

Community Nappy Trial Report



13 November 2014

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1 Executive summary

When Council introduces Phase 2 of its 3-bin system in 2016, residents will be able to dispose of their food and garden waste in a weekly green waste service. Once Phase 2 is implemented, Council will collect the 240L garbage bin will fortnightly.

A standard fortnightly garbage service is expected to meet the needs of most Lake Macquarie households. However, concerns have been raised about whether or not households that use Absorbent Hygiene Products (AHP), such as disposable nappies, adult incontinence aids and feminine hygiene products, will be able to manage their waste following changes to the service.

To decide on the best way to manage disposable infant/child nappies or adult incontinence aids in Phase 2, Council sought direct user-feedback through a Community Nappy Trial (involving about 100 households), and interviewed four other NSW councils who have already implemented Phase 2 of the 3-bin system. This report shows the findings.

In summary, the trial showed that the odour of nappy bins at the end of a fortnight was no worse than the odour of regular garbage bins at the end of a week. Furthermore, odour does not significantly increase with time, nor with the amount of nappies in the bin. Wrapping soiled nappies in at least one plastic bag, and keeping the bin out of the sun are both key odour management behaviours.

Most households that dispose of nappy and incontinence aids will be able to manage their waste with a fortnightly 240L garbage service, as long as they sort waste into the three bins correctly. Council will need to provide available service options for households that cannot manage, which will generally be households that have three or more people who use nappies/incontinence products.

Six other NSW councils (Coffs Harbour, Bellingen, Nambucca, Lismore, Clarence Valley and Penrith) have introduced the Phase 2 bin collection system, and collect nappy waste through the fortnightly garbage bin¹. The councils did not report an ongoing issue with disposal of nappies.

After analysing the data available to Council, it is recommended that soiled nappy and incontinence aid waste should continue to be disposed of in the fortnightly garbage service in Phase 2. However, a second 240L fortnightly garbage service should be made available and promoted as the best way to deal with any capacity issues. A weekly 240L garbage service should be made available on a cost recovery basis.

Summary of key results from the community nappy trial are as follows:

- Majority of households dispose of soiled nappy waste wrapped in either one or two plastic bags (87%)
- The average household with one person in nappies generates about 30 soiled nappies per week (60 per fortnight). The average with two people in nappies generate just over 50 per week (100 per fortnight), and the average household with three people in nappies generate about 70 per week (140 per fortnight). However, in reality the number of soiled nappies put in the household bin will vary depending on the proportion of time the user spends at home and/or in care
- Nappy generation will be highest in households where the number of children in nappies is high and their average age is low (under about 2 years of age)
- A 240L bin holds about 300 soiled nappies
- At the end of the fortnight, participants' nappy bin was on average between 30% and 50% full depending on the household type (number of children in nappies)
- Based on the nappy trial results and the latest City-wide waste audit results, households with three or more people in nappies/incontinence aids are likely to require extra garbage bin capacity in Phase 2
- The average odour rating of the garbage bin before the trial (when it contained the household's garbage and nappy waste) was approximately the same as the average odour rating of the kerbside nappy bin at the end of each fortnight.
- The amount of nappies in the bin did not have a significant effect on the odour rating of the bin.

¹ Environmental Protection Authority, [Local Government Waste and Resource Recovery report \(2012/2013\)](http://www.epa.nsw.gov.au/warr/datareport.htm)
<http://www.epa.nsw.gov.au/warr/datareport.htm>

- Observed evidence suggested the level of odour increased significantly when a bin was positioned in the sun, and increased when the nappies were not wrapped in a plastic bag.
- There was no increase in vermin in the nappy bin across the trial period compared to the garbage bin.
- At the end of the trial, 87% of participants responded that their household could manage with a fortnightly collection service, 14% were unsure and 5% felt they could not manage.
- At the end of the trial, 62% of participants had no on-going concerns about disposing of nappies in a fortnightly service. Of those that did have concerns, odour was the most common concern followed by capacity and then vermin.
- Participants' service preference for disposing of nappies in Phase 2 are largely dependent on the cost to the household (the cheapest option is the most preferred).
- The most preferred option was disposing of nappies in a fortnightly garbage service as it was the most cost-effective option (for both Council and the household).

Summary of key findings from six other NSW councils experience

Six NSW councils have introduced food and garden waste (FOGO) as a weekly service, with a standard fortnightly garbage service. Three of the councils (Coffs Harbour, Nambucca and Bellingen) operate under the same waste contract and only the largest (Coffs Harbour) was interviewed.

Key findings:

- All six councils dispose of absorbent hygiene products (nappies, incontinence aids and feminine hygiene products) waste in a fortnightly garbage service. Their experience indicates that a 240L fortnightly service is adequate for most households (two councils provide a 140L fortnightly garbage as their standard service).
- Three out of six councils offer a weekly garbage service option for households. Two councils charge an additional annual fee for the weekly service, which ranges from \$110 for an additional 140L service to \$242 for an additional 240L service. There is a vast discrepancy between the number of households that have taken up the service – 36 at one council, and close to 7,000 at another. One council offers a weekly service to those with a proven medical need, at no cost; currently about 30 households have the service.
- All four councils interviewed promote an additional fortnightly 240L garbage service for a fee. The additional fee varies between \$100 to \$242 per year.
- All councils stressed the need for clear, practical information about disposal of nappy/incontinence products to be available about three months prior to the introduction of the Phase 2 service.
- Each council highlighted the need for clear and effective community education coupled with a reliable contamination management program, particularly for recycling and green waste services.
- The six councils did not report a significant on-going problem with disposal of nappies/incontinence aids.

2 Background

2.1 Changes to Council's kerbside bin system in the next few years

In February 2011, Lake Macquarie City Council resolved to introduce a phased source separated organics (3-bin) collection system for all domestic properties in the City as a key part of its waste strategy (Figure 1).

In April 2013, Council introduced Phase 1 of the green waste service – a new fortnightly collection of garden waste through a 240L bin. There were no changes to the existing 240L weekly garbage and 240L fortnightly recycling services.

Council is now preparing to introduce Phase 2 of the green waste service. Once implemented, Lake Macquarie residents will be able to put all their food scraps (including all meat, seafood, dairy and processed food) in the green waste bin along with the garden waste. The collection frequency of the green waste service will increase to from fortnightly to weekly, to manage any odour and hygiene issues arising from decomposing food waste. The 240L garbage service will be emptied fortnightly. There will be no change to the 240L recycling service.

How to put your bins out



Figure 1: Graphic showing the different collection schedule for household kerbside bins now (Phase 1) and in Phase 2.

2.2 Key drivers of change

Lake Macquarie City Council is committed to improving how the City's waste is managed because:

- **Financially:** It is becoming increasingly expensive to landfill (for example, Council pays the NSW Waste Levy on every tonne of waste put into landfill. In 2013/2014 the fee per tonne was \$107.80, and Council paid almost \$7.8 million in levy fees. If no change was to occur to the kerbside bin system (meaning if the phased green waste service was not introduced), it is estimated by 2016,

Council would pay up to \$18 million under the levy each year. The cost of these payments is passed onto our ratepayers).

- **Practically:** The space and lifespan of our only landfill facility at Awaba is limited.
- **Environmentally:** Landfilling waste is unsustainable. ==. Also, when organic material decomposes in landfill it produces large amounts of greenhouse gases, including highly-potent methane. Other materials also leach substances that can pollute both soil and groundwater.
- **Community benefits:** Compost produced from collected food and garden waste can be used to enhance local areas including parks, home gardens, sports grounds and in agriculture.
- **Community empowerment:** By providing practical systems to manage household waste plus education to use the system correctly, Council empowers its residents to live more sustainably.
- **State Government drivers:** The NSW State Government has set a municipal waste diversion target of 70% by 2021.

2.3 Technical analysis and community consultation

Council's waste strategy initially focused on domestic waste because, at the time, it made up 70% of all the City's waste that goes to landfill.

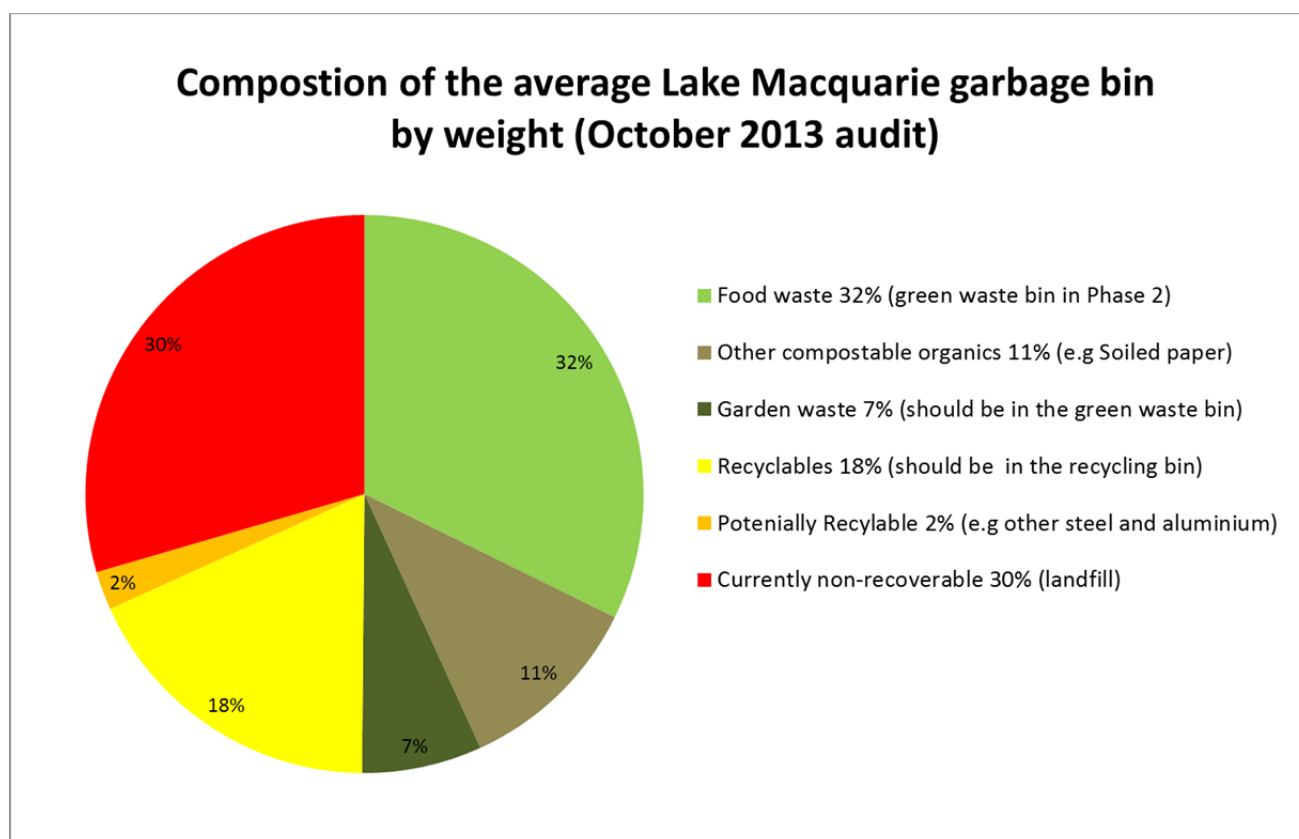
Council undertook detailed triple bottom line analysis of the options on how to manage domestic waste. In late 2010, the top two options were the subject of extensive community consultation in the *Draft Waste Strategy*. The community's preferred solution was a phased source separated organics (3-bin) system, as it was the most cost-effective in the long term and improved the environmental sustainability of the City.

For more information on Council's Waste Strategy go to:

<http://www.lakemac.com.au/page.aspx?pid=1097&vid=11>

2.4 A fortnightly 240L garbage service is expected to meet most households' needs

City-wide waste audits conducted in October 2013 (six months after the start of Phase 1), show the average Lake Macquarie garbage bin was 65% full, and consisted of the materials shown in Figure 2.



In an effort to reduce the recyclable materials that go into the general waste bin, Council offers 360L recycling bins to residents who need additional capacity in their fortnightly garbage service. In addition, Council's contractor Hunter Resource Recovery is providing on-going education to teach residents how to practise sustainable household waste management.

Once Phase 2 is introduced and residents sort their waste into the three bins correctly, the amount of material left in the garbage bin will be minimal. The audit showed the average weight of non-recoverable waste was 3.44 kg per household each week.

The October 2013 audit data are consistent with data from previous City-wide waste audits, and indicate that a fortnightly 240L garbage service will meet the needs of most Lake Macquarie households.

The only significant issue that has been raised with this bin system is what to do with absorbent hygiene product waste in a fortnightly garbage service.

3 How to manage absorbent hygiene products in Phase 2

3.1 What are absorbent hygiene products?

Absorbent hygiene products (AHP) include disposable infant/child nappies, adult incontinence aids and feminine hygiene products.

Soiled nappies and incontinence aids comprise approximately 7% (3,600) tonnes of Lake Macquarie's domestic garbage waste stream collected through kerbside garbage bins each year².

Based on Australian Bureau of Statistics (ABS) population data, we estimate about 10% of Lake Macquarie households use either disposable nappies or incontinence aids³.

Whilst AHP comprises a small percentage of the total waste stream, it is generally an important issue for the households that use them. Soiled nappies and incontinence aids are bulky, so consequently, households that use them are likely to generate a larger volume of currently non-recoverable waste per week than the average household. In addition to this, it is also 'smelly' waste, so with the change to a fortnightly garbage service, some parts of the community may have perceived concerns about an increase in odour issues arising from soiled AHP sitting in the garbage bin for up to two weeks rather than up to one week.

A State-wide analysis of AHP waste was undertaken in South Australia⁴. This analysis has not been done for NSW. The following South Australian results (Table 1) can be considered roughly indicative to Lake Macquarie:

- Infant/child and adult incontinence sources constitute the majority of the AHP waste stream (combined total of 96% by weight);
- Approximately 75 – 80% of AHP waste (by weight) is generated from domestic/residential sources;
- Approximately 15 – 20% of AHP waste (by weight) is generated from Residential Aged Care;
- The majority of AHP waste is collected through municipal collection services (57% of adult incontinence, 83% of feminine hygiene and 97% of infant/child AHP waste); and
- Approximately 40 - 45% of adult incontinence AHP waste is managed through commercial collection services, which is largely comprised of waste generated at Residential Aged Care facilities.

² Australian Bureau of Statistics, 2011 Census data for Lake Macquarie

³ Australian Bureau of Statistics, 2011 Census data for Lake Macquarie

⁴ Government of South Australia, Zero Waste SA, 'Absorbent Hygiene Products Waste, Review of South Australia' January 2013

Table 1: *Estimated breakdown (% weight) of AHP Waste quantities by collection service in South Australia*⁵

	Adult Incontinence	Feminine/Hygiene	Infant/Child
Municipal collection	57%	83%	97%
Commercial collection	42%	2%	2%
Sanitary	<0.5%	15%	<0.5%
Medical	<0.5%	-	<0.5%

Infant/child nappies

- 6.04% of Lake Macquarie's total population is aged four years and below, equating to 11,240 people most likely to use disposable infant/child nappies.
- In Australia, 95% of parents use disposable nappies; with 20% of parents using cloth nappies at least some of the time (Choice 2011).
- The average age for completion of daytime toilet training is 28.7 months (or roughly two and a half years old)⁶. After this age, there is generally a substantial decrease in the number of nappies each child uses per day.
- The number of nappies going into the household garbage bin varies greatly depending on the age of the child and the proportion of time the child spends at home and/or in childcare. This varies greatly between households.
- ABS data estimates show under the age of 2 years, 22% of children usually attended formal care (including paid child care and Family Day Care), while 35% attend informal care (non-regulated care, at child's home or elsewhere, predominantly by grandparents, relatives, nannies or babysitters) (Figure 3). The highest level of overall care attendance was among two and three year olds, of whom 54% usually attended formal care and 40% informal care⁷.

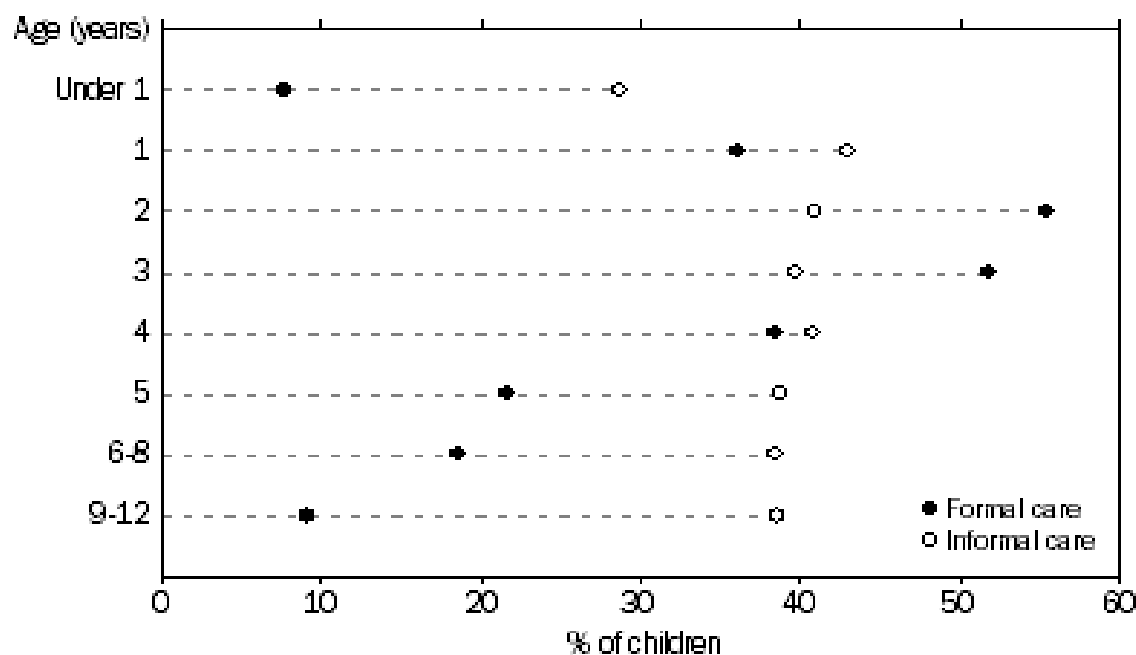


Figure 3: *Children who usually attended care, by type of care and age, ABS 2011*

⁵ See 3 above

⁶ University of NSW (The Restraint Project), "Toilet training of infants and children in Australia: 2010 parental attitudes and practices", Anna Christie B Juris

⁷ Australian Bureau of Statistics, 4402 - Childhood Education and Care, Australia, June 2011

Adult incontinence aids

- ABS data estimates that about 1.42% of the Australian population experiences severe incontinence (or 316,500 people)⁸. About 62% of these people use continence aids. Of this population, approximately 51 % of people live in cared accommodation and 49% live in households⁹.
- Applying this to the Lake Macquarie's population¹⁰, it is estimated that about 900 Lake Macquarie residents experience severe incontinence, use continence aids, and live in a residential household.
- It is estimated that the average adult who uses incontinence aids produces 25% less AHP waste per week than an average child/infant who uses nappies¹¹.

Feminine Hygiene Products

- Approximately 4% of the total AHP waste stream is feminine hygiene products¹². As a result, households who use these products are not expected to have any garbage capacity issues in Phase 2. As a consequence, feminine hygiene products were not specifically included in the scope of this trial, although the general findings in relation to AHP are applicable.

3.2 Australian Standards and composting AHP waste

Australian Standard AS4452 does not permit nappies to be composted if the end product is to meet the Australian Standard. Council has a contractual requirement that requires the end-product meets AS4452. As a result, AHP waste must be sent to landfill.

This regulatory constraint is not likely to change in the foreseeable future.

3.3 Best practice bin systems

In November 2011, the Office of Environment and Heritage (OEH) published '*Preferred resource recovery practices by local Councils, Best Bin Systems*' ('OEH Best Practice Guidelines'). This guide sets out preferred service levels for consideration by local councils.

Lake Macquarie's recycling service and green waste service both comply with the OEH Best Practice Guidelines, which recommend a 240L dry recyclables service collected fortnightly, and a 240L bin for organics. Both services will also comply with the Guidelines in Phase 2 of green waste service.

In regards to the garbage service, the OEH Best Practice Guidelines state that where there is a weekly food and garden organics service (which Lake Macquarie will have in Phase 2) the recommendation is a fortnightly 240L garbage service with an optional weekly service.

3.4 Lake Macquarie City Council's preferred solution

In November 2012, Council endorsed the following recommendations regarding management of AHP (12WAC001):

- In Phase 2, disposal of AHP in the fortnightly garbage service is the preferred solution
- Council will "*Consult with users of disposable nappies, after commencement of Phase 1 and prior to commencement of Phase 2, regarding their preferences for kerbside collection of disposable nappies (Option 2, 3, 4 or 5)*"

⁸ Australian Bureau of Statistics, 2009 Survey of Disability, Ageing and Carers c/o Australian Institute of Health and Welfare, Bulletin 112, 'Incontinence in Australia: prevalence, experience and cost' (December 2012)

⁹ See number 7 above.

¹⁰ Total population of 200,84, Regional Population Growth, Australia, 2009–10 (cat. no. 3218.0).

¹¹ Assumptions used in the Relivit "Absorbent Hygiene Waste" calculator. This tool is supported and funded by the EPA. The tool is currently in draft form. It has been verified as 'fit for purpose' by an independent statistician but is yet to be approved and released by the EPA.

¹² See 3 above

- Council to make a final decision on how to dispose of AHP prior to commencement of construction of the composting facility.

These options provided for the following methods of AHP disposal:

- Option 2 - disposal in the garbage bin collected fortnightly;
- Option 3 - disposal in the garbage bin collected fortnightly, with an optional weekly collection;
- Option 4 - disposal in the green waste bin collected weekly, for composting; or
- Option 5 - disposal in the green waste bin collected weekly, for landfilling.

As Option 4 doesn't comply with regulatory requirements, and Option 5 has never been implemented by another council and doesn't have industry support, the main options for consultation and consideration were Options 2 and 3.

4 Community nappy trial – methodology

In accordance with Council's endorsed recommendation (November 2012), Council officers sought to inform Council's decision on the best way to manage AHP in Phase 2 by obtaining direct user feedback through consultation with residents in the form of a community nappy trial.

4.1 Objectives

The objectives of the nappy trial were to:

1. obtain information about household patterns of behaviour and attitudes in relation to disposal of nappies and incontinence aids;
2. identify any perceived and actual issues arising from disposal of AHPs in a fortnightly garbage service (including but not limited to capacity, odour and vermin/insects). Where possible, quantify the extent of the identified issues;
3. identify ways households can manage these issues and/or Council can assist households to manage these issues;
4. gather user feedback on opportunities and barriers to acceptance to disposal of AHPs through a fortnightly garbage service; and
5. gather feedback about the likelihood of households applying for an optional weekly service or dedicated nappy service, and the factors that they perceive will impact on making this decision.

The appropriate level of engagement on Council's engagement spectrum is 'consult'. At this level, Council makes the following commitment: 'We will listen to and acknowledge feedback from stakeholders'.

4.2 Pilot trial with staff

A six-week pilot trial involving 21 households recruited from Council staff was conducted between 11 November – 24 December 2013 (6 weeks). This period was chosen to coincide with the hotter months of the year to ensure any effect of warmer temperatures was observed.

The purpose of this pilot trial was to:

- inform the community trial;
- identify and refine the trial methodology; and
- look at odour comparisons between different ways to manage soiled nappy waste.

Participating staff were sourced across Council. Each household was given a 240L kerbside nappy bin and assigned one of three treatment options – either disposing of nappies loosely in the nappy bin, wrapped in a single plastic bag, or wrapped in a double plastic bag (Figure 3). Participants were asked to dispose of all household nappy waste in the kerbside nappy bin in accordance with their treatment option for the

duration of the trial. The kerbside nappy bin was emptied once a fortnight by Council's garbage collection trucks.

Feedback and results were obtained through a pre-trial survey, three fortnightly Observation Records (completed on the day the nappy bin was put on the kerb to be emptied) and an end of trial survey.

The small sample size of the pilot trial means the results are not representative. The results were analysed, but no noteworthy trends were evident. This is likely to be because the results are extremely susceptible to influence of individual household's tolerance levels. For example, there was no trend suggesting that bins with loose nappies smelt any worse/better than nappy bins with single or double bagged nappies. This could be largely due to the different tolerance levels of the individual households.

Council's Sustainability Engagement Officer inspected two bins from each treatment group each fortnight and found that:

- bins with wrapped nappies (either double wrapped or single wrapped) smelt better than bins with loose nappies;
- the level of odour increased if the bin was positioned in the sun; and
- within treatment groups, there was significant variation between the individual households odour and management tolerance levels (for example, in the loose treatment group a number of households were fine with the odour and bin, but one household (who had the same number of children in nappies) felt they could not manage and had to change treatment groups.



Figure 4: Photos from the staff nappy trial. Clockwise from top left: Kerbside nappy bin with other three bins at a participant's home (December 2013); Participant's bin in the loose treatment group (December 2013); Participant's bin in the double-bagged treatment group (December 2013); Participant's bin in the single-bagged treatment group (November 2013).

4.3 Summary of trial

The community nappy trial involved about 100 households from the Lake Macquarie community that use disposable nappies and/or incontinence pads in their homes.

Council's Sustainability Engagement Officer worked with Service Manager Family Day Care, Community Planner (Children and Community), and Community Planner (Ageing & Disabilities Services) to distribute information flyers to family day care facilities, child care facilities and doctors' surgeries across the City.

Registrations of interest were accepted on a first-in, best-dressed basis. A \$50 voucher was used as an incentive to participate (Figure 4) and complete the trial. Participants who completed the trial were entered into the draw to win one of three iPads.

Participants were asked to dispose of all household nappy waste in the kerbside nappy bin. The kerbside nappy bin was emptied once per fortnight by Council's garbage collection trucks. Unlike the staff nappy trial, treatment groups were not assigned; instead participants disposed of their nappy waste in their usual way.

Feedback and results were obtained through a pre-trial survey (**Appendix 3**), four fortnightly Observation Records completed on the day the nappy bin was put on the kerb to be emptied (**Appendix 4**) and an end of trial survey (**Appendix 5**).

4.4 Timing

The trial was conducted between 3 February 2014 and 4 April 2014 (8 weeks). This period was chosen because it coincided with the hotter months of the year to ensure any effect of warmer temperatures was observed, and it was during the school term (increasing the likelihood of families being home for eight consecutive weeks).



Figure 5: Web banner for the community nappy trial (December 2013)

4.5 Methodology

The methodology adopted for the community nappy trial is illustrated in Figure 6.

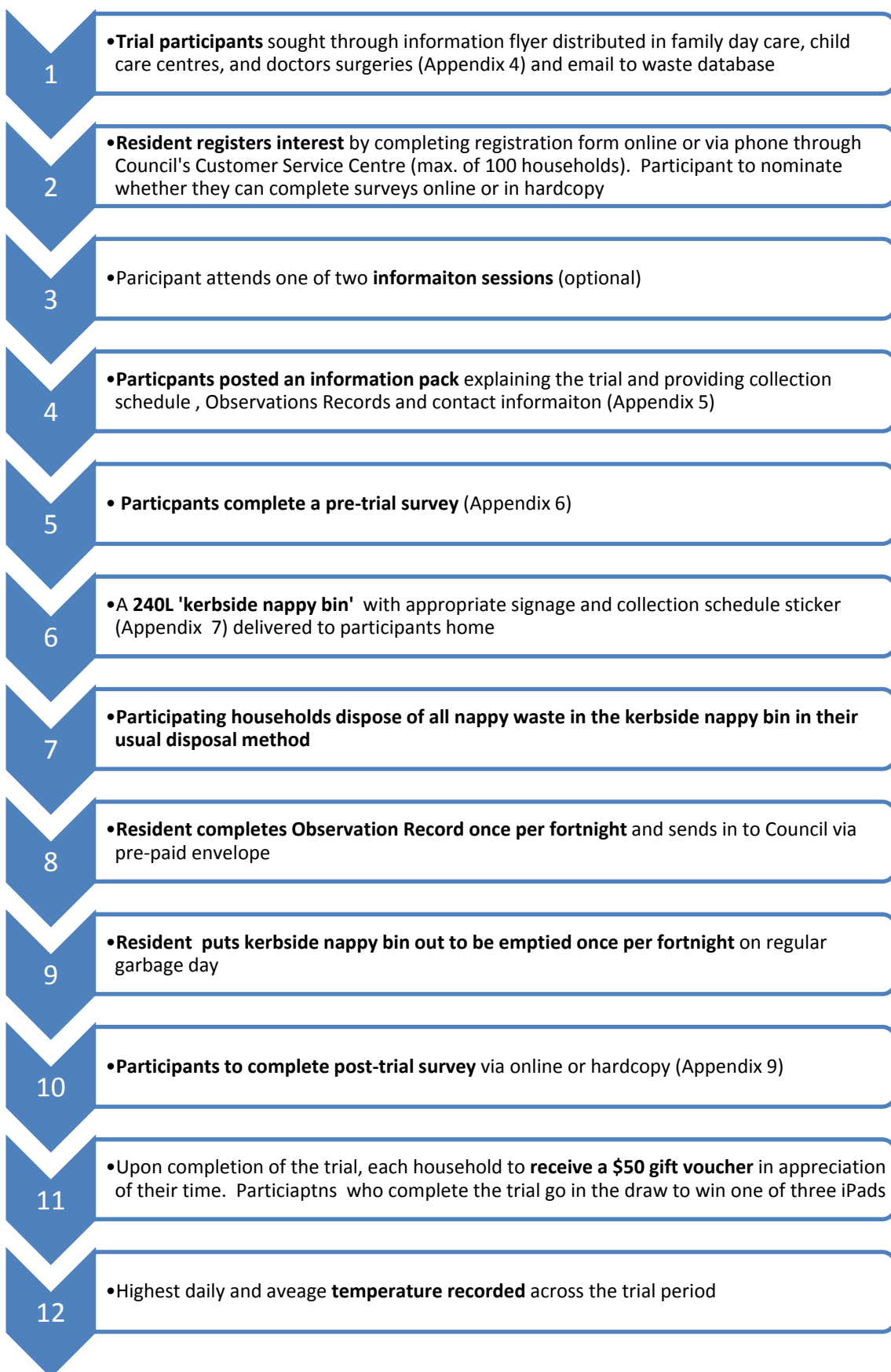


Figure 6: Community nappy trial methodology flow chart

5 Community nappy trial – results

5.1 Participating households

Participants' homes were located across 50 different suburbs. Ninety-six households completed the trial. Analysis focussed on the groups in Table 2.

Table 2: Number of households used in the analysis by household type

Household type	Number of Households included in attitudes and behaviour analysis	Number of Households included in capacity analysis
1 person using infant/child nappies	46	46
2 people using infant/child nappies	23	23
3 people using infant/child nappies	8	8
4 people using infant/child nappies	1	0
1 person using incontinence aids	2	0
Households with incontinence aid and infant/child nappy users	3	0
Total*	83	77

*Note:

- 11 Family Day Care households participated in the trial but their results were not included in this analysis as their circumstances are different to regular households
- 2 households were excluded due to incomplete data.
- Only 1 participating household had four people in nappies, this household was essentially two families living in the one home (two mums each with 2 children under 3 years of age). Because there are no other results for this household type for comparison/context, the data are unreliable and was excluded from the capacity analysis.
- The five households using incontinence aids were excluded from the capacity analysis, primarily because the age skewed the interdependent generation by age analysis.

The small number of households using only incontinence aids prevented a meaningful and robust analysis. However, data estimates provided by Relivit show on average an adult using incontinence aids generates about 25% less waste per person compared to a child in nappies¹³. This means the capacity analysis for child/infant nappy households can be applied to households with incontinence users (and is likely to significantly over-estimate the AHP capacity used by 25%).

The surveys were completed by the person mainly responsible for managing nappy waste in the household – 10% were male and 90% were female.

When asked about the type of home participants lived in, the majority lived in a separate house (93%), 3% lived in a semi-detached, row or terrace house, and 2% lived in a flat, unit or apartment.

5.2 What factors about dealing with AHP waste are important to households

Participants scored the importance of various factors in their decision on how to manage nappy waste in the home, with a ranking of 5 being high importance through to a ranking of 1 being low importance. All factors scored in the upper range of the spectrum, with affordability coming out as the most important and keeping waste out of landfill the least important (Table 3).

¹³ See 11 above.

Table 3: Participating households' average importance ranking of AHP waste management factors

Factor	Average Score	Ranking (most important to least important)
Affordability for the household	4.53	1
Easy to use/convenience	4.50	2
Keeping the cost of waste services low for all households	4.02	3
Benefiting the environment	4.02	4
Keeping waste out of landfill	3.71	5

5.3 How do people dispose of their nappies?

Survey responses showed 87% of households dispose of their soiled nappy waste wrapped in either one or two plastic bags (Figure 7).

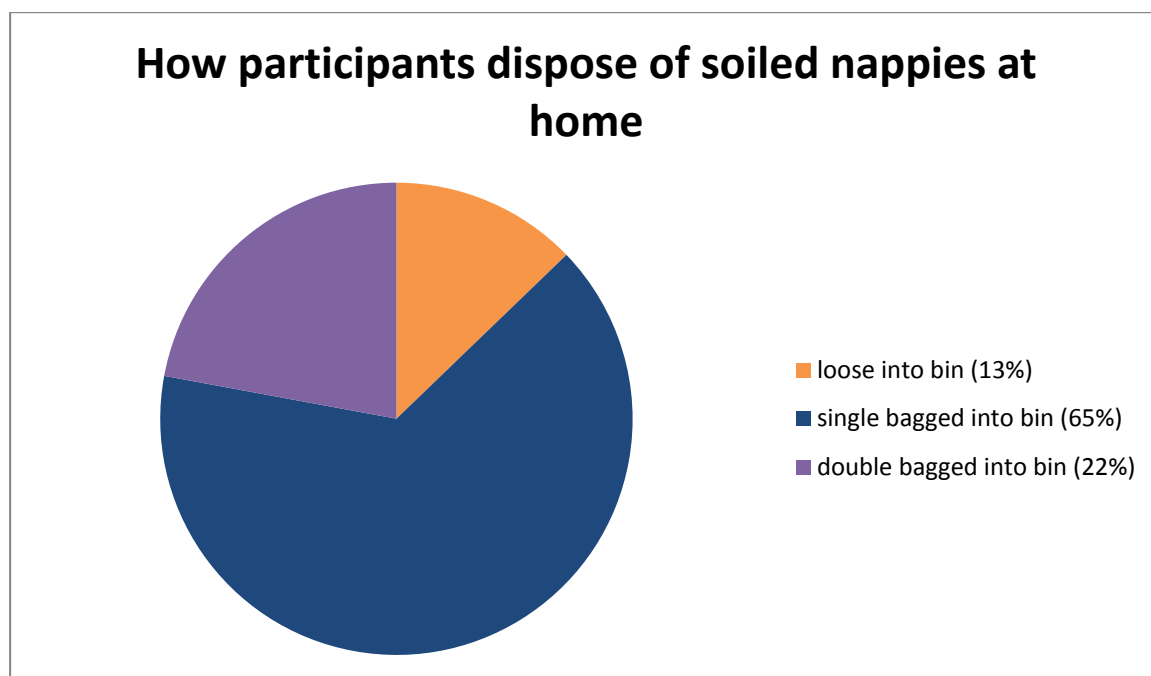


Figure 7: Nappy disposal method of participating households

5.4 How much nappy waste do households generate per week?

Data were obtained from responses to Question 6 in the pre-trial survey.

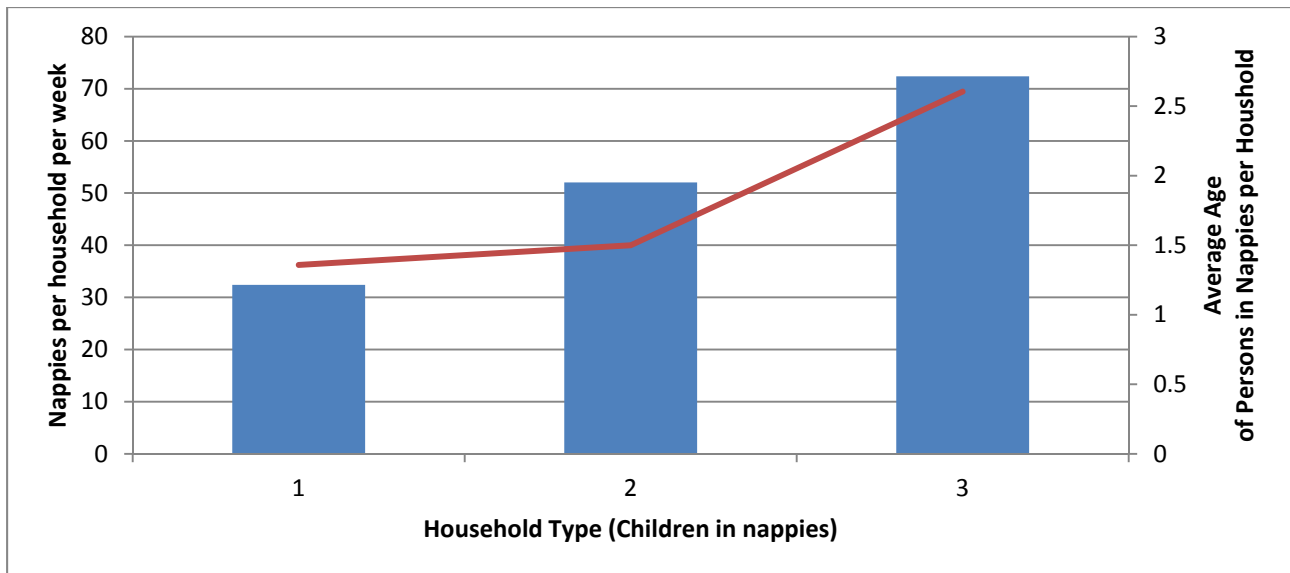


Figure 8: Average number of nappies generated per week per household type (number of children in nappies) (bars) and average age of the persons in nappies (line)

Figure 8 shows the average household with one person in nappies generates a total of about 30 soiled nappies per week (60 per fortnight). This increases to just over 50 soiled nappies per week for households with two people in nappies (100 per fortnight), and almost 70 nappies per week for households with three people in nappies (140 per fortnight). The proportion of these soiled nappies that will be disposed of in a household bin will depend on the amount of time (if any) a child spends in care.

Only one participating household had four people in nappies, this household was essentially two families living in the one home (two mums each with 2 children under 3 years of age). Because there are no other results for this household type for comparison/context, the data are unreliable. However, indicatively this household disposed of about 140 soiled disposable nappies per week.

The average age of the children per household type generally shows that nappy use does not double with every additional child and as older children transition out of nappies (Figure 8). This is supported by data on nappy generation per individual child by age group in the trial (Figure 9).

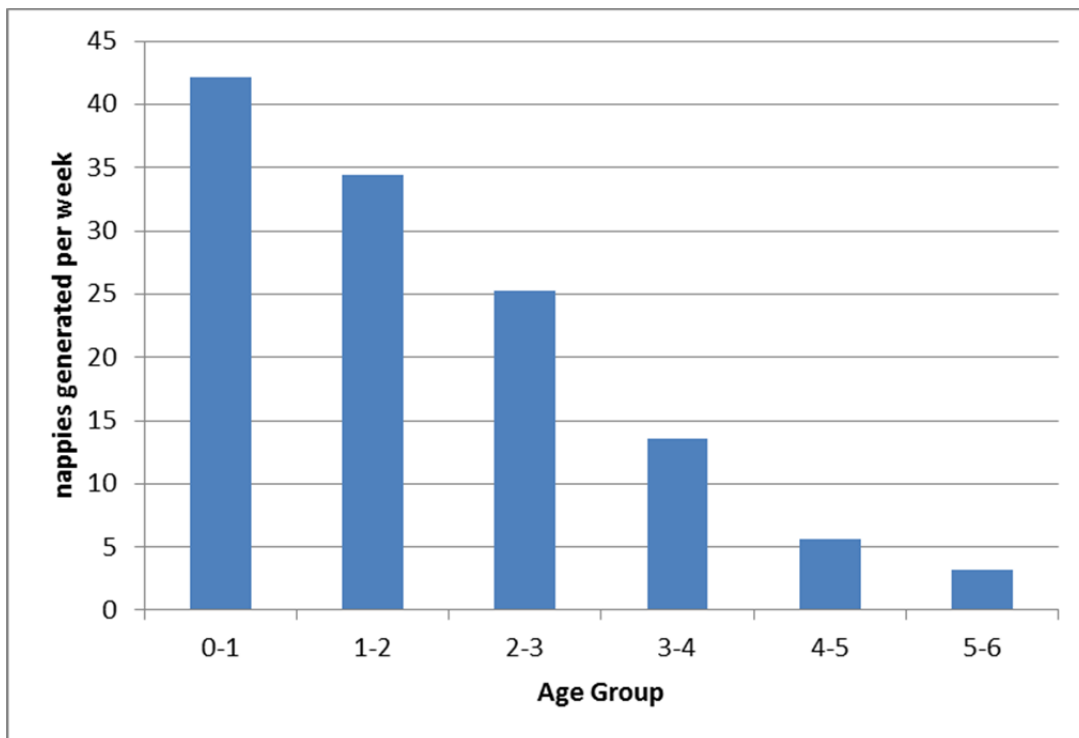


Figure 9: Average number of nappies generated per child in the trial according to age

Figures 8 and 9 indicate that nappy generation will be highest in households where the number of children in nappies is high and their average age is low.

5.5 How many nappies fit in a 240L bin? A practical test.

Data estimates across age groups show there are approximately 1.25 nappies per litre meaning a full 240 litre bin would contain approximately 300 nappies. This was verified with a practical test filling a 240L nappy bin with nappies from a Family Day Care household. When full, the bin contained 316 bagged nappies and weighed a total of 53 kg (40 kg of nappy waste and 13 kg of bin).

It took 9 weeks to fill the bin with nappies. The nappies were double wrapped – once in a plastic glove (compulsory when changing children at Family Day Care Centres) and then numerous nappies were disposed of in a tied plastic bag (usually a plastic shopping bag). The bin was located in a position where it received partial sun and shade throughout the day.

After 9 weeks, there was very little odour with the lid closed. When the lid was open, the odour was stronger, but was not offensive enough to be unacceptable. Interestingly, the bin was located next to the walk way where parents drop-off and pick up their children each weekday, and the Family Day Carer reported they did not receive comments about the odour of the bin. There were no vermin or insect issues after 9 weeks.

This seems to suggest that double wrapping the nappies, and keeping the bin in the shade where possible are both key factors to managing AHP waste. It also seems that the odour of nappy waste does not worsen significantly with time.

To gain first-hand experience, three Councillors on the Waste Advisory Committee inspected the bin (Figure 10).



Figure 10: Left: the full nappy bin contained 316 soiled nappies and weighed 53 kg (40 kg of nappies). Right: Councillors inspect the nappy bin.

5.6 How much bin space do households use to dispose of their soiled nappy waste?

The percentage of the 240L nappy bin that was filled by the end of each fortnight, categorised by household type, was determined from the participant's responses of total number of nappies generated per household per week, multiplied by two to obtain the total for a fortnight, and then converted into litres (Figure 11). The blue shows the average of each group, and the error bar shows the household that generated the most amount of nappies in each group.

In reality if a child/children are in care outside the home (for example, child care or Family Day Care), the number of nappies going into the household garbage bin each week will be less.

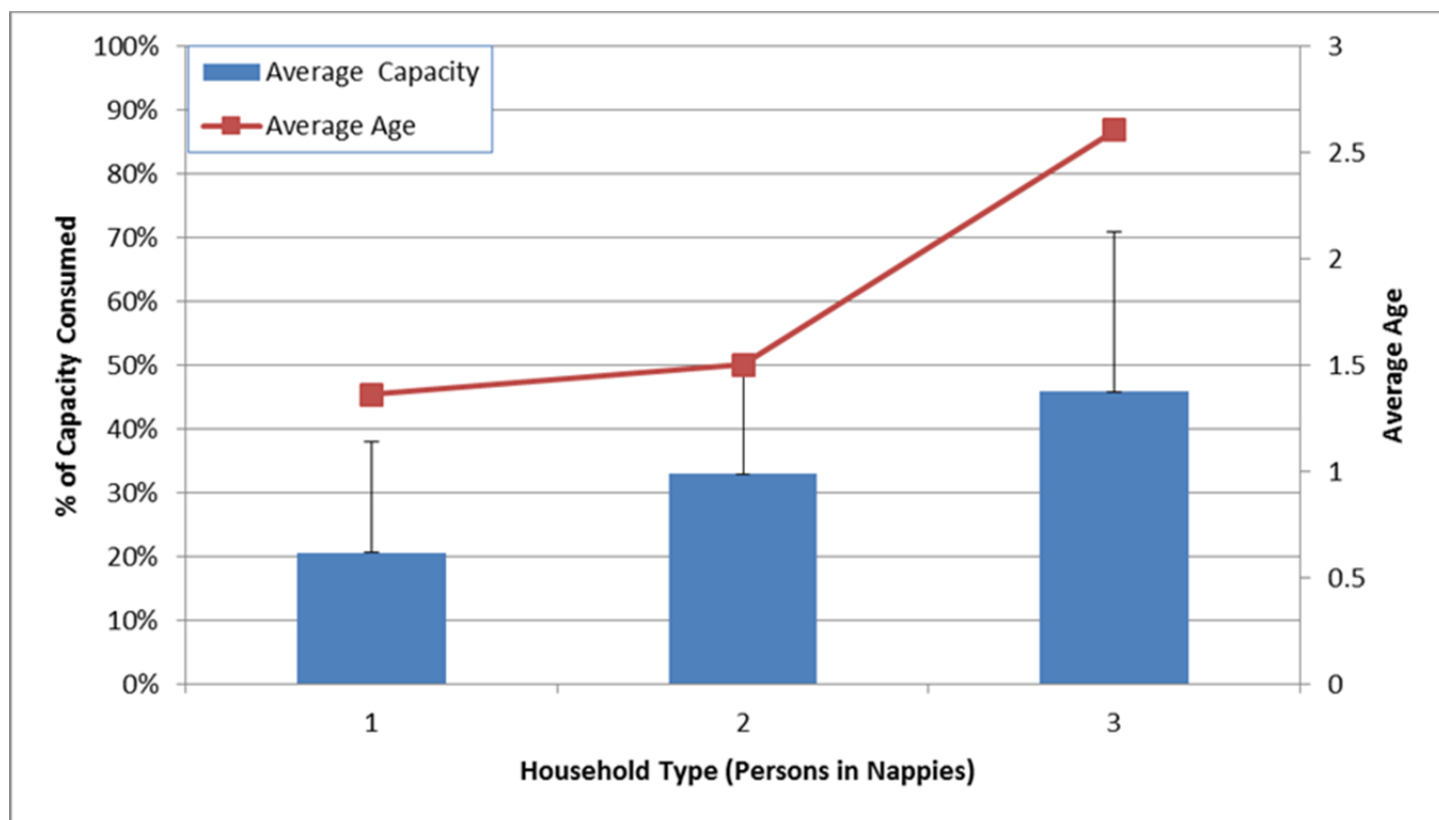


Figure 11: Nappy bin capacity used per household type extrapolated from the total number of nappies generated per week

Figure 12 shows the average percentage the 240L nappy bin was filled by the end of each fortnight, categories by household type, based on the participants' visual observation results by household type. It shows a similar trend to the **Figure 11: Nappy bin capacity used per household type extrapolated from the total number of nappies generated per week** Figure 11 but the capacity varies +/- 10%. Due to limitations with the data capture, Figure 11 is considered to be more reliable.

Indicatively, the one household with four people in disposable nappies recorded their nappy bin was 80% full each fortnight.

Based on the estimates above (Figure 11 and Figure 12), at the end of the fortnight, the average household 240L bin is expected to be between 20% and 50% full of nappy waste depending on the household type.

In Phase 2, this would mean households that use nappies would have at least 50% of the garbage bin space available for disposal of other residual household garbage (equivalent to at least 120 litres of capacity per fortnight).

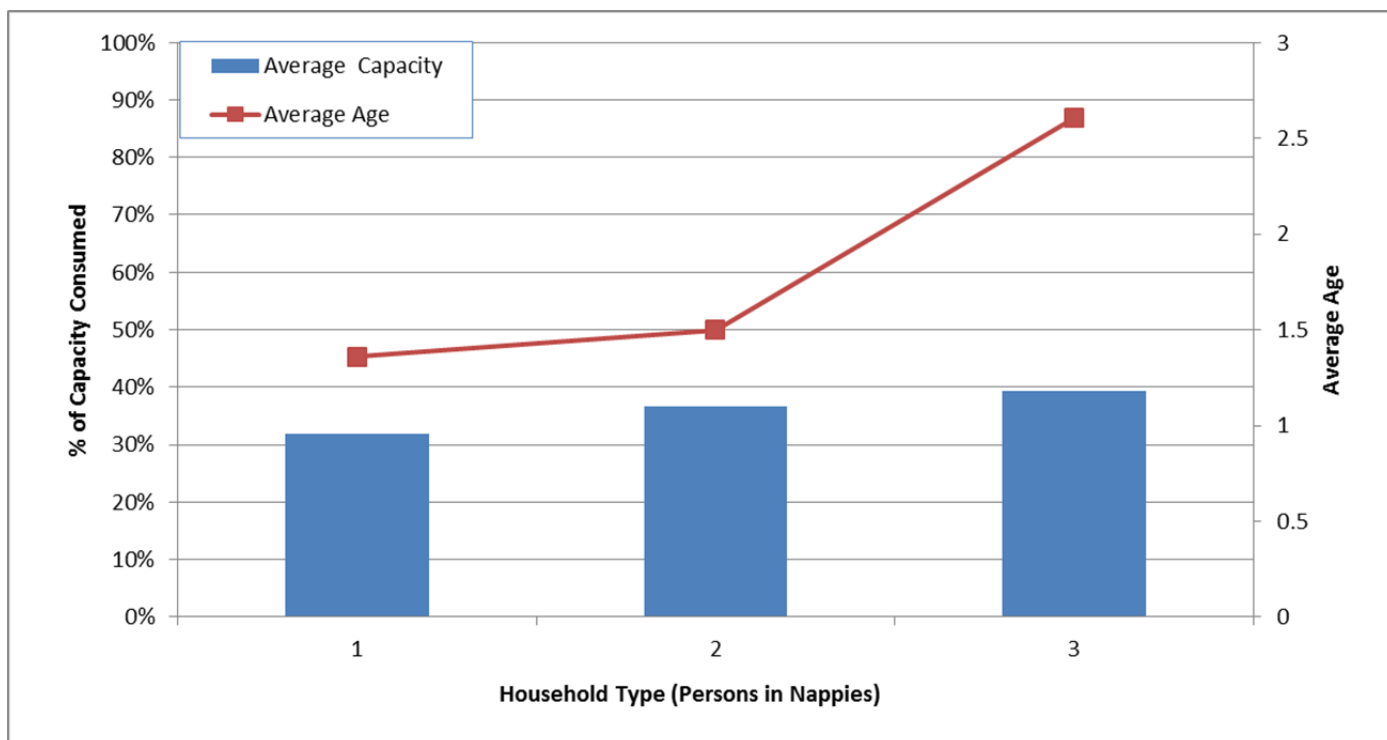


Figure 12: Nappy bin capacity used per household type from visual observation results

5.7 Household's bin space in a fortnightly garbage collection service

The results from the October 2013 City-wide garbage bin audit data was doubled to account for fortnightly waste generation, and combined with the fortnightly nappy trial bin capacity data to give a picture of how full the general bins of households that uses AHP will be in Phase 2 (Figure 13).

Figure 13 shows in Phase 2 the garbage bin capacity used at the end of the fortnight (as shown by the combined height of the non-recoverable waste plus nappy waste) if households sort their waste correctly. The graph suggests that the average participating household with one, two or three persons in nappies would have sufficient capacity in their fortnightly 240L garbage bin.. However, the maximum nappy generating household with three AHP users would not have sufficient capacity.

Based on this analysis, in Phase 2 it is expected households with one or two people who use nappies will be able to manage with a fortnightly garbage collection service. Households with three persons in nappies may be able to manage or may require additional capacity depending on the consumption habits of the individual households.

Council will need to make service options available for households with 3 or more people in nappies or incontinence aids.

ABS data shows in Lake Macquarie there are 165 households with 3 or more dependent children under the age of 4, and 1521 households with 2 children under the age of 4.

Data estimates show that an adult using incontinence aids generates 25% less AHP waste than an infant/child in disposable nappies. Based on this, in Phase 2 it is expected that households with one person or two persons using incontinence aids will be able to manage a 240L fortnightly garbage service. In reality, it is unlikely to have more than two people in a household requiring incontinence aids.

In conclusion, as long as households sort their waste correctly it is estimated that 165 households will require additional garbage capacity in Phase 2. If families do not sort their waste correctly, there may be demand for additional capacity from about 2,000 households.

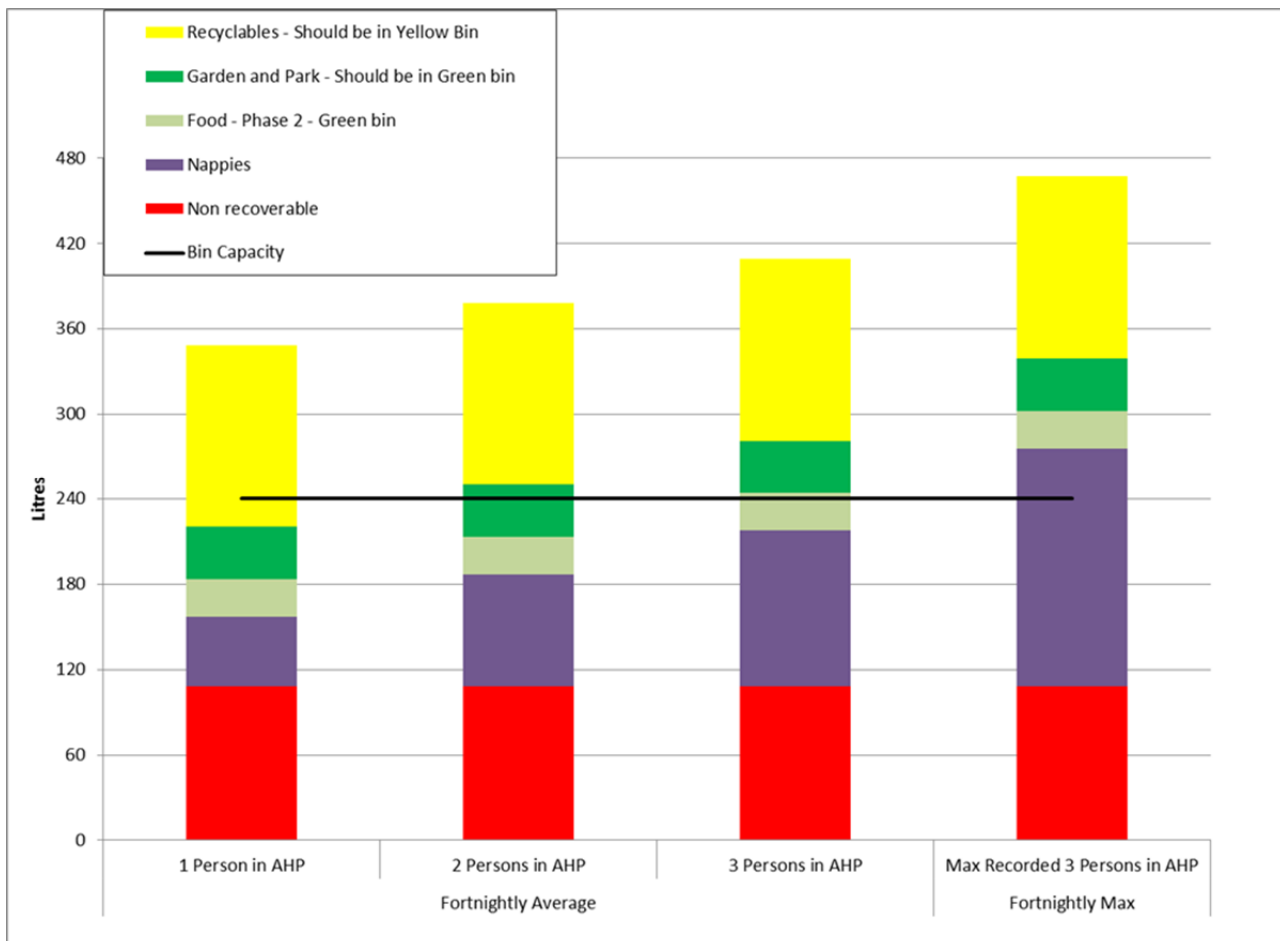


Figure 13: Nappy trial capacity data combined with the latest City-wide waste audit data for the garbage stream (October 2013) giving a picture of how full AHP-using households 240L garbage bin will be in Phase 2 if they sort their waste correctly.

5.8 Odour

Participating households were asked to record the odour of their:

- regular garbage bin before the trial (which included soiled nappy waste plus all other residual garbage);
- nappy bin at the end of the first week of the fortnight and at the end of the fortnight across the eight week trial period.

The average odour rating of the garbage bin before the trial (when it contained the households garbage and nappy waste) was about the same as the average odour rating of the nappy bin at the end of each fortnight. The odour was noticeably stronger with the lid open than the lid closed for both the garbage bin before the trial and the nappy bin during the trial, and the odour of the bin increased with warmer weather (Figure 14).

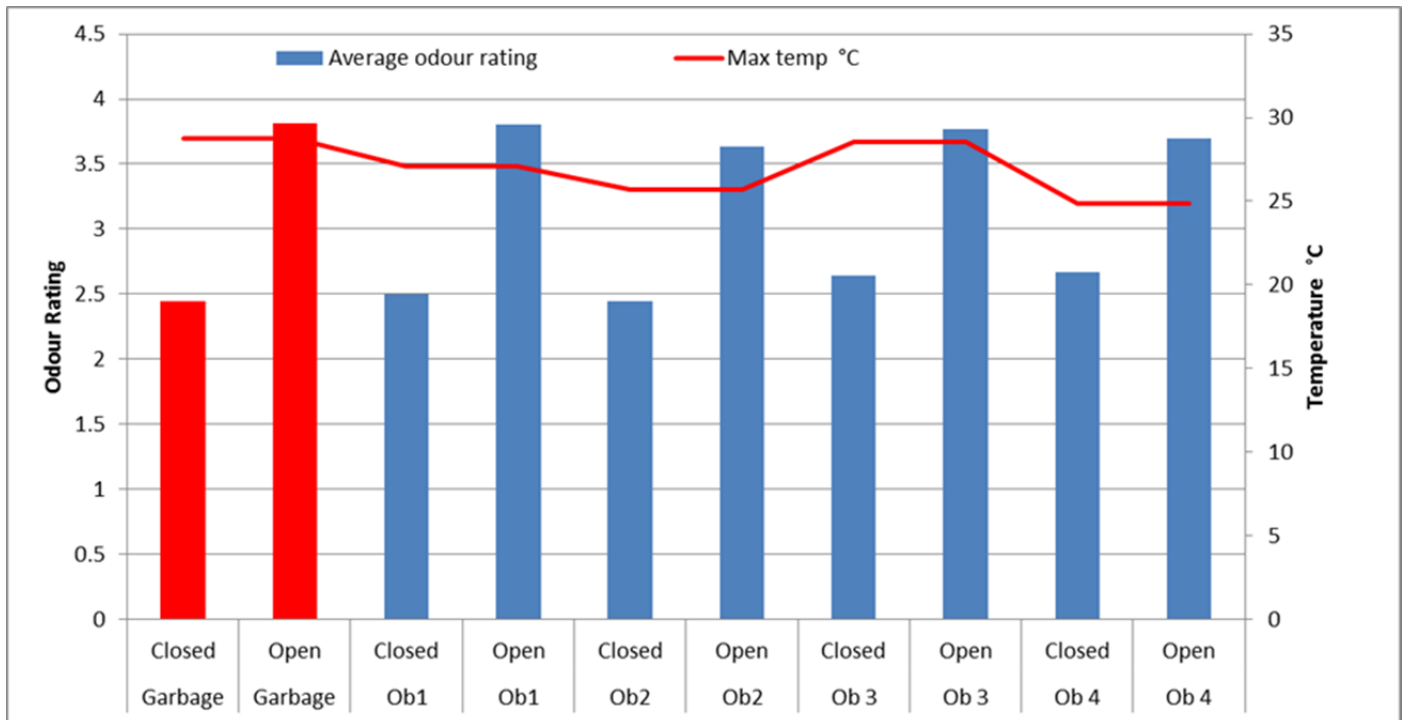


Figure 14: Average odour rating of the regular garbage bin at the end of a week before the trial started (lid closed and open), and the average odour rating of the nappy bin at the end of the fortnight (lid closed and open).

Did the number of nappies in the bin affect the odour?

The amount on nappies in the bin generated by different household types didn't have a significant effect on the perception of odour (Figure 15).

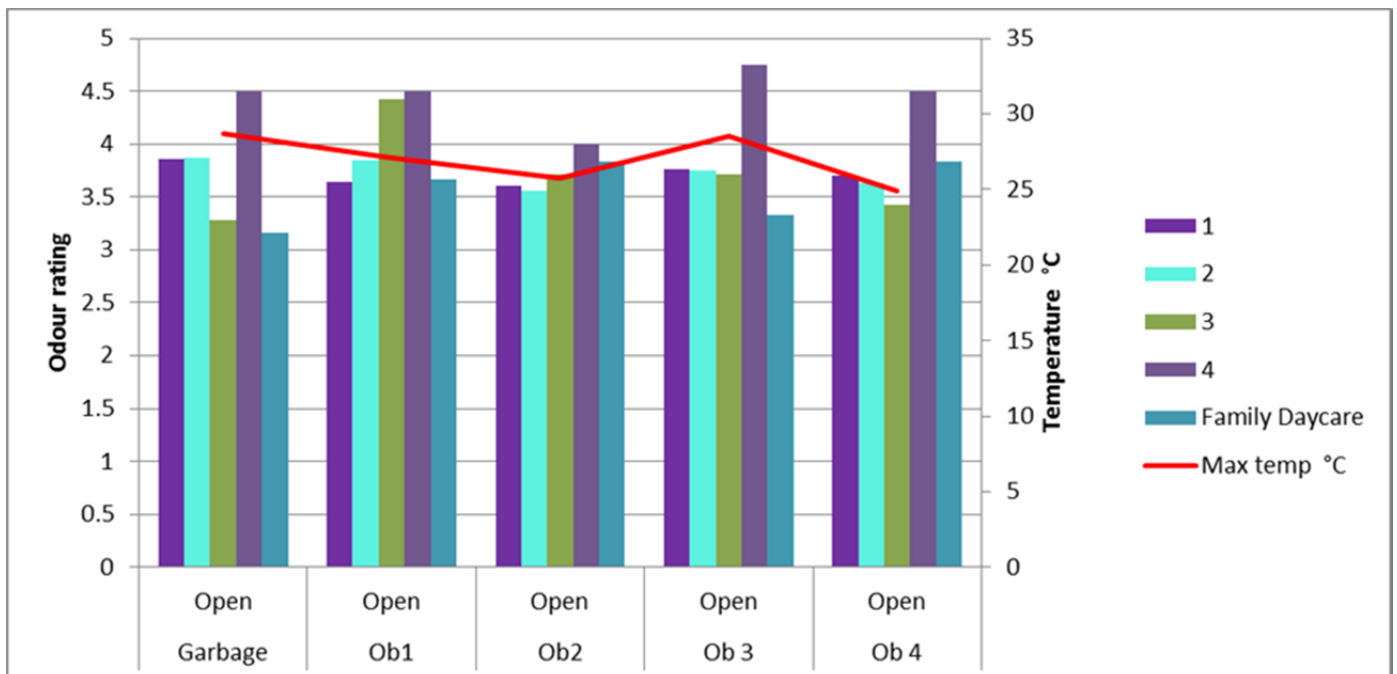


Figure 15: Odour by household type (persons in nappies)

5.9 Vermin

Participating households were asked to record any incidents of vermin or insects (Figure 16):

- in their regular garbage bin before the trial (which included their household's regular garbage plus soiled nappy waste), and
- in the nappy bin at the end of each fortnight across the eight week trial period.

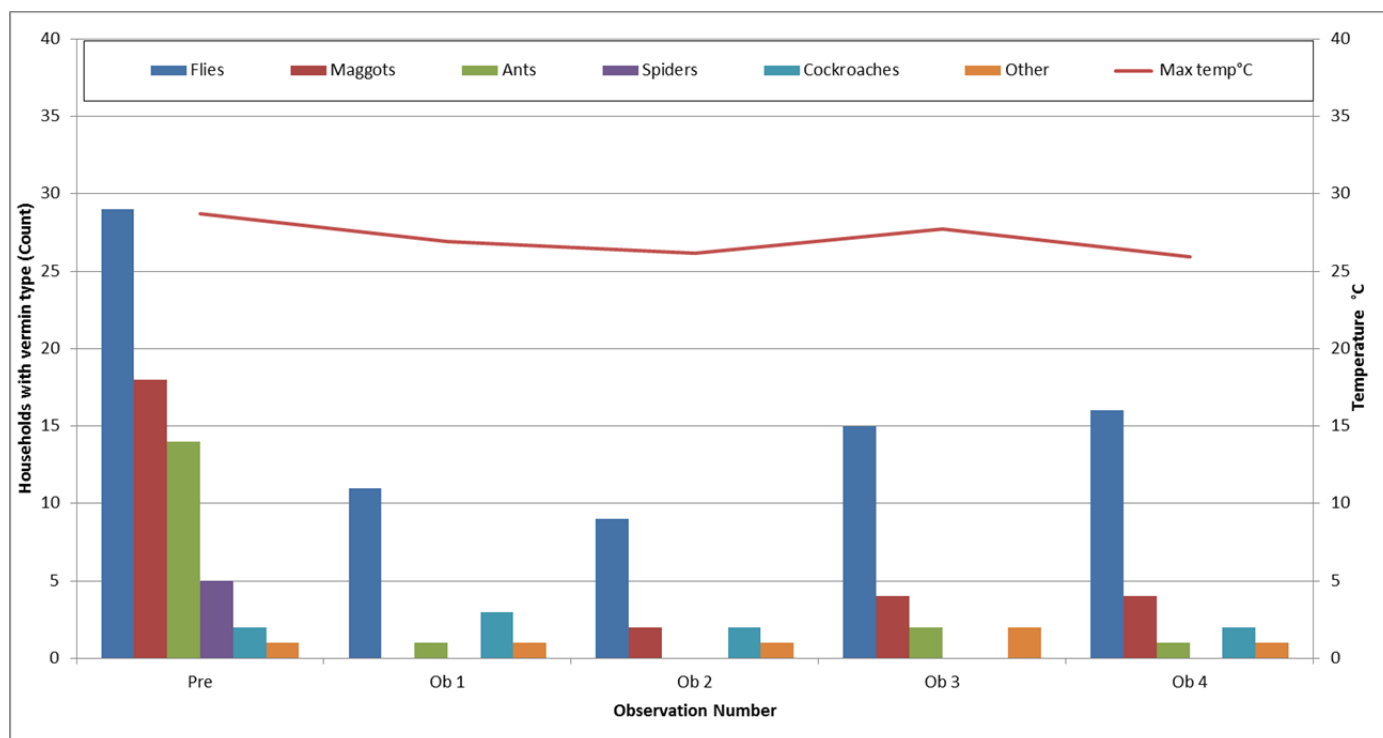


Figure 16: Incidents of vermin in the garbage bin (pre-trial) and in the nappy bin (during the trial).

This graph shows that there was no increase in vermin compared to the garbage bin across the trial period.

5.10 Participants' perceptions of their ability to manage a fortnightly garbage collection service

At the end of the trial, participants were asked how they felt about disposing of the household's soiled nappy/incontinence aid waste in a fortnightly collection service. As Figure 17 shows, the majority of participants (80%) responded 'Yes, our household could manage', 15% responded 'I'm unsure/not confident our household could manage, and 5% responded 'No, our household could not manage'.

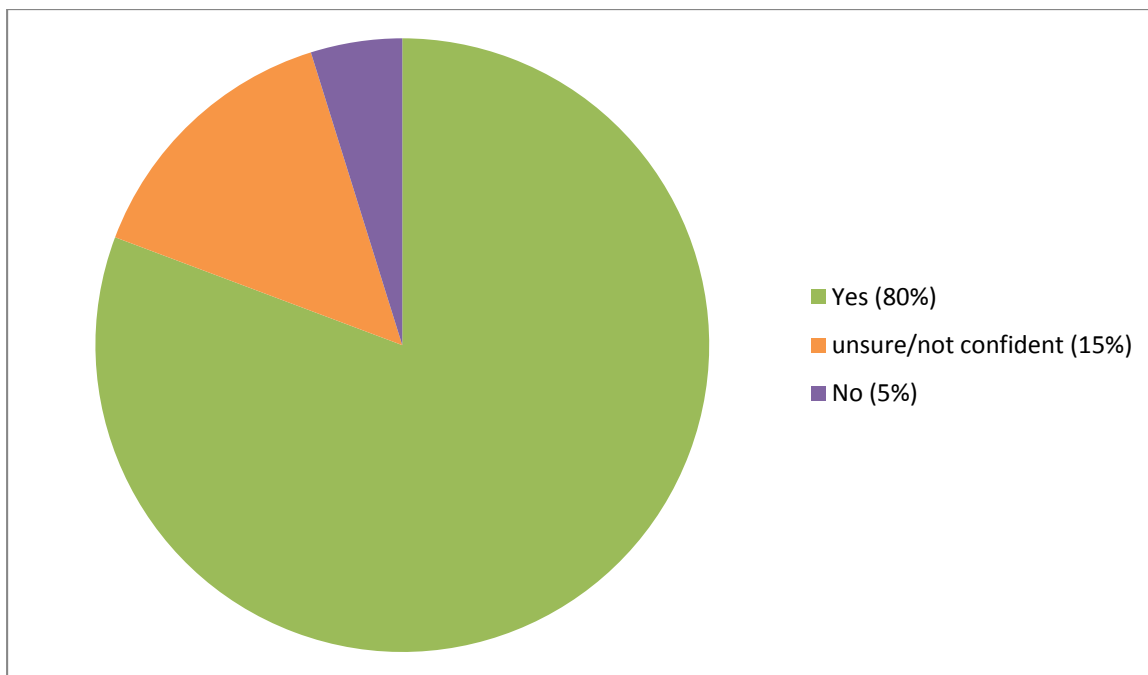


Figure 17: Participants response to whether they could manage a fortnightly nappy collection

Did households have any on-going concerns?

At the end of the trial, participants were asked if they had any on-going concerns about disposing of the household's nappy/incontinence aid waste in a fortnightly garbage service. The majority of participants (62%) had no concerns (Figure 18). Of the participants that did have concerns, odour was the most common (47%), followed by capacity (23%) vermin (17%), cost (8%) and hygiene (5%).

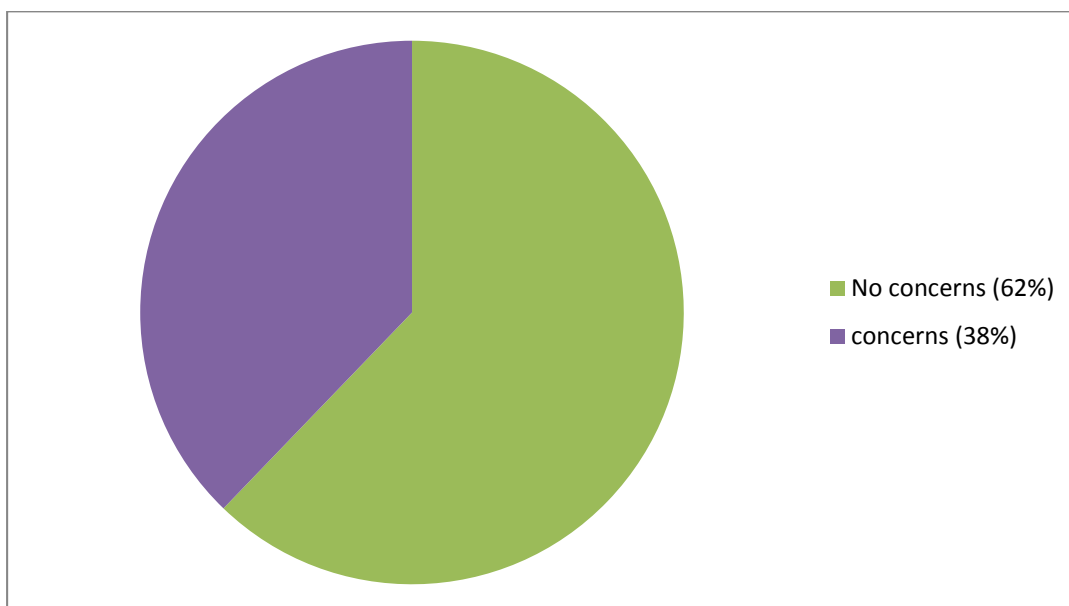


Figure 18: The proportion of participants that had concerns about a fortnightly service at the end of the trial

5.11 Service preferences

At the end of the trial, participants were given four garbage service options and asked to rank them in order of preference with 1 being the most suitable, and 4 the least suitable. The four service options given were:

- Keep your current 240L garbage bin and have it emptied once per fortnight (new standard garbage service) for no additional cost;

- Upsize your current 240L garbage bin to a 360L garbage bin (50% bigger than your current bin) and have it collected once per fortnight for an additional \$100 per year (about \$1.90 extra per week)
- Keep your current 240L garbage bin and get a second 240L garbage bin and have both bins emptied once per fortnight for an additional \$150 per year (about \$2.90 extra per week); or
- Keep your current 240L garbage bin, and have it emptied once per week for an additional \$300 per year (about \$5.80 extra per week).

The results (Figure 19) show that service preferences are largely determined by cost, with the cheapest option being the most preferred, and the most expensive option being the least preferred.

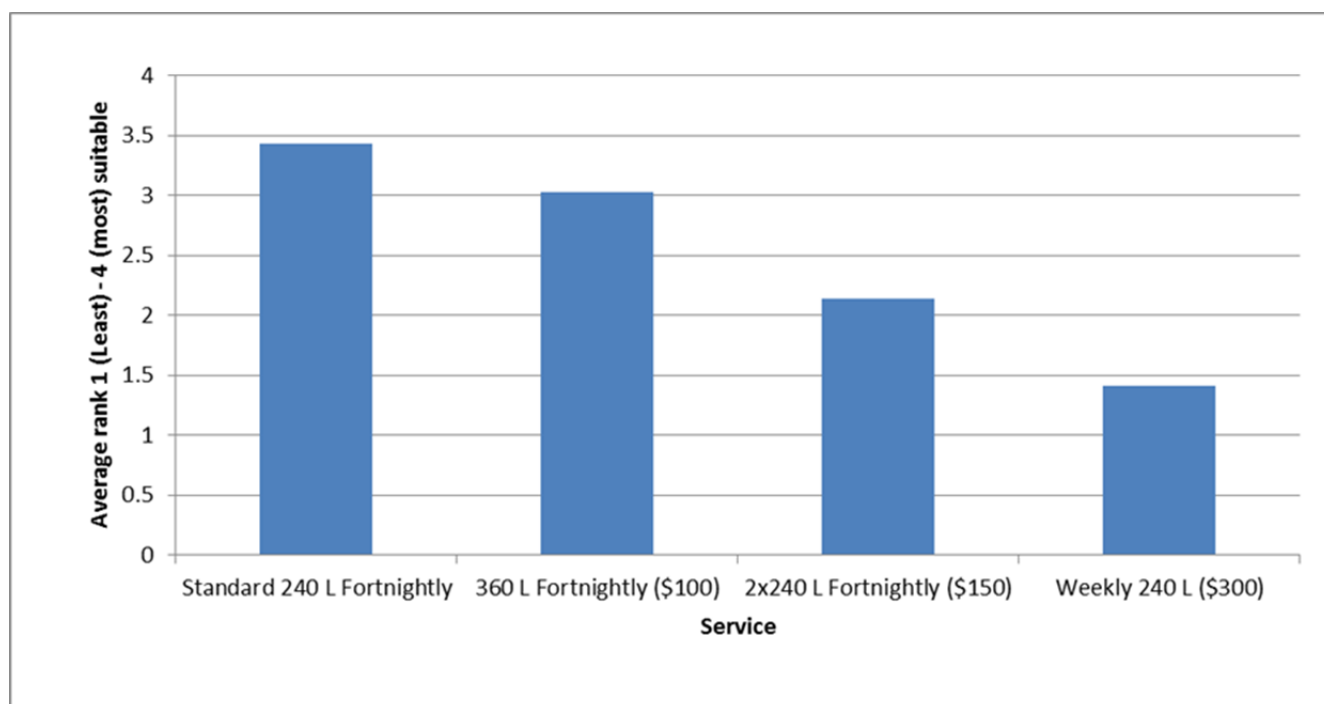


Figure 19: Participants' preferences for Phase 2 garbage service

This result is consistent with:

- Council's 2014 Community Survey results, which showed the same cost-dependent trend in preferred service provision (Appendix 7).

'Affordability to the household' being ranked as the most important factor when considering how to deal with nappy waste in the home (see

- Table 3).

6 The experience of other councils

Council's Sustainability Engagement Officer interviewed waste management staff from the largest four NSW councils (Coffs Harbour, Clarence Valley, Lismore and Penrith) who have implemented the same Phase 2 bin collection system. Waste services at Coffs Harbour, Nambucca and Bellingen are provided under the same contract, so the information provided by Coffs Harbour covers this region.

The aim of interviewing other councils about their experience was to identify what has been done well, and what can be improved.

Feedback from the participating councils was positive and encouraging. The 3-bin system works well and has significantly increased waste diversion rates in all four council areas.

6.1 Management of AHPs

Key information on the management of AHPs has been summarised in Table 4.

All four councils dispose of AHP waste in a fortnightly garbage service. Their experience indicates that a 240L fortnightly service is adequate for most households. Interestingly, two councils provide a 140L fortnightly garbage service as their standard service, and then an 'upsized' option to a 240L fortnightly service for an additional fee.

All four councils stressed the need for clear, practical information about AHP disposal to be available about three months prior to the introduction of the Phase 2 service. An example of this type of information from Penrith Council is in Appendix 6.

All four councils highlighted the need for clear and effective community education coupled with a reliable contamination management program.

6.2 Optional weekly garbage service

Coffs Harbour, Bellingen and Nambucca councils do not offer an optional weekly garbage service collection.

Clarence Valley offers an optional weekly garbage service to those households who have someone with a medical issue, for no additional fee (the two examples given were dialysis and severe adult incontinence). About 30 households in Clarence Valley have this service.

Lismore City Council offers an optional weekly garbage service for an additional \$176 per year. About 36 households currently have this service.

Penrith City Council offers an optional weekly garbage service for an additional \$110 per year (for 140L weekly service) or \$242 (for 240L weekly service) per year. About 7,000 households currently have this service. One of the main reasons for the high take up rate relates to issues associated with a difficult service introduction. The weekly service is cost and resource intensive to provide.

6.3 Other services provided by these councils

Until July 2014, Lismore City Council ran a compostable nappy program, which required households to register, buy compostable nappies and then dispose of these nappies in the green waste service. Out of 10,000 households in the City, 45 households have registered for this program. A contributing factor to the low participation rate may be compostable nappies (eg Bamboo Nature and Eenee) are typically twice the price of budget disposable nappies (Choice 2010).

The decision to stop this program arose because Lismore Council wanted to have the compost/mulch product certified. All nappies now go in the garbage bin.

One Council (Clarence Valley) offered a dedicated nappy collection service through a private provider but no households registered for this service.

Table 4: Summary of key information about AHP waste management in four other NSW Councils with a weekly food and garden organics service (interviews conducted in May 2014)

Council	Households in the LGA	Standard service	Start	DWMC (2013/14)	How is AHP disposed ?	On-going issues with AHPs?	Weekly service offered?	Contamination	Comments
Lismore City Council	14,000 (10,500 on standard service as FOGO not offered to rural properties)	Weekly 240L FOGO bin Fortnightly 360L recycling bin Fortnightly 140L garbage bin	2006	\$271	Garbage bin	No	Yes, weekly 140L garbage DWMC \$447 (+\$176) Currently provided to 36 households	Recycling < 3% FOGO <1%	Strict contamination management program important from start of new service “If everyone sort properly then bins size and garbage collection frequency should be adequate” Good education and reliable compliance program key to success Clear, practical information on disposing of AHPs provided 3 months prior to service start including bagging nappies to reduce odour.
Coffs Harbour City Council	32,000 (26,000 on standard service as FOGO not offered to rural properties)	Weekly 240L FOGO bin Fortnightly 240L recycling bin Fortnightly 240L garbage bin	2006	\$587.40	Garbage bin	No 240L fortnightly service	No, not required. Additional 240L fortnightly garbage service (+\$242)	Recycling < 5% FOGO <1%	Issues with fortnightly garbage service decreased over time. Currently get 1 – 3 complaints per year. Contamination management program important. If waste sorted correctly and nappies wrapped in plastic bag then households should not need a weekly service. Capacity not an issue (audits show bin very rarely over 75% full) Provide practical information on AHP disposal before service start including bagging nappies to reduce odour.

Council	Households in the LGA	Standard service	Start	DWMC (2013/14)	How is AHP disposed ?	On-going issues with AHPs?	Weekly service offered?	Contamination	Comments
Penrith City Council	65,000 (55,000 on standard service as FOGO not offered to MUD properties)	Weekly 240L FOGO bin Fortnightly 240L recycling bin Fortnightly 140L garbage bin	2009	\$322	Garbage bin	Not anymore. Upsizing to fortnightly 240L garbage service available (+\$201).	Yes. Weekly 140L garbage DWMC \$432 (+\$110) Weekly 240L garbage DWMC \$564 (+\$242)	Recycling pre-2009 4% Now 8% - 10% FOGO Start 35% Now 5%	Many lessons to learn from Penrith experience. Good communications for start of new service is critical. Weekly service should be for those with a medical issue only Continued strong investment in education and contamination management key to reducing contamination rates Currently provide weekly service to about 7,000 households. Requires two trucks to provide this service.
Clarence Valley Council	20,600 (17,500 on standard service)	Weekly 240L FOGO bin Fortnightly 360L recycling bin Fortnightly 240L garbage bin	2012	\$290	Garbage bin	No. Additional 240L fortnightly garbage service (+\$100)	Yes, to residents with a medical need. Currently provide to about 30 households at no additional cost to resident.	Recycling 3% FOGO 1.4%	Weekly service should be for those with a medical issue only. Council pro-actively contacted households with a medical condition (for example, dialysis or acute adult incontinence) through community services officers. 3-bin system works well – domestic waste diversion rate increased from 41% to 64% Introduced a separate kerbside nappy collection service and no one signed up. Information provided prior to service start. Nappies are a perceived issue, but not actual. Capacity rarely an issue with 240L fortnightly service

7 Conclusions

The staff and community nappy trials have identified the following key factors for consideration in Council's determination regarding the treatment of AHP in Phase 2 of Council's green waste service.

- At the introduction of Phase 2, the most appropriate option available for disposal of soiled AHP waste is via the fortnightly garbage service.
- A 240L fortnightly garbage service is expected to meet the needs of most Lake Macquarie households. However, service options are required for some AHP using households – generally those households with three or more people using nappies or incontinence aids.
- Where bin capacity is an issue, an additional 240L garbage service should be promoted as the best option for households and should be provided on a cost-recovery basis (at this stage estimated to be approximately \$150 per year). A weekly garbage service should be provided on a cost-recovery basis for those households who are unable, or perceive they are unable, to manage with a fortnightly service (at this stage estimated to be approximately \$300 per year).
- Clear, practical information on how to manage AHP in a fortnightly garbage service should be made available to the community commencing about three months before the introduction of the Phase 2 service
- Family Day Care households are likely to face a capacity issue in Phase 2. Council should consult with this group prior to the introduction of Phase 2 with information about the available service options to ensure the transition for this stakeholder group is as smooth as possible.

Appendices

Appendix 1

Community nappy trial, information flyer

A green flyer for the 'Get involved in Lake Mac's Community Nappy Trial'. The title is in large white text. To the right is the Lake Macquarie City Council logo, which features a stylized sailboat. Further right is a blue speech bubble containing the text: 'Receive a \$50 voucher and go in the draw to win one of three iPads!'.

Get involved in Lake Mac's Community Nappy Trial

Receive a \$50 voucher and go in the draw to win one of three iPads!

If someone in your home uses nappies and/or incontinence aids, and you live in Lake Macquarie, we would love you to take part in our eight-week trial.

The nappy trial will help Council determine the best way to manage absorbent hygiene product waste (including nappies and incontinence aids) in a fortnightly garbage service.

As a token of thanks, you will receive a \$50 Bunnings or Charlestown Square voucher at the completion of the trial. Participants who complete the trial will also go into the draw to win one of three iPads (iPad2 16GB WiFi). **Only 100 places available.**

What does it involve?

- The trial goes for eight weeks, from early February to late March 2014.
- You're required to complete a survey at the start and end of the trial (10 minutes).
- An extra 240L garbage bin will be delivered to your home ('kerbside nappy bin'). An information pack will come with the bin.
- For the duration of the trial, please place all of your household's nappies/incontinence aids in the kerbside nappy bin. The rest of your household's garbage can go in your garbage bin as normal.
- Once a fortnight (on your regular garbage collection day), complete an Observations Record (5 minutes) recording how full the kerbside nappy bin is, any odour etc and then put the bin out on the kerb with your other bins to be emptied.
- At the end of the trial the kerbside nappy bin will be removed.
- You will have the opportunity to attend an information session and focus group to further discuss your observations (optional).

How do I register to be a part of the nappy trial?

The community nappy trial is open to any household in Lake Macquarie City use nappies and/or incontinence aids.

Registration closes Friday 24 January 2014. Only 100 places available. You can register by completing the online form at **www.lakemac.com.au/nappytrial**

Alternatively, you can complete the form on the back and return it to: Lake Macquarie City Council
Box 1906 HRMC NSW 2310



Community nappy trial – registration form

1. First Name: Surname:

2. Are you a resident of Lake Macquarie? ☐ Yes ☐ No

3. Address:

..... Suburb:

Email address:

Phone number:

4. Number of people in your house who use child/infant disposable nappies

☐ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 Other:

5. Number of people in your house who use adult disposable incontinence aids?

☐ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 Other:

6. Preferred method of contact (please tick one)

- ☐ I can complete the pre-trial and post-trial surveys online.
- ☐ I would like Council to post the pre-trial survey and post-trial survey to me in the mail with a reply paid envelope.

7. Agreement

- ☐ I agree to participate in the community nappy trial
- ☐ I understand the kerbside nappy bin will be collected at the end of the trial
- ☐ I understand that when I have completed the trial I will receive a \$50 voucher and go in the draw to win an iPad. (Drawn on Wednesday 16 April 2014).
- ☐ I understand that Council will contact me to confirm my place in the community trial and provide me with further information.

.....

.....

Signed

Date

For more information, and a full list of Terms and Conditions, go to www.lakemac.com.au/nappytrial or call Bridget Saint, Sustainability Engagement Officer, on 4921 0333.