Cooks River Sustainability Initiative

Planning Strathfield South Subcatchment

STRATHFIELD COUNCIL

NSW Environmental TRUST

COOKS RIVER Foreshores Working Group

OurRiver

cooks river sustainability initiative

Contents

Front cover: 1. Strathfield Golf Club 1937, State Library of NSW, 2. Corner of Punchbowl and Juno Parade 1936 State Library of NSW, 3. Enfield Railway Depot1966 - 68 by Raymond de Berquelle, State Library of NSW, 4. Cooks River after bank restoration Freshwater Park 2008, 5. Cooks River channel Strathfield 2008.

Introduction - The Cooks River Sustainability Initiative

The Cooks River Sustainability Initiative is about communities, businesses and councils working together in a new way for long term improvement of the Cooks River catchment

Partnership

The Cooks River Sustainability Initiative is a partnership between eight councils within the Cooks River Catchment which are Ashfield, Bankstown, Canterbury, City of Sydney, Hurstville, Marrickville, Rockdale and Strathfield Councils.

The goals of the Initiative are to:

- Improve the quality of water that flows to the Cooks River
- Create new relationships within and between councils and the community that will provide ongoing long term benefits for the Cooks River
- Develop a Vision and Action Plan for six local subcatchments

The Cooks River Catchment (area outlined in black) is approximately 100km2 and is made up of many smaller subcatchments.

The Cooks River Sustainability Initiative is currently working on six subcatchments, named Ashbury, EC1East, Munni Street, Rookwood Road, Strathfield South and Upper Wolli Creek.

Why is this Initiative unique?

The Cooks River Sustainability Initiative acknowledges and builds on previous work and studies completed by other government agencies and community groups. It is however, taking a new approach to improving the long term health of the Cooks River. This includes:

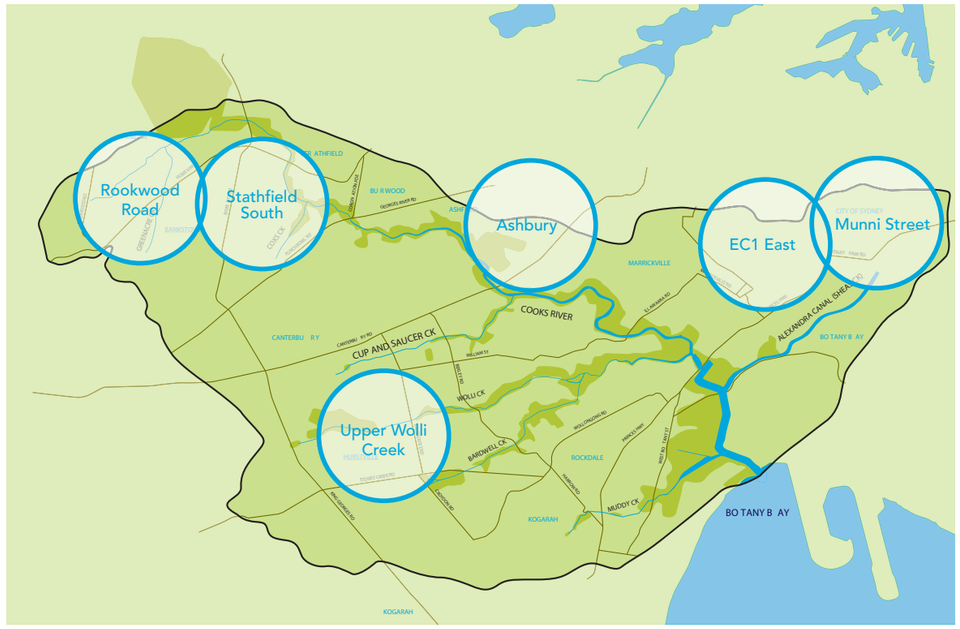
Planning at a neighbourhood or subcatchment scale, working in partnership with local people to ensure solutions represent local ideas, knowledge and values;

Undertaking detailed social, physical and organisational research to ensure that the solutions and strategies developed are right for the subcatchment and its community.

How is this Initiative being funded?

The Initiative is funded from 2007 to 2010 through the NSW Environmental Trust's Urban Sustainability Program.

Photo by Tanja Pokrajac



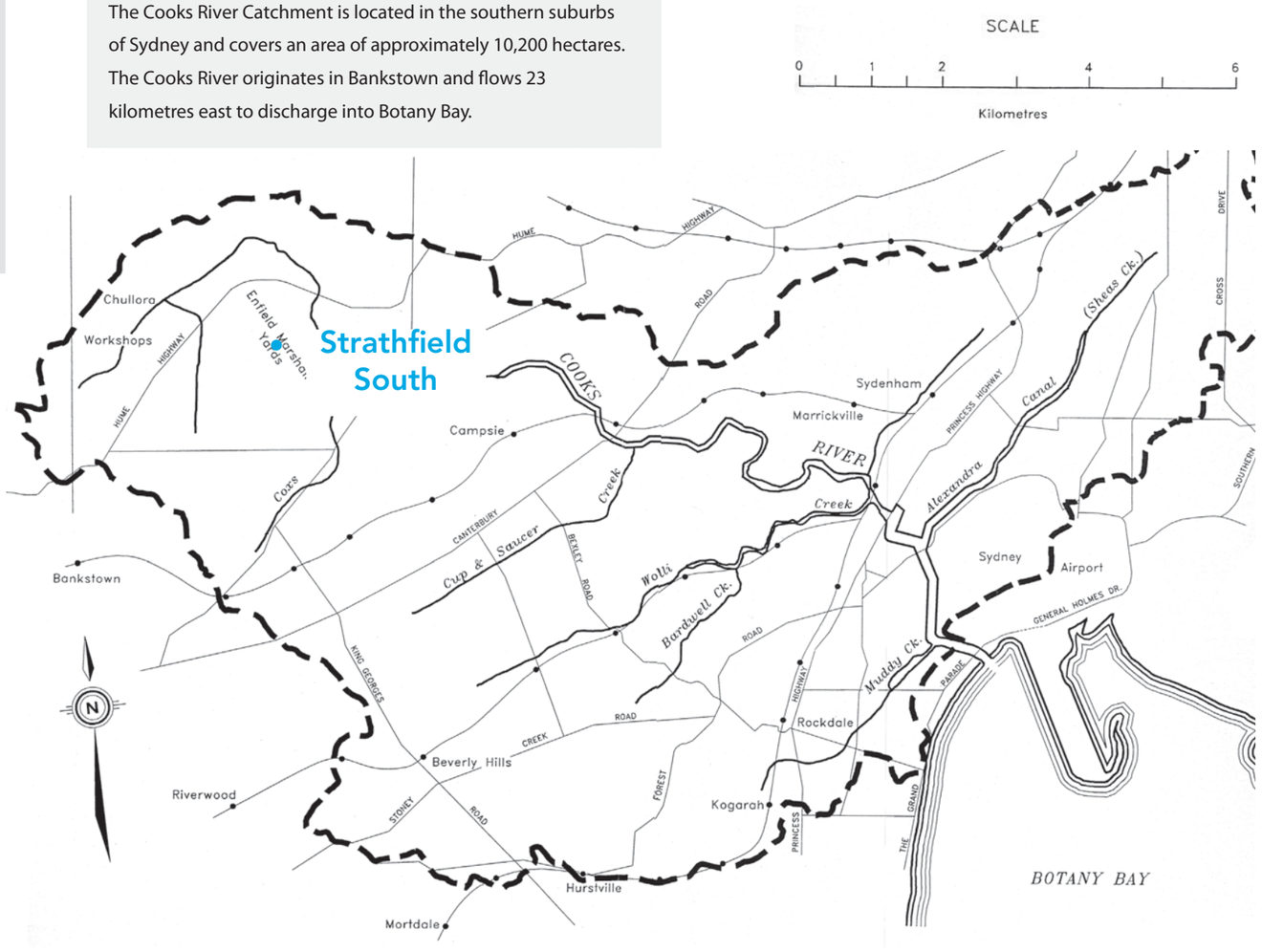
The Cooks River Catchment

There are 8 tributaries to Cooks River:

- Wolli Creek
- Bardwell Creek
- Muddy Creek
- Sheas Creek / Alexandra Canal
- Cup and Saucer Creek
- Cox's Creek
- Fresh Water Creek

Cooks River Catchment

The Cooks River Catchment is located in the southern suburbs of Sydney and covers an area of approximately 10,200 hectares. The Cooks River originates in Bankstown and flows 23 kilometres east to discharge into Botany Bay.



Water Quality

Cooks River is regarded as one of the most polluted urban rivers in Australia. Discharges of sediments and gross pollutants combined with sewage overflows are significant contributors to the degradation of the river.

Various studies since 1997 have identified that the river contains high levels of faecal contaminants, elevated concentrations of heavy metals (lead, zinc, mercury, chromium, silver and copper), high levels of nutrients resulting in potential for eutrophication or algal growth and highly contaminated sediments. Water quality with respect to primary and secondary contact recreation is considered poor.

Impacts on Estuarine Environments

There are over 150 sewer overflow points that regularly discharge sewage into the Cooks River after rainfall events. Stormwater runoff and sewer overflows have a negative impact on the River. Toxins in sewage and stormwater accumulate in the river bed and affect organisms that live in the mud and the animals that eat them. Sediments in stormwater smother water plants and destroy the habitat of riverine animals.

Before European Settlement

Prior to the arrival of the First Fleet in 1788, it is estimated that 1500 Aborigines lived in the Port Jackson/Botany Bay area. The Cadigal and Wangal people had successfully lived along the Cooks River for thousands of years. Over this time, an enormous body of knowledge and special skills were developed to use the life sustaining resources that the Cook's River and the surrounding lands provided.

The Cadigal people spoke the coastal Eora language and are often referred to as the Eora people. Other clans of the Sydney region who occupied different parts of Eora land included the Wangal, the Cammeraygal, the Cadigal and the Bidjigal.

There were two major groups to the north and south of the Eora lands; they were the D'harawal and Darug.

Cadigal history, like the history of many Aboriginal clans, is based on oral traditions handed down by many generations over millennia.

Urban Water Management

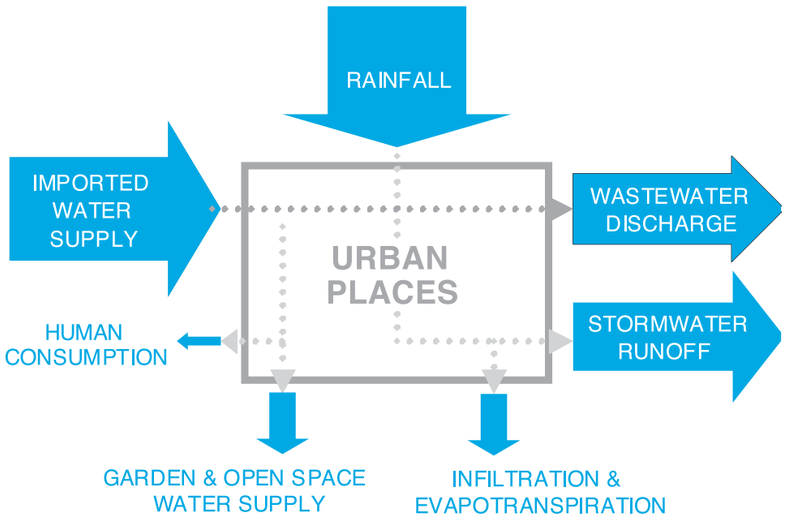
The Cooks River Sustainability Initiative is funded by the NSW Department of Environment and Climate Change Urban Sustainability Grants Program. It aims to plan for managing water sustainably in urban environments such as the Strathfield South Subcatchment. The project addresses three problems in conventional urban water management:

1. Technical experts, have traditionally been responsible for developing solutions to complex urban water problems. Other thinkers are also needed, such as social scientists and ecologists.
2. The people affected by urban water problems, including residents, businesses, community groups and government departments need to work more closely to identify solutions.
3. Plans are usually designed for whole river catchments and can miss out on practical "locally grown" solutions to urban water problems.

Sustainable urban water management means:

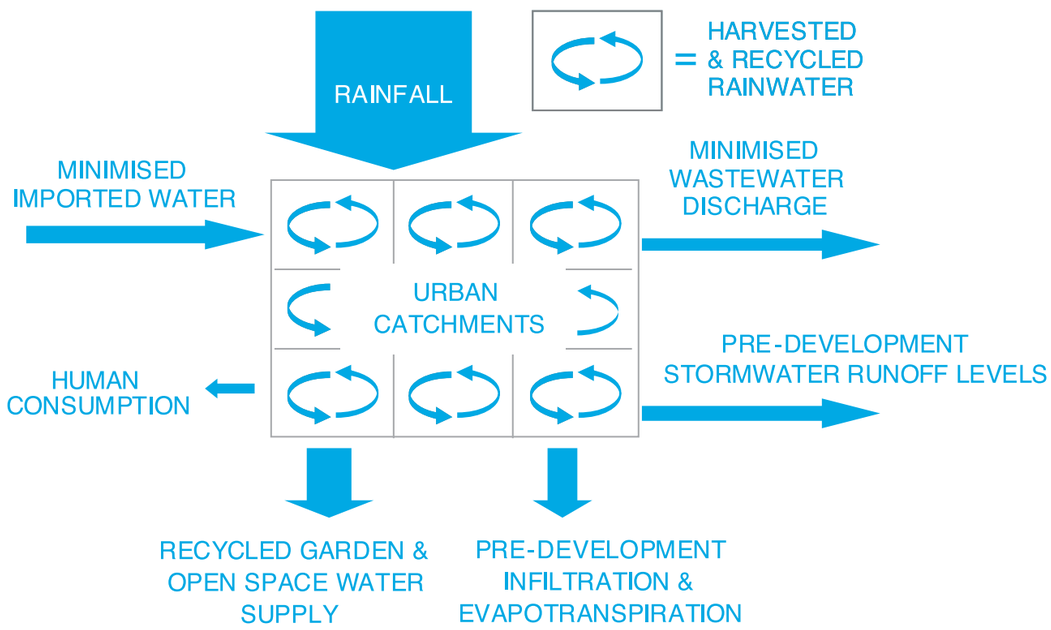
- Reducing the amount of waste water leaving a catchment that may cause pollution in other areas (e.g. ocean outfalls)
- Reducing the reliance on drinking quality (potable) water brought in from outside the catchment
- Using water appropriately i.e. using potable water for consumption only – not for watering the garden or flushing the toilet
- Reducing the impact of stormwater on waterways

Conventional Urban Water Management



Traditionally, the main goal is flood protection

Sustainable Urban Water Management



Stormwater and wastewater are valued as a resource

Strathfield South - What Have We Done So Far?

What have we done so far?

- Gained a good understanding of the demographics in Strathfield South Subcatchment
- Surveyed residents about their attitudes, knowledge and current behavior in relation to water conservation and use
- Collected and analysed information about the physical environment in the Subcatchment
- Calculated the water budget for the Subcatchment – this is the amount of water coming in and out of the area (see page 5)
- Involved people from many disciplines in identifying problems and solutions – engineers, social planners, environmental scientists, educators, parks and recreation managers
- Identified possible on-ground water solutions

What is happening with water now?

In 2008:

- 94% of drinking quality water is used for purposes other than drinking and ends up in the ocean as wastewater
- 68% of rainwater runs directly in to the Cooks River because 71% of Strathfield South Subcatchment is impervious (sealed surfaces that do not allow water to soak in)
- Rainwater runoff from the roofs and streets of Strathfield South Subcatchment carries sediments and other pollution to the river
- The level of pollution in the Cooks River is so high that it cannot be used for swimming or fishing 75%-100% of the time
- Sydney's dam storage water supply can not be guaranteed in the long term.

What are we doing now?

Residents and other stakeholders are being asked to imagine what water management will look like in Strathfield South Subcatchment in 2050. The results will contribute to a community water vision which will be the basis for planning at the community water planning forums to be held in November, 2008.

Why a community water vision?

Including the community's vision in the planning for Strathfield South Subcatchment will make use of local knowledge and represent locally generated ideas. This will produce a plan that is tailor-made to local conditions and therefore be more widely accepted and adopted.

How to use this booklet

This booklet presents information about the Strathfield South Subcatchment relevant to water planning. To help you take part in the vision and planning sessions think ahead to the year 2050 and as you read this booklet imagine how things may have changed by then. Please make notes of your ideas in this booklet. These will be discussed briefly at the beginning of the vision session.

Strathfield South Subcatchment Water Cycle - Now

This presents an overview of the water cycle in the Strathfield South Subcatchment based on Sydney Water data and the outcomes of stormwater modelling.

A study of the urban water cycle highlights where potable water savings can be made through harvesting rainwater and stormwater. Stormwater harvesting also provides an opportunity to treat stormwater and reduce pollutant loads.

Rainfall
3,966 ML/yr
100%

Potable water import
1,948 ML/yr
100%

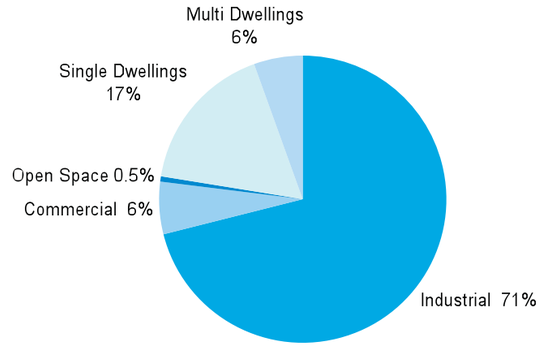
Wastewater
1,841 ML/yr
94%

Garden and open space watering
88 ML/yr
5%

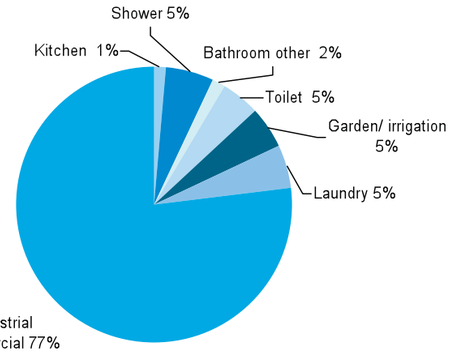
Consumed by residents
19 ML/yr
1%

Stormwater infiltration and evapotranspiration
1,269 ML/yr
32%

Stormwater runoff to Cooks River
2,697 ML/yr
68%



Consumption by Sector

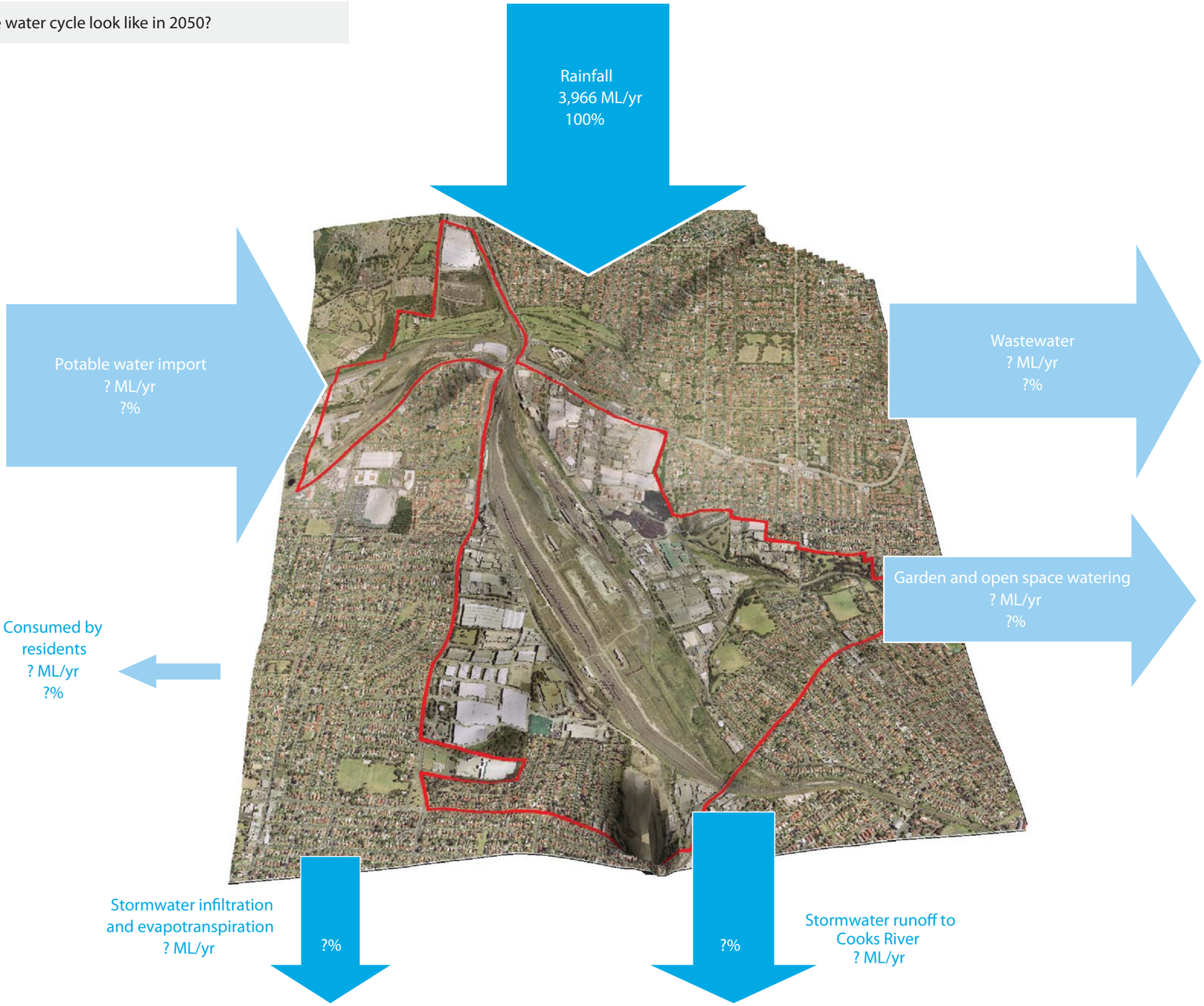


End use consumption

Do you think the current water cycle is sustainable?

Strathfield South Subcatchment Water Cycle - 2050?

What should the water cycle look like in 2050?



What part of the water cycle needs the most significant change?

1960's Enfield Marshalling Yards

1930's Punchbowl Rd and Juno Parade

1930's Strathfield Golf Club

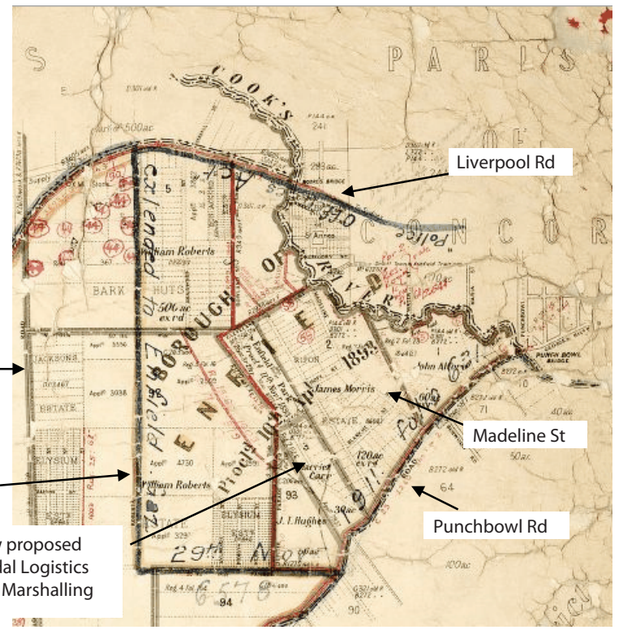
1938 - Newly completed Cooks River 'improvement' at the junction of Coxs Creek and the Cooks River, Water St Bridge

Strathfield South Subcatchment history since European settlement

Year	What Happened
To 1788	Wangal people had successfully lived in the area for thousands of years.
1802	In what is now known as Belfield a grant of 100 acres was made to John Terry Hughes a whaler, brewer and flour merchant
1810	120 acres in Belfield was granted to James Morris, a private in the NSW Corps who arrived on the Second Fleet.
	John Alford, an 'animal doctor', received a grant of 60 acres. Alford's grant was bounded by Cooks River, Coronation Parade and Punchbowl Rd
	In the same area smaller grants were allocated to Harriott Carr and J Mollett
	Grant of 570 acres to Mr James Wilshire by Governor Macquarie
1812-1814	Liverpool Road built by ex-convict William Roberts. Roberts was also the recipient of a large land grant in Strathfield South, Chullora and Greenacre. Roberts Rd is named after him.
1826	Justice John Stephen consolidated several smaller properties into a country estate, which he named 'Clareville' of 250 acres. 'Clareville' was located on the north side of Punchbowl Rd, near the Cook's River crossing.
1837	Father John Joseph Therry was granted 47 acres in an area called 'Bark Huts'. Father Therry offered 4 acre blocks for £25, to fund the construction of the original St Anne's Church.
1840's	The Bark Huts Hotel built by Mr. William Taverner was a half-way house and the changing station for the coaches between Sydney and Liverpool on the Liverpool Rd near the crossing of the Cooks River
1885	The Council of Strathfield, which includes Homebush, Redmyre, and part of Druitt Town (Strathfield South), was incorporated
1898	Golf was first played at "Strathfield Golf Club" Freshwater Park
1916	Enfield Marshalling Yards were established in 1916 on land that was once "Enfield Park"
1930's	Concreting of the Cooks River channel commenced
1935	Wooden bridge at Water St washed away and replaced with current bridge
1946	Cooks River Improvement Act was gazetted with its primary aim being to control flows and prevent degradation of the Cooks River banks
1970's	Enfield Marshalling Yards closed in the early 1970's
1990's	Dean Reserve created from former brick pit and tip
1990 - now	Council and community groups ongoing re-vegetation of Cooks River foreshore
2001-2008	Rehabilitation of Cooks River at Freshwater Park

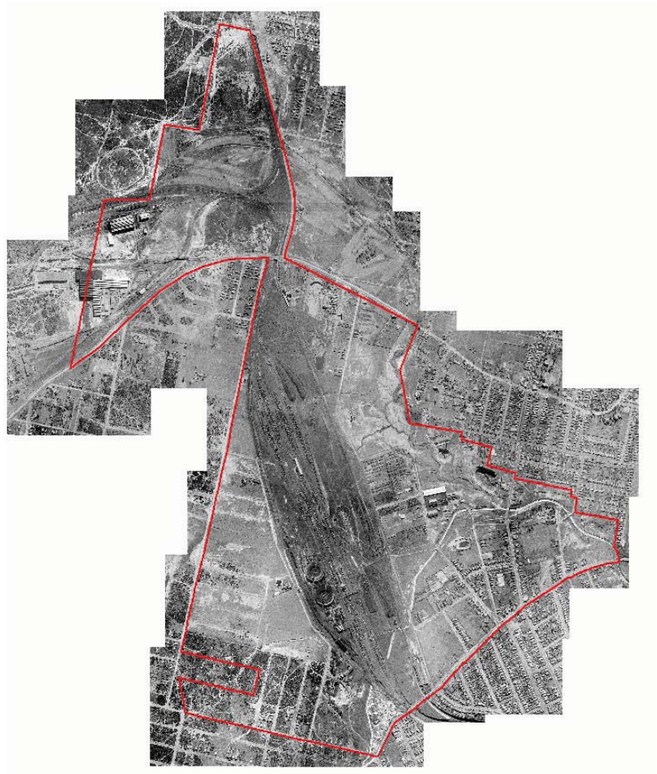
Changing Land Use in Strathfield South

1890s...



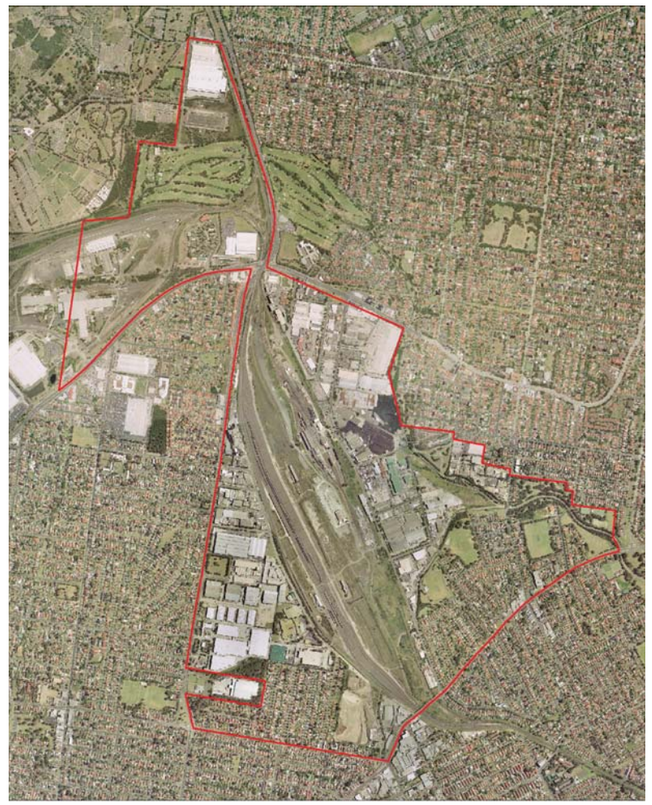
Early parish map (approximately 1890s) of the Strathfield South area

1943...



1943 aerial photograph. NSW Dept. of Lands

Today....



2003 aerial photo. Strathfield Council

There has been a drastic change in the land use in the Strathfield South Subcatchment from the 1890s to today. Most of the Subcatchment in the 1890s was farmland and bush with a small amount of urban development. The Cooks River was still in its natural state. Things hadn't changed that much by 1943 - the farms had mostly gone but the Subcatchment was still largely undeveloped except for the Enfield Marshalling Yards and the Strathfield Golf Club at the top of the catchment. Also you can see that the Cooks River has been converted to a concrete channel to just past the junction of Coxs Creek at Water St. An area of bush land survived in the south west corner, most of which is gone by 2008 except for a tiny area next to today's Primo factory. Besides this area of remnant bush by 2008 the entire Subcatchment and surrounds have been developed with only a few parks and the banks of the Cooks River left as open space.

Land Use - Today

Residential Dwelling Types

Subcatchment Size – 417 Hectares
Number of residential dwellings – 1,024

72%
Separate Houses

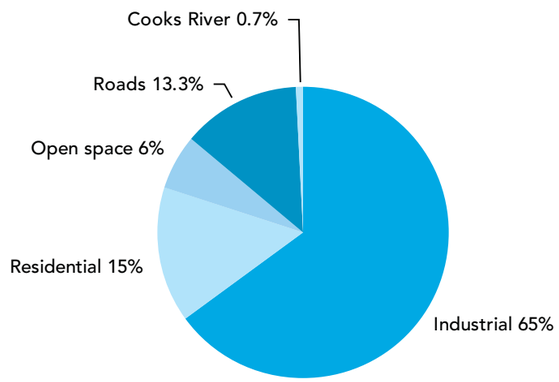
2.7%
1 storey semi, row, or terrace house

3.6%
2 storey semi, row, or ter - race house

0.6%
Unit or flat attached to shop or house

13%
1 or 2 storey block – flat, unit, apartment

8%
3 storey block – flat, unit, apartment



Land Use Zonings

Pollutants and Hard Surfaces

Pollution and surface types in the Strathfield South Subcatchment

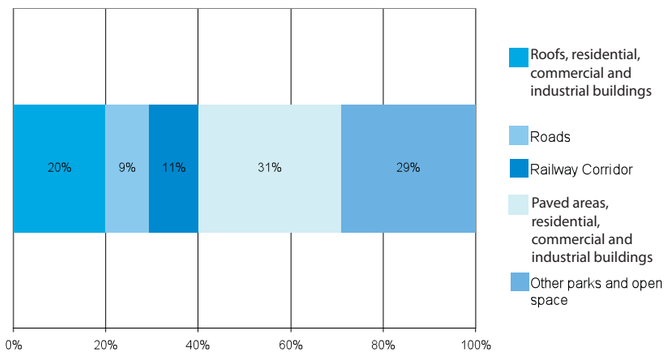
Approximately 71% of the Strathfield South Subcatchment is made up of hard or paved surfaces including roads, pavements, roofs and railway tracks. The large proportion of hard surfaces reflects the highly industrial character of the area and the high residential density of inner Sydney in general. More than 90% of pollutants found in stormwater that flows from the Subcatchment into the Cooks River comes from these hard surfaces (see graph at bottom right below).

The table below shows the estimated amount of pollutants currently found in stormwater in the Subcatchment. The Best Practice Stormwater Targets shown are draft targets set by the NSW Government to improve water quality. Based on these targets gross pollutants for example, should be reduced by 90% from the current level of 61,500 kilograms per year to 6,150 kilograms per year.

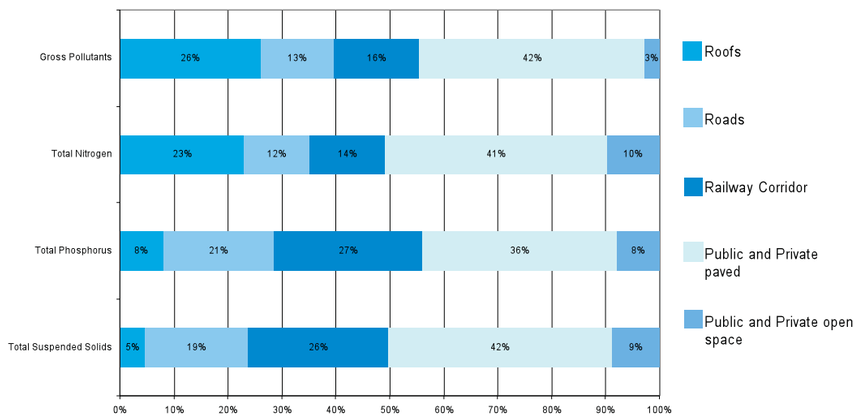
Pollutant	Estimated average pollution loads - NOW (kg/yr) *	Best Practice Stormwater Targets (% reduction)	TARGET pollution loads (kg/yr)
Gross pollutants	61,500	90%	6,150
Suspended Solids #	747,000	85%	112,050
Total Phosphorus	1,380	65%	483
Total Nitrogen	8,710	45%	4,791

* Estimated with MUSIC modelling software

#Note: removal of suspended solids will result in a reduction of heavy metal and hydrocarbon loads.



Surface types in Strathfield South Subcatchment



This graph shows the amounts of pollution generated from each surface type in the Strathfield South Subcatchment. At least 90% of these pollution types comes from a hard surface.

Water Quality Indicators	What is it?	What are their impacts?
Gross Solids	• Litter • Coarse sediments • Organic matter	• Reduce stormwater drainage capacity • Impact on visual amenity • Impact on aquatic habitats • Impact on water quality indicators such as oxygen demand, hydrocarbons and metals
Total Nitrogen Total Phosphorus	Nutrients from natural and non-natural sources including: • Atmospheric deposition • Soil particles • Human and animal faeces • Plant matter • Fertilizers • Vehicle exhaust	• Nutrients promote growth of aquatic plant life. In large concentrations they can produce algal blooms on the water surface. • Algae are microscopic plants which occur naturally in water bodies. Increased nutrients promote algal growth resulting in a build up of toxins. Toxic algal blooms cause the closure of fisheries, water farming industries and public beaches.
Suspended Solids	• Soil particles • Airborne particles • Sediment from erosion and land degradation • Leaf litter	• Reduce the penetration of light through water impacting on the respiration of aquatic plants • Phosphorus, heavy metals and organic chemicals utilise sediment as the medium for transportation in urban runoff
Lead	Trace metals derived from petrol additive, hydrocarbons, paint	Impacts of metals in water bodies can vary widely. Impacts are affected by complex interactions with biophysical parameters such as pH, dissolved oxygen and temperature.
Zinc	Trace metals derived from vehicle wear, pesticides	
Hydrocarbons	• Mineral oils • Petrochemicals	• Impact on visual amenity • Impact on chemical oxygen demand
Chemical Oxygen Demand	Measure of oxygen demand from chemical oxidation of organic and inorganic material	• Used as an indicator of “general health” of a water body. Organic material uses oxygen in biodegradation and chemical oxidation. • High oxygen demand will limit capacity to support vibrant ecosystems.
Biological Oxygen Demand	Measure of oxygen demand from biodegradation and oxidation of organic material.	
Total Organic Carbon	Total amount of organic material as measured in carbon	Organic matter can impact on: • Biogeochemical processes • Impacts on nutrient cycling • Biological availability • Chemical transport and interactions
Organic Matter	• Leaves • Grass clippings • Human and animal faeces	

Hot Spots

This diagram shows stormwater issues and hot spots as identified in interviews with Council staff

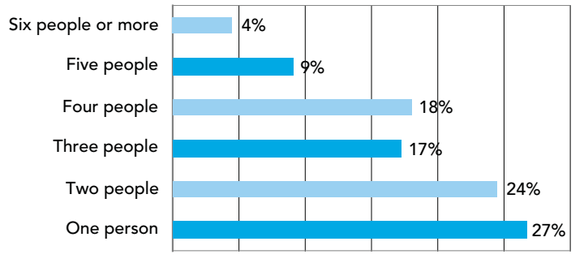
Do you know of any hot spots in the Strathfield South Subcatchment that are not shown here?

Social Characteristics

Key Statistics

- Population – 2,989 residents
- Origin – 43% born overseas; Lebanon (5%) followed by Italy, Korea and China, all 3%.
- Languages at home – 56% non-English including Arabic (18%), Italian (6%), Greek (4%) and Korean (4%).
- Religion – 64% Christian, 13% Islam, 7% no religion
- Travel to work - Car (77%),Train (7%), Buses (3%), walk (3%), bicycle, motorbike or a scooter (1%).

Household Types

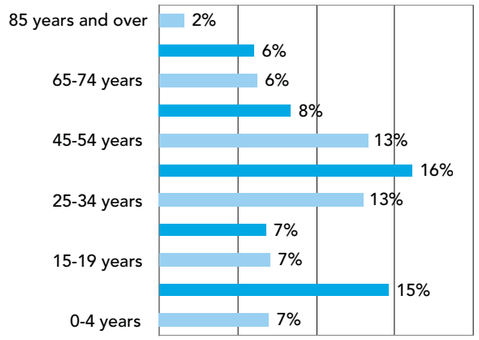


- 50% of residents are married
- 52% of residents are living as a couple with children
- 19% of residents are single parents
- 26% of resident are living as a couple with no children

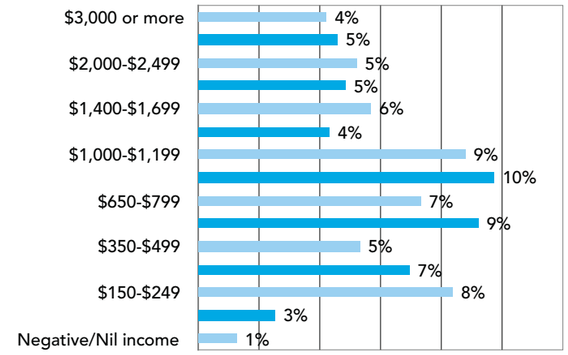
Education

- Currently attend an educational institution: 34% of residents
- Currently hold a non-school qualification: 39% of residents (over 15yrs) have a non-school qualification, including 11% Bachelor degree or higher and 16% Advanced Diploma, Diploma or Certificate.

Age Distribution



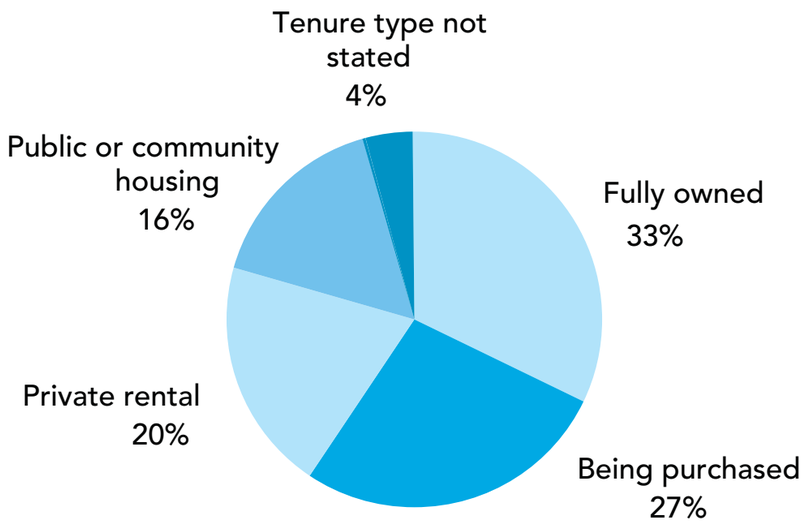
Weekly Household Income



Employment

Of the active labour force (1,208 residents):

- 60% are employed full time
- 26% are employed part time
- 6% are unemployed



Household Tenure

All data sourced from the Australian Bureau of Statistics 2006 Census

Strathfield South Community Water Survey

Who answered the survey?

(Total: 109 people (11% of households))

Gender	48% Males 52% Females
Origin	52% born in Australia
Language	75% speak english at home 7% Cantonese 6% Arabic
Education	34% - High School (Yr 10 or 12) 31% - Uni. qualification 16% - TAFE / trade cert.
Age	60-75 years – 21% 75+ years – 20% 50-59 years – 17% 20-29 years – 10%
Household Type	36% Couple with children at home 28% Single person living alone
Tenure Type	44% Fully own home 28% Buying home 20% Rental – public 6% Rental - private
Dwelling	69% Separate house 22% Flat, unit, apartment
Time in Current Residence	48% - 1 -10 years 30% - 20+ years 17% - 10 – 20 years
Individual Gross Weekly Income	20% - $200 - $399 16% - $1,500 or more 14% - $600 - $799 14% - $1,000 - $1,499

Knowledge of urban water systems

1. In my council area, the rainwater in the street drains normally goes:

- 56% Waterway (correct)
- 37% Sewerage

2. From the list below, which would normally end up in the street drains?

Water From:	% Responses	
Driveways, footpaths	76%	Correct
Rainwater from the roof	69%	Correct
Other paved areas	58%	Correct
Water from the garden	55%	Correct
The washing machine	34%	Incorrect
The kitchen sink	33%	Incorrect
The shower	32%	Incorrect
The toilet	26%	Incorrect

3. On average, how many litres of water does a typical household use per day?

- 85% underestimated daily household water use
- 6% chose the correct range (400-500L per day)
- 3% overestimated daily household water use

Receptivity to using rain and recycled water

The percentage of people who would consider using rainwater and greywater and how they would use it.

	Rainwater	Grey Water
Watering Garden	94%	76%
Washing Car	82%	57%
Flushing Toilet	74%	64%
Washing Clothes	38%	23%
Showering	19%	9%
Other	1%	3%
Would not use	4%	11%

Behaviour

Of 109 people:

1. Rainwater Tanks

- 38 people answered the question about how they use water from their rainwater tank.
- 95% use it for garden; 76% for washing the car and 63% for flushing the toilet.

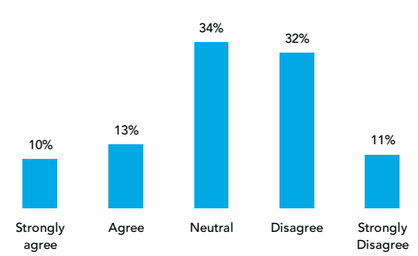
2. Greywater Systems

- No households had a greywater diversion or treatment system installed.
- 51 households collect and reuse greywater.
- 63% (32 households) use it on the garden, 56% (29 households) for flushing the toilet and 26% (13 households) for washing the car.

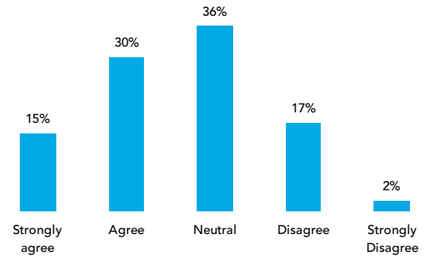
3. Water Saving Devices

- 83% (91 people) have water saving devices

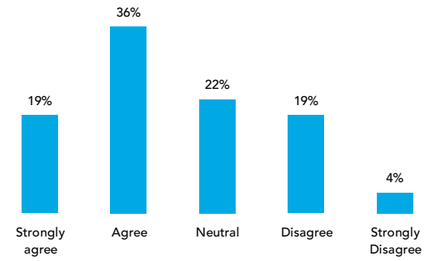
Attitudes



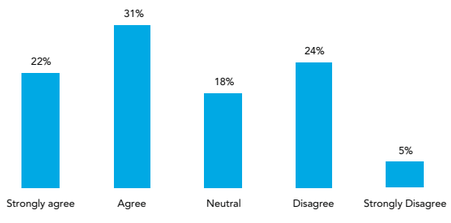
a) 'Jobs are more important than the environment'



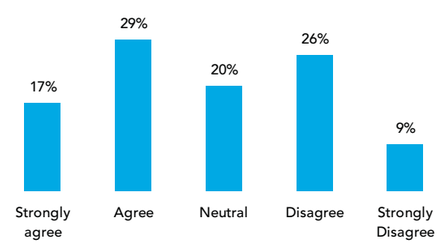
b) 'Access to a healthy natural environment is more important than access to community facilities'



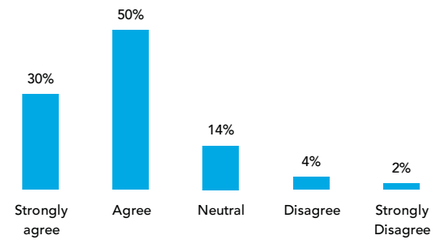
c) 'My daily activities have little negative impact on the waterway environment'



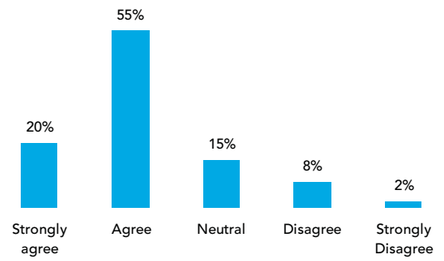
d) 'Government agencies should have the main responsibility for the waterway environment rather than the individual.'



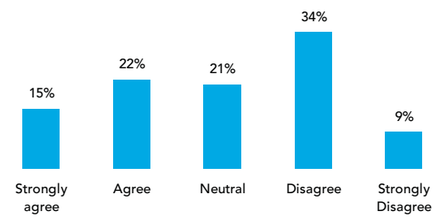
e) 'We should aim for the same waterway conditions as before the Europeans arrived over 200 years ago.'



f) 'I would reduce my shower time by half to save limited water resources.'



g) 'Most people want to help improve the health of the waterway environment.'



h) 'Laws are more effective than education for protecting the waterway environment.'

Authorities and Land Users

Authorities

Department of Housing / Community Housing

Provide affordable housing options. 16% of the dwellings managed in the Strathfield South Subcatchment are either rented or owned by the Department of Housing or organisations such as Affordable Community Housing.

Sydney Water

Owns and is responsible for the maintenance of the concrete channel that carries the Cooks River, the potable water and waste infrastructure and delivery of potable water within the Subcatchment. Sydney Water also owns the Liverpool to Ashfield Pipeline that runs through the top of the Subcatchment.

Roads and Traffic Authority

Jointly responsible for the operation and maintenance of Liverpool Rd, Juno Parade and Punchbowl Rd.

Sydney Ports Authority

Responsible for the development and management of the Enfield Intermodal Logistics Centre

Railcorp

Responsible for the management and maintenance of the New Enfield Marshalling yards

Land Users

Industrial and Commercial

There is a range of commercial operators within the Subcatchment consisting largely of automotive related business and other heavy industries such as concrete batching, industrial recycling, small goods, dry cleaning and machine storage.

Strathfield Golf Course

Is a privately managed grade 1 golf course. Half of the course area (18.8 ha) is leased from Strathfield Council while the club owns that part of the course located within the Subcatchment.

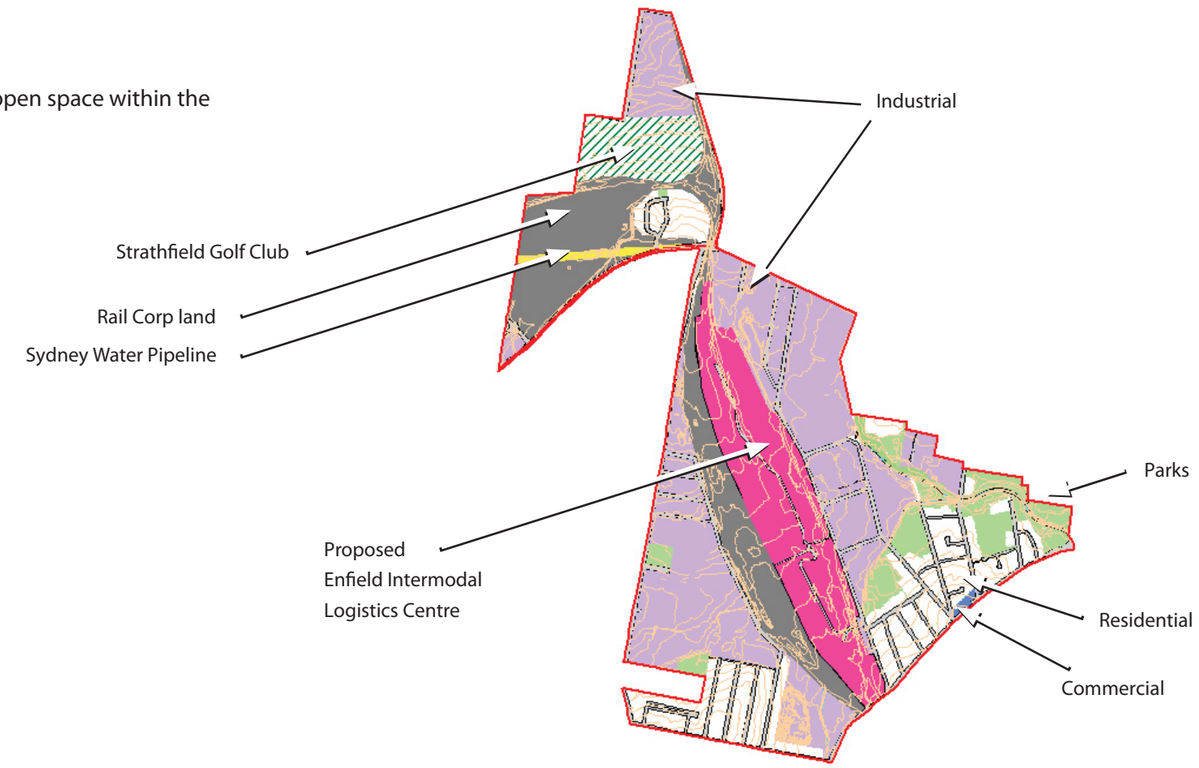
Southend Tennis Centre

Managed by the Strathfield Hardcourt Junior Tennis Club Limited on land leased from Strathfield Council.

Strathfield Council

Manages the parks, playgrounds and open space within the Subcatchment.

Parks, Playgrounds and Reserves	
Ford Park	2.8 ha open space playground, rest area
Matthews Park	1.4 ha grassed park
Jim Begnell Memorial Park	3.9 ha park, rugby field and grand stand
Cooke Park	3.7 ha. 2 playgrounds, cricket pitch, skate park, toilets and rest area
Bark Huts Reserve	3.5 ha soccer and cricket pitch, basketball court, playground and rest area
Dean Reserve	3.8 ha park, Cooks River cycle way, playground, rest area
Maria Reserve	1.6 ha green space, remnant Castlreagh Ironbark Forest
Elliot Reserve	1.4 ha open space
Coxs Creek Reserve	1.5 ha remnant Castlereagh Ironbark Forest



Proposed Enfield Intermodal Logistics Centre

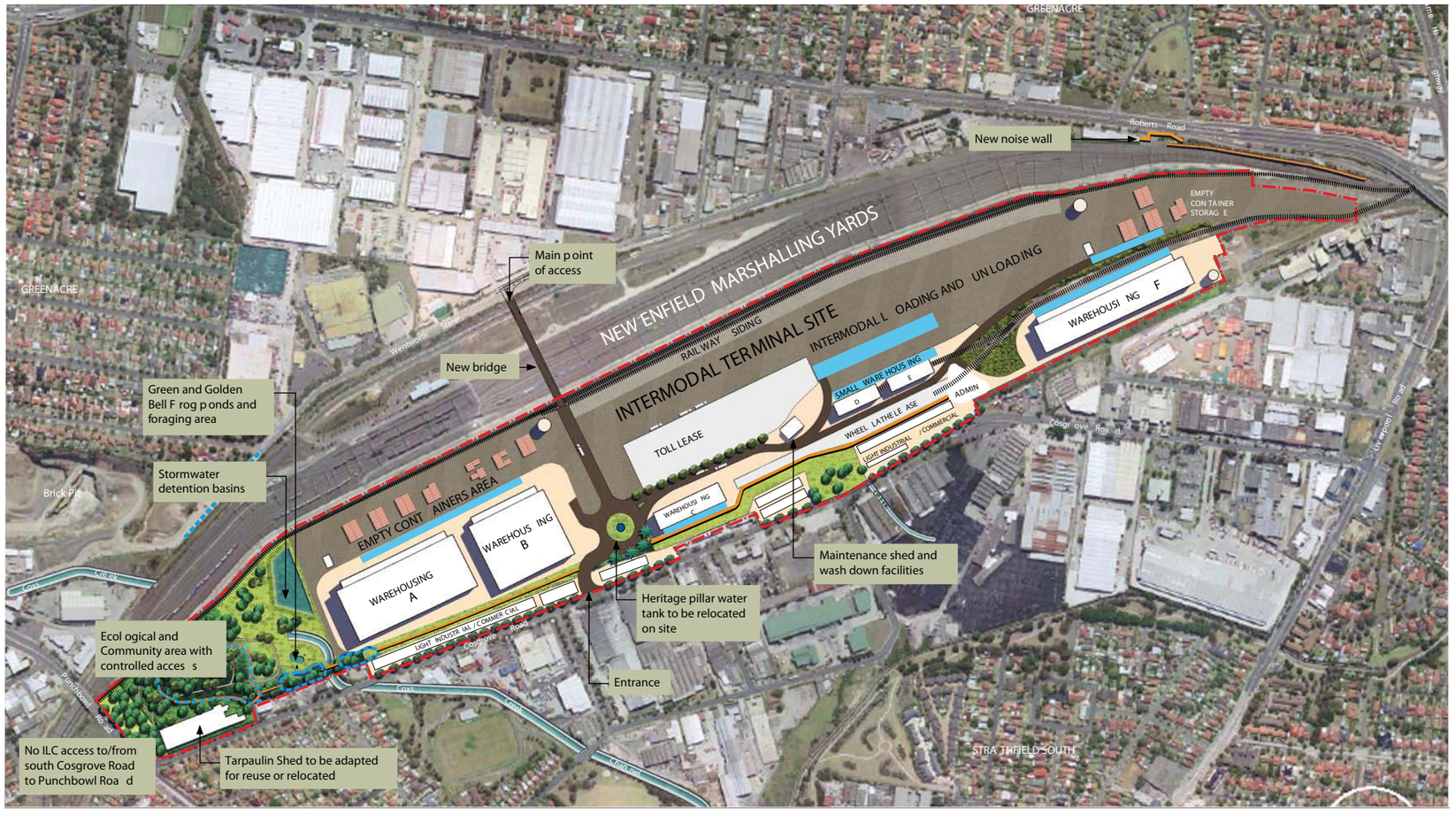
Site History

Enfield Marshalling Yards were established in 1916 on land that was once 'Enfield Park'. The Marshalling Yards became a large local employer and drove residential development in suburbs close by at Enfield, Belfield, Strathfield South, Chullora and Greenacre. The Yards closed in the 1970s but many of those once employed in the Marshalling Yards still live in the area.

Proposed Enfield Intermodal Logistics Centre

- 60 hectare disused site located in an industrial/commercial area connected by a dedicated freight line to Port Botany
- An intermodal terminal in a 12 hectare area where a total of 300,000 containers can be moved into and out of the site
- Six warehouses close to 70,000 square metres
- A light industrial and commercial area, comprising up to 40,000 square metres
- Two road access points linking to Roberts Road and the Hume Highway through industrial areas
- Empty container storage areas
- A six hectare ecological area
- Areas of the site will operate 24 hours, seven days a week
- Construction is expected to take approximately two years and scheduled to begin in 2009.
- The intermodal terminal is expected to be operating at full capacity by 2016.

ILC site September 2008 © CRSI



Sydney Ports Authority, ILC Project Overview April 2008

Strathfield Golf Club - Cooks River Bank Stabilisation

Strathfield Golf Club – Cooks River bank stabilisation and naturalisation

Strathfield Council is completing the last stage of bank restoration works in Freshwater Park to stabilise and revegetate the banks of the Cooks River and prevent local flooding. Restoration began in 2001 to a 200m section of the Cooks River, just upstream from Hedges Ave. Several homes in this area and the Strathfield Golf Club were under threat from the collapsing river banks.

Since 2001 bank restoration has been completed from Hedges Ave up to Centenary Drive with the last stages of landscaping to be completed at Centenary Drive by 2009.

Whilst the immediate aim of the project was to stop bank erosion and flooding the project also offered the opportunity to naturalise this part of the Cooks River. This had the additional benefit of improving the riverine habitat, improved water quality and the amenity of the river. Below are some before and after images of the project.

Drawing by PSB Pty Ltd, Landscape Sections and Details, Cooks River Restoration, Freshwater Park, Strathfield 2004

Before




After