

Wilton Junction

Waste Management Strategy



Produced for the Wilton Junction Landowners Group

Prepared by



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Executive Summary

In November 2011, the NSW Government initiated the Potential Housing Opportunities Program and invited landowners with suitably located substantial landholdings to nominate sites which might be able to deliver additional housing to address Sydney's housing supply shortfall. Walker Corporation, Governors Hill, Bradcorp and Lend Lease responded to the Program and nominated landholdings of more than 100 hectares (ha) in Wollondilly Shire, surrounding the Hume Highway-Picton Road intersection for consideration. This area has subsequently become known as Wilton Junction, and is the subject of this application.

Following a Wollondilly Shire Council resolution in May 2012, the four major landowners (collectively known as the Wilton Junction Landowners' Group) signed an agreement to work cooperatively with Council to prepare a high level Master Plan for Wilton Junction to deliver high quality new housing, jobs close to homes, supporting social and utilities infrastructure and services, and a range of complementary land uses.

A high level Master Plan and a Preliminary Infrastructure Requirements Report were considered by the Council on 17 December 2012, with Council resolving to give in-principle support to the proposal. Council also resolved to request that the rezoning be a state-driven process.

Subsequently, the NSW Government decided to coordinate the statutory planning process, led by the Department of Planning and Infrastructure (now the Department of Planning and Environment, DP&E). The Minister for Planning and Infrastructure (now the Minister for Planning and Environment) proposed to prepare a State Environmental Planning Policy (SEPP), as per Section 24 of the Environmental Planning and Assessment Act 1979 (EP&A Act), which identifies that a SEPP is an Environmental Planning Instrument, and Section 37 of the EP&A Act, which relates to the making of a SEPP for State or regional significant development. This was done with a view to rezone the land

through an amendment to the Wollondilly Local Environmental Plan 2011 (LEP) to facilitate the early delivery of housing and infrastructure, linked to an agreed Infrastructure, Servicing and Staging Plan.

The Department of Planning and Infrastructure issued Key Study Requirements (KSRs) to the Proponents (Walker Corporation, Bradcorp and Governors Hill) to guide the planning investigations for a new town at Wilton Junction. The KSRs set the criteria for carrying out environmental investigations across the Study Area (excluding both Bingara Gorge and the existing Wilton village which will not be affected by any proposed amendments to their current zoning and planning provisions). The investigations examine the potential for the Wilton Junction Study Area to be rezoned under a SEPP.

This Waste Strategy has been commissioned by the Wilton Junction Landowners Group to meet the Director General's Requirements. Strategic consideration of waste impacts is an essential consideration in creating sustainable communities and this Strategy complies with the Director General's Requirements to achieve Government policy on waste management.

The goal of this Waste Strategy is to ensure that the Wilton Junction Precinct minimises the generation of waste and maximises the recovery of resources. In practice all recyclable materials are captured for reuse on site or recycled off-site for return to society as useful new products. This goal aligns with Wollondilly Shire Council's objective of minimising waste to landfill through resource recovery and recycling.

Wastes are viewed in the Strategy as *resources* and any materials that do not have reuse or recycling potential are referred to as *residuals* for landfill disposal. The Strategy emphasises *resource management* as the central theme.

The Strategy promotes highest net resource value outcomes for identified activities at each stage of the development and describes recycling and reuse opportunities. Particular opportunity exists to reuse biomass and recycled organics in biofiltration systems for rain gardens to treat run-off waters, and materials such as coal wash and glass sand in road and footpath construction projects respectively. Development of a dedicated area for the receipt of separated builders waste to provide a best practice resource management model.

Residents and workers of Wilton Junction will have access to best practice waste and resource management systems with new and improved processing technologies available over time to significantly convert waste to resources and minimise the use of landfill.

Total employment generation from waste management and recycling activities for the Wollondilly local government area including the Wilton Junction development is estimated to be 31 jobs.

NSW Director General's Requirements

The NSW Department of Planning and Infrastructure issued Director General's Requirements to guide planning investigations for a new town at Wilton Junction. A list of requirements was released on 2nd May 2013 and item 5 "Ecologically Sustainable Development" requires the proponent to *"Detail how ESD principles are proposed to be incorporated in the future design, construction and ongoing phases of the development, and outline any proposed sustainability best practice initiatives. This should also include appropriate waste management strategies to achieve Government policy."*

The Waste Strategy identifies best practice systems that meet State Government policies and legislation to reduce waste to landfill.

Vision for Wilton Junction

- Wilton Junction is a new community cradled in a unique landscape characterised by bushland, rivers, creeks, lakes and ridges set against the backdrop of the Razorback Range. By design, the place and the lives of its people are intertwined with the bush.
- The community respects the location's rich bushland setting, engages with surrounding water features and embraces sustainability.
- Inclusive and welcoming of diversity, it's a place to nurture relationships, grow a family - to put down roots.
- Founded on a 21st century interpretation of timeless "Garden City " principles, Wilton Junction combines the best features of our most loved country towns with the facilities, services and technologies found in Australia's most successful, edgy, and vibrant town centres.
- A safe place to visit – a healthy place to live – a great place to learn - a rewarding place to work – the local community takes pride in the strength of its cultural and civic life and the role of their town in Wollondilly Shire and the region.
- The Wilton Junction Landowners Group commit to this vision and to holding it into the future.

The opportunity exists to create a township that embraces sustainability principles across the diverse mix of dwelling types, enterprise and educational precincts, transport systems and lifestyle choices. The Waste Strategy is designed to integrate with all aspects of the development from initial land clearing and civil works, through to the construction and ongoing use phases.

Introduction

This Waste Strategy forms part of the documentation required by the Department of Planning and Environment (DP&E) for the proposed Wilton Junction Precinct rezoning process. In its list of Study Requirements dated 2 May 2013, DP&E (then DPI), made specific reference to inclusion of sustainability best practice initiatives in the project's design including waste management strategies that achieve Government policy.

The Strategy integrates with the systems that will deliver a sustainable community and encompasses wastes from land clearing and construction, households, commercial and industrial premises, and biomass. The goal of the Waste Strategy is to ensure that the Wilton Junction Precinct minimises the generation of waste and maximises the recovery of resources.

Waste management has many associated costs and potential impacts to human and environmental health. It is proposed that the Wilton Junction Precinct will act as a model for future development within the Shire with all recyclable materials being reused on site or, recycled off-site for return to society as useful new products.

The application of waste processing technologies that recover resource value from waste streams and the implementation of least-waste design principles throughout each stage of the development will lead to an overall marked reduction in waste to landfill.

Context

Wilton Junction is located within the Wollondilly Shire approximately 80km from Sydney CBD and 30km west of Wollongong. The Precinct has a consolidated land ownership of approximately 2,600ha of which 1,425ha is estimated to be developable land, the remaining land being a mix of conservation and infrastructure land provision. The area is strategically located around the Hume Highway/Picton Road interchange and

represents the next potential major town focal point along this transport corridor south of Campbelltown – Macarthur. It includes the existing village of Wilton and the recently approved suburb of Bingara Gorge.

Wollondilly Shire has 15,600 dwellings and the Wilton Junction proposal aims to generate an additional 11,000 to 13,000 dwellings by 2041. The development proposal consists of a wide choice of housing type, a new town centre and areas zoned for enterprise, commercial and industrial uses.

Wollondilly Shire is one of the leading Local Government jurisdictions for residential waste reduction in New South Wales through its partnership with 3 other Councils in a regional waste and recycling processing joint contract. This arrangement ensures all waste is processed and only residuals are landfilled. The contract is supported by a best practice kerbside collection system based on the preferred collection model of the NSW Government.

Two significant considerations for the Shire as a result of this proposal are the potential for illegal dumping and the limited landfill disposal capacity of the Bargo Waste Management Facility. Illegal dumping creates an impost on local economic resources and damages the environment and is a priority environmental policy focus of the NSW Government. There were 261 illegal dumping incidents reported in Wollondilly Shire 2009/10.¹

The landfill at Bargo Waste Management Centre provides a finite resource for waste disposal in the Shire. Issues such as population growth and increased commercial and industrial development that add to the volumes of waste generated will shorten the lifespan of the facility unless suitable programs and systems are in place to divert resources from disposal. Wollondilly Council seeks to conserve the available disposal capacity for as long as possible through recycling programs that maximise resource recovery and divert waste from landfill.

¹ “2009/10 Sustainable Wollondilly Report”

A brief description of the primary waste streams and materials anticipated to be generated at various phases of project development are presented in Table 1.

Table 1 - Primary Waste Streams

| PHASE | PRIMARY STREAMS & MATERIALS |
|--------------------------------------|--|
| Land Clearing and Civil Works | Trees, other vegetation & top soil Illegal Dumping Remnant Site Materials |
| Construction | Masonry (brick/tile/concrete), timber, wood and metals Top soil & vegetation Plastics (film, containers, expanded polystyrene) Plaster/gyprock, electrical wiring. Cardboard & paper Littering, illegal dumping & street sweeping |
| Ongoing Use | |
| Residential Sector | Residual waste Dry recyclables & garden organics Mixed food and garden organics Bulky waste/clean-up Electronic waste Paints, oils, batteries etc. Illegal Dumping & street sweeping Biosolids |
| Commercial sector | Mixed waste Dry recyclables Paints, oils, batteries & electronic waste |

Principles and Themes

Sustainability

To integrate sustainability principles into waste management, the focus is upon applying the Waste Hierarchy at each stage of the development and integrating low waste design aspects into landscaping and civil works. Low waste design elements include slow growing lawns, non-deciduous tree species and proven hardy plant species that are tolerant of local environmental conditions.

Employment

Employment generation from waste management and recycling activities is estimated to provide 9.2 full time equivalent jobs in recycling and 2.8 jobs for landfill for each 10,000 tonnes of waste.² At completion, the Wilton Junction Precinct is estimated to generate an additional 10 jobs in recycling and 3 jobs in landfill.

Table 2 - Employment Generation Estimates – Waste and Recycling

| SOURCE | TONNES PER ANNUM | JOBS | | TOTAL |
|---------------------------------|------------------|-----------|----------|-------|
| | | RECYCLING | LANDFILL | |
| Wollondilly Shire (present) | 15,330 | 14.10 | 4.29 | 18.40 |
| Wilton Junction (at completion) | 11,570 | 10.64 | 3.24 | 13.88 |
| TOTAL | 26,900 | 24.75 | 7.53 | 32.28 |

² Access Economics “Employment in Waste Management and Recycling” 2 July 2009.

Waste Reuse

The development supports waste reduction, recycling and reuse. In the construction phase, activity involving land clearing, civil works and construction will recycle and reuse materials as indicated further in the Strategy.

The ongoing use phase will be serviced by a range of best practice waste avoidance and source separation systems for households, business and public domain areas to build on the success of the recycling programs operating in the Shire.

There is a need for a consistent approach to the design of waste and recycling systems that encourage repetitive recycling habits whether at home, work, or in public places to maximise waste separation and recycling.



Figure 1 - Rain garden after 9 months using recycled organics, Lyne Park, Sydney

Wastes as Resources

In this strategy reference is often made to describe certain waste materials as *resources* to reinforce the ‘resource value’ of particular materials or streams, and to clarify the terminology to describe them. For example, ‘food waste’ in this strategy is referred to as ‘food organics’ to capture the resource value of the material. The terminology used in waste management is important for accurately describing if a material has resource value or is a waste. A glossary is provided at the end of the document.

The principle of waste separation and recycling is carried through each stage of the development. Separated materials must be supported by convenient locations and facilities that encourage recycling.

The construction phase will present the most challenges for waste and resource management where unsorted construction waste is typically loaded as mixed waste into skip bins for landfill disposal. The development should be provided with separate recycling facilities for separated construction waste accessible only to site contractors to encourage the collection of separated materials and off-cuts for recycling. For example bricks, tiles and concrete can be periodically crushed for reuse in drainage, as temporary all-weather access driveways during construction and as inert fill material behind retaining walls and similar structures.

Legislation

Waste management regulation appears in legislation at Federal, State and Local Government levels to:

- ensure environmental harm is minimised
- maximise the recovery and recycling of resources.

The most significant policies and legislation for Wilton Junction are summarised below.

National Waste Policy

The Federal Government's National Waste Policy "Less Waste, More Resources" aims to reduce the production of greenhouse gas emissions and the amount of waste landfilled by managing waste as a resource. The Policy establishes national programs such as product stewardship schemes for recycling materials like computers and televisions, and national strategies for litter management mechanisms like container refund schemes. Reporting and coordination between State agencies are two functions the national framework delivers to provide consistent data and prioritise wastes. The National Waste Policy will be applied during the ongoing phase of the development particularly as recycling schemes develop for TV's, computers, tyres and the like over time.

Waste Avoidance and Resource Recovery Act, 2001

The Waste Avoidance and Resource Recovery Act, 2001, NSW (WARR) establishes waste reduction targets for the residential, commercial and industrial and construction and demolition sectors to minimise the amount of waste landfilled. This is supported by a Waste and Environment levy that provides a financial disincentive to landfilling and encourages greater recycling. The Act also establishes the waste hierarchy that identifies three priority areas against which to assess resource management options, these are:

Prevention or Avoidance of Waste – encourages the community, industry and government to avoid products from becoming waste. Examples include home composting and reusing shopping bags, etc.

Resource Recovery – maximises the options for reuse, recycling, reprocessing and energy recovery at the highest net value of the recovered material. This encourages the efficient use of recovered resources while supporting the principles of improved environmental outcomes and ecologically sustainable development. Kerbside recycling programs provide examples of resource recovery in action, these programs are successful because of the efforts of residents to separate waste from recyclables and place

them in correct bins for collection.

Disposal of Waste – an end-of-pipe solution that is the least desirable option and must be carefully handled to minimise negative environmental outcomes. Landfills have a place in all societies but they should only be used to dispose of materials that cannot be recycled i.e. residual waste.

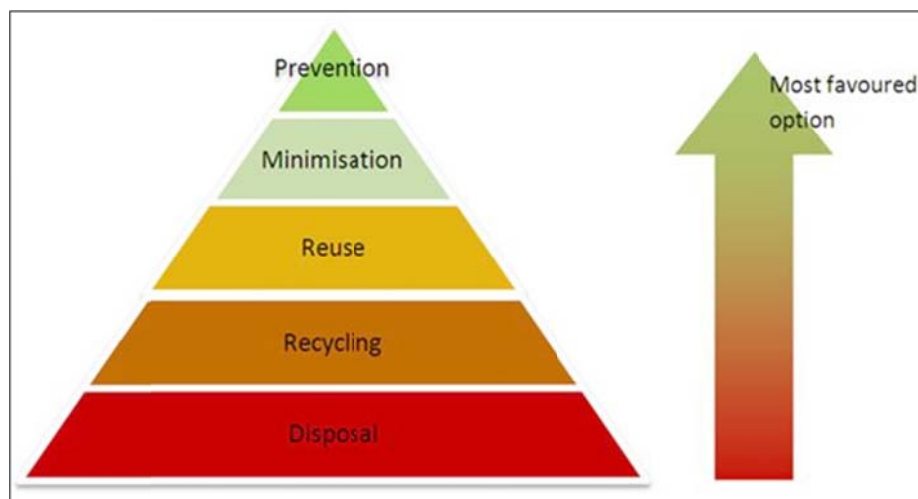


Figure 2 - Waste hierarchy

The WARR Act has recently been strengthened by the release of three significant policy initiatives. Firstly, an “NSW Energy from Waste” consultation draft policy statement that allows for the introduction of thermal and other similar technologies for the treatment of residual waste fractions with high calorific value for energy recovery purposes. Such technologies include combustion, thermal oxidation, thermal or plasma gasification, pyrolysis and torrefaction systems.

Secondly, the NSW Government’s “Waste Less, Recycle More” funding package provides Councils and communities access to \$465.7 over 5 years to encourage maximum resource recovery and recycling and to minimise the environmental harm caused by illegal dumping. Funding opportunities can be sought to support the waste and sustainability goals for Wilton Junction.

The Third policy initiative is the “Draft strategy to combat illegal dumping” which focuses on reducing the impacts of illegal dumping through a range of awareness, compliance and enforcement programs. The draft strategy includes an action plan to combat illegal dumping and identifies funding to manage illegal dumping “hot spots” and includes preventative measures.

Table 3 - NSW Waste Reduction Targets (%)

| SECTOR | YEAR 2000 BASELINE (%) | PROGRESS YEAR 2008-2009 (%) | YEAR 2014 TARGET (%) |
|-----------------------------|---------------------------|--------------------------------|-------------------------|
| Municipal | 26 | 44 | 66 |
| Construction and Demolition | 65 | 73 | 76 |
| Commercial and Industrial | 28 | 52 | 63 |

Protection of the Environment Operations Act 1997 (PoEO)

The PoEO Act is established to protect against pollution in air, water and land and introduces a range of environmental offences and penalties, environment protection policies, licences and notices. The principle agency is the Environment Protection Authority and other public agencies also have particular responsibilities under the Act such as local councils.

Protection of the Environment Operations (Waste) Regulation

The Regulation allows for issuing of general and specific exemptions to assist certain materials as being to utilize their value as a resource. For example, biosolids, coal washery rejects, food waste compost, recovered glass sand and several others have been approved by the EPA for use under certain conditions to ensure no harm is brought to human health or the environment when applied to land or used as a fuel. The

Wilton Junction development provides the opportunity to use materials such as recovered glass sand and coal wash in the construction of pedestrian and vehicle movement areas.

Existing Waste Management Capability

The Wilton Junction Precinct is located within relatively close proximity to the Spring Farm Resource Recovery Park (approximately 32km) and Bargo Waste Management Centre (approximately 15km), and will have access to best practice collection and processing technologies and systems. Additional systems will be considered onsite for the processing of specialised wastes such as biosolids.

Spring Farm Advanced Resource Recovery Park

The Spring Farm Advanced Resource Recovery Park is a multi-facility site providing regional scale processing of mixed wastes, dry recyclables and garden organics for Wollondilly, Campbelltown, Camden and Wingecarribee Councils under a joint regional processing contract. The regional contract avoids waste going directly to landfill and diverts each waste “stream” into a range of processing systems that recover highest resource value from inputs collected from households. These materials are separated by residents into resources for processing and marketing as useful products in society and reducing the “pull” on environmental resources in the production of new goods.

Bargo Waste Management Centre

Bargo Waste Management Centre is an approved landfill operating under the requirements of Environmental Protection License No. 6061 issued by the Environment Protection Authority NSW. The licence limits the amount of waste received at the site to a maximum of 5,000 tonnes per annum, and only non-putrescible waste can be received. The landfill has an estimated lifespan of approximately 10 to 12 years.

Council wishes to retain this facility primarily for use by residents for the duration of its working life. New development in the Shire coupled with

population growth will increase pressure on available landfill capacity. Resource recovery strategies incorporated into new subdivisions and other developments will assist in preserving this finite community resource.

Kerbside Collection Systems

The residences and businesses of Wilton Junction Precinct will be serviced by a 3-stream collection system for mixed waste, dry recyclables and garden organics as described in the green box below. The following Table estimates the increase in volume from the Wilton Junction Precinct and its contribution to the waste management profile of Wollondilly Shire. Based on current generation rates for mixed (residual) waste, dry recyclables and garden organics from Wollondilly Shire an additional 11,570³ tonnes per annum is estimated to be generated by the time the development is completed. The impact of this increase will occur in stages commensurate with the rate of housing occupancies.

Table 4 - Residential waste generation profile (tonnes per annum)

| BIN STREAM * | CURRENT GENERATION (Wollondilly Shire Council Tonnes) | ADDITIONAL GENERATION (Wilton Junction Tonnes) | TOTAL ESTIMATED GENERATION |
|-----------------------|--|---|---|
| Household Mixed Waste | 8,500 | 6,500 | 15,000 |
| Dry Recyclables | 3,530 | 2,570 | 6,100 |
| Garden Organics | 3,300 | 2,500 | 5,800 |
| TOTAL | 15,330 | 11,570 | 26,900 |

* Bulky waste clean-up excluded.

³ Tonnage estimate based on 12,000 dwellings.

Proposed residential waste service model

A description of the proposed waste collection system model for Wilton Junction residents is described as follows:

Residual Waste collected on either a weekly or fortnightly basis depending on the choice of bin size and collection frequency; electronic bin tags may be included to monitor services. Waste is processed to capture and convert organic resources into compost or energy products, the residual component sent to a Energy from Waste (EfW) facility if suitable, or to landfill for disposal;

Dry recyclables collections will be provided to maximise capture and diversion rates of recyclable containers, packaging and paper products;

A 3rd bin will be for either garden organics or commingled food and garden organics emptied weekly (with food) or fortnightly (without food). The organics are processed and returned to the local area to for utilisation in agriculture and food crop production.

A clean-up service will be available for bulky wastes either on an on-call basis (pre-booked service), provided at fixed times throughout the year or a combination of the two. Following waste separation to recover resources such as timber, cardboard and steel for recycling, any remaining non-recyclable materials will be offered to an Energy from Waste facility when available, to recover calorific values and convert into energy for subsequent purchase by residents and business. Alternatively, residuals will be disposed of at landfill.

E-waste and Household Hazardous Waste drop-off points established at key locations throughout the Shire.

Overall Outcome: Greater than 70% reduction in waste to landfill.

During the 30-year life of the Wilton Junction development, waste collection service arrangements may be reviewed depending on community feedback, changes to State Government policy and priorities, and in response to the introduction of new processing technologies.

The current service delivers best practice waste management and is proposed to be continued at least into the medium term. Wollondilly Council will undertake consultation with residents to canvass options and benefits in consideration of any potential service changes.

The *kerbside to market* diagram in Figure 3 shows the pathway for materials when separated for recycling and how residual waste can be either processed or landfilled.

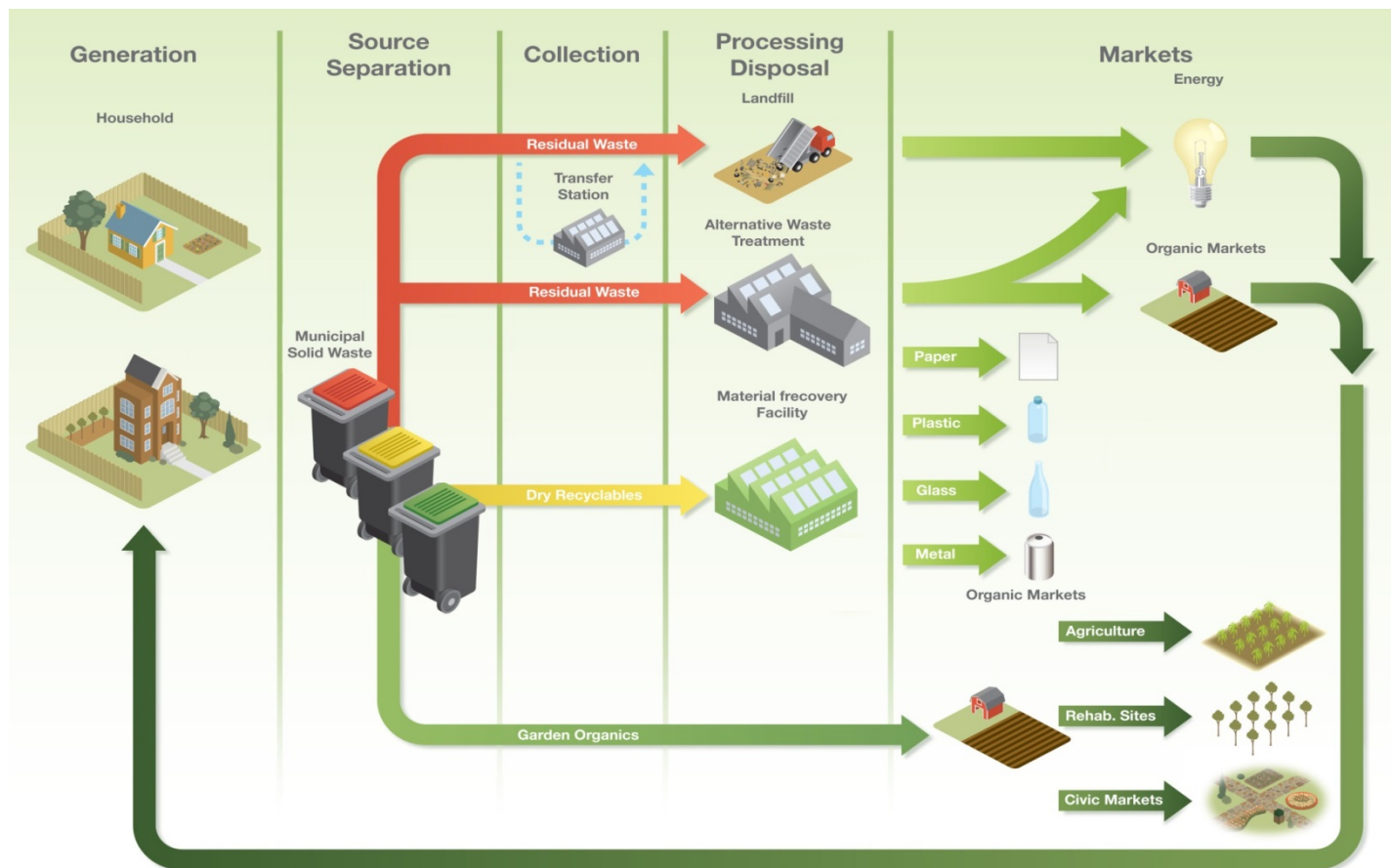


Figure 3 - Resource flows from kerbside to market

Other Service Systems

Litter bins, street sweeping and gross pollutant traps (GPT's) are all services undertaken by Council that are designed to protect amenity and the environmental quality of the area. These services will be extended to the Wilton Junction Precinct.

Litter bins located in strategic areas aim to increase convenience and minimise the incidence of littering. Modern litter bin stations designed to encourage separation of waste from recyclables enable residents, workers and visitors to continue recycling in public places, at events and the like.



Figure 4 - Public place waste and recycling bins

Litter typically finds its way into street gutters, drains and waterways. A series of GPT's designed into the stormwater drainage system capture pollutants and prevent their entry into waterways. It is feasible to utilise bio-filtration systems containing recycled organic (RO) materials downstream of GPT's, to further filter and treat run-off waters prior to discharge into receiving waters. Once the RO materials have reached their design lifespan they are simply recycled into compost, nothing goes to waste.

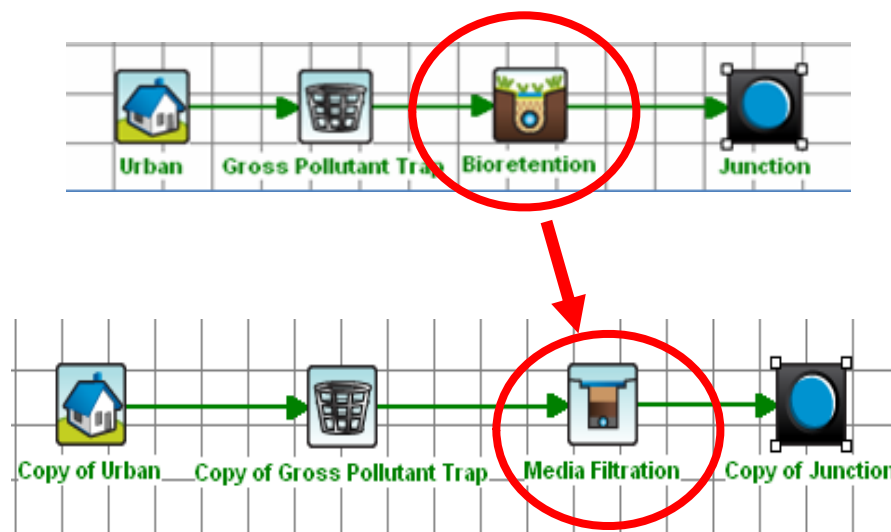


Figure 5 - Substituting bio-retention systems with media filtration using recycled organics

Streetsweepings vehicles will continue to provide valuable litter and road waste cleaning services with the opportunity of recycling this waste stream through the use of either composting or via processing technologies that convert waste to energy, depending on the composition of the sweep. Roadway designs that factor in access for streetsweepings vehicles will be promoted to consider litter management within the overall design and servicing specification.

Illegal dumping in Wollondilly Shire grew by 35% in 2009/10 over the previous period. Illegal dumping involving waste from construction sites is a target of the State and Local Government sectors and the Wilton Junction development provides opportunity to introduce measures to educate and demonstrate best practice waste management. Funding is available from the State Government⁴ for Councils and Public Land Managers to assist with education, monitoring and enforcement programs for issues such as asbestos and surveillance of dumping “hot spots”.



Figure 6 - Dumped rubbish

Commercial waste will be generated by small to medium sized enterprises (SMEs) as well as some larger organisations such as supermarkets, shopping centres and other large retail, storage or commercial premises. SME waste and recycling is typically collected from mobile garbage bins e.g. 240 litre capacity, similar to residential bin collections using vehicles of similar size.

⁴ Actions 5 and 6, Action Plan, “Draft strategy to combat illegal dumping” NSW EPA.

Waste and recyclables from larger size businesses is collected from bins of increased capacity e.g. 1100 litre, using larger specialised collection trucks such as hook lift and front lift vehicles.

Education and awareness campaigns for residents, workers and visitors to Wilton Junction will be part of Council's Shire-wide environmental education program entitled "Adopt an Environment". The program targets school communities, work sites, visitors and households and includes source separation and recycling in at-home and away-from-home situations, littering and illegal dumping. Information and support is provided to ensure the impact of urban development on the environment is minimal and promotes a harmonious lifestyle at one with the environment.

Waste Processing Technologies

Communities have supported Council run source separation schemes for over 30 years in the case of commingled dry recyclable schemes for materials such as glass, plastic, aluminium, steel and paper. More recently, garden waste collection programs are also a common sight throughout many towns and cities in Australia. Organics typically account for at least 50% of the composition of mixed waste from households. Wollondilly Council sends all household mixed waste for processing to recover any recyclables remaining in the waste stream and to convert the organic fraction into compost. Residual materials or contaminants unsuitable for processing are currently landfilled.

Where waste cannot be avoided or products reused, there are various recovery technologies available to maximise resource efficiencies and increase the sustainability of our communities, businesses and industries. Table 5 provides a summary of the main processing technology types, the streams treated and the outputs.

Table 5 - Processing Technologies Summary

| SEPARATE STREAMS | TECHNOLOGY DESCRIPTION | OUTPUTS/PRODUCTS |
|---|--|--|
| Household Garbage (mixed waste) | Composting – uses a combination of enclosed mechanical and manual systems to separate the organic fraction from mixed waste for processing and composting; targets food and garden waste; biosolids can also be added to the process. | Organics converted into soil conditioners for use in non-contact agriculture, forestry and site rehabilitation projects. Recyclables such as plastic, aluminium and steel containers are recovered, decontaminated, baled and sent to market. |
| | Anaerobic Digestion – (digestion of organics in the absence of oxygen) separates the organic fraction from mixed waste for processing and composting, targets primarily food waste; biosolids can also be added to the process. | Digested organics are converted into renewable electricity. Recyclables such as plastic, aluminium and steel containers are recovered, decontaminated, baled and sent to market. |
| | Landfill – is a site for the disposal of waste by burial. Landfills are designed to control odour and vermin and to capture liquids (leachate) and gas (methane). Landfills produce harmful gases such as methane (CH ₄) through the decomposition of organic matter. | Many landfills either flare-off or capture gas to produce energy. |
| Food and Garden Organics | Composting – enclosed systems process mixed food and garden organics to produce a pasteurised product suitable for land application. | Soil conditioners. |
| Dry Recyclables – fully commingled | Materials Recovery Facility (MRF) – The mix of recyclables is sorted at the MRF via a series of enclosed mechanical and manual systems into separate products for baling and transport to market. Contamination of recyclables by household garbage and the like is removed at the MRF to ensure products meet the buyers quality specification. | Mixed paper, cardboard, aluminium cans, steel cans and mixed plastics are all typical products from a MRF. MRF's are ideally set up to respond quickly to changes in market conditions, for example bales of mixed plastics can be altered to produce separate PET, HDPE, PP and other plastics bales as required. |
| Green Waste (garden organics) | Composting – this occurs primarily in enclosed facilities or in open windrows. The incoming material is first decontaminated by removal of bags of waste and any other foreign items of 'garden waste' origin such as hoses, spades and hose reels. The organic material is shredded and stockpiled to reach pasteurisation conditions prior to transport to market. | Mulches, soil conditioners and blends. |
| Residual Waste (RW) is the fraction that remains after initial processing | Thermal decomposition technologies include combustion, thermal or plasma gasification, pyrolysis and torrefaction that recover energy from residual waste feedstock. These technologies treat residual materials that are destined for landfill. | Energy as heat and power. |

Note: The inputs and outputs from processing systems are regulated to ensure environmental impacts are minimised.

Staged Waste Management Approach

The Wilton Junction Precinct is designed to be developed in stages and each stage will generate wastes during its development and ongoing use. The aim of the Strategy is to maximise recycling and ensure that the majority of material generated as waste is recycled for reuse within the Precinct. For example, organic wastes generated from land clearing activities can be reused on site as mulch or in biofiltration media.

The following Tables set out the waste streams and recycling/reuse options during land clearing and civil works (Table 6), construction activity when houses, schools, commercial and industrial buildings are being built (Table 7), and from ongoing use when residents and business take occupation (Table 8). The strategy for each stream is identified against Highest Net Resource Recovery Value outcomes.



Figure 7 - Cardboard bales ready to be recycled

Table 6 - Waste Management Options (Land Clearing and Civil Works)

| STREAM | STRATEGY | DESTINATION OPTIONS * | COMMENTS |
|--------------------------------|--|---|--|
| Illegal Dumping | <ul style="list-style-type: none"> Separation to recover recyclables such as brick, tile, concrete, rubble, metal and timber. Disposal of residuals to landfill prior to introduction of EfW technology. | Bargo landfill (interim) for residuals; Energy from Waste processing for residual fraction. | Landfill provides an interim <i>solution</i> for disposal of residuals until approved Energy from Waste (EfW) technologies are available. Separation of recyclable materials will reduce current residual waste volume to approximately 30%. |
| Street Sweeping | <ul style="list-style-type: none"> Tunnel composting with garden organics; Blend with local Sewage Treatment Plant (STP) wastes for composting and approved land application. | Spring Farm Advanced Resource Recovery Park. | Compost applied in approved areas. Residuals separated from compostable fraction suitable for processing in EfW facilities. |
| Stormwater run-off | Biofiltration of stormwater run-off using wood chip from cleared trees to remove pollutants (biofiltration). | Onsite. | Integrate with stormwater management strategy. |
| Trees | All trees to be removed are chipped for landscape mulch and/or used in biofiltration systems to rain gardens and ponds. | Onsite. | Integrate with landscaping and stormwater management strategies. |
| Road and footpath Construction | Reuse coal wash that meets government waste exemption specifications in road works, and crushed waste glass bedding under footpath areas in place of sand. | Processed materials imported to site. | Coal wash to comply with the Coal Wash Exemption. Crushed waste glass (ex MRF) meets performance specifications. |
| Topsoil and vegetation | Reuse topsoil in place of silt fencing as an erosion control measure in sediment berms, as a compost blanket and in embankment stabilisation. Stockpile materials to reach pasteurisation temperatures and destroy weed seeds. | Onsite. | Noxious weeds such as blackberry separated out and excluded from recycling/reuse. |
| Remnant site materials | Existing fencing and outbuildings deconstructed for future recycling and reuse. | Onsite. | Materials made available for reuse in local reuse projects via Men's Shed and other groups. |

* Based on existing approved facilities, new processing sites will be added over time.

Table 7 - Waste Management Options (Construction Phase)

| STREAM | STRATEGY | DESTINATION OPTIONS * | COMMENTS |
|---|--|---|--|
| Littering | Energy from Waste (EfW), Mixed Waste Processing. | Spring Farm Advanced Resource Recovery Park or Bargo Waste Management Centre. | Low volumes. |
| Illegal Dumping | Separation to recover recyclables such as brick, tile, concrete, rubble, metal and timber. Disposal of residuals to landfill. | Bargo Waste Management Centre. | Landfill provides an interim <i>solution</i> for disposal of residuals until approved Energy from Waste (EfW) technologies are available. Separation of recyclable materials will reduce current residual waste volume by approximately 70%. |
| Brick/tile/concrete/timber/plasterboard/PVC/cabling/film or sheet plastic/plastic buckets and other items | Builders waste separated into skips for recycling. Brick, tile and concrete crushed for reuse throughout development. Plasterboard offcuts recycled. Plastic film and containers recycled. | Brick/tile/concrete managed onsite. Plastic and plasterboard recycled offsite. Electrical wire offcuts and timber offcuts to Men's Shed for reuse in local volunteer projects. Alternatively, timber to shredding and mulch, and electrical wiring off-cuts to metal recyclers. | Construction waste management plan is recommended for the development. |
| Topsoil and vegetation | Reuse material to enhance site soil as a mulch especially in shallow soil profile areas, or as input to filtration media for rain gardens. | Onsite. | - |

* Based on existing approved facilities, new processing sites will be added over time.

Table 9 - Waste Management Options (Ongoing Use Phase) – Residential and Commercial

| STREAM | STRATEGY | DESTINATION OPTIONS * | COMMENTS |
|----------------------------------|---|--|--|
| Littering | Energy from Waste (EfW), Mixed Waste Processing. | Spring Farm Advanced Resource Recovery Park or Bargo Waste Management Centre. | Low volumes. |
| Illegal Dumping | Separation to recover recyclables, disposal of residuals at landfill. | Bargo Waste Management Centre. | Landfill provides an interim <i>solution</i> for disposal of residuals until approved Energy from Waste (EfW) technologies are available. Separation of recyclable materials will reduce current residual waste volume by approximately 70%. |
| Streetsweepings | Tunnel composting with garden organics or alternatively, blend with local Sewage Treatment Plant (STP) wastes for composting and land application. | Spring Farm Advanced Resource Recovery Park. | - |
| Residential mixed waste | Recover recyclables for market; Compost food organics for conversion into soil conditioner products or anaerobic digestion to produce energy product; dispose of residuals to landfill. | Spring Farm Advanced Resource Recovery Park. | Issue compost bins and worm farms to homes and businesses to reduce organic component of waste and reuse outputs for garden/site enhancements. |
| Dry recyclables | Process recyclables for market. | Spring Farm Advanced Resource Recovery Park. | - |
| Garden organics | Compost for raw mulch or for use in soil blends. | Spring Farm Advanced Resource Recovery Park. | Shallow soil profile of the area can be enhanced with processed organics. |
| Mixed food and garden organics | Compost into soil conditioner products. | Kemps Creek Organics Processing Facility via Spring Farm Advanced Resource Recovery Park. | - |
| Bulky waste/clean up | Recover recyclable metals, timber and cardboard for recycling. Dispose of residuals to landfill of EfW processing. | Bargo Waste Management Centre for separation and recovery of recyclables, disposal at landfill to be determined. | Accumulate stockpile of residuals for landfill disposal or EfW processing if suitable. |
| E-waste | Send to recycling facility. | Facilities at Smithfield and Wollongong. | Explore most efficient options by tender process. |
| Commercial Mixed Waste | Explore integration with Council's processing contract. | Suitable for processing at Spring Farm. | Explore integration of household and commercial residual wastes into processing contract. |
| Commercial Dry Waste (separated) | Separation of timber, cardboard, plastic film and containers, plasterboard and steel. Residual to landfill. | Bargo Waste Management Centre for separation and recovery of recyclables, disposal at landfill to be determined. | Accumulate stockpile of residuals for landfill disposal or EfW processing if suitable. |
| Commercial Dry Recyclables | Explore integration with Council's processing contract. | Suitable for processing at Spring Farm. | Explore integration of household and commercial recyclables into processing contract. |
| Hazardous materials | Separate from mixed waste for treatment. | EPA/Council co-funded collection program. | Paints, oils, batteries, gas bottles etc. |
| Biosolids | Processing onsite and reuse. | Onsite | Licence requirements for land application of treated biosolids. |

* Based on existing approved facilities, new processing sites will be added over time.

Road Design Considerations

To facilitate efficient waste collection for the life of the development, road and access ways should be designed with waste management servicing in mind. Roadway design needs to consider safe waste collection and management for the life of the development through:

- avoiding one-way streets and cul-de-sacs to facilitate safe access for collection vehicles and bin servicing,
- safe bin access and collection in the town centre area for commercial and mixed commercial/residential buildings,
- selection of street tree species such as non-deciduous varieties to minimise leaf litter,
- traffic calming devices and the like should be fully accessible by street sweeping vehicles, and their location should ideally be clear of bin collection zones.

Glossary

Contamination – is a term referring to the presence of any foreign material in a resource stream e.g. house bricks in a garden organics collection stream or general waste in the dry recyclables stream;

Dry Recyclables – a collective term used to describe the paper and container products collected for recycling such as cardboard, newsprint, mixed paper, glass containers, aluminium and steel cans, plastic containers and liquid paperboard (milk and juice cartons). Dry recyclables are typically collected in a mixed or ‘commingled’ form for later separation at a Materials Recovery Facility or MRF;

E-waste – describes electronic or e-waste materials as anything with an electric cord such as TV’s, computers and the like.

Food Organics – any food separated from waste for processing and recycling.

Food Waste - food collected for landfill disposal.

Garden Organics – lawn clippings and yard trimmings (tree branches and cuttings).

Garden Waste - non-organic material such as brick, concrete, hose etc. used in connection with gardens;

Gross Pollutant Traps – GPT’s are installed in drainage systems to capture solid waste pollutants from stormwater run-off;

Mixed Food and Garden Organics – collection of commingled food and garden organics in the same bin for processing into usable products such as energy and compost;

Non-putrescible Solid Waste – inert materials such as bricks, tiles, concrete and other materials that do not contain food;

Putrescible Waste – waste that contains putrescible organics such as food, manure, animal waste etc.

Pyrolysis - is a thermochemical decomposition of organic material at elevated temperatures in the absence of oxygen.

Residual Waste – waste that cannot be recycled or reused and is destined for landfill disposal.

Torrefaction - a thermochemical treatment of biomass e.g. wood, under the absence of oxygen to produce a fuel.