins for households in Cockburn. Over the course of the Program the non-presentation rate for waste and recycling bins was relatively consistent with non-presentation of the waste bin ranging between 21 – 22% and the recycling bin between 25-28%. This pattern is different to the other Local Governments, where there was a significant reduction in presentation over the course of the audits. The Greenwaste presentation rates were also relatively consistent, with between 54 -56% of greenwaste bins were not presented.

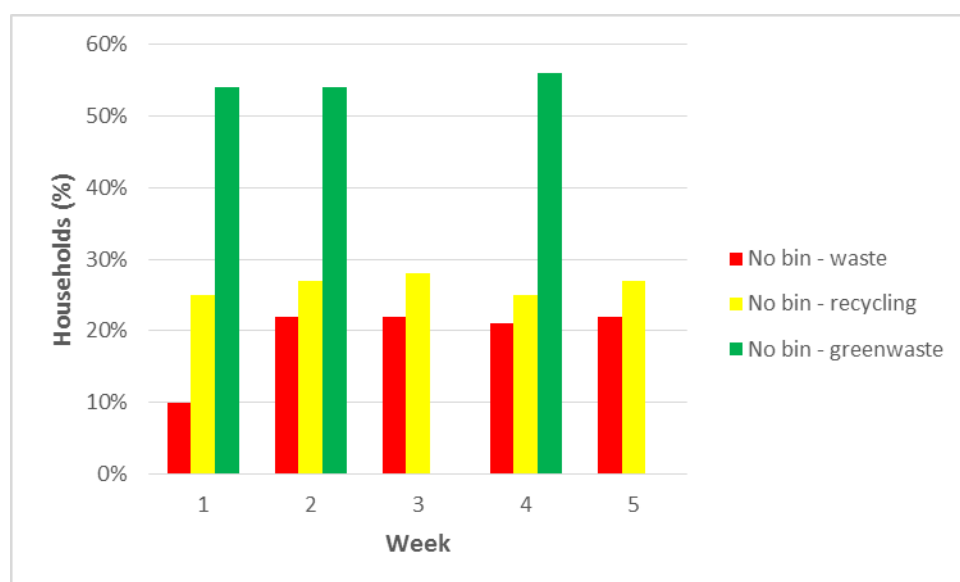


Figure 4: Cockburn non-presentation rates for waste, recycling and greenwaste bins.

As Cockburn has a weekly recycling service it was important to determine if households were using the service weekly and if so what percentage. To answer this question a sample of 429 households was examined. The households that had not presented their recycling bin at all during the audits were removed from the sample (23 households). 403 households presented their bin at least once over the 4 weeks, however only 162 (40%) were putting out their bin every week.

Of the 40% that were putting their recycling bins out every week, 91% ended up with correct recycling at the end of the four weeks – exactly the same percentage as the overall correct recycling rate. Due to the frequency of the recycling service there are potentially 16 different combinations of behaviour, only 10 were expressed in the results, these are shown in Figure 5.

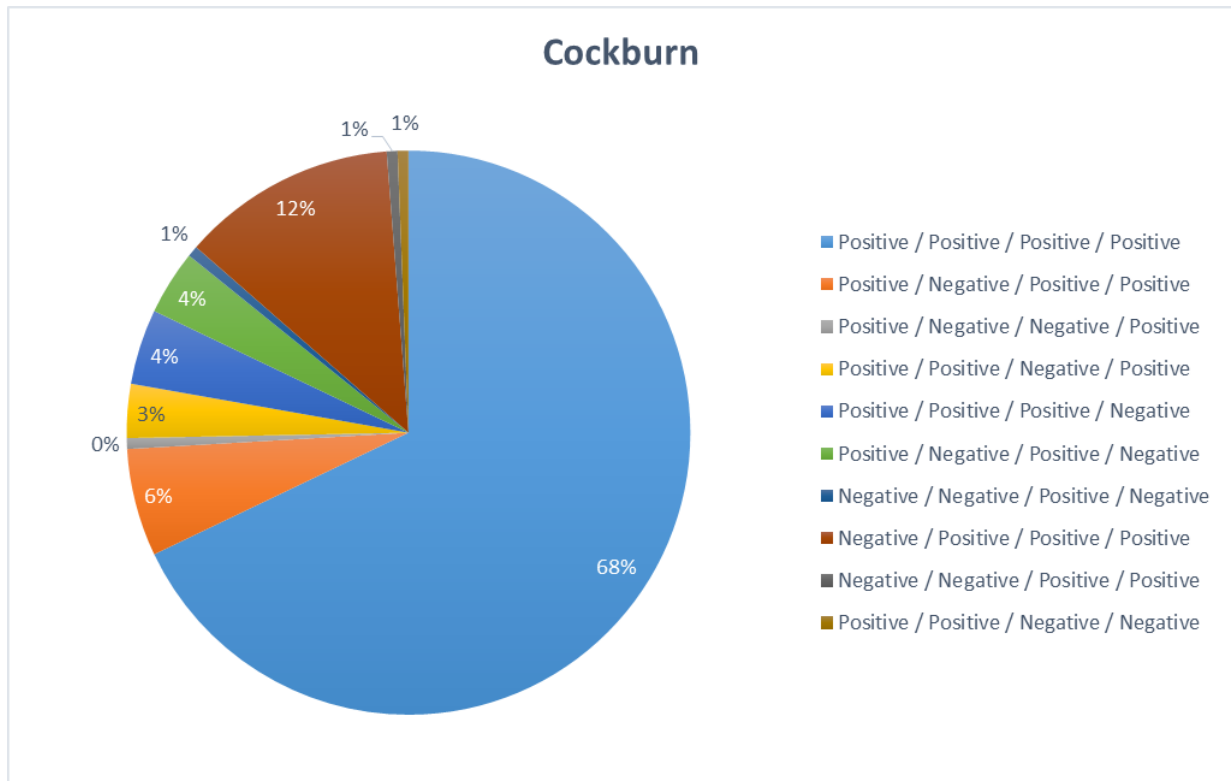


Figure 5: Feedback provided each week to Cockburn households that consistently presented recycling bins (40% of households).

6.6 Analysis of Greenwaste Bin Use

These overall presentation rates do not answer the question of whether it is the same households not presenting their bin every fortnight or different households. To answer this question a sample of 453 households was examined. Of those households:

- 38% did not put their greenwaste bin out over the course of the auditing
- 16% put their bin out in Week 2
- 23% put their bin out in Week 4
- 23% put their bin out on both opportunities.

Of the 23% of the households which put their bins out on both opportunities, 98% had received positive feedback on the second occasion – that is compared to 91% positive overall.

Figure 6 shows the pattern of behaviour, with the majority of households putting their bin out on both occasions receiving positive feedback on both occasions.

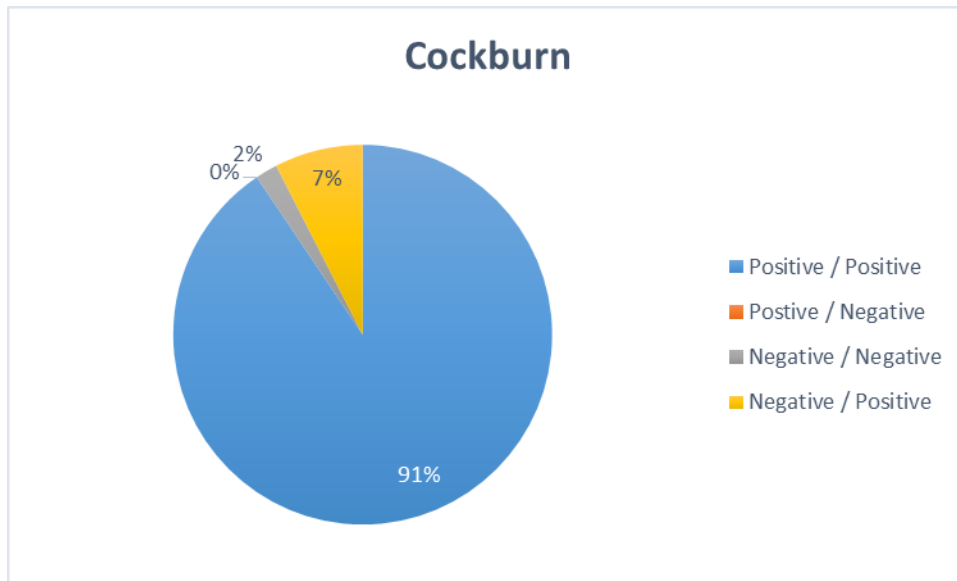


Figure 6: Feedback provided each fortnight to Cockburn households that consistently presented organics bins (23% of households).

7.0 Conclusion

The Bin Tagging Program can be successfully used to alter source separation behaviour with respect to the kerbside waste collection system. However, the results depend on a number of factors:

- *Initial behaviour:* For Bassendean, Joondalup and Mosman Park there were increases in correct recycling behaviour. The amount of improvement (as with the pilot Program) was dependant on the starting point – the lower the initial correct recycling rate, the more improvement there was overall.
- *Frequency and consistency of feedback:* For the standard waste and recycling services, where feedback was only provided on three occasions, there was limited correlation between consistent feedback and improved recycling. However, the results from City of Cockburn show is that ongoing, frequent, education equate to better overall results. For the Shire of Capel the organics collection is weekly, however the tagging only occurred fortnightly. What the results from Capel show is the need for more frequent tagging in order to capture all the households, rather than just a small sample.
- *Collection contractor commitment:* It is vital to ensure that the collection contractor is committed to the Program and will delay collections.
- *Use data to understand system operations:* The data collected in Capel highlights the importance of collecting specific data to understand how well the system is operating – for example foodwaste in the waste bin and the general fullness of the bins.