

# LISMORE INTEGRATED WASTE MANAGEMENT SYSTEM

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## Abstract

In July 2006 Lismore City Council took a new direction in holistic waste management and introduced kerbside recycling to urban areas in addition to waste and organics collections. This service allowed additional recyclables to be diverted from landfill and was linked to a comprehensive educational campaign. Six months later kerbside recycling was introduced to rural areas. In addition Council took operational control of the Lismore Revolve Centre and organics composting and mulching contracts. A new focus was put on environmental management and specialised recycling and collection services were introduced, such as tyres, construction and demolition material fluorescent tubes and dry cell batteries. The result has been a comprehensive integrated waste service focusing on resource recovery.

## Introduction

In the late 1990's Lismore City Council took over waste kerbside collection within Lismore.

In 2001 Lismore City Council introduced an organics waste collection and worked in partnership with Tryton Waste Services to develop the largest worm farm in the southern hemisphere.

Kerbside recyclable collections were not introduced as it was not seen to be economically viable and the volume of recyclables that could be collected was underestimated. This led to Lismore City Council introducing recyclable drop off centres.

The recycling drop-off centres were strategically located around the City with the aim of diverting recyclables from landfill. The recyclable drop off centres were operated by contractors and the costs of operating these centres blew out to over \$500,000 per annum. It was found the drop off centres were becoming ineffective and were suffering vandalism, contamination and recyclable type limitations.

At the same time a significant portion of the household waste stream consisted of

recyclables, as it was easier to put these in the waste bin than travel to the recyclable drop off centres to recycle them. Annual waste audit data indicated that approximately 23% of the waste bin in the domestic sector was recyclable and so a significant amount of recyclable diversion was possible.

With the Lismore landfill filling up and massive increase in the amount Council was spending on waste management contractors and the operational costs of the recycling drop off centres, plus increasing community pressure to introduce kerbside recycling, Lismore City Council undertook an extensive review of its waste management systems in early 2006.

The review included auditing of the waste streams and the drop off centre recyclables to determine potential recyclable volumes.

A proposal went to Council in April 2006 to introduce kerbside recycling with the purchase of a recycling truck and employment of a driver. This was approved and the kerbside recycling service was rolled out in July 2006.

There was much debate at Council regarding the fate of the recyclable drop off centres and it was resolved to retain two of the centres for

the use of rural residents in strategic locations and for Lismore City Council to operate them. This involved the purchase of a recyclable skip truck and the employment of a driver.

The new kerbside recycling service saw the roll out of over 10,000 recycling wheelie bins, changing the bin lids on all waste and organics bins to match the new colour code system and the placement of stickers on all bins to reflect the new collection system. The recycling bins were introduced as 240 litre wheelie bins and the waste bins were changed from 240 litres to 140 litres, while the organics bins were changed from 140 litres to 240 litres. The frequency in the collection of waste was also changed in this new kerbside system, where it was changed from a weekly pickup to a fortnightly pickup.

In late 2006 a trial commenced of kerbside recycling in a rural area, which was highly successful. This led to the introduction of kerbside recycling to all rural areas being rolled out in January 2007.

In conjunction with the roll out of the kerbside recyclables collection a comprehensive education program was developed. The program was called "Red, Yellow, Green... Lets Keep it Clean!" and focused on the now 3 bin kerbside waste collection system. With the red lidded bin being for waste, the green lidded bin being for organics and the yellow lidded bin being for recyclables. The education program involved the production of a brochure, the repainting of the collection trucks, new signage, new logos, updated website and the introduction of a contamination management program.

Council introduced a bin rejection system to enable the management of recyclable and organics contamination. This involved the issuing by the collection truck drivers of bin rejection stickers on bins that contained contaminants. When a resident receives a bin rejection sticker they are sent a letter outlining the rejection and how to remedy the problem. Once a resident receives three rejection stickers their service (either organics or recyclables) is withdrawn for a period of

time and Council staff work with the resident to address the problem.

The project period also saw Lismore City Council take over the control of the Revolve Centre, which is a second hand shop selling pre-loved goods collected from the landfill or dropped off at the waste facility. Previously the Centre was operated by Contractors and cost Council significant funds to operate. With Council taking over the operation of the Centre, it was easier to assess the total volume of diversion from landfill to the Centre, employ an additional staff member and reduce operating costs, to where the shop now turns a profit.

During the project period Lismore City Council identified gaps in its recycling services and this led to the introduction of new recycling options for residents, including:

*Dry Cell Batteries* – this service was introduced to manage the metals contained within dry cell batteries. Batteries are collected at collection points around the Local Government Area and brought to the waste facility where they are sorted. Any rechargeable type batteries are separated for recycling and the remainder (mainly alkaline batteries) are stockpiled while recycling options are being investigated. The dry cell battery collection program included a schools program, where schools have been engaged to collect batteries to educate the students about waste management and recycling and to win prizes for the school.

*Fluorescent Tubes and Bulbs* – this service was introduced to manage the mercury contained in fluorescent lighting. Fluorescent lighting collection points have been established around the Local Government Area and are brought to the waste facility for processing, where recyclable components are recovered.

*Tyre Collection and Recycling* – during the project period Lismore City Council began the collection and recycling of old vehicle tyres.

*Construction and Demolition Waste Recycling* – during the project period the collection and separation of recyclable construction and demolition wastes commenced. This included concrete, steel, bricks and timber.

*Household Hazardous Waste* – in conjunction with the North East Waste Forum, Lismore City Council introduced the collection of household hazardous waste, which included a safe and secure collection shed. The Household Hazardous Waste Store also included the integration of the Drummuster collection program and resulted in a drum collection being available one day per month opposed to once annually.

The project period also saw Lismore City Council take over the processing and composting of the kerbside organics and green waste at the waste facility. Previously this was done by Tryton Waste Services who operate the worm farm.

The program has worked towards diverting additional recyclables from landfill, finding a cheaper alternative to the recyclable drop off centre system, modifying the integrated kerbside collection system to include recyclable collections for both urban and rural areas, introduce additional recycling and waste diversion services to improve overall waste diversion and provide a supporting education program that encourages service efficiency and uptake.

The program is working towards achieving the New South Wales Waste Avoidance and Resource Recovery Targets, extending the life of the current landfill cell and managing green house gas production.

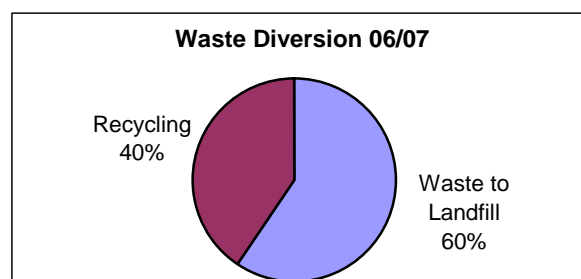
The result has been a fully integrated waste service that has resulted in a increase in the amount of waste diverted from landfill. Every cubic meter of waste disposed to landfill has a cost associated to it, including environmental, social and economic costs. It will cost a significant sum of money to commission another landfill when the current site is full. Therefore it is important to reduce the amount of waste going to landfill right now to extend the life of the current landfill site by a number of years.

## Results

The integrated waste system has achieved significant outcomes for Lismore City Council and these include:

### *Diverting additional recyclables from landfill*

There has been a reduction in waste sent to landfill by 7% per annum. In 2005/2006 11,736 tonne of waste was diverted from landfill and recycled. The new waste system incorporating the kerbside recyclable collection and other new recycling programs resulted in 15,351 tonnes of waste diverted from landfill and recycled during 2006/2007, a 7% increase in diversion (this was the biggest single increase in diversion since the inception of kerbside organics collection, usually only increases around 2% annually). Total diversion from landfill has reached 40%. Diverting additional recyclables from landfill has significantly increased the life span of the current landfill site.

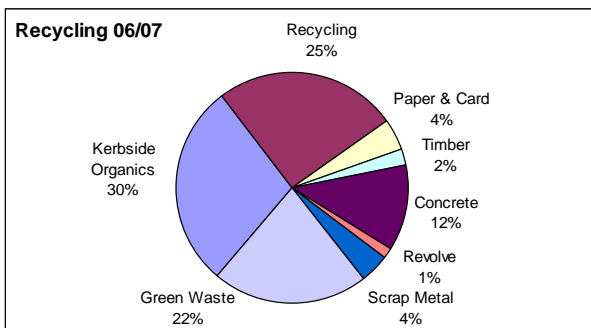


In 2006/2007 the recyclables diverted from landfill consisted of:

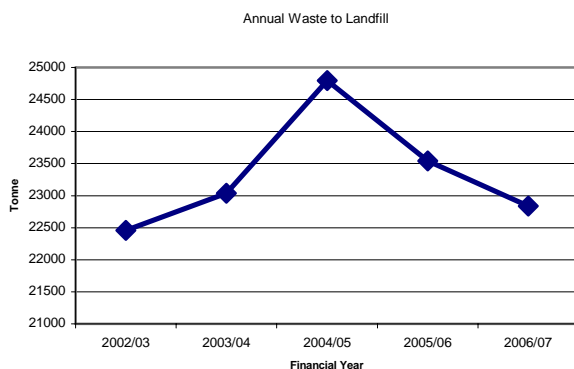
- 7,678 tonne of green waste & organics was diverted to the Tryton Worm Farm
- 4,970 kilograms of hazardous chemical waste
- 29 tonne vehicle batteries (containing lead and acid)
- 687 tonne of paper and cardboard
- 3,887 tonne of co-mingled recyclables (aluminium cans, plastics, steel cans)
- 635 tonne of scrap steel

- 7 tonne chemical drums
- 3,835 litres of used oil
- 205 tonne of pre-loved goods recycled through the Revolve Centre
- 3,678 tonne of construction and demolition material (concrete, timber, steel)

The chart above shows the breakdown of the recyclables diverted from landfill last financial year by weight. Note that organics/green waste is a large proportion of our diversion.



The chart below shows the amount of waste sent to landfill each year. Due to the introduction of extensive recycling programs we are now sending less waste to landfill than we were in 2004. This is a great result, but there is heaps more diversion that can occur.



*Provide a supporting waste education program*

A comprehensive waste education program has been developed and implemented to support the integrated waste system.

Lismore City Council has employed a waste education officer to support the integrated waste system.

The waste education staff were responsible for the development of a branded program for the new waste system, including “Red, Yellow, Green...Lets Keep It Clean”. A comprehensive service brochure was developed along with a new section for the Lismore City Council website, street signage, repainting of the collection trucks, media advertising, media releases and displays at events and local shopping centres.

## Environmental Management

Lismore City Council has invested significant funds to ensure the environment at the waste facility is properly managed. The components of the environmental management program include:

### *Leachate Management System*

Ground and surface waters from the landfill site can be contaminated by leachate, which is the liquid that percolates through landfills, as a result of infiltration and/or decomposition of the wastes. It can cause serious water pollution if not properly managed.

Leachate is collected from the landfill cells using a leachate channel and drainage system. The leachate is collected in a five metre deep well and is pumped to a leachate treatment pond. In the pond the leachate works its way through three reed beds to remove dissolved metals and organics. From the treatment pond the leachate is sent to a vertical wetland (sand filter) for further polishing, then to the sewerage treatment plant for processing. It is planned that treated waste water from the sewerage treatment plant, containing a proportion of the treated leachate, will return to the waste facility for use onsite. This use will include dust control, vegetation watering, truck and machinery washing and compost watering. The leachate volume and composition is tested regularly.

The waste water from the collection truck washing is also disposed of through the

leachate treatment ponds to enable polishing before it is sent to the sewerage treatment works for processing.

### *Surface Water Management System*

Surface water run-off from a landfill can cause unacceptable sediment loads in receiving waters, and can lead to excessive generation of leachate, if not adequately diverted from land filling areas to settling ponds

A drainage system has been installed around the waste facility to collect and divert stormwater runoff into sediment ponds, where sediment laden water is settled and tested before being discharged.

### *Site Rehabilitation*

Part of any waste disposal and landfill site is the need for future rehabilitation. Lismore City Council has addressed the rehabilitation requirement by earmarking the Wyrallah Road Waste Facility site as the future Lismore Botanic Gardens.

A master plan for the botanic gardens has been created and the site conditions are seen as a rare opportunity to define a new model for the development of botanic gardens. As the demand for space in cities increases there is a need to re-use degraded land sites. The site provides the community with the opportunity to create a public space within close proximity of the city. This will be an ongoing gardens project as more land becomes available.

A major objective of the master plan is to raise community awareness, understanding and a sense of responsibility by linking the landfill and waste recycling components of the Gardens to environmental education, ecological restoration, research and recreation/tourism.

The aim is to return the area to a significant wildlife and recreational habitat, through sensitive, locally sourced planting, to extend rainforest habitat corridors in the area and to preserve and rehabilitate endangered rainforest habitat.

### *A-ACAP Trial*

A-ACAP is a trial that is looking at alternative landfill capping techniques. Lismore City Council was selected as one of the 5 A-ACAP trial sites Australia wide. If this trial is successful it offers Lismore City Council and other Councils significant savings when it comes to capping and rehabilitating landfill sites. The project links closely to site rehabilitation planning.

## **The Future**

The future of waste management in the Lismore City Council is looking very bright. A number of key projects are currently being implemented that will result in significant additional tonnages of landfill diversion. These include:

### *Resource Recovery Facility*

Approval has been given by Council to construct a resource recovery facility (RRF) at the waste facility to increase the amount of waste diversion from landfill and construction should be completed by July 2008. The RRF will be a sorting facility where waste brought into the site by the public and waste contractors will be sorted to maximise diversion. It is expected that diversion will increase by an additional 5,000 tonnes each year (which is 20% of the volume of waste currently sent to landfill), a majority of which will be construction and demolition recyclables (steel, timber, concrete, bricks etc).

### *Public Place Recycling*

A trial has commenced of public place recycling in key central business district streets and parks within Lismore. The trial is proving very successful and indicating that each public place recycling bin can yield 520 kilograms of recyclables annually. As the trial adopts the standard educational techniques used for recycling in Lismore, being Red, Yellow, Green... Lets Keep It Clean, very little contamination of the recyclables is occurring.

### *Commercial Hazardous Waste Collection*

The waste facility is the location of a household hazardous waste store, which is a regional facility where households can bring up to 20 litres of household chemicals per month for disposal. In the past this service was not available for commercial quantities. Planning is underway to extend the hazardous waste collection to commercial quantities.

### *Commercial Collection Expansion*

Lismore City Council has purchased a rear loader collection truck that will be used for delivering new 1,100 litre bulk bin services to commercial customers and unit developments around Lismore. The aim of this service is to offer tailored waste services that will result in increased diversion of co-mingled recyclables and paper and cardboard. This service will also allow us to address contamination issues in unit developments.

### *Cardboard Baler*

Council has approved the purchase of a paper and cardboard baler to allow Lismore City Council to bale the paper and cardboard collected. Doing the baling in house improves the cost benefit ratio of the program.

## **Conclusion**

The integrated waste management system introduced by Lismore City Council is providing impressive diversion rates and has increased the life of the current landfill cell by a number of years. Lismore City Council adopts an innovative mix of recycling and resource recovery options to achieve its waste diversion targets and a large number of new recycling projects are planned to increase diversion further.

## Biography

### Kevin Trustum

Kevin is the Waste and Water Education Officer for Lismore City Council. He has been with Council since June 2007 and is responsible for developing and implementing the waste and water educational and promotional programs for Council. Key programs include the dry cell battery and fluorescent lighting collection programs, the waste wise ways schools education program, recycling and organics contamination management, Lismore Odds 'n' Evens, and the Lismore Water Meter Challenge.



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