Waste Management Strategy

2017-2030

SORT IT OUT!
It's too good to waste

Randwick City Council
a sense of community

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Executive summary

Randwick City Council is spread over a land area of 37 square kilometres, and is home to more than 140,000 people. The total number of residents in the summer season increases significantly as the City welcomes visitors from across the country and the globe. Thousands of students attend the University of NSW and other workplaces adding to our daily population profile. This results in significant waste management challenges impacting on residential and public place services.

Council provides all households with the New South Wales best practice service, which includes weekly rubbish (red-lid) bin, fortnightly household recycling (yellow-lid) bin and green waste (green-lid) bins, and four free bulky waste (two scheduled and two on-call) collection services. Council also provides electronic waste, household chemicals, polystyrene, paper and cardboard, soft plastics and whitegoods drop-off services at the Randwick Recycling Centre located in Matraville.

Council currently achieves a 56% landfill diversion, which indicates there is substantial work to be done, particularly in the context of the NSW Waste Avoidance and Resource Recovery (WARR) 2014-2021 strategy and targets. The NSW WARR strategy sets out the following key targets:

- reduction of waste generation per capita
- increase landfill diversion rate to 75%
- reduce household problem waste
- reduce illegal dumping and litter

In light of the above targets, Council is setting out its strategy, targets and a roadmap to achieve these targets. The development of the targets encompasses the review of the Waste Management Strategy 2010, analysis of the legislative requirements, overall waste management data and current waste collection and processing services; including household bin composition as identified through waste audits. In addition, substantial research and analysis of available alternative waste treatment technologies, which can be used to increase landfill diversion. This information combined with input from our community is reflected in the options being considered for future waste management in the City (Table 1).

Council's analysis of options considers current and combination of additional collection and processing services, including increasing amounts of rubbish processed in Mechanical and Biological Treatment (MBT) facility. As well as the introduction of food and garden organics and processing in available facilities and in facilities to be developed that uses advanced technology such as energy from waste.

Option 1 presents the current collection system (3 bins and bulky waste) and processing (20,000 tonnes of rubbish processed in MBT facility and the remainder disposed in landfill system), through which Council achieves 56% landfill diversion rate, which is far below NSW target of 75%.

Option 2 provides significant improvement taking into account no changes to the current collection services and use of available processing facilities. In this option Council maintains the current service, but all rubbish is processed at a MBT facility, the residual disposed of at landfill. This option will lead to an increase in the overall landfill diversion rate potentially to over 63%. In addition, if bulky waste is processed prior to disposal, there is potential to increase the diversion rate by approximately 4%. Currently there are no bulky waste processing facilities in Sydney. However, bulky waste processing facilities are expected to be established in the near future.

Options	1	2	3	4	5	6
Processing facility availability	**Available**				**To be developed**	
Uses current collection service	✔	✔			✔	
Requires changes to collection service			✔	✔		✔
20,000 tonnes of rubbish processed prior in Mechanical Biological Treatment facility	✔					
All rubbish processed in MBT facility		✔	✔	✔	✔	✔
Food Only collected in separate bin (units and apartments)			✔			
Food and Garden Organics collected in green-lid bin (all households)				✔		✔
Bulky waste processed for higher recovery					✔	✔
Residual waste processed at Energy from Waste						
Diversion rate (%)	56	63	64	64	67	68

Table 1: Future waste management options analysis

Options 3 to 6 present improved opportunity for achieving higher diversion rates, however, they have additional requirements prior to implementation. These includes either changes to domestic waste collection services provided and/or establishment of processing facilities. Energy from waste technologies can help Council achieve more than 90% landfill diversion. However, there are no such facilities currently established in Sydney. Energy from waste facilities are expected to be established in Sydney in the near future due to industry and stakeholder interest. NSW Energy from Waste Policy requires that all recyclables including food waste are separated at household level and recycled prior to processing of rubbish at an Energy from Waste processing facility. If this option becomes available, Council officers will need to report to Council.

The Waste Management Strategy 2017-2030 sets out Council's vision for long term waste management in the City. It also defines the targets and a roadmap to achieve the targets. The targets set are consistent with the NSW WARR Strategy 2014-2021 and the South Sydney Regional Organisation of Council's (SSROC) Draft Regional Technical Waste Strategy.

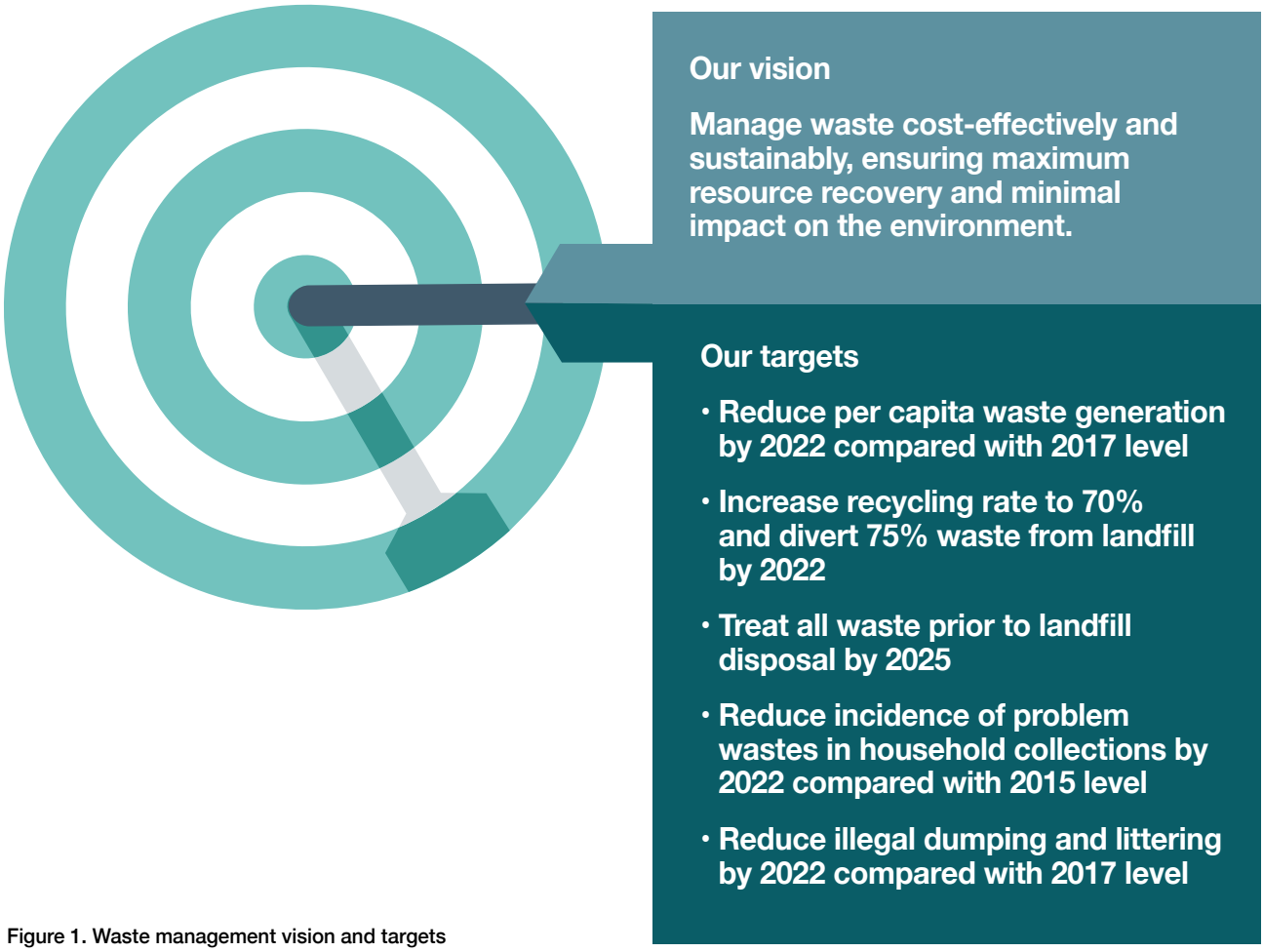


Figure 1. Waste management vision and targets

Focus areas and priorities

Council's focus areas and priorities emphasise and direct Council actions towards achieving its set targets.

Focus areas	Priorities	Actions
Collection services	Improve bin infrastructure, review fleet and routes. Encourage the use of efficient compaction systems and innovative collection system.	• Review and implement efficient collection services. • Investigate potential underground waste collection system for new developments. • Review Development Control Plans to improve waste management in high density developments.
Recycling and resource recovery	Increase and improve household and public place recycling. Investigate innovative waste processing technologies. Improve and expand the use of Recycling Centre services. Increase organics recovery and recycling. Increase recovery from hard waste.	• Increase access to recycling infrastructure. • Continue to process rubbish at an AWT facility. • Investigate options and implement high recovery technology for bulky waste. • Develop and implement procurement options for processing residual waste at an Energy from Waste facility • Implement new services at the Recycling Centre. • Investigate collection and processing options for Food and Garden Organics. • Procure hard waste recovery technology services.
Clean City and streetscapes	Reduce illegal dumping Reduce litter Optimise city cleaning program Keep our beaches, parks and reserves clean	• Continue illegal dumping and litter prevention programs • Participate and support the NSW government Return and Earn scheme • Review and improve services in line with community needs and expectations.
Problem wastes	Reduce the incidents of problem waste Increase appropriate disposal of problem waste Advocate for extended producer responsibility Increase recovery of electronic waste	• Improve and expand (targeting problem and other wastes) services at Randwick Recycling Centre, • Participate and support the NSW Household Chemical Clean Out events • Implement increased recovery options for electronic waste
Community engagement	Increase community engagement in waste reduction, recycling, resource recovery and waste management services Increase understanding of AWT including Energy from Waste	• Develop and implement effective community education programs aiming at waste avoidance and reduction • Implement community program engagement to reduce recycling contamination and reverse contamination

Table 2: Summary of strategy priorities and actions

1. Introduction

The City of Randwick is among the more diverse Council areas in the Sydney metropolitan area. It is situated in the eastern suburbs of Sydney and is home to iconic beaches and two National Parks. The local government area is set on 37 square kilometres land area and is made up of 13 suburbs being Randwick, Clovelly, Coogee, South Coogee, Kensington, Kingsford, Maroubra, Malabar, Matraville, Chifley, Little Bay, Phillip Bay and La Perouse.

According to the 2016 census the total population is just over 140,000. In the summer months the City welcomes visitors from across the globe leading to a population increase that can result in significant waste management challenges impacting domestic and public place services. The rental properties turnover similarly present challenges with managing illegal dumping in the area.

Despite these challenges, significant opportunities remain to deliver improved services and achieve greater resource recovery based on research and best practice, these are outlined in the waste management strategy.

Council's Waste Management Strategy provides a comprehensive long-term plan and roadmap to reduce waste generation, increase resource recovery and boost landfill diversion in a cost-effective manner by 2030.

Council's waste profile, resource recovery analysis and the Waste Management Strategy 2010 inform the strategy. The requirements of the New South Wales Waste Avoidance and Resource Recovery (WARR) Strategy 2014-2021, South Sydney Regional Organization of Councils Technical Waste Strategy 2017-2022 and other relevant legislation guide the strategy.

Additional insight from community consultation sessions assesses knowledge, expectations and opinions about future waste collection and processing options within the City. A number of trials and case studies also provide valuable information on the potential for more diverse approaches to waste collection, processing, resourcing and stakeholder engagement.

The strategy presents the current waste management landscape in Randwick City, sets out Council's vision for waste management, waste targets, priorities and a roadmap to achieve the targets.

2. Community profile

Knowing our population demographics is key to understanding the suitability of current waste services and planning for future waste management services. In addition, it helps Council in planning and delivering of targeted community engagement initiatives.

The 2016 Australian Bureau of Statistics household survey results, provide Council with the following key information, relevant to waste services planning:

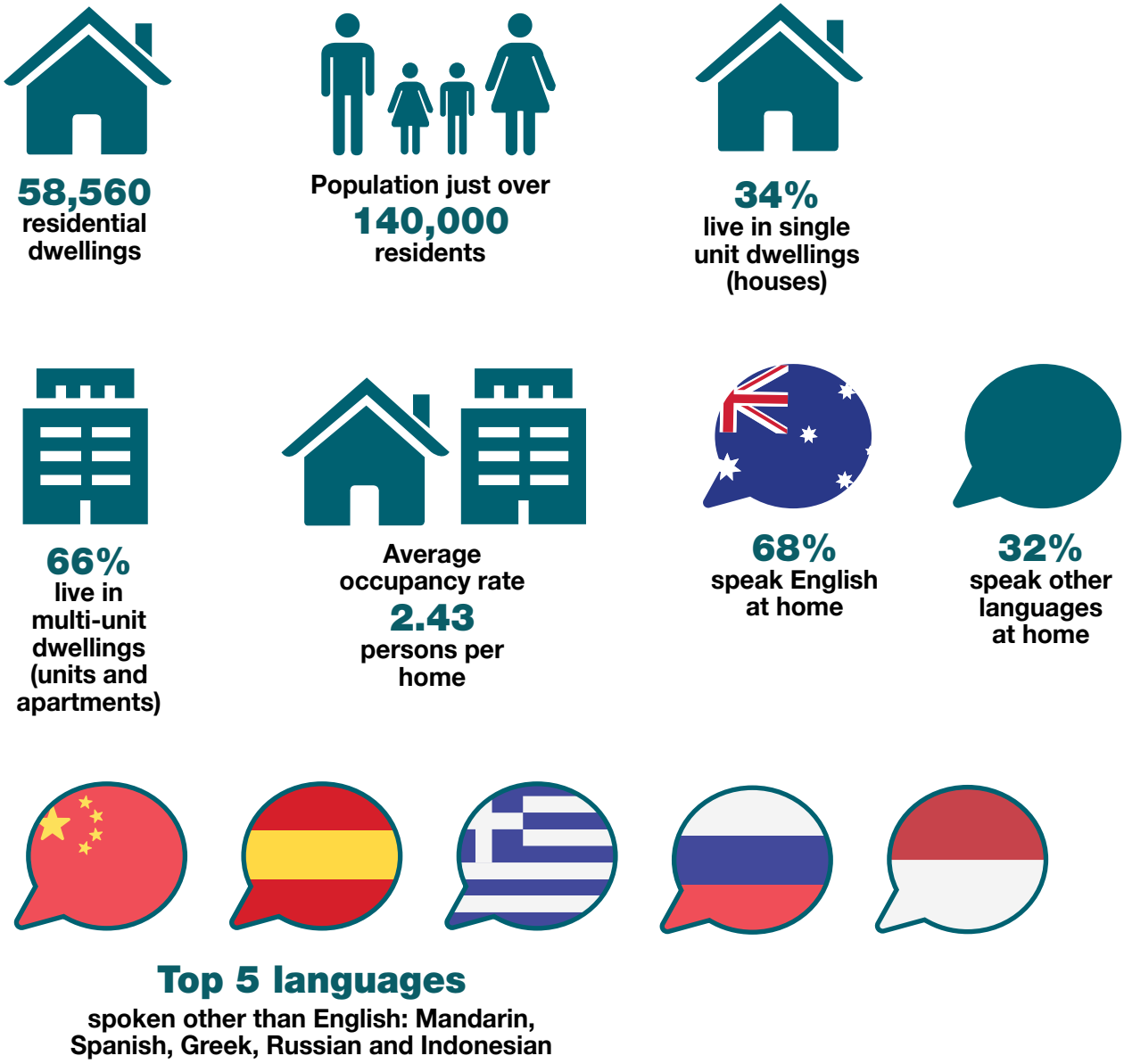


Figure 2: Our community profile

3. Strategic background

The Waste Management Strategy 2017-2030 follows and builds from the Waste Management Strategy 2010. The NSW Waste Avoidance and Resource Recovery Strategy (WARR) 2014-2021 informs key elements of the new Council strategy. Furthermore, the Waste Avoidance and Resource Recovery Act 2001 which underpins the NSW WARR Strategy, requires Council to consider the following hierarchy (Figure 3) when planning its waste management approach. The hierarchy places greater emphasis on avoiding and reducing waste, while waste disposal is the least preferred option. This approach also applies in Council's approach to future waste management.

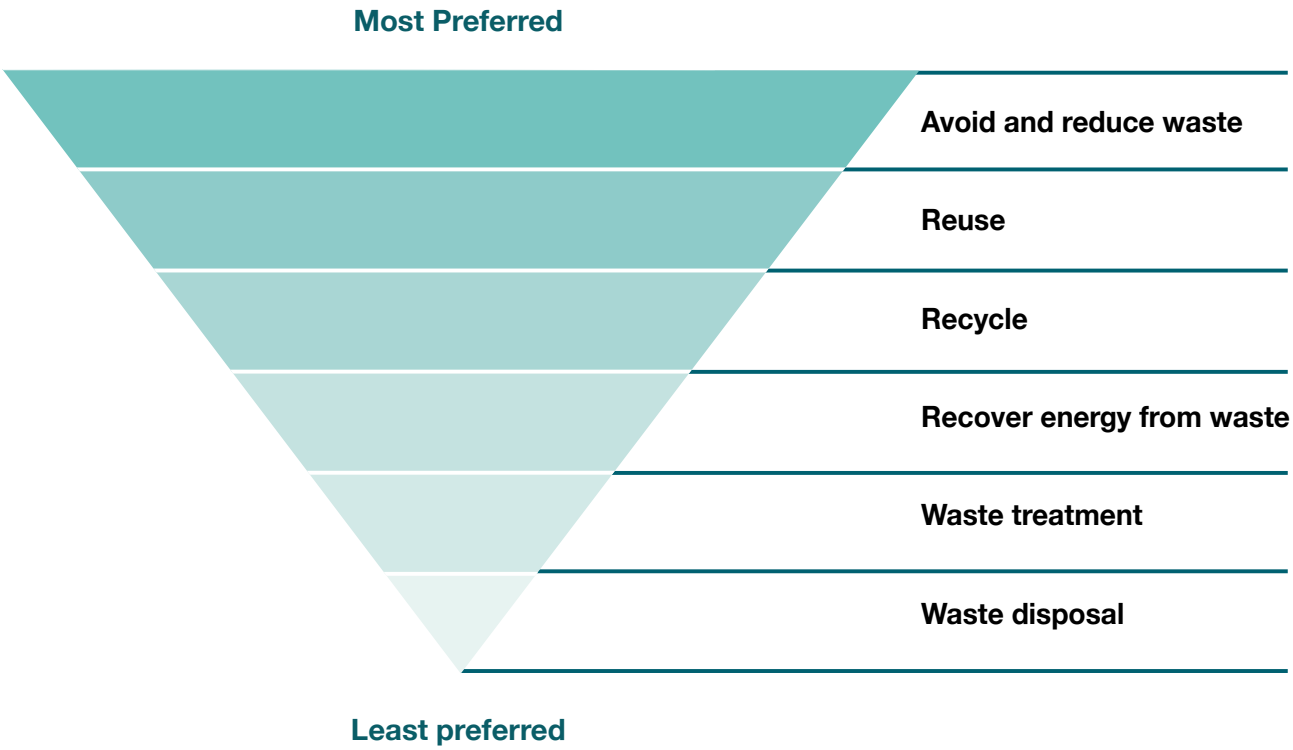


Figure 3: Waste hierarchy

Legislation and regulations guide the strategy and underpin the waste management policies and plans. Table 3 below, outlines the key pieces of legislation and policies from both state and federal government relevant to the development of the waste strategy.

Legislative framework

National Waste Policy 2010	Provides direction for waste management in Australia to 2020
Local Government Act 1993	Charges Councils with the responsibility to provide and charge an annual fee for waste services
Protection of the Environment Operations Act 1997 and POEO (Waste) Regulation 2005	Establishes the waste and environment landfill levy, sets controls for waste facilities and provides a pathway to incentivise councils to reduce waste to landfill. Provides law enforcement tools and penalties for litter and illegal dumping.
NSW WARR Act 2001 and NSW WARR 2014-2021 Strategy	The WARR strategy sets targets for resource recovery and recycling. It guides the development of Council recycling and landfill diversion targets.
EPA NSW Energy from Waste Policy Statement 2014	Sets out the policy framework for processing of waste at energy from waste facilities and the applicable criteria for councils wishing to use this technology.
Waste Avoidance and Resource Recovery Amendment (Container Deposit Scheme) Act 2016 No.57	Provides the framework for the introduction of the Container Deposit Scheme, commencing in December 2017. The scheme is NSW government litter reduction initiative, aimed at encouraging residents to return eligible drink containers in return for a 10 cents refund.

Table 3: Legislative and policy framework

4. Current waste management services

Randwick City Council is responsible for the provision of household waste and recycling services. This includes bins and waste collection and processing services across the City. In addition, residents can drop off excess recyclables and selected household problem waste for free at the Randwick Recycling Centre located in Matraville. Council delivers a comprehensive street and footpath cleaning service including collection of waste from street and park bins. An overview of each service is provided below.

4.1. Collection services

Household waste collection

Household waste is collected from red-lid (rubbish), yellow-lid (mixed recycling) and green-lid (garden organics) bins. The red-lid bins are picked up weekly, while the yellow-lid and green-lid bins are collected fortnightly in alternate weeks from the nature strip (kerbside).

There are two scheduled and two on-call bulky waste collection (clean up) services provided annually for large household items. However, residents can request additional services at cost.

Council also collects Christmas trees from households for free after the festive season.

Photo 1: Rubbish collection using a sideloader

The Randwick Recycling Centre

The Recycling Centre at 72 Perry Street in Matraville offers residents a facility to drop off excess recyclables, metals, whitegoods, televisions, computers and printers, expanded polystyrene and soft plastics.

Following the facility upgrade, the centre now accepts household problem waste. These wastes include paints, gas bottles, fire extinguishers, fluorescent tubes and globes, car and household batteries, smoke detectors, motor and cooking oil.

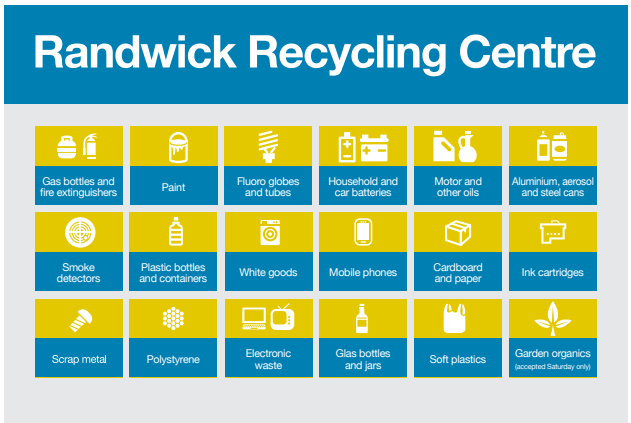


Photo 2: Materials accepted at the Randwick Recycling Centre

In addition to accepting household problem waste at the Recycling Centre, Council supports the NSW EPA Household Chemical CleanOut events. These events are held twice a year within Randwick. The objective is to assist residents to safely dispose of residential hazardous waste, this includes items such as paint, oils, pool chemicals, acids etc. Council's support includes advertising and community engagement to inform residents of the event.

Public place waste collection

To keep our City clean, Council provides regular street cleaning service and a network of 613 rubbish and recycling bins for residents, visitors and workers.

Council provides regular streetscape, town centre and shopping village cleaning services as well as regular cleaning of parks, reserves, sporting fields and beaches.

In addition, during the summer months, Council provides additional staff, bins and increases its service levels to manage the extra demand created by the large influx of visitors.

Photo 3: Cleaning crew at Coogee Beach

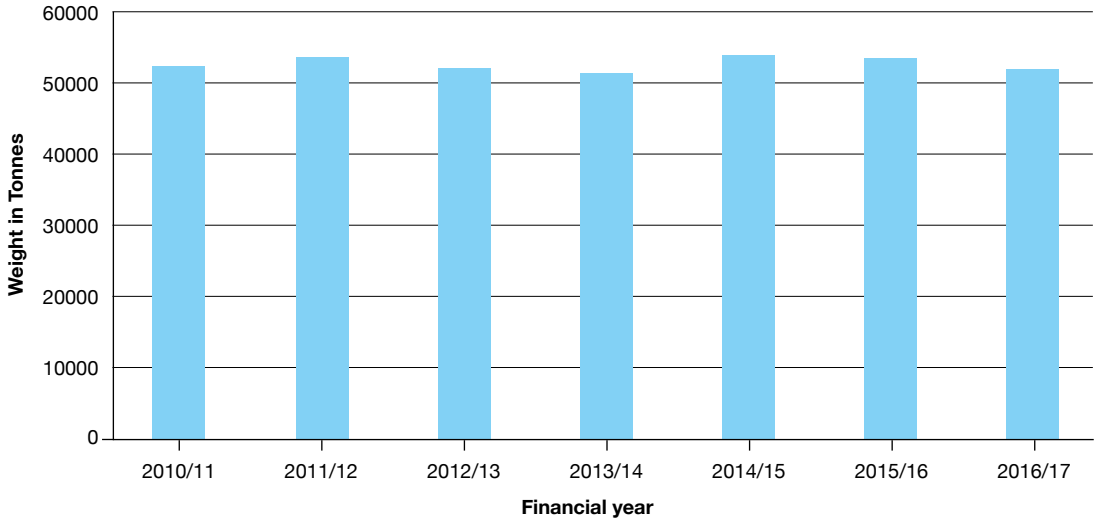
Photo 4: Waste and recycling station at Coogee Beach

4.2. Processing and disposal

Total waste collected for the period 2010 to 2017 is shown in graph 1. In the 2016-17 period, 52,175 tonnes of waste were collected. The data also shows fluctuation of waste generation over the seven (7) financial years, without showing any notable variation in waste volumes generated.

Since 2014-15 financial year Council started processing incremental amounts of rubbish at an Alternative Waste Treatment (AWT) facility that uses Mechanical and Biological Treatment (MBT) technology, with the remainder disposed of in landfill. Recyclables and green waste collected were processed at a materials recovery facility and composting facility respectively, as shown in figure 4.

Total waste generated



Graph 1: Total waste generated by households 2010 to 2017

Alternative waste treatment (AWT) generally refers to a facility that applies a combination of mechanical, biological and (sometimes) thermal processes to separate organic materials from mixed residual waste stream (usually household waste).

A Mechanical Biological Treatment system or MBT is where rubbish is sorted and the recyclables are removed and recycled. The organic material is sent to a composting facility where it is composted to produce lower grade compost. The remaining waste is made up of material that cannot be processed any further is sent to landfill.

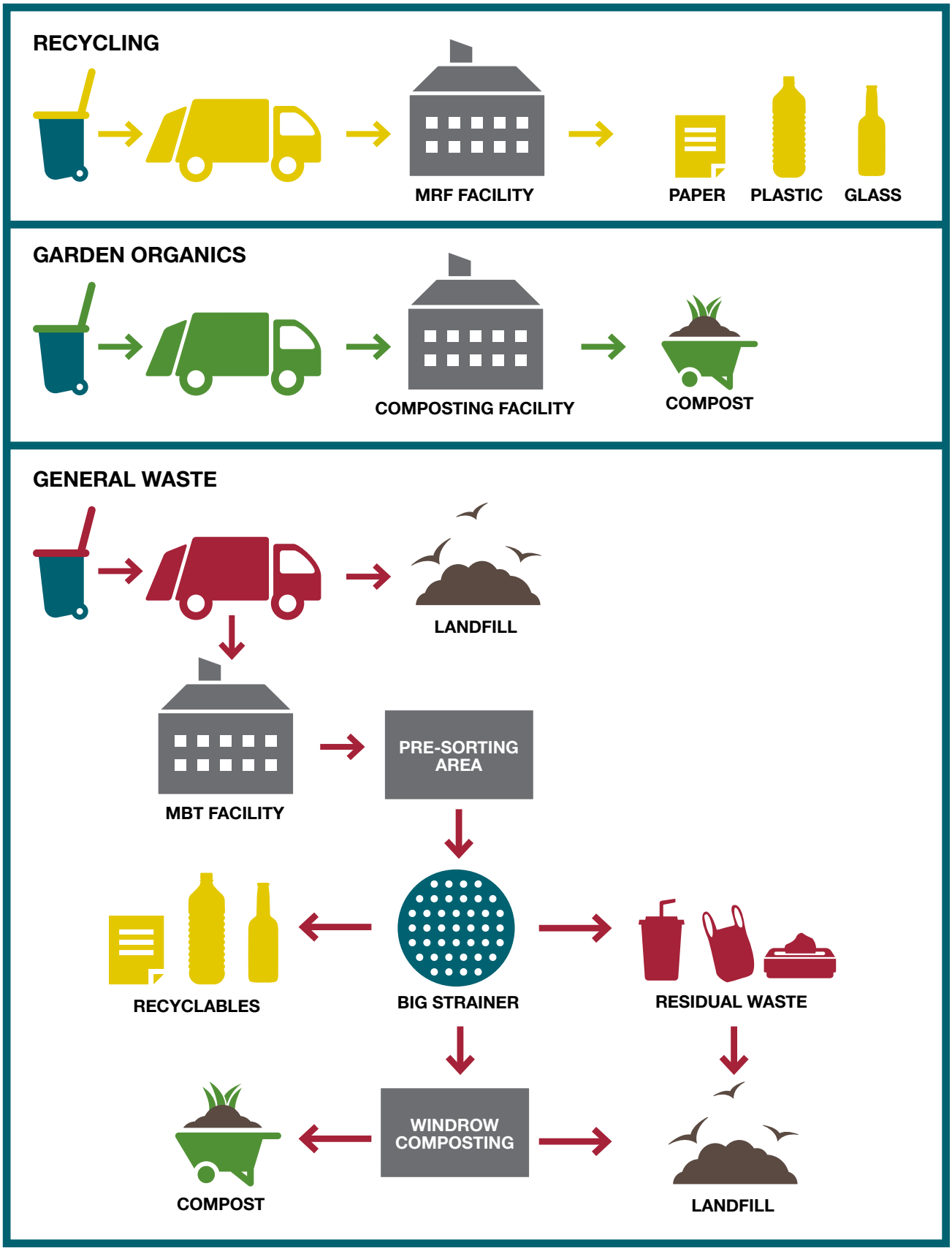
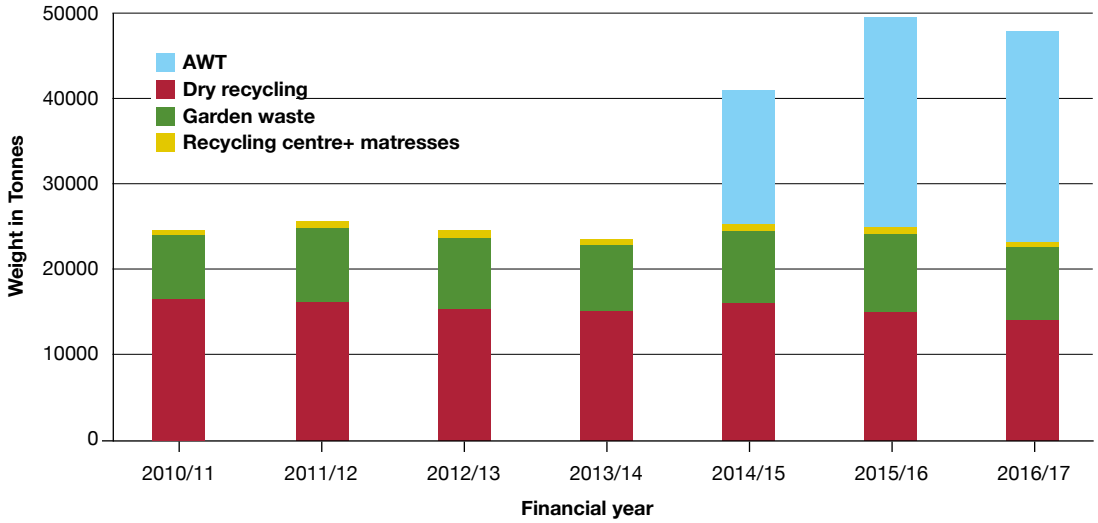


Figure 4: Waste processing and disposal facilities

Working out the total waste generated is a complex process as a number of issues influence this data. Some noteworthy issues that influence waste generation include the economic activity, consumption patterns of the community and changes in population as well as packaging materials. In addition, the total amount of garden organics generated can fluctuate significantly depending on the seasons.

Council strives to recover recyclable materials wherever possible, the recycling service for household collected recyclables (i.e. yellow and green-lid bin contents) is well established, as such all materials collected are sent to appropriate facilities for recycling respectively. Additional recyclables and household problem wastes collected through the Recycling Centre are also sent to recycling and processing facilities as appropriate. In addition, all mattresses collected are sent to a recycling facility where the various components are recovered. Graph 2, shows the amount of various waste streams recycled and processed in each financial year from 2010 to 2017.

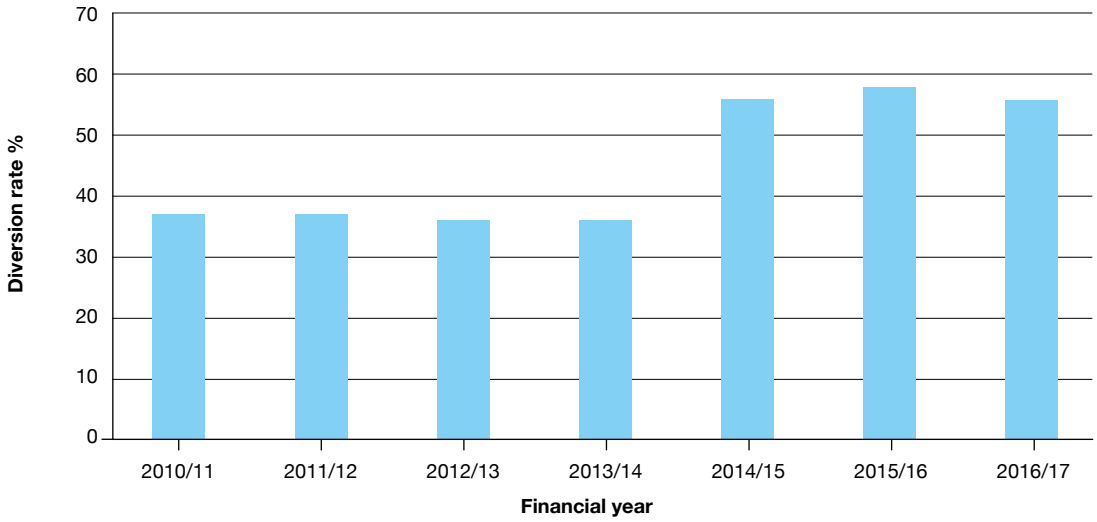
Total waste processed



Graph 2: Total waste processed from 2010 to 2017

The benefit of processing the red-lid bin contents at an AWT facility is that the recovery of the recyclable material contributes to an increase in overall waste diversion from landfill. Graph 3, shows Council's landfill diversion rate over the period 2010 to 2017, the data shows that the landfill diversion increased from below 40% in 2013 to 56% in 2017 (Graph 3).

Waste diversion rate



Graph 3: Waste diversion rate for the period 2010 to 2017

4.3 Community engagement

Council uses a range of community engagement approaches and channels to keep residents and visitors informed about Council's waste and recycling services. These include the Council website; MyRandwick App; Council publications including the waste calendar that is mailed out to residents annually as well as the use of social media platforms such as Facebook and Twitter. Traditional methods such as direct mail (letterbox drop), face to face contact, workshops and advertising through the local media remain relevant and a cost effective way to engage residents.

5. Current waste profile

Better understanding of our waste profile, collection, processing technology and community behaviour are key to identifying and maximizing opportunities available for improving resource recovery and landfill diversion.

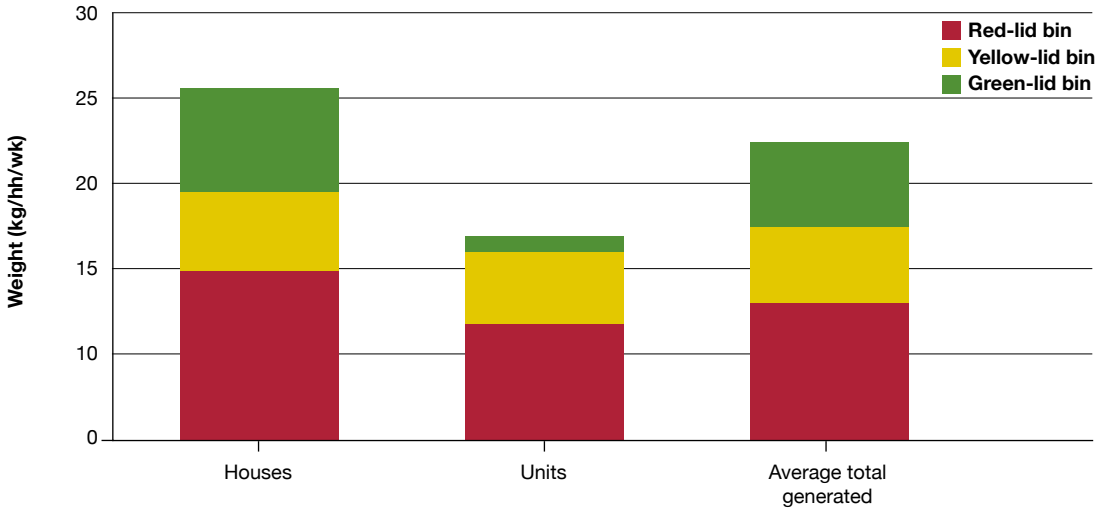
The new strategy development process includes investigation of Council's current waste practices, composition of waste streams and available waste processing technologies; and consultation.

Household bins audit

For better waste management planning it is important to know what waste items residents put in which bin and how much waste is generated in each household. Waste bin audits are one of the most useful tools to gain that information.

Audits of household red-lid, yellow-lid and greenlid bins were conducted in July 2015. The audits provided the following key information: average amount of waste generate by each household (Graph 4) and the components of the bins and characteristics such as bin capacity, contamination and potential for diversion rate.

Waste generated by each household



Graph 4: Waste generated by each household

Figure 5: Summary of rubbish bin composition

Waste composition by bin type

i. Red-lid bin composition

The 2015 audit results show that food remains the highest single component (39%), followed by residual (23%) and other organic material (22%) and recyclables(16%). Figure 5 shows in detail the composition of the rubbish bin. Food and other recyclables material such as recyclable containers, paper and e-waste have a potential to be recovered and recycled. This could potentially increase the recycling rate.

To explore the potential for food waste recovery, Council implemented a food waste collection trial in multi unit dwellings, for more information see case study 1- Food waste trial.

The other two components- other organics (22%) and residual (23%) are suitable for processing in an Energy from Waste facility for better recovery.

The other two components- other organics (22%) and residual (23%) are suitable for processing in an Energy from Waste facility for better recovery.

- **Residual waste – remaining non-recyclable material**
- **Other organics – textiles, nappies, food and liquids in containers,**
- **E-waste – television, computers, mice and cables/cords, mobile phones**
- **Contamination – items placed in the wrong bin**

ii. Yellow-lid bin composition

As shown in figure 6 the audit found recyclable paper made up 42.4% and recyclable containers made up 44.2%. The remaining 13.4% was of non-recyclable items (contamination).

Figure 6: summary of recycling bin composition

More than 40% of the recyclables are paper, magazine, newspaper and cardboard. Previously these items made up 55% of all recyclables, however due to increased electronic communication these items are reducing in the recycling bin and likely to continue in the future.

The most common beverage container materials were glass, polyethylene terephthalate (PET) plastic and aluminium, of this glass drink containers made up 33%. Glass containers were predominantly beer bottles, while PET containers were mostly water bottles and carbonated water/soft drink bottles. Aluminium containers were carbonated water and soft drink cans. This composition data is of significance in light of the recently passed NSW Container Deposit legislation. The implementation of the container deposit scheme, called "return and earn" has implications for Council's recycling service. It is expected that the scheme will result in a reduction of eligible containers in the yellow-lid bin. Future audits will provide clarity and details on these implications.

Understanding why items are placed in the incorrect bin is important in order to improve the recycling stream. This requires better community engagement and waste education programs.

One such community engagement initiative aimed at tackling contamination levels was the Recycling Contamination Management project that Council implemented in 2016/17. See case study 2 for more information.

Container Deposit Scheme (CDS): Return and Earn

This monetary incentive scheme commencing from December 2017 gives residents an opportunity to return containers to a facility and receive a 10 cent refund.

The scheme is targeting drink containers and is intended to contribute substantially to litter reduction. The State Government will provide a variety of collection points for eligible containers in public places and at supermarkets. It is anticipated that this scheme will influence the litter profile particularly in those areas of high and seasonal pedestrian movement, such as beaches and town centres, educational institutions, etc.

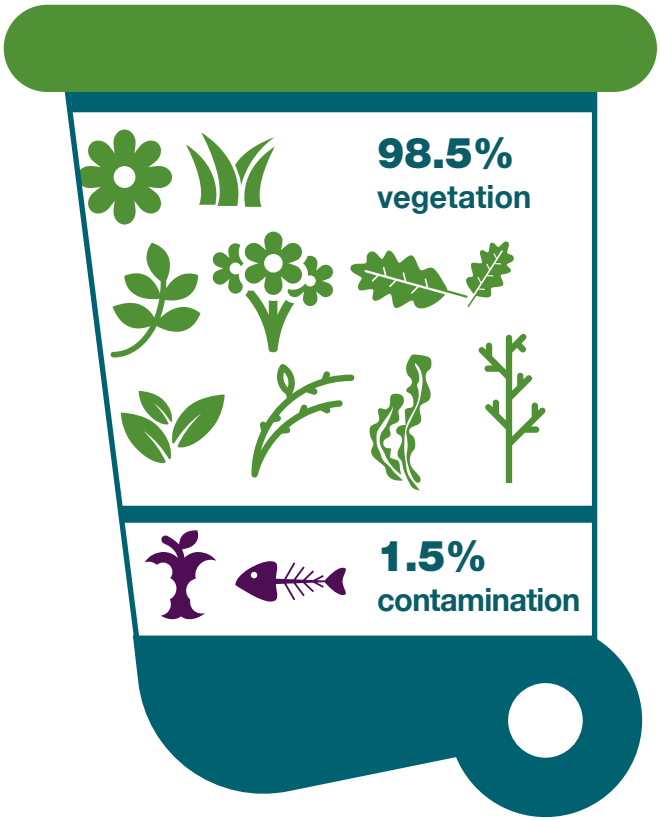


Figure 7: Summary of organics bin composition

iii. Green-lid bins

The organics (green-lid bin) had the lowest level of contamination at just 1.5% as shown in figure 7. The low level of contamination is a positive sign showing residents knowledge of the service and potential effectiveness of the community education efforts. However, a small amount has been lost as it has been put incorrectly to the other bins.

iv. Household hazardous waste materials in bins

The presence of hazardous waste material in household bins is of concern, particularly as Council moves towards the treatment of waste at MBT facility. The audit data shows that a total of 131 items in both the red and yellow-lid bins, 89 % of these in the red-lid bin and 11% inside the yellow-lid bin. The most common objects are electrical items/peripherals, non-rechargeable batteries and fluorescent tubes. Also present is a small number of computer equipment, mobile phones and toner cartridges.

The presence of hazardous waste in rubbish has negative impacts when processing rubbish using the mechanical biological treatment technology. Hazardous waste contained in the rubbish impacts upon the quality of compost produced poor, which results in the compost being used for lower grade activities such as mining or landfill cover rather than the optimum use in crop production.

It is important that hazardous waste is removed from all waste streams collected. Thus measures such as the household hazardous waste drop-off at the Recycling Centre and NSW Household Chemical Clean Out are significant avenues for residents to dispose of such waste in a responsible manner.

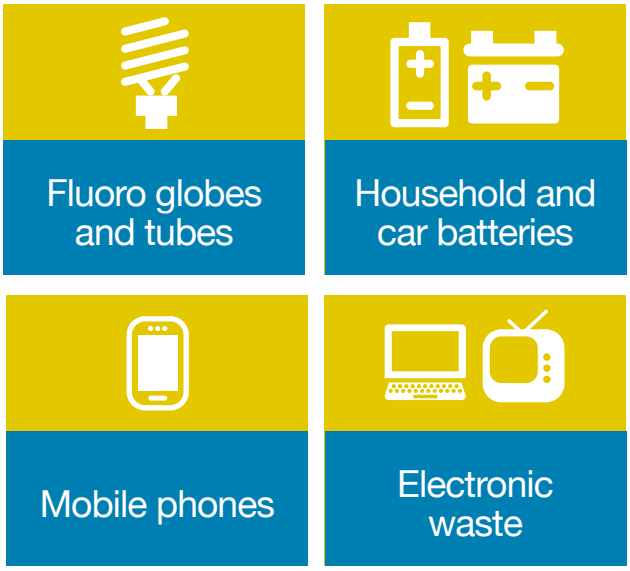
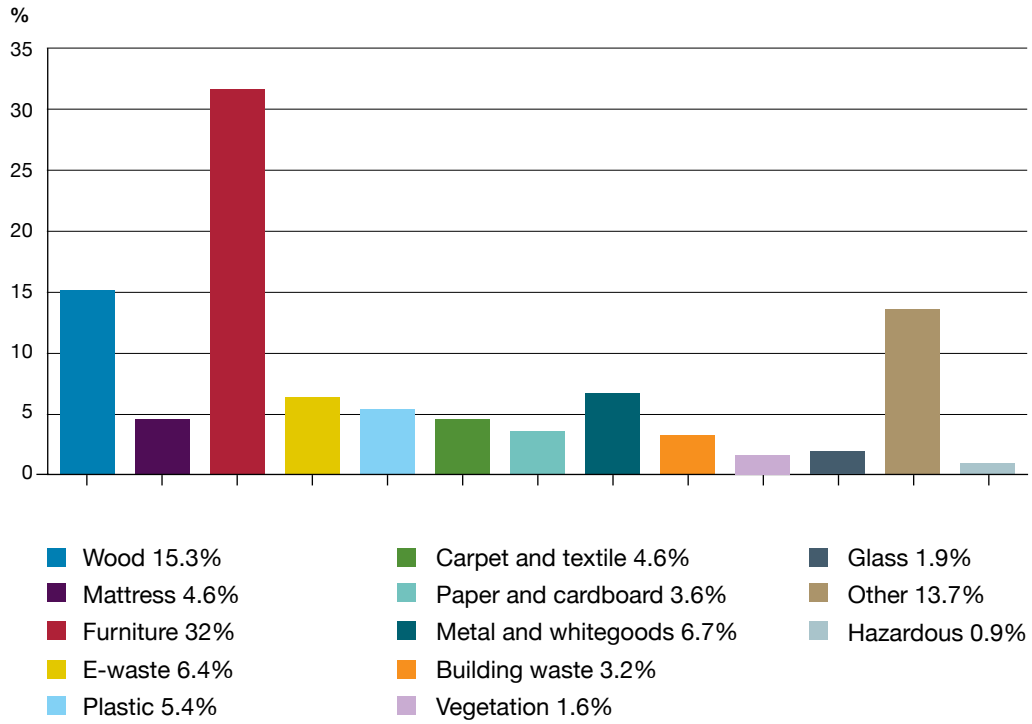


Figure 8: Most common household hazardous objects thrown in bins

Bulky waste audit

The results of Council's recent household clean-up (bulky waste) audit show that there is great potential for increased resource recovery and landfill diversion. Most of the items currently go to landfill have high calorific value that can be recovered if processed in an energy from waste facility. This form of waste processing can contribute substantially to Council's overall landfill diversion rate. However, currently there are no energy from waste facilities.

Composition of bulky waste (clean-up)



Graph 5: Composition of bulk waste (clean-up)

6. Waste Management challenges and opportunities

6.1. Collection

Randwick is one of the highly densely populated Council areas in metropolitan Sydney. The overall make up of households in Randwick is dominated by units and apartments, which make up over 66% of all dwellings in the area. Many of these households have competing demands for space particularly storage space for rubbish and recycling bins. Narrow streets and lane ways remain a challenge as collection trucks cannot easily manoeuvre during collection runs. Also trucks collecting three different waste streams from these narrow streets have negative impacts on traffic flow and the environment. In addition, parked cars on streets impedes smooth flow of traffic during waste collection.

Bins and large items (bulky waste) presented on the nature strip impact the visual amenity on collection days, particularly for those larger multi-unit dwellings. The number of bins presented on collection can be high and on windy days bins may be knocked over by the wind creating a potential hazard.

Advanced collection systems such as underground collection systems and waste compaction systems as well as collection service type (inside property) can address some of these challenges.

6.2. Recycling and resource recovery

Disposal of waste through landfill is no longer acceptable as it has significant environmental impacts, such as the emission of greenhouse gases, odours and environmental pollution. These impacts can be minimised through processing of waste prior to landfilling. Processing of waste is the best future option for ensuring that only waste that cannot be recycled or processed is sent to landfill. However, processing of waste is a challenge as currently there are only two (2) waste processing facilities in the greater Sydney metropolitan area (SMA) and a few others outside the SMA. These facilities have limited capacity and as such cannot process all waste generated in Sydney, unless they are significantly expanded.

Energy from Waste (EfW) facilities are the future for waste management. The directive and policy platform set by NSW Government Energy from Waste policy and funding from the NSW Waste Less Recycle More initiative, provide the incentive and greater potential for a facility to be commissioned in the Sydney region.

To process all residual waste at an Energy From Waste facility a Council will be required to have separate collection system for dry recyclables, food and garden organics – NSW Energy from Waste Policy Statement.

Processing non-recyclable waste at an energy from waste facility, may result in Council achieving higher landfill diversion rates.

Establishment of new waste processing facilities is a challenge. Waste services companies require commitment from potential suppliers of the waste feedstock (guarantee of supply). Therefore, to be able to influence the market and increase access to suitable waste processing within the Sydney Metropolitan area, Council needs to investigate potential solutions, including procurement models and cost effective and efficient methods for establishment of additional facilities.

Another key challenge related to recycling and resource recovery is the contamination (placing of incorrect items in the yellow-lid bin) level particularly in the recycling bins as well as recyclables loss (placing of recyclable items in the red-lid bin). Both contamination and recyclables loss lead to a loss of resources and impacts Council's recycling and resource recovery rates. Community engagement and behaviour change programs play a pivotal role in reversing the losses associated with contamination and recyclables loss.

6.3. A clean city and streetscapes

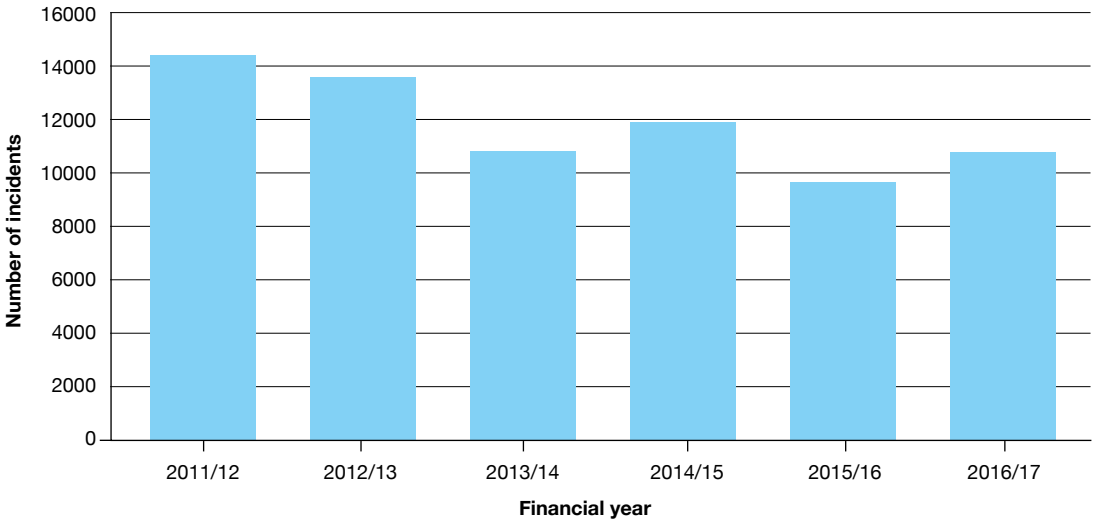
Keeping the city and beaches clean

Council maintains a comprehensive street and town centres cleaning program that includes manual and mechanical sweeping of footpaths and gutters. Council's award winning beaches are kept clean through a regular waste collection and cleaning regime across all beaches as well as a network or rubbish and recycling bins. Council works hard to keep our city and the beautiful beaches clean for all residents and visitors to enjoy. However challenges such as litter and illegal dumping remain for Council to tackle. It remains critical to position infrastructure and maintain services to meet the community expectations and seasonal changes.

Managing illegal dumping

Council's Litter and Illegal Dumping Action Plan provides Council will a roadmap for tackling illegal dumping within the City. The plan outlines measures for preventing illegal dumping such as infrastructure, education and enforcement strategies. Since its implementation reports of illegally dumped waste have decreased by 25% (graph 6.)

Illegal dumping incidents



Graph 6: Number of illegal dumping incidents

Despite these efforts, incidents of illegal dumping remain prevalent particularly near units and apartments where there can be limited infrastructure for housing bulky waste (clean-up materials). Illegal dumping is typically comprised of household furniture, kitchen items, e- waste, tyres, paint and similar items. It can sometimes include hazardous wastes like asbestos. This is exacerbated by a high residential turn-over. Residents sometimes dump materials on the false assumption that a passer-by will most likely want their items or a scavenger will collect it for recycling. A number of approaches to manage illegal dumping remain important in particular prevention, monitoring and compliance. Keeping the community engaged and informed of options to dispose large items, provision of clean up services to each household annually; and supporting the reuse and rehoming service continue to be high priorities for Council in managing illegal dumping incidents.

Litter management

Council currently has a network of more than 613 public place rubbish and recycling bins, to help residents and visitors to dispose of rubbish properly. This network of bins covers the business districts, beaches, parks and bus stops. Council staff monitor and service the sites daily. Despite having the bin network and service, litter remains a challenge within the City, Council collects more than 1,300 tonnes of litter per year across the City. .

In response to this challenge, Council's Litter and Illegal Dumping Action Plan, identifies actions for Council to implement to reduce incidents of litter. These include service reviews, for example, increasing the number of public place bins and frequency of collection service in the summer season. Delivery of community engagement activities and programs to raise awareness for all residents and visitors to the City. As well as capacity building activities for Rangers to take actions against offenders where appropriate.

However litter incidents remain prevalent, prompting Council to intensify actions on litter. These actions are in lockstep with the NSW Government focus on reducing litter through its "Hey Tosser" campaign and the implementation of the Container Deposit Scheme. One such initiative has been the implementation of the beach litter awareness campaign following the successful grant application for the NSW EPA Hey Tosser! Campaign, the results from this campaign show that there is great potential to reduce litter through behaviour change and community engagement actions. For more information on the trial see Case study 3- Hey Tosser! Campaign.

The introduction of the NSW Government's Container Deposit Scheme is likely to result in fewer eligible containers in residential yellow-lid recycling bins. This will help free up bin space and is likely to reduce overall tonnage collected.

6.4. Community engagement

Council continues to have a strong focus on community engagement and behaviour change, to reduce waste and increase recycling and resource recovery. As the primary generators of waste, community members and their actions in managing waste at the point of generation are critical. It is therefore important that Council continues to deliver targeted engagement programs, to reduce waste generation and increase the correct use of the waste bins provided to all residents and visitors. Council will broaden the scope of its recycling and resource campaigns to reduce contamination and increase residents understanding of alternative waste treatment technologies, to further the potential for future diversion through energy from waste.

In addition, to respond to the challenge of household Problem Waste in rubbish and recycling bins and clean-up material, Council will promote the Randwick Recycling Centre services and continue to support the NSW EPA Household Chemical CleanOut events.

7. Future waste management options

Community feedback is important as it provides opportunities for Council to improve and continue to meet residents' needs. Council will continue to seek feedback on the services and assess community needs against strategic priorities to ensure that these fit together wherever possible.

Through recycling (yellow-lid and green-lid bin contents) and processing part of red-lid bin contents at an Alternative Waste Treatment facility, Council currently achieves approximately 56% landfill diversion rate. To achieve greater landfill diversion, Council explored potential waste solutions considering Mechanical and Biological Treatment (MBT) and Energy from Waste (EfW) processing technologies, and source separated collection of food. NSW Energy from Waste Policy requires dry recyclables, garden organics and food waste to be separated prior to processing rubbish at an EfW facility. A multi criteria analysis method to compare future waste management options and identify suitable option. The multi criteria analysis considers the following key criteria: cost, landfill diversion rate, greenhouse gas emissions, government policy, community requirements and convenience. Community input in this process is vital as they are key to the successful implementation of the proposed options.

Waste management options analysis

In assessing the waste and recycling collection and processing options, qualitative (community convenience and behaviour; state policy compliance) and quantitative criteria (environmental outcomes and cost) have been considered. Specifically the potential to maximise recycling and landfill diversion and to process all waste before. disposal to landfill. Council's analysis of options considers a combination of current and additional collection and processing services, including increasing amounts of rubbish processed in MBT. As well as the introduction of food and garden organics collection and processing in available facilities. Furthermore, additional processing services in facilities yet to be developed that uses advanced technology such as energy from waste.

Details of the options and their implications for achieving the targets as well as other factors are provided in Table 4.

Option 1 presents the current collection system (3 – bins and bulky waste) and processing (20,000 tonnes of garbage processed in MBT facility and the remainder disposed in landfill) system, through which, Council achieves 56% landfill diversion rate, which is far below NSW target of 75%.

Option 2 provides significant improvement taking into account no changes to the current services and available processing facilities. In this option Council maintains the current service, but all rubbish is processed at a Mechanical and Biological Treatment (MBT) facility, the residual disposed of at landfill. This option will lead to an increase in the overall landfill diversion rate potentially to over 63%. In addition, if bulky waste is processed (facilities are currently being established) prior to disposal, there is potential to increase the diversion rate by approximately 4%, thus potentially achieving an overall 67% diversion rate.

Options	1	2	3	4	5	6
Processing facility availability	**Available**				**To be developed**	
Uses current collection service	✔	✔			✔	
Requires changes to collection service			✔	✔		✔
20,000 tonnes of rubbish processed prior in Mechanical Biological Treatment facility	✔					
All rubbish processed in MBT facility		✔	✔	✔	✔	✔
Food Only collected in separate bin (units and apartments)			✔			
Food and Garden Organics collected in green-lid bin (all households)				✔		✔
Bulky waste processed for higher recovery					✔	✔
Residual waste processed at Energy from Waste						
Diversion rate (%)	56	63	64	64	67	68

Table 4: Multi criteria analysis for waste collection and processing options

Options 3 to 6 present improved opportunity for achieving higher diversion rates, however, they have additional requirements prior to implementation. These includes either changes to domestic waste collection services provided and/or establishment of processing facilities. Energy from waste technologies can help Council achieve more than 90% landfill diversion. However, there are no such facilities currently established in Sydney. Energy from waste facilities are expected to be established in Sydney in the near future due to industry and stakeholder interest. NSW Energy from Waste Policy requires that all recyclables including food waste are separated at household level and recycled prior to processing of rubbish at an Energy from Waste processing facility. If this option becomes available, Council officers will need to report to Council.

8. The Strategy 2017-2030

Our current waste management practices, multi-criteria analysis of future options and community consultation have informed the development of Council's vision for waste management, as outlined below.

Waste Management Vision

Manage waste cost-effectively and sustainably, ensuring maximum resource recovery and minimal impact on the environment.

Objectives

Continually improve the provision of waste services and facilities to reduce the potential environmental, social and financial costs to the community.

Meet the needs of the community and provide an excellent standard of service.

Maximise diversion of waste from landfill.

Use advanced proven technologies to achieve or exceed the NSW WARR Strategy (2014-2021) landfill diversion target.

9. Targets and focus areas

9.1. Targets

With a better understanding of our waste environment and technology, Council has set the following targets and identified priority focus areas as well as an action plan to achieve the set targets.

- Reduce per capita waste generation by 2022 compared with 2017 level
- Increase the recycling rate to 70% and divert 75% waste from landfill by 2022
- Treat all waste prior to landfill disposal by 2025
- Reduce incidence of problem wastes in household collections by 2022 compared with 2015 level
- Reduce illegal dumping and littering by 2022 compared with 2017 level

9.2. Focus areas and priorities

The Table 5 outlines the priority areas and potential solutions.

Focus area	Priorities
Waste collection	• Improve bin infrastructure, review fleet and routes • Encourage the use of efficient compaction systems • Innovative collection system
Recycling and resource recovery	• Increase and improve household and public place recycling • Investigate innovative waste processing technologies • Improve the use and expand the Recycling Centre services • Increase organics recovery and recycling • Increase recovery from hard waste
Clean city and streetscape	• Reduce illegal dumping • Reduce litter • Optimise city cleaning program • Keep our beaches, parks and reserves clean
Problem wastes	• Reduce the incidents of problem waste • Increase appropriate disposal of problem waste • Advocate for extended producer responsibility • Increase recovery of electronic waste
Community engagement	• Increase community engagement in waste reduction, recycling, resource recovery and waste management services

Table 5: Focus areas and priorities

9.3. Action plan

The Action Plan, outlines steps that Council will take to meet the targets and priorities.

Timeline	Action
Short term 1-5 years	Review and implement efficient collection services
	Procure improved waste collection and processing services
	Update and expand education programs to avoid waste, in particular single use soft plastics and utensils
	Investigate opportunities for establishment of communal waste and recycling storage system
	Investigate potential underground waste collection system for new developments
	Continue developing and implement effective community education programs aiming at waste avoidance and reduction
	Implement community engagement program to reduce recycling contamination and reverse contamination
	Continue processing rubbish at Mechanical and Biological (MBT) facilities
	Investigate options and implement high recovery technology for bulky waste
	Develop and implement community awareness program on potential alternative waste treatment technologies
	Investigate opportunities for processing of waste at Energy from Waste (EfW) facility (participation in facility development; procurement of services etc.)
	Investigate greater access to services at Randwick Recycling Centre
	Develop and implement illegal dumping and litter prevention programs
	Introduce opt-in foodwaste collection in all multi-unit dwellings
	Investigate and prepare a report to determine feasibility of operating an e-waste micro factory
Medium term 5-10 years	Continue illegal dumping and litter prevention programs
	Review Recycling Centre services
	Develop and implement procurement options for processing of residual waste at an Energy from Waste (EfW) facility
	Review Council waste services in line with new state government strategy
	Review current waste management strategy and commence strategy update
	Develop and implement a comprehensive organics behaviour change program for the Food and Garden Organics Collection (FOGO) system
	Develop and implement community education program for energy from waste service
	Introduce opt-in organics collection in all single unit dwellings
Long term 10-15 years	Implement improved collection system
	Implement improved waste processing technology
	Develop and implement improved community engagement for higher waste reduction resource recovery

Table 6: Randwick City Council Waste Management Strategy Action Plan 2017-2030

Case study 1
Food waste recycling

Council is operating a Food Waste collection trial with funding from the NSW EPA Waste Less Recycle More grant. The trial, has been running since 2013, involves approximately 4000 selected units as well as some that requested to participate.

Residents are given kitchen benchtop bins (caddies) and compostable bin liner bags to put food waste in. When the liner bags are full, residents drop the bags into the Council provided bins with maroon lids.

The collected food waste is sent to EarthPower Technologies – a small-scale anaerobic co-digestion plant at Camellia in Western Sydney. The facility produces gas which is used to generate electricity and the remaining sludge is dried and pelletised and used as fertiliser in industrial processes.

In 2016/17 the average amount of food waste collected and recycled per month through this trial is approximately five (5) tonnes. Participating householders are supported with ongoing engagement and information including with owners corporations, body corporates, strata managers and cleaners.

Council conducted a broad community survey to gauge level of support for this type of service in 2014, including surveying trial participants to measure their experience of the service. Council received more than 8,000 responses to the survey. The results indicated enthusiasm for food waste recycling, with 85% of those not participating in the trial supporting the rollout of the service to all households and 90 % of trial participants supported it with suggestions for future improvements to ensure success. The strategy includes an opt-in service for residents in the action plan.

Case study 2
Improving recycling

In 2016/17 Council implemented the Target Street Contamination Reduction Project. The aims of the project were to educate and engage with residents to decrease recycling contamination. The project entailed Council officers conducting bin inspections of selected single unit dwellings and providing households with tailored feedback. It aimed to measure the impact of the inspection feedback given to residents and gauge the effect of educational material and the onsite Project Officer on recycling behaviour.

Inspections were carried out in three separate rounds over a six week period for every sample site. The first round began with the delivery of an introductory letter explaining the project. It detailed correct recycling and waste disposal practices, with images of specific items to provide more clarity.

The red-lid rubbish bins were checked for the presence of recyclable materials to target messages for reverse contamination (recyclables leakage).

All residents in the sample area received the letter regardless of whether their bins were being sampled or not.

Inspectors closely examined the contents of recycling bins to estimate:

- the percentage of used capacity, and
- percentage of contamination in relation to its capacity.

Contaminants were recorded, using data from the first round as a baseline. Inspectors recorded this as present, not present or cannot determine. Residents were notified of the result. If recyclable material was present, the items were listed under the categories of cardboard, paper; plastic, steel, aluminium, glass, and aerosol.

Feedback forms were delivered to each household after each inspection. The forms specified incorrect items in bins and how to correct that in future. In addition, educational stickers were distributed to residents whose recycling bins were highly contaminated (over 15% contamination).

Common contaminants included: plastic bags, bagged recycling, polystyrene, newspapers wrapped in plastic and soft plastics. These contaminants are consistent with the audit findings. A total of 8000 bin inspections were completed in 3 rounds from a sample of over 10% of single unit dwellings (SUDs). An average reduction of 43% in recycling contamination was observed over the three rounds of sampling as shown in Graph 8. The mean contamination rate within the LGA was 15% by volume before any education material had been distributed.

This exercise revealed the potential to increase awareness and change behaviour with a consistent presence and two-way feedback mechanism directly with residents. The results imply that when residents are aware of monitoring, they make an effort to practice correct waste disposal and recycling behaviour. It also shows the importance of using a range of techniques in communicating to the community, to capture all audience types and reception levels. This exercise revealed the potential to increase awareness and change behaviour with a consistent presence and two-way feedback mechanism directly with residents. The results imply that when residents are aware of monitoring, they make an effort to practice correct waste disposal and recycling behaviour. It also shows the importance of using a range of techniques in communicating to the community, to capture all audience types and reception levels.

Case study 3
Beach litter awareness campaign

The campaigns' main objective was to increase awareness of the impacts of littering on coastal and marine environments. The target groups comprised of beach visitors, tourists and the local community. It involved engaging and informing the target groups in the identified hot spot areas of Coogee Beach and Maroubra Beach and was delivered over January to April 2017. The campaign used the four pillars approach- infrastructure, education, enforcement, evaluation and monitoring.

Initial data gathering through observations indicated that the most common litter problem was picnickers walking away and leaving their litter behind or in the car parks. While the common litter types identified were cigarette butts, drink containers, takeaway containers and plastics. Both sites had high levels of takeaway food and beverage litter as well as high pedestrian and car traffic, particularly as it was during the summer months. Council operations staff also anecdotally observed that Coogee Beach had higher counts of takeaway food and drink containers.

To change behaviour passive and active engagement strategies were used. The passive engagement consisted of signage installed along promenades, on bin surrounds and in car parks to inform the target audience of the impact of littering on the marine environment. The active engagement involved education officers targeting beach visitors with face to face contact where they were asked to pledge to put their rubbish in the bin. As well as enforcement officers patrolling reinforcing the message on the potential for getting penalty notices (fines). Over 4,300 beach visitors (well over the project target of 2,000) signed a pledge at both sites to put their rubbish in the bin. Some did not make a written commitment, but engaged in conversation about litter and its impacts.

Local litter checks were done at the same selected spots at the beginning and end of each 'shift'. The litter checks showed that there was less litter on the sand at the end of the day.

Involving the Council rangers as educators provided an 'authority' presence and was an effective engagement strategy to reinforce the potential for getting fined. However, while this strategy was somewhat successful it also had limitations for further engagement as rangers in uniforms were seen as enforcers and beach-goers hesitated to engage with them.

Council rangers received a better reception when being able to talk to beach visitors in a positive way, rather than from just an enforcement perspective under normal patrolling circumstances.

Beach-goers were very aware of the impact of littering and volume of litter. Many confirmed that they are familiar with the Hey Tosser! brand.

This project provided three important insights:

- Target groups awareness of the impacts of littering and knowledge that it is unacceptable is very high, the target audience know that littering is not acceptable.
- There is a high level of awareness of the Hey Tosser! campaign in the community, with a majority of people easily identifying the brand and slogan.
- Behaviour change was achieved through the visibility of law enforcement, that is, the "fear" of being caught and fined. The sampled population on littering changed their behaviour when the rangers were present and extensive signage was visible.

These key insights will be used in future campaigns, in addition, Council will aim to incorporate "enforcement visibility" as a strategy option in other priority areas as well.

Photo 5: Hey Tosser beach campaign

Glossary

Alternative waste treatment (AWT) facility: a facility that applies a combination of mechanical, biological and (sometimes) thermal processes to separate organic materials from a mixed residual waste stream and/or generate renewable energy.

Containerised food and liquid: Bottle or takeaway container with food and liquid still in it that would be considered a contaminant in a recycling or waste treatment facility.

Contaminant: Item that is in the wrong bin and not accepted for processing at the facility that accepts that bin contents.

Diversion rate: The percentage of the total recycled and recovered waste diverted from disposal to landfill.

Energy from Waste: A renewable energy technology that converts waste which cannot be recycled into energy.

Household problem waste: Common household products that are potentially harmful to the environment like cleaning products, paints, pool chemicals, garden products and hobby chemicals.

Recycling rate: Proportion of all recycled materials compared to the total amount of waste generated – does not include energy from waste

Reducing waste: Reducing waste generation by avoiding or preventing the creation of waste where possible along the various parts of the supply chain.

Recycling stream: Material source-separated for the purposes of recycling.

Recovery rate: The amount of material recovered from a product group as a percentage of overall consumption.

Source separation: physical sorting of the waste stream into its components at the point of generation.

Problem waste: Hazardous waste and batteries

Total waste stream: The combined waste, recycling and garden organics streams and bulky waste.

Waste composition: Component material types by proportion of weight or volume.

Acronym list

ABS	Bureau of Statistics
ABS	Bureau of Statistics
AD	Anaerobic Digestion
AWT	Alternative Waste Treatment
EPA	Environment Protection Authority
EfW	Energy from Waste
ERF	Emissions Reduction Fund
FOGO	Food organics and garden organics
HHW	Household Hazardous Waste
LGA	Local Government Area
MBT	Mechanical and Biological Treatment
MRF	Materials Recovery Facility
MUD	Multi-Unit Dwelling
MSW	Municipal Solid Waste
POEO	Protection of Environment Operations Act
SUD	Single Unit Dwelling
WARR	Waste Avoidance and Resource Recovery

References

1. NSW Waste Avoidance and Resource Recovery Act 2001
2. NSW Waste Avoidance and Resource Recovery Strategy 2014-2021
3. NSW Energy from Waste Policy Statement
4. Randwick Waste Management Strategy 2010
5. Randwick Litter and Illegal Dumping Management Action Plan 2010-11
6. Waverley Sustainable Waste Strategy 2015-2020
7. City of Sydney Draft Waste Strategy and Action Plan 2017-2030

SORT IT OUT!

It's too good to waste

Randwick City Council

a sense of community