

RECYCLING FACTSHEET

Managing waste is one of the greatest environmental issues facing people today. Landfills are filling up very quickly, so it is more important than ever to reduce, reuse and recycle our waste.

Reducing waste is important for: protecting the environment, protecting our health and saving money. The simplest and easiest way to reduce waste is to recycle. Recycling involves the collection, sorting and reprocessing of suitable waste materials to create the same or different products. Instead of sending waste to landfill, recycling saves valuable natural resources, conserves landfill space and reduces greenhouse gas emissions.

What is the recycling process in Lithgow?

Have you ever wondered what happens to your recyclables after they have been collected?

Once the Recycling Collection truck is full, your recyclable materials are transported to a Materials Recovery Facility (MRF) where there are separated into their recyclable groups.



The first station at the MRF is where MRF staff manually sort through materials by hand to remove any obvious contamination such as household garbage, plastic bags and garden waste.

Recyclables then travel along a conveyer belt through a trommel. The trommel is a large rotating barrel with holes in the sides to allow certain materials to drop through. Heavy items like glass and steel drop through these holes, leaving behind lighter items such as paper and cardboard to travel to the end of the trommel. The paper and cardboard are manually sorted again to ensure there is no contamination before it is compacted, ready for reprocessing.

All other items travel along an inclined bouncing conveyer belt. Any remaining paper and cardboard travel upwards to join the paper line, while other items fall downwards to pass through a second trommel.



Image: Materials Recovery Facility (MRF) working conveyer belt.

All materials then travel along a conveyer belt under a magnet, which attracts steel cans and aerosols.

The plastic, aluminium, glass and cartons continue along another conveyer belt and into the air classifier. Here, air blows the lighter items to a separate conveyer, leaving only the glass. The glass is transported to a glass sorting facility where it is separated into the colour streams; clear, green and brown.

The remaining materials pass through an electricity or "eddy" current. Strong magnets create the eddy current, which repels the aluminium cans away from the magnets and the rest of the material.

Finally, only the plastic bottles and containers remain. These are sorted using an optical sorting machine. A light registers each item as it passes along the conveyer belt. A signal is sent to the computer as it recognises what material type the item is. A shot of air blasts the item onto the correct conveyer belt to allow the different types of plastic to be baled separately for transport to the reprocessing facility.

For more information about the recycling process visit: www.jrrichards.com.au/or

RECYCLING

What can you recycle in your yellow lidded recycling bin

- Packing glass (bottles and jars only)
- All clean paper and cardboard
- Milk and juice cartons
- Steel cans and aerosols
- Aluminium cans
- Plastic bottles and containers (from the kitchen, bathroom and laundry)

Contamination of kerbside recycling can be a major problem. Contamination of recyclables with non-recyclable materials can not only ruin a load of useable recycling but can also obstruct the recycling process and cause danger to MRF workers. It is important that the following items do not go into the yellow lidded household recycling bin:

- Garden waste
- Polystyrene and foam
- Ceramics
- Nappies
- Hazardous waste (chemicals, syringes, medical waste etc)
- Any glass that is not a bottle or jar
- Soft plastics (cling wrap, biscuit and chip packets etc)
- Plastic bags

Important - No Plastic Bags!

There is not enough time for workers in the factory to open bags to find out if there are high quality recyclables such as paper, glass, plastic containers or aluminium inside. Therefore, filled plastic bags are removed from the recycling process, sent to landfill and lost forever.



Additionally, plastic bags cannot be separated from other materials by the sorting machinery as they get caught in the conveyer belts and spinning parts. This can cause machinery breakdowns and requires the bags to be found and removed by hand, which is both time consuming and potentially dangerous as the entire factory has to be closed.

How are materials recycled?

Paper and Cardboard

Materials are cleaned and screened removing staples and paper clips. Water is then added to create a mushy pulp. This is mixed with raw materials and dried. It is then flattened by rollers and sent to paper/cardboard manufactures for processing.

Milk and Juice Cartons

Milk and juice cartons are recycled in a process similar to paper and cardboard. The cartons are soaked in water to separate the paperboard from plastic and aluminium layer. The separated material is then sent to manufactures for reprocessing.

Steel and Aluminium

Steels items are heated, melted and ready for reshaping into new products. Aluminium is heated, melted and poured into metal casts called ingots. They are then rolled into sheets for reprocessing.

Plastic

Plastic bottles and containers are shredded into small flakes and washed. These flakes are turned into pellets. These are then melted and made into new shapes.

Glass

At the reprocessing factory, glass is checked for contamination. It is then melted down to a liquid and moulded into new bottles.

When placing items into the recycle bin, there are some simple things you can do to prepare your recyclables:

- Flatten cardboard boxes
- Rinse/wipe out and squash aluminium and steel cans
- Do not squash aerosols
- Rinse/wipe out and squash all plastic bottles
- Remove lids off bottles and jars
- Place items in the bin loose; i.e do not place recycling in plastic bags

If you would like more information please contact Lithgow City Council on (02) 6354 9999 or the Waste Hotline 1300 728 978.



LANDFILLS

LANDFILLS FACTSHEET



Commonly known as the 'tip' or the 'dump', landfills house remaining waste material that has not been diverted or recovered by other waste streams such as recycling. While landfills are intended to 'seal and capture' waste residues, certain substances contained or produced in them can sometimes escape in gas, liquid and solid forms when the material begins to break down, causing potential harm to the surrounding environment.



The cost of waste

The development of new landfills is a lengthy and costly process which requires extensive planning, gaining of approvals, garnering community support, constructing the new cells and finally opening the site.

Many landfills in NSW are required by State Government to pay a Solid Waste Levy for each tonne of waste received for disposal at the facility. The purpose of the levy is to encourage recycling and recovery of materials in an attempt to reduce the amount of waste being sent to landfill.

The Sydney Metropolitan Area and extended Regulated Areas, currently pay \$120.90 per tonne, which increased from \$107.80 on the 1st July 2014. Lithgow Local Government Area (LGA) does not pay a Solid Waste Levy however, this may change in the future as the amount of waste being sent to landfill continues to grow and the levy is reviewed.

Landfill gas

Landfill gas is produced as waste in landfill biodegrades, sometimes reacting with other substances present.

The gases contribute to Australia's greenhouse gas emissions, most of which from the waste sector, occurs in the form of methane (CH_4). Methane is a greenhouse gas approximately 25 times more potent than carbon dioxide (CO_2), in terms of its radiation trapping capacity, and is produced in landfills when organic waste (like food and garden waste) breaks down.

Other gases produced include nitrogen and oxygen, benzene, toluene and vinyl chloride and even toxic or explosive gases such as the ammonia, hydrogen sulphide and other sulphuric compounds.

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Litter

Plastic bags, plastic film (like cling wrap and biscuit/lolly wrappers) and other lightweight materials can easily get carried around and out of the landfill by wind and rain, even though each layer or cell is covered by soil.

This creates litter in the environment when it ends up in rivers, dams, oceans, bushlands, playgrounds and streets. It also presents a range of hazards for wildlife and domestic animals which can choke, become entangled, or starve when their stomachs become full of plastic.



Did you know?

Landfills and the litter they produce often attract introduced species as scavengers within and around the landfill (e.g. ibis, seagulls, foxes and feral cats). These creatures then have a impact on the surrounding environment and native wildlife.

One large landfill in Sydney employs four people just to pick up litter, minimising litter pollution the impact it can have in the environment when it is carried out of landfill.



Can you spot the ibis?



Particulate

Particulate is the term for the dust matter which can escape into the air from building materials and other dry substances, contributing to air pollution and causing respiratory problems or the unintended ingestion of chemicals associated with these materials (i.e. paint and cement).

Leachate

Landfills also produce a liquid waste know as leachate. This liquid contains a mixture of organic and chemical compounds which form when liquids and dissolved solids accumulate in rainwater and collect at the bottom of the landfill cells. Leachate may contain a variety of toxic substances and pollutants, the composition of which varies from one landfill to the next. Leachate can escape into the soil and groundwater if the landfill is not properly sealed. This poses a range of environmental and health risks, as it is likely to carry hazardous material such as heavy metal compounds, pesticides, solvents, chlorides and other chemicals.

This toxic mixture can either poison or contaminate the groundwater and surrounding soil leaving them unsuitable or unsafe for future use.

Biodiversity loss

Every year in Australia and around the world large areas of forest and woodland are cleared to make way for new disposal sites for our waste. The process of finding suitable land, clearing the land and constructing the landfill cells can take many years, displacing hundreds and thousands of species of flora and fauna living in these areas through the loss of habitat.

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LANDFILLS

LANDFILL TECHNOLOGY FACTSHEET



Landfills produce pollution in solid, liquid and gas forms when waste materials break down. The gases that are produced contribute to Australia's greenhouse gas emissions, most of which occurs as organic waste (like food and garden waste) breaks down. One of these gases is methane, which is approximately 20 times more potent than carbon dioxide. The liquid pollution, known as leachate, contains a variety of chemical compounds which can seep into the surrounding environment if not properly managed.

Gas capture

Technology now exists to capture methane produced in landfill, preventing its release into the atmosphere. The process involves burning the methane, turning it from mechanical energy into electrical energy. The heat and gases produced from burning methane are then used to run a generator or spin turbine, which in turn can be used to power other on-site operations or can be fed back to the electrical grid.

Landfills that do not have this technology burn off the captured methane, converting it to less potent carbon dioxide, a process known as 'flaring'.

Most landfills in Australia now have some sort of gas capture systems in operation; however the amount of methane which escapes these systems is variable from one landfill to the next.

Choosing a landfill site

Landfill designs and maintenance have changed in recent years, they are no longer just a hole in the ground where all unwanted material is 'tipped' or 'dumped'.

Many provisions are taken to reduce the environmental risks of escaping leachate, greenhouse gases and particulate matter, beginning with controls on where landfills are located. Siting landfills away from groundwater and significant water catchment areas is considered 'best practice' to reduce the risk of escaping leachate entering underground water bodies and affecting plants and animals downstream.

Other considerations include the geological suitability of the area; whether the rock or substrate is permeable (or porous); and whether there are faults in the foundation.



Figure 1: Methane gas capture/flaring.



Figure 2: Leachate

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LANDFILL STRUCTURE



Once a suitable site for a new landfill is found, the sites are then lined with impermeable (waterproof) membranes. This process uses materials like clay and geotextile fabric, which prevent leachate from soaking through to underlying soil and groundwater.

A network of pipes is constructed at the bottom of the landfill cell, inside a gravel layer, to remove the leachate for treatment. In modern landfills, the leachate is then recirculated continuously through the landfill, to maintain moisture levels and create more favourable conditions for microbial activity, needed for decomposition. This type of landfill is known as a bioreactor landfill. Decomposition of organic waste increases the energy production potential of the site, as it raises the rate at which landfill gas is produced.

Landfill gas can then be captured and used to generate electricity, preventing the release of the potent methane into the atmosphere. In addition, water is sprayed regularly to control dust and particulate escape. The waste is also compacted and covered with soil which reduces exposure and assists in controlling litter, odour and interference by pests and vermin.

Once landfills are full, they are covered or capped off and sealed; however, methane can be produced for up to 20 years as waste continues to decompose. Thus, careful monitoring and data collection is required for a long time, after the site is decommissioned.



1: Excavating the landfill hole on cleared land



2: Adding the clay layer



3: Adding the geotextile layer



5: Soil capping over waste



4: Pipes to divert leachate