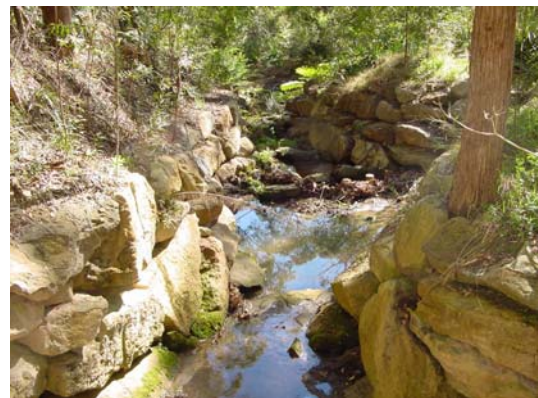




Hornsby Shire Council

# Water Management Plan

2004





The Hornsby Shire Council Water Management Plan was produced by Dr Ross McPherson, Manager, Water Catchments and Katie Clarke, Administration Officer, at the direction of the Executive Manager, Environment, Mr Robert Stephens, Hornsby Shire Council.

We would like to thank the following Teams and Divisions within Council for their contribution to the Hornsby Shire Water Management Plan:

Water Catchments Team  
Parks and Landscape Team  
Environmental Health and Protection Team  
Waste Management Team  
Bushland and Biodiversity Management Team  
Works Division  
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Strategy Division  
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## A message from the Mayor

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Australia is one of the driest continents on this planet, and as Australians, we are all starting to realise that our reliance on water is important to our economic, social and environmental wellbeing.

This Water Management Plan has been developed as a framework for Council and the community to better understand and prioritise the actions required to effectively manage our water resources in Hornsby Shire.

A number of these actions are both innovative and difficult to apply, nonetheless if Council does not take a lead in this important area of natural resources management, it is doubtful that any other agency or organisation in this state will take this action for us.

Cllr Nick Berman  
Mayor



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## Foreword

The production of this Water Management Plan has been initiated by Hornsby Council's involvement in the International Council for Local Environmental Initiatives (ICLEI) Water Campaign™. The Management Plan development process has enabled Council to prioritise and integrate a range of current and future water management initiatives.

Significant existing management plans currently operating in this area include the Environment Protection Authority (EPA) (now the Department of Environment and Conservation)'s Stormwater Management Plans. These cover the Berowra, Cowan and Lane Cove Catchments and address a range of water quality issues associated with stormwater.

Prior to the EPA directing Council to develop these stormwater management plans, Hornsby Council had developed its own set of stormwater planning documents which not only considered stormwater quality, but also integrated stormwater quantity works. These were applied and developed on a sub-catchment basis. Hornsby Shire currently has 18 of these Sub-catchment plans with the associated works being implemented by both Council's Works and Environment Divisions.

The primary State Government natural resource management planning tool which applies to Hornsby Shire is the Hawkesbury-Nepean Catchment Management Blueprint, this was developed by the Department of Infrastructure, Planning and Natural Resources (DIPNR), in consultation with Hornsby Council and a number of other Councils within the Hawkesbury-Nepean Catchment. This Blueprint addresses issues associated with water quality and quantity in the Hawkesbury-Nepean catchment and forms a basis for the future management of the Hawkesbury-Nepean by the recently established Catchment Management Authority.

The first significant management plan associated with water resources developed in the Hornsby Shire was the Berowra Creek Water Quality Management Strategy, which was developed via the Statement of Joint Intent (SoJI), see ([Appendix A](#)) in 1995.

Other major planning tools currently being developed and implemented for aquatic systems in the Hornsby Shire are the Estuary Management Plan for the Brooklyn area of the lower Hawkesbury and the implementation of the Berowra Estuary Management Plan (2000).

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Council is also an active participant in Sydney Water's Every Drop Counts Program and sees great opportunities for integration between this initiative and the ICLEI Water Campaign™.

The Water Catchments Team, Bushland and Biodiversity Team and Environmental Health and Protection Teams, within the Environment Division at Hornsby Shire Council, are all certified under the International Standards ISO14001 (Environmental Management Systems) and ISO9001 (Quality Management Systems).



**Figure 1 Arcadia Oval (Leachate treatment project)**



**Figure 2 Clarinda wetland project**

Hornsby Shire Council's involvement in the Water Campaign was officially endorsed at Council's Ordinary Meeting on 12 June 2002. (See Appendix i Report to Council)

Since then, Council has successfully completed Milestone 1 – The Inventory, for the Water Campaign for Corporate and Community. This achievement was formally recognised at the ICLEI recognition breakfast at the National General Assembly in Canberra on 24 November 2003.



The Hon. Dr. David Kemp, MP, the then Minister for the Environment and Heritage addressing Councils at the National General Assembly in Canberra on Monday, 24 November 2003.



NSW Group, including Hornsby Shire Council, receiving their Award.



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## 1. Introduction

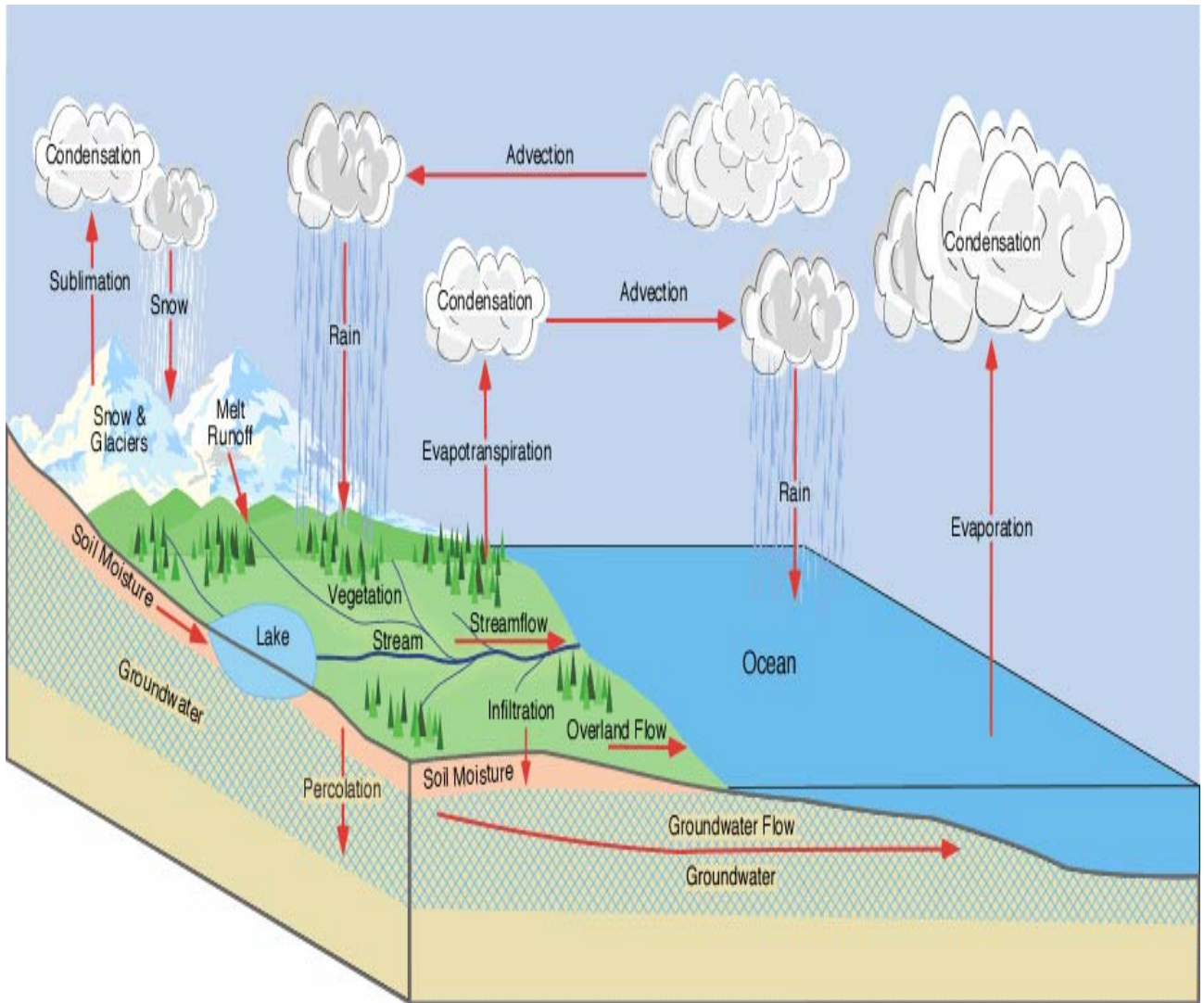
Over the last 10 years, the management of water in Australia has evolved through a number of phases. Initially, primary concern revolved around the importance of water quality. This then slowly changed to a more planning-based perspective, with the implementation of the principles of water sensitive urban design.

Hornsby Council made an undertaking to utilise the principles of water sensitive urban design in its consideration of future developments. To achieve this goal, documents were drafted and introduced in 1997, i.e. Sustainable Water Best Practices and the Sustainable Water Development Control Plan, 1997. The Sustainable Water Development Control Plan is presently under review.

While Water Sensitive Urban Design principles identified the need for the use of devices such as rainwater tanks for the re-use of stormwater, the principles around re-use are only now being developed with some urgency under the impetus of the current drought conditions and water restrictions imposed in most major population centres

After undertaking a desktop survey of water management practices within Australia, it is concluded that within the last decade few elements of water management, such as water quality, can be managed in isolation from any other elements of the water cycle.

Hornsby Shire Council has subsequently realised that to manage water efficiently, a better understanding of the complete water cycle needs to be developed so that when a decision needs to be made relating to one component of the water cycle, the implications for the rest of the components of the water cycle can be better assessed.



**Figure 3 Basic Water Cycle model**

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A sustainable future is a challenge to all of us in Hornsby Council, and one that drives Council in achieving its intent of 'creating a living environment'. Hornsby Council's Management Plan has the following set of elements to ensure its intent becomes a reality. These are:

1. Engaging the community in the future of the Shire.
2. Protecting the natural environment.
3. Conserving resources.
4. Facilitating increased social well being.
5. Aligning service provision to meet changing needs.
6. Integrating land use and transport planning.
7. Facilitating a diverse local economy.
8. Achieving financial sustainability.

To conserve water resources, the implementation of a Hornsby Shire Water Management Plan thus aligns with Elements 2 and 3 of Council's Management Plan.

It can be seen in Section 8 Hornsby Shire Water Management Plan under Water Quality, No. 8 that Council has recently initiated the development of a Water Cycle Management Strategy for Hornsby Shire. This project will produce an integrated water cycle management plan and predictive model. The strategic framework will facilitate a clear understanding of the demands on water across the Shire's catchments and will map climate, environmental flows, surface water, ground water, wastewater and reticulated sources with a major emphasis on the sustainability of ecosystem health.

The strategy will develop a predictive model interactively linked to Council's GIS system. This will allow Council to run "what if" scenarios in regards to the assessment of water usage and developments, new landuse zonings, population density and ecosystem health in assessing the various elements of the water cycle in achieving better future planning.

It is anticipated that the modelling component of this Strategy will take several years to complete. The benefit of developing and maintaining such a model will be to manage development in a more sustainable fashion.

It is envisaged that this Water Management Plan will be updated pending the completion of the Sustainable Water Cycle Management Strategy.

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The Hornsby Shire Water Management Plan was developed in collaboration with the International Council for Local Environmental Initiatives (ICLEI). ICLEI is an association of local governments on a national and international scale, with more than 400 members representing nearly 300 million people worldwide. The ICLEI Water Campaign™ serves as a trigger for Local Government to integrate initiatives relating to water quality and water consumption. This Plan also aims to integrate all of the elements of the water cycle, and those responsible for these functions, to better manage water resources in Hornsby Shire.

Apart from the Water Campaign, Council's involvement in sustainability projects dates back to the establishment of its Local Agenda 21 Committee in 1997, after the preliminary work of the Local Agenda 21 Establishment Team. Agenda 21, which was adopted at the 1992 Earth Summit in Rio de Janeiro, reflects the highest level of global consensus and political commitment to sustainable development and international co-operation.

Council, through its Local Agenda 21 Committee, joined the Cities for Climate Protection (CCP) program in 1999, and has resolved to reduce its greenhouse gas emissions generated by Council activities, local households, business, waste disposal, land use change, and transport. Council developed the Greenhouse Gas Reduction Strategy to provide a strategic framework for meeting the draft emissions reduction target adopted by Council of 20% from 1996 to 2010. This complies with Council's Strategic Management Plan 2000-2010 that aims to improve the environmental, economic, and social sustainability of all sectors of the community.

Council's Sustainable Action Committee (formerly the Local Agenda 21 Committee) has been involved in the following projects and community representatives are encouraged to participate in Council's Hornsby earthwise initiatives.

Community Sustainability Indicators Project (CSIP)  
Cities for Climate Protection (CCP)  
Energy Performance Contract (EPC)

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Following participation by hundreds of community members in developing the vision and indicators through the Community Sustainability Indicators Project (CSIP), a Hornsby earthwise project was initiated in 2000 which aimed to:

- ❖ Identify what the community treasure about the Shire and what their visions and ideals are for the future.
- ❖ Develop a set of community sustainability indicators to measure progress towards the community vision.

To date, six community sustainability indicators have been adopted into Council's Management Plan and State of Environment Report. In addition, the eight themes are being aligned as 'community visions' under the corresponding eight elements in Council's Management Plan.



**Figure 4 Hornsby Earthwise Logo**



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## **2. Framework of the Water Campaign™**

The ICLEI Water Campaign™ supports a systematic identification and evaluation of the water resource management challenges facing local government at the Corporate, Community and Catchment levels.

The Milestones framework covers a broad spectrum of water management issues under the categories of Corporate, Community and Catchment. These include:

1. Inventory - the compilation of water quality and water consumption data within a Local Government Area to form a base year;
2. goal setting - the assessment of the current state of water quality and water consumption; goal setting to improve the current situation;
3. adoption and implementation of a Local Action Plan to achieve these goals and,
4. monitoring and evaluation of the actions being implemented.

The Hornsby Shire Water Management Plan has been prepared using the ICLEI Water Campaign™ framework to review our current management of freshwater resources and the total freshwater cycle. It also addresses how Hornsby Council can contribute to the improved management of these resources within our operations and across the Shire.

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### **3. Purpose of the Hornsby Shire Water Management Plan**

This Plan has been developed to better prioritise and integrate the range of water management initiatives currently being delivered within Hornsby Shire and those which are planned to be delivered over the medium to long term.

The Plan sets goals and targets for water consumption and quality within the Shire and develops a framework within which all stakeholders can participate and easily understand their place within the management of the water cycle in this region.

The actions set out in this Plan have been developed to give a prioritised structure to the management of the Shire's water resources.

There are many established programs relating to water management in this Shire and these are identified within the Management Action Plan in Section 8. There are also a number of new initiatives developed as a result of the formulation of this Plan and these are also flagged in the Action Plan.

### **4. Study Area**

#### **4.1 Physical**

The Shire of Hornsby is the second largest Local Government Area (LGA) in the Sydney region. The Shire, located to the north of Sydney, takes in land from Epping north to Wisemans Ferry and Brooklyn. The Hornsby LGA supports the needs of 150,000 residents over an area of 50,990 hectares. Hornsby Shire is a vibrant beautiful place to visit, live, and has rich human and natural resources.

It includes the suburbs of:

Epping, Cheltenham, Beecroft, Pennant Hills, Thornleigh, Normanhurst, Wahroonga, Waitara,

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Hornsby, Asquith, Mt Colah, Bobbin Head, Berowra, Berowra Waters, Cowan, Brooklyn, Dangar Island, Lower Hawkesbury, Laughtondale, Wiseman's Ferry, Carlingford, Cherrybrook, Glenhaven, Dural, Middle Dural, Mt Kuring-gai, Galston, Crosslands, Berrilee, Fiddletown, Arcadia, Glenorie, Forest Glen, Canoelands and Maroota.

Please refer to Appendix B [ICLEI Hornsby Map](#) for information on the Shire's creeks, HSC pools, Sewage Treatment Plants, Parks and Sportsgrounds.

## **4.2 Catchments**

The Shire includes four catchments, namely ([See Appendix ii – Map of catchments](#))

### **4.2.1 *Berowra Creek Catchment***

The Berowra Creek Catchment is bounded on the south by Castle Hill Road, to the west by Old Northern Road, to the north by the Canoelands Ridge and to the east by the Pacific Highway. All of the Berowra Creek Catchment is within the jurisdiction of Hornsby Shire Council.

This catchment contains significant bushland areas which include Marramarra National Park, Muogamarra Nature Reserve and the Berowra Valley Regional Park. Landuses in this catchment include: bushland, rural, developed, urban, light industrial and commercial. Most urban and industrial activities occur in the eastern and southern regions of the Catchment.

In order to address poor water quality across Hornsby Shire, Council has embarked upon a program to remediate degraded waterways and reduce stormwater pollutants. Works include:  
constructed wetlands

Gross pollutant devices

Sediment basins

Creek rehabilitation, and

Control of leachate from former landfills.

All these works are funded by a special environmental rate or Catchment Remediation Rate (CRR) which is levied at 5% of Council's Ordinary Rate Shire-wide. The image below is an example of a capital project conducted at Berowra Creek.



**Figure 5 Clarinda Street wetland, Berowra**

#### **4.2.2 Lane Cove River Catchment**

Seven local government authorities have jurisdiction over the Lane Cove River Catchment. Only the upper reaches of the Lane Cove River Catchment are within Hornsby Shire. This catchment is dominated by developed urban landuses and some commercial areas as well as bushland areas such as the Lane Cove National Park.

#### **4.2.3 Cowan Creek Catchment**

Within the Cowan Creek Catchment there are four Local Government Areas. The western boundary, defined by the Pacific Highway, lies within Hornsby Shire. Land uses in the southern part of this area include extensive light industrial areas, large commercial shopping centres and developed urban areas. Kuring-gai Chase National Park also covers a large part of the catchment.

#### **4.2.4 Hawkesbury River Catchment**

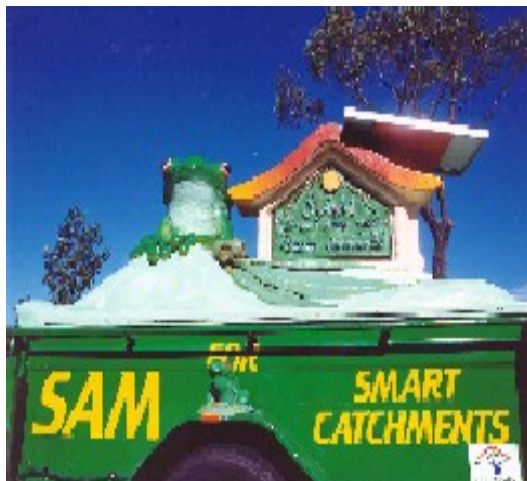
The Hawkesbury River Catchment within Hornsby Shire is divided into two areas which include the Wisemans Ferry/Maroota region as well as the Brooklyn area. These areas drain directly to the Hawkesbury River. Landuses in this area include small farming ventures, market gardening, residential, marinas, boat ramps, aquaculture and fishing (commercial and recreational).

---

### 4.3 SAM FOR Smart Catchments

Council recognises the importance of environmental education, a number of officers responsible for environmental education at a number of levels and across a variety of resources have been employed. These officers undertake projects that are aimed at raising environmental awareness within Council's corporate and the general community.

SAM for Smart Catchments is a stormwater education project, which aims to increase awareness of stormwater issues through the use of an interactive catchment model called SAM (Stormwater Activity Model). SAM is a portable interactive catchment model developed to demonstrate water flows in a catchment, and to remind people of all ages and occupations that we can all have an effect on the quality of water in our local streams, creeks and rivers. Environmental education on stormwater issues is essential because most environmental problems arise as a result of peoples actions. SAM has been so popular over the last 2 years that it has now undergone a facelift, and now features beaches, people, cars, shops, mangroves, wetland, farms, etc.



**Figure 6 SAM for Smart Catchments trailer**



#### 4.4 Social

To gauge water consumption, it is necessary to obtain information on the population of the Shire. A snapshot of the Shire based on the 2001 Census of Population and Housing is presented in Table 1 below.

**Table 1 2001 Census Data**

<b>AUSTRALIAN BUREAU OF STATISTICS 2001 Census of Population and Housing</b>			
Hornsby (A) (SLA 105604000) 462.4 sq. Kms			
<b>Persons</b>			
	<i>Males</i>	<i>Females</i>	<i>Persons</i>
<b>Total persons(a)</b>	<b>70,503</b>	<b>75,465</b>	<b>145,968</b>
Aged 15 years and over(a)	55,095	60,385	115,480
Aged 65 years and over(a)	7,341	10,733	18,074
Aboriginal	198	196	394
Torres Strait Islander	15	20	35
Both Aboriginal and Torres Strait Islander(b)	7	11	18
<i>Total Indigenous persons</i>	<i>220</i>	<i>227</i>	<i>447</i>
Born in Australia	46,153	49,271	95,424
Born overseas(c)	20,986	22,283	43,269
Speaks English only	53,571	56,683	110,254
Speaks other language(d)	14,197	15,403	29,600
Indigenous persons aged 18 years and over	127	132	259
Australian citizen	60,994	64,894	125,888
Australian citizen aged 18 years and over	44,314	48,420	92,734
Enumerated in private dwelling(a)	69,616	73,327	142,943
Enumerated elsewhere(a)(e)	887	2,138	3,025
Overseas visitors	528	748	1,276
(a) Includes Overseas visitors.			
(b) Applicable to persons who are of both Aboriginal and Torres Strait Islander origin.			
(c) Includes 'Inadequately described', 'At sea', and 'Not elsewhere classified'.			
(d) Includes 'Non-verbal so described' and 'Inadequately described'.			
(e) Includes 'Non-Private dwellings', 'Migratory and Off-shore'.			

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The following table shows the population projections from January 2004 to June 2010, prepared by Hornsby Shire Council Strategic Planning Section:

**Population Projections January 2004 to June 2010**

14-May-03

District	Jan-04 2009/2010	Projected Population Growth 2004 to 2010
1	31430	32181 751
2 & 2A	27086	28320 1234 (District 2A only - 494)
3	18138	20144 2006
4	19009	20340 1331
5	9463	9884 421
6	10326	11525 1199
7	993	1144 151
8	27238	28491 1253
9	8182	10426 2244
<b>Shire Total</b>	<b>151865</b>	<b>162455 10590 6.97% increase</b>

The projected increase in population would reflect a corresponding increase in water consumption.

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## 5. Assessment of Existing Conditions

### 5.1 Water Quality

Hornsby Shire Council's water quality monitoring program has been in progress since October 1994. During 2002-2003, 36 sites were monitored on a monthly basis, of these sites, 17 sites were monitored twice a month. Sites selected for monitoring are representative of the major catchment and landuse types or are located to address specific water quality issues.

The results obtained from this program are used to identify trends in the quality of water at sites monitored. This information, to highlight the impacts of landuse on receiving water quality, has been used by organisations external to Council. These organisations include the Sydney Water Corporation, various Consultants employed by Council, community groups, and students. The Environment Division within Council uses the information for environmental education programs, the Catchment Remediation Program, State of the Environment Reporting and various environmental assessments (eg. development applications and estuarine process studies, etc).

For further information on our Water Quality program, please refer to the [Interactive Water Quality Map](#) in our website.

#### **5.1.1. Physical and Chemical Monitoring**

At each site physical measurements including pH, temperature, conductivity, dissolved oxygen and turbidity are recorded in situ. In addition, water samples are collected for laboratory analysis for suspended solids, faecal coliforms, total phosphorus, oxidised nitrogen, ammonia and total nitrogen. At Fishponds Waterhole and at selected estuarine sites, samples are collected for chlorophyll-a analysis and soluble reactive phosphorus. Samples for algal identification and cell counts are also collected at Berowra Waters and Calabash bay, where problematic algal species are known to occur. General observations recorded at each site include flow, weather conditions, presence of oily films, frothing, algae or nuisance organisms, odour and the colour/appearance of the water column. All samples are collected according to strict quality control procedures which assures the integrity of the results obtained. Data obtained from monitoring is then utilised to ascertain trends through time including spatial and temporal changes.

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Areas of highest water quality were associated with the least disturbed catchments. Specifically, the quality of the water within the two reference creeks is considered 'healthy' as specified within the ANZECC (2000) guidelines. Areas where the water quality was impacted or consistently degraded received impacts from either stormwater, high flows, periodic pollution incidents, sewer overflows or effluent discharges. These identified pressures are being addressed through various management strategies (such as the Statement of Joint Intent, Water Quality Management Strategy for Berowra Creek, and catchment remediation initiatives).

All urban and industrial areas contribute the highest concentrations of contamination via stormwater runoff. Concentrations of nutrients, suspended solids and faecal coliforms are significantly greater within these landuse zones during wet weather. Wet weather is also problematic for sewage treatment and transport as indicated by the frequency of sewer overflows and number of bypass operations of the sewage treatment plants during wet periods. In line with WaterPlan 21, a major upgrade to reduce total nitrogen loads from the sewerage treatment plants has now been completed, and has resulted in significant reductions in nutrient concentrations.

The industrial areas at Thornleigh, Mount Kuring-gai and Hornsby continue to have poor water quality with high concentrations of suspended solids, nitrogen and faecal coliforms. These results indicate sewage pollution from inadequate private connections, illegal connections or failing sewage mains infrastructure in both private and Sydney Water lines. Of particular note is the Thornleigh industrial area (Larool Creek) which has had consistently poor water quality since monitoring began in 1994, and is considered to be the most degraded creek in Hornsby Shire when compared to national water quality guidelines and reference creek conditions.

Pollution from on-site disposal or pumpout of effluent is evident within the rural areas. This is particularly evident at Site 80, Glenorie Creek. High nitrogen, specifically oxidised nitrogen and ammonia are often associated with high faecal coliform levels indicating the infiltration of sewage from on-site disposal/pumpouts in the area and/or illegal disposal. The high levels of faecal coliforms potentially indicate the presence of other bacteria, viruses and protozoa that are harmful to human health.

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Within the estuarine areas, high levels of nitrogen and chlorophyll-a at the ferry crossing (site 60) and at Calabash Point (site 61) are of major concern. The origin of these nitrogen concentrations is due to a combination of sources including the two STPs', leachate, on site effluent disposal and stormwater from urban and industrial areas. Upgrades of the STPs have significantly reduced the amount of nitrogen entering the estuarine areas. It is also anticipated with reduced nitrogen levels within the estuary there will be a corresponding reduction in the frequency of algal blooms.

### **5.1.2. Biological Monitoring**

Australian Museum Business Services Consulting have completed the first year of a three year Macroinvertebrate and Diatom Monitoring Program for Council. The information referring to this program within this report has been sourced directly from the AMBS 2002-2003 document (AMBS, 2003. "Macroinvertebrate and Diatom Monitoring 2002-2003 Annual Report" Australian Museum Business Services, Sydney).

The program involved the sampling of 18 sites along creeks within the Shire in Spring 2002 (November) and Autumn 2003 (April). The sampling sites were located downstream of various land use types including; urban, rural, rural/urban and industrial. Macroinvertebrate and diatom sampling, in situ water quality readings, and habitat assessments were undertaken at each site. Water quality samples for chemical analysis were also collected at each site for Council.

Please refer to [Appendix C Water Quality Annual Report 2002-2003](#)

For more information on individual sampling sites, please refer to the [Appendix D Interactive Map](#) located on [www.hornsby.nsw.gov.au](http://www.hornsby.nsw.gov.au).

A total of 4436 macroinvertebrate specimens from over one hundred taxa were collected during the program. The most common genera in the Spring 2002 samples were the Chironomidae non-biting midges 18% (Chironominae), Hydrobiidae snails 17% (*Potamopyrgus antipodarum*), mayflies 7% (*Atalophlebia*), and the Culicidae mosquito larvae 6% (*Mansonia*). The most common genera in the Autumn 2003 samples were the Hydrobiidae snails 26% (*Potamopyrgus antipodarum*), the Chironimidae non-biting midges 18% (Chironominae), the Physidae snails (*Physella acuta*) 10% and the Oligochaeta segmented worms 5% (*Lumbriculidae*).



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A total of 222 species representing 53 diatom genera were recorded from the spring 2002 (180 species, 49 genera) and autumn 2003 (184 species, 50 genera) samples. The most common species in the Spring 2002 samples were; *Achnantheidium minutissimum*, *Nitzschia inconspicua* (17 sites), *Gomphonema parvulum* (15 sites), *Achnanthes oblongella*, *Navicula cryptocephala*, and *Navicula gregaria* (14 sites). The most common species in the Autumn 2003 samples were *Achnantheidium minutissimum* and *Nitzschia palea* (17 sites), *Gomphonema parvulum* and *Nitzschia inconspicua* (16 sites), and *Achnanthes oblongella*, *Eolimna minima* and *Navicula veneta* (15 sites).

The habitat assessments indicated that while creek substrate generally provided habitat considered suitable for macroinvertebrates and diatoms most of the sites were experiencing various levels of disturbance to the water quality and riparian zones. Analysis of the macroinvertebrate and diatom communities using AUSRIVAS modelling, EPT, SIGNAL2 and multivariate statistics (classification, MDS ordination and BIOENV) further substantiated these habitat observations. The communities in the catchment separated according to the predominant land use patterns for all season- species and genus combinations. The macroinvertebrate communities changed between seasons while the diatom community composition at most sites was consistent between the seasons.

Generally, community diversity varied according to the predominant land use above each site. Communities at industrial and highly impacted urban sites were characterised by low species diversity, whereas communities at rural sites were highly diverse. However, the apparent relationship between land use and the macroinvertebrate and diatom community assemblages was not well explained by the measured environmental variables. Macroinvertebrate community assemblages did not relate significantly to the measured water quality variables, except for riffles in Spring 2003 which were being fed directly by groundwater. For diatoms, the distance from source and nutrient gradients (total nitrogen and total phosphorus) best explained the separation of sites between land use types. No significant correlation between environmental variables and community composition could be calculated to explain the land use community trends.

The program to date indicates that the creeks in the catchment are being influenced by general land use patterns, but rather than these being related specifically to direct upstream or adjacent land uses, the sites appear to be being influenced at a catchment level. A better understanding of how community composition is influenced by water quality and other catchment characteristics is further required if macroinvertebrates and diatoms are to be used to monitor changes in the

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catchment. The use of other catchment derived variables such as catchment imperviousness, geology, and riparian/buffering vegetation, together with the integration of historical water quality data in future analyses may be useful.

The ongoing nature of this program will allow for trends to be further analysed with more data in consultation with Council. This will ensure the outcomes of the program delivered to Council are useful in catchment management decision making.

## **5.2 Water Consumption**

Hornsby is using the water consumption data from the calendar years from 1999 to 2002 as its baseline for future comparisons.

The consumption figures for the top 20 users for each of the calendar years are presented in Tables 2, 3 and 4. It can be seen from these data that the major consumers are the public pools, various large parks and Council's administration buildings.



**Figure 7 Reverse Osmosis (RO) Filtration Unit at Hornsby Pool.**

**Table 2 Water Consumption Top 20 (1999-2000 Calender Year)**

Council Asset No.	Building Name	Address	Suburb	Sydney Water Account No.	Total 1999/2000 kLs	\$0.88/ per kL
QB01	Hornsby Aquatic Centre	Hornsby Park - Pacific Hwy	Hornsby	3173116	19151	\$16,852.88
TA27 & RA31?	Brooklyn Park	associated with preschool	Brooklyn	3146154	11076	\$9,746.88
RB15 & RB16	Greenway Park	Shephards Dr	Cherrybrook	3179419	6855	\$6,032.40
QC01	Epping Aquatic Centre	Dence Park	Epping	3180940	6831	\$6,011.28
RA17	Foxglove Oval	Foxglove RD	Mt Colah	3156281	5367	\$4,722.96
TA10, TA28, TA31, RA01-RA07 & RA33	Fagan Park	Fagan Park	Galston	3141412	5359	\$4,715.92
GB01 & GB04	Main Admin Building	296 Pacific Hwy	Hornsby	3173917	4678	\$4,116.64
TA12 & RA32	Crosslands Reserve	Somerville Rd	Hornsby Heights	3180778	4150	\$3,652.00
QA01	Galston Aquatic Centre	Galston Park - Galston Rd	Galston	3157451	3515	\$3,093.20
SA01 & EA01*	Asquith Nursery & Pre-School, Council own and operate	18-22 Lords Ave	Asquith	3173325	3053	\$2,686.64
CC04 & TC01	Epping Community Centre	9 Oxford St	Epping	3172635	2916	\$2,566.08
RC25 & RC26	Sommerville Park	Blaxland Rd	Eastwood	3144851	2888	\$2,541.44
TB01*	Hornsby Park	Pacific Highway	Hornsby	3173117	2880	\$2,534.40
WB01	Depot	33 Sefton Rd	Thornleigh	3179189	2868	\$2,523.84
RA24*	Mt Kuring-gai	Blackwood av	Mt Kuring - gai	3144749	2843	\$2,501.84
TB02	Lisgar Garden	Lisgar Rd	Hornsby	3165519	2500	\$2,200.00
RC31 & RC32	Epping Park	Norfolk rd	Epping	3171013	2266	\$1,994.08
RA11 & RA12	Store Asquith Park & Amenities Block	Wall Av	Asquith	3184309	2078	\$1,828.64
TB09, RB04 & RB05	Waitara Oval	Waitara Av	Waitara	4840293	1958	\$1,723.04
LC02	Pennant Hills Library	Lot 2 Hillcrest Rd	Pennant Hills	3187036	1889	\$1,662.32

**Table 3 Water Consumption Top 20 (2000-2001 Calendar Year)**

Council Asset No.	Building Name	Address	Suburb	Sydney Water Account No.	Total 2000/01 kLs	\$0.93 / per kL
QB01	Hornsby Aquatic Centre	Hornsby Park - Pacific Hwy	Hornsby	3173116	11752	\$10,929.36
QC01	Epping Aquatic Centre	Dence Park	Epping	3180940	8626	\$8,022.18
QA01	Galston Aquatic Centre	Galston Park - Galston Rd	Galston	3157451	7961	\$7,403.73
RA17	Foxglove Oval	Foxglove RD	Mt Colah	3156281	7091	\$6,594.63
MA06	Restaurant	Kangaroo Point	Brooklyn	3173704	5893	\$5,480.49
TA12 & RA32	Crosslands Reserve	Somerville Rd	Hornsby Heights	3180778	5389	\$5,011.77
RB15 & RB16	Greenway Park	Shephards Dr	Cherrybrook	3179419	5307	\$4,935.51
RB11	Oakleigh Park	Giblett Av	Thornleigh	3157882	4770	\$4,436.10
TB02	Lisgar Garden	Lisgar Rd	Hornsby	3165519	4514	\$4,198.02
TB01*	Hornsby Park	Pacific Highway	Hornsby	3173117	3989	\$3,709.77
RC25 & RC26	Sommerville Park	Blaxland Rd	Eastwood	3144851	3905	\$3,631.65
RA24*	Mt Kuring-gai	Blackwood av	Mt Kuring - gai	3144749	3494	\$3,249.42
RC07	Roselea Park	Pennant Hills Rd	Carlingford	3175151	3453	\$3,211.29
GB01 & GB04	Main Admin Building	296 Pacific Hwy	Hornsby	3173917	3229	\$3,002.97
TA10, TA28, TA31, RA01-RA07 & RA33	Fagan Park	Fagan Park	Galston	3141412	3116	\$2,897.88
RB02 & RB14	Thomas Thompson Park	Cedarwood Dr	Cherrybrook	3148722	3050	\$2,836.50
RB08	Normanhurst Park	Harris Rd	Normanhurst	3159885	3040	\$2,827.20
RB13	James Henty Park	Lot 2461 James Henty Dr	Dural	4816930	2829	\$2,630.97
WB01	Depot	33 Sefton Rd	Thornleigh	3179189	2749	\$2,556.57

**Table 4 Water Consumption Top 20 (2001-2002 Calendar Year)**

Council Asset No.	Building Name	Address	Suburb	Sydney Water Account No.	Total 2001/02 kLs	\$0.93 / per kL
QB01	Hornsby Aquatic Centre	Hornsby Park - Pacific Hwy	Hornsby	3173116	17699	\$16,460.07
MA06	Restaurant	Kangaroo Point	Brooklyn	3173704	12421	\$11,551.53
RB15 & RB16	Greenway Park	Shephards Dr	Cherrybrook	3179419	12384	\$11,517.12
QA01	Galston Aquatic Centre	Galston Park - Galston Rd	Galston	3157451	9888	\$9,195.84
QC01	Epping Aquatic Centre	Dence Park	Epping	3180940	7968	\$7,410.24
WB02	Old Brick Pit	Dartford Rd	Thornleigh	3174893	6861	\$6,380.73
RB13	James Henty Park	Lot 2461 James Henty Dr	Dural	4816930	5767	\$5,363.31
TB09, RB04 & RB05	Waitara Oval	Waitara Av	Waitara	4840293	5673	\$5,275.89
RB11	Oakleigh Park	Giblett Av	Thornleigh	3157882	5339	\$4,965.27
TA02**	Rofe Park	Galston Rd	Hornsby Heights	3157289	4814	\$4,477.02
RC25 & RC26	Sommerville Park	Blaxland Rd	Eastwood	3144851	3911	\$3,637.23
TA12 & RA32	Crosslands Reserve	Somerville Rd	Hornsby Heights	3180778	3870	\$3,599.10
WC01/WC02/ WC03	Nursery Cottage	28 Britannia St	Pennant Hills	3145954	3824	\$3,556.32
TB02	Lisgar Garden	Lisgar Rd	Hornsby	3165519	3684	\$3,426.12
TB01*	Hornsby Park	Pacific Highway	Hornsby	3173117	3374	\$3,137.82
GB01 & GB04	Main Admin Building	296 Pacific Hwy	Hornsby	3173917	3320	\$3,087.60
RC08-11 & RC13-16	Pennant Hills Park	Brittania St	Pennant Hills	4839313	3045	\$2,831.85
TA08 & RA09	Glenorie Park	1763x Old Northern Rd	Glenorie	3172173	3009	\$2,798.37
RA29*3	Montview Oval	Montview Pde	Hornsby Heights	4878329	2907	\$2,703.51
RC31 & RC32	Epping Park	Norfolk rd	Epping	3171013	2467	\$2,294.31

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## 6. Goals and Objectives

### 6.1 Water Conservation Policy

#### 6.1.1. Introduction

Australia's population grew by an average of 224,000 people a year from 1986 to 2000 (Australian Immigration/Migration Statistics – 'Consolidated Statistics' Publication) but our water resource remains drought dependant. More and more people are sharing the same amount of water. Since the 1970s Sydney's water use has gradually increased from 400,000 ML per year to over 500,000 ML per year while the Sydney dams remain at a limited capacity.

The conservation of a natural resource such as water is good both environmentally and economically since water costs money—saving water saves money. However it is now becoming obvious that the price of water is too low. This is reflected by the fact that you can buy 1000L of reticulated water for the price of a can of soft drink. Conserving and recycling water also means that less water is being drawn out of dam supplies. As pictured in the graph, around 37% of reticulated water in Australia is being used outdoors—good drinking water is being used to water the garden where collected stormwater could have been used. With low levels of rainfall, severe droughts and record lows in dams it is very important to conserve water now so that there will still be water available for the future.

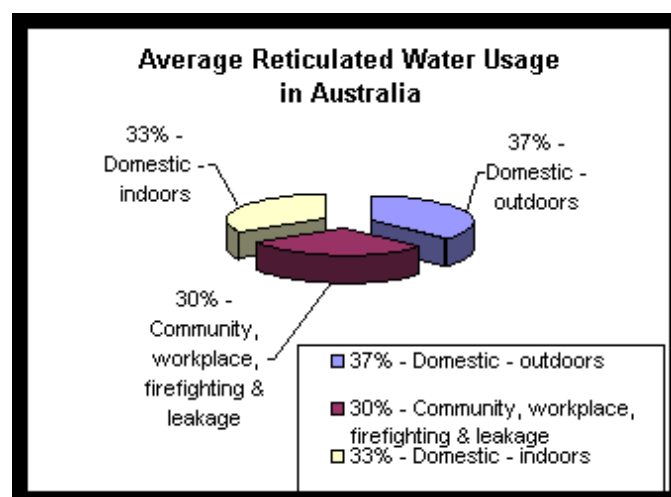


Figure 8 Riverina Water County Council-Fact Sheet 6

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Hornsby Shire Council has recognised the need to take the initiative in this area and lead by example to better manage the water resources of this locality.

### **6.1.2. Targets and Goals**

#### **Organisation-wide goal**

The Water Conservation Policy is deliberately non prescriptive so as not to stifle innovative technologies which are constantly evolving in the field of water conservation and reuse. It is however acknowledged that some minimum level of achievement for water conservation is required if significant gains are to be made in this area.

- ❖ To this end **Hornsby Council** has set an organisation wide goal of a **20% reduction (by 2011)** in its use of reticulated water. The base comparison for this reduction is the average Council wide water use over the years 1999 to 2001.
  
- ❖ The goal for the **community** of Hornsby Shire will be an **18% reduction by 2011** with an average base year taken from 1999-2001 consumption data.

This target is based on the current Sydney Water target for all of Sydney which is an 18% reduction, but with a base year of 1991. As Council's base year is much more recent a 20% reduction over the shorter time frame is considered feasible while stretching the organisation to achieve the goal.

Water conservation for both the community and Council will be monitored on an annual basis and reported to Council via the State of Environment Report, with comparison against the 1999 to 2001 consumption figures.

### **6.1.3. Water Conservation Policy Cost Benefit Study**

In August 2004 consultants were engaged by Council to undertake an economic analysis on the introduction of the Water Conservation Policy.

It was agreed that an economic scoping study was the most effective way of assessing the likely costs and benefits of Council's introduction of the Policy. Three "case studies" were to be prepared. These were the hypothetical "retrofit" of two existing Council buildings and the fitout of a proposed new facility, all using water conserving fittings. In each case the cost of supplying and



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installing water conserving fittings was measured against the expected savings in potable water costs and other related benefits using benefit cost analysis.

The two buildings considered as “retrofit” case studies are:

1. ***The Council Administration Building, located on Pacific Highway, Hornsby, adjacent to the Council Chambers and***
2. ***Council’s Nursery Cottage, located at Britannia Avenue, Pennant Hills.***
3. ***The third case study considered is a proposed childcare centre to be built at Cherrybrook.***

In each case, a “Do Nothing” base case scenario for the operation of the building was developed, with water usage estimated for two evaluation periods, 7 years and 20 years. In this “Do Nothing” scenario, each building was assessed as continuing to operate in its current configuration over the evaluation period and the cost of supplying necessary fittings was included but without a specific investment in water saving equipment.

Various levels of specific investment in water conservation measures were then considered, and the respective costs and benefits for each level of investment were assessed and compared to the “Do Nothing” base cases.

### **The Council Administration Building**

Council’s Administration Building is located in the Council “precinct” on the Pacific Highway, north of the West Hornsby central business area. Hornsby Local Court is located next to the Administration Building on the southern side and to the south of the Court is the Hornsby Police Station. Part of the Hornsby TAFE College lies to the immediate north of the Council Administration Building.

Approximately 250 Council staff members work in the Administration Building. This level of staffing has remained consistent over the last 5 years. The building contains the following water-using devices:

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- 3 showers
  - 40 basins
  - 36 water closets (toilets)
  - 10 kitchen sinks
  - 8 hose cocks, and
  - 4 urinals

According to Council's Manager Environmental Health and Protection, approximately 3,396 kLs of potable water are used in the Administration Building each year at an average of 9.30 kL per day.

Potable water is purchased by Council from Sydney Water Corporation at a current cost of \$1.00 per kL. The cost of water from Sydney Water is estimated to increase by 2% per annum in real terms for the foreseeable future.

Four options have been considered to conserve potable water in the Administration Building. Each option has been assessed over both 7-year and 20-year evaluation periods.

**Option 1** - the "Do Nothing" base case

Under this option, water usage in the Administration Building is not curtailed in any way and no changes are made to the existing taps, sinks, toilets and other water using fittings. They are maintained as is and replaced with like fittings.

**Option 2** - Install a Water Saver System in Year 1

Under this option, a water saver system is retrofitted to the Administration Building. This system involves:

- fitting flow control valves to all internal tapware including replacement of tap washers
- fitting hose cocks with key-operated handles to all external tapware for use by authorised personnel only
- fitting water points for public access with spring-loaded handles and flow control valves
- fitting cistern modifiers to toilets and urinals to adjust cisterns to a smaller flush and replacing inlet and outlet seals.
- removing and sealing off any redundant tapware.

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This system is estimated by the Manager Environmental Health and Protection to cost \$5,758 net of GST and should save an estimated 475 kL of potable water usage per annum.

No extra annual maintenance expenditure is required with this system. The water saver system equipment is estimated to have an economic life of 30 years.

**Option 3** - Install Water Saver System plus Install Rainwater Tank and re-plumb toilets and urinals so that they are flushed with rainwater from the tank, with mains potable water backup. All work undertaken in Year 1

Under this option, the water saver system as described in Option 2 is installed in the Administration Building and in addition a 20,000 litre rainwater tank with first flush diverter is installed to harvest rainwater from the roof. The pipe work supplying water to the toilets and urinals in the Building are re-plumbed so that rainwater from the tank is used to flush them. The rainwater tank is connected to mains supply so that when the tank runs low it is refilled with potable mains water. A pressure pump is fitted to the rainwater tank to fill the toilet and urinal cisterns.

**Option 4** - Install Water Saver System and Rainwater Tank and divert Backwash Water from Council's Aquatic Centre to flow to Rainwater Tank as backup water. Use water from tank to flush toilets in Administration Building. All work undertaken in Year 1.

Under this option, the water saver system as described in Option 2 is installed in the Administration Building and in addition a 20,000 litre rainwater tank with first flush diverter is installed to harvest rainwater from the roof. The pipe work supplying water to the toilets and urinals in the Building are re-plumbed so that rainwater from the tank is used to flush them.

The Hornsby Aquatic Centre is located in Hornsby Park on the western side of the Pacific Highway immediately opposite the Administration Building. The pools' backwash cleaning system is run weekly in winter and twice weekly in summer and produces 45 kL of water each running. 25 kL is currently reused to water Hornsby Park, immediately in front of the Aquatic Centre. The remaining 20 kL of pool backwash water from the Aquatic Centre is disposed of into Old Mans Valley Creek, the local watercourse. This has resulted in a 2km length of the Creek being severely degraded, through scouring of the banks and the growth of noxious weeds.

Council is faced with a major rehabilitation of the Creek every 5 years at an estimated cost of

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\$2.3M, together with ongoing riparian works for the intervening years at an annual cost exceeding \$200,000.

While the Aquatic Centre's backwash water is disposed of to Old Mans Valley Creek, this creek rehabilitation work will continue to be necessary.

Under Option 4, it is proposed to pipe that portion of the Aquatic Centre's backwash water currently being disposed of to Old Mans Valley Creek across Hornsby Park and then under the Pacific Highway to connect to the rainwater tank to be installed at the Administration Building. This will avoid the need to use mains supply potable water to back up the rain water in the tank. It will also divert the backwash water from disposal into Old Mans Valley Creek, removing the need after 5 years to continue rehabilitation of the Creek.

### **The Nursery Cottage**

Council's Nursery Cottage is located in Britannia Avenue, east Pennant Hills, just south east of Pennant Hills Oval and Council's Sports Complex. The area is on the upper western side of the Lane Cove River catchment at Pennant Hills. The Cottage is in the grounds of Council's Nursery, where indigenous plants are grown by Council staff and volunteers. When project work is done in an area of the Shire by Council, seeds and cuttings of local plants are recovered where possible and grown in the Nursery for use in site rehabilitation. Council's policy is to return endemic species after site rehabilitation where possible.

The Nursery Cottage dates from the 1960's and was originally a brick veneer and tile family home. It was acquired by Council as an office building when the Nursery was established next door. The Cottage has a permanent staff of three full time Council employees. Volunteers also work at the Cottage and meetings are often held there. The Cottage is only used for work purposes and no one lives onsite.

The Cottage contains a bathroom with bath, shower and sink and a separate single toilet with basin. The kitchen contains a fridge and stove, with one sink. The water meter at the Cottage measures combined usage for the Nursery and Cottage but it is estimated that annual water usage at the Cottage is currently 250 kL.

Two options have been considered to conserve potable water in the Nursery Cottage. Each option

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has been assessed over 7-year and 20-year evaluation periods.

**Option 1** - the “Do Nothing” base case

Under this option, water usage in the Nursery Cottage is not curtailed in any way and no changes are made to the existing taps, sinks, toilets and other fittings. They are maintained as is and replaced with like fittings.

In addition, a conventional water usage dishwasher and washing machine are installed and greywater from these machines, as well as the kitchen sink and handbasins, will continue to be disposed of to sewer.

**Option 2** - Install a Water Saver System and a Rainwater tank and microdrip irrigation system in front and rear gardens and use rainwater to flush toilet with mains supply potable water backup. Divert rainwater and greywater to irrigate gardens with microdrip system. All work to be undertaken in Year 1.

Under this option, a water saver system is retrofitted to the Nursery Cottage. This system involves:

- ❖ fitting flow control valves to all internal tapware including replacement of tap washers
- ❖ fitting hose cocks with key-operated handles to all external tapware for use by authorised personnel only
- ❖ fitting water points for public access with spring-loaded handles and flow control valves
- ❖ fitting a cistern modifier to the toilet to adjust to a smaller flush and replacing inlet and outlet seals.

It is estimated that this system will cost \$1,000 net of GST.

In addition a 7,500 litre rainwater tank with first flush diverter is installed and plumbed to harvest rainwater from the roof, at an estimated net cost of \$6,500. The pipe work supplying water to the toilet is r-plumbed so that rainwater from the tank is used to flush the toilet.

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The rainwater tank will be connected to mains supply so that when the tank runs low it is refilled with potable mains water. A pressure pump is fitted to the rainwater tank to fill the toilet and urinal cisterns.

A Maytag 5A rated low water usage front loading washing machine and an Asko 4A rated low water usage dishwasher are installed in Year 1 instead of a conventional washing machine and dishwasher.

A microdrip irrigation system is installed in front and rear gardens and greywater diverters are fitted to basins and sinks within the Cottage. Rainwater and greywater are then used to irrigate both gardens and the gardens are mulched annually.

### **Proposed new Cherrybrook Childcare Centre**

Council is planning the future construction of a new childcare centre at Cherrybrook. It is proposed that the Centre will operate for 5 days each week between 7.30 a.m. and 6.30 p.m. as a long day care centre, catering for a daily average of 48 children of preschool age, with 2 adult carers.

The Centre will then remain open until 9.30 p.m. to act as a community facility for meetings. It is expected that an average of 2 after-hours meetings will be held at the Centre each week, with an average of 10 people attending each meeting.

The Centre will have 9 dedicated toilets for children, with 3 full-sized toilets for adults. The Centre will have 3 full-sized showers for cleaning children and a heavy duty washing machine will be installed. There will be 16 basins for the children, with 2 taps per basin, and 9 bubblers.

The Centre will cater for breakfasts, morning teas, lunches, afternoon teas, late meals and takeaway meals. The kitchen will have 3 sinks installed, 2 large sinks and a hand basin. Two dishwashers will be installed, one heavy duty for washing children's plates, cups, cutlery and cooking utensils and a normal domestic dishwasher for staff use.

Two options have been considered to conserve potable water in the Cherrybrook Childcare Centre. Each option has been assessed over 7-year and 20-year evaluation periods.

#### **Option 1 - the "Do Nothing" base case**

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Under this option, water usage in the Cherrybrook Childcare Centre is not curtailed in any way and no changes are made to the existing taps, sinks, toilets and other fittings. They are maintained as is and replaced with like fittings.

In addition, conventional water usage dishwashers and washing machine will be installed.

It is estimated that potable water usage under the “Do Nothing” base case at the Cherrybrook Childcare Centre will total 900 kL per annum. Toilet flushing will use 165 kL, hand washing and showering 491 kL and washing clothes and dishes and cooking will use another 244 kL.

**Option 2** - Install a Water Saver System, Rainwater tank and water minimising dishwashers and washing machine. Use rainwater to flush toilet with mains supply potable water backup. All works installed in Year 1.

Under this option, a water saver system is installed during construction of the Cherrybrook Childcare Centre. This system involves:

- ❖ fitting flow control valves to all internal tapware including replacement of tap washers
- ❖ fitting hose cocks with key-operated handles to all external tapware for use by authorised personnel only
- ❖ fitting water points for public access with spring-loaded handles and flow control valves
- ❖ fitting of cistern modifiers to the toilets to adjust to a smaller flush and replacing inlet and outlet seals.

It is estimated that this system will cost \$3,000 net of GST.

In addition a 35,000 litre rainwater tank with first flush diverter is installed and plumbed to harvest rainwater from the roof, at an estimated net cost of \$20,000. The pipework supplying water to the toilets is plumbed so that rainwater from the tank is used to flush the toilet. The rainwater tank is connected to mains supply so that when the tank runs low it is refilled with potable mains water. A pressure pump is fitted to the rainwater tank to fill toilet cisterns.



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During initial construction a Maytag 5A rated low water usage front loading washing machine and two Asko 4A rated low water usage dishwashers are installed in Year 1 instead of conventional washing machine and dishwashers.

For each case study considered, the economic analysis has been conducted so that capital and recurrent costs are fully included for the various water conservation options. The benefits of these options reflect the savings in potable water costs and other savings from the Option 1 base case, as well as the residual value of equipment and assets at the end of the 7-year and 20-year evaluation periods.

Please refer to the attached [Cost Benefit Analysis \(Appendix I\)](#) attached.

## **6.2 Achieving these goals**

To assist in achieving the above goals the following standards will be applied to Council's new assets and operations;

For all new buildings/sites the following criteria will be met:

- ❖ That the NSW Government's BASIX program be applied.(Web address <http://www.iplan.nsw.gov.au/basix/index.jsp>),
- ❖ That 50% of the water entering the building be reused on site and;
- ❖ That no reticulated water be used for irrigation purposes.

For all new or refurbished reticulation elements (taps, toilets etc) the following standards will be met;

- ❖ Only products with a water conservation rating of AAA or better are to be purchased.
- ❖ That no reticulated water be used for irrigation purposes.

For the Water Campaign, the Water Catchments Team has compiled baseline water consumption data. Data compiled for this exercise include: 1999-2000; 2000-2001; 2001-2002.

Hornsby Council aims to achieve all of the milestones of the Water Campaign by 2006.

## **6.3 Checklist for the development of major Council assets**

### **Start at the design phase**

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- ❖ Apply the NSW Government's BASIX Program and the Hornsby Shire Water Management Plan.

### **Stormwater**

#### A Apply water sensitive urban design principles (see [Appendix iii Sustainable Water DCP](#))

- ◆ Minimising paved impervious areas which increase the amount of runoff.
  - ◆ Harvesting rainwater from car parks. Where applicable, avoid the use of kerbing and directing runoff into grasses or vegetated recharge zones.
  - ◆ Use open natural drainage lines.
  - ◆ Design ground surfaces to slope away from buildings and structures.
- ❖ Water conservation landscaping: zonation of plants, group plants with the same water needs together, e.g. low-, moderate- and high-water use zones.

#### B Water saving practices in gardens/parklands (See [Appendix vi Parks Locations in the Shire](#))

Design parklands to apply

- ◆ Planting of native plants that require less water
- ◆ Management of soil for efficient water use.
- ◆ Mulching around trees and on flower beds to retain water in soil
- ◆ Use of rain barrels/tanks to harvest rainwater
- ◆ Xeriscape principles – water conservation gardens. Only require irrigation for establishment, then only water from rainfall, landscape design to channel water to plants with higher water needs.

Develop a maintenance schedule so that;

- ◆ plants are watered deeply but infrequently to minimize evaporation and encourage deep rooting.
- ◆ grass is mown often to around 10 cm high to encourage deep rooting and to shade lawns to retain soil moisture.

### **Reticulated Water**

#### C Design water conservation plumbing

- ◆ Choose AAA water rated devices, or better.

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- ◆ Low-volume flow control devices (taps, 3/6L flush toilets, etc)
  - ◆ Install waterless urinals (work completely without water or flush valves)
  - ◆ Urine diversion systems to save on treatment costs (urine contains most of the nutrients ending up in wastewater)
  - ◆ Where appropriate, make use of composting toilets instead of flush toilets.
  - ◆ Hot water pipe insulation
  - ◆ Installation of rainwater tanks and dual plumbing for reuse of rainwater and /or recycled water (grey water) for toilet flushing and landscape irrigation.
  - ◆ Reduce water pressure to fixtures (sinks, toilets, showers, laundry, and dishwashers), helps reduce water flow and the formation of leaks.
  - ◆ Using air-cooled units and not water-cooled air conditioning units.
  - ◆ Install tap aerators to increase pressure and reduce volume of water used.
  - ◆ Use hoses with on/off valves.
  - ◆ Use drip irrigation systems (morning/night) – apply water directly to soil instead of to the air like sprinklers, reducing evaporation and encouraging deep rooting.
  - ◆ Schedule regular water efficiency audits.
  - ◆ Install water meters on machinery or processes to track water use performance, identify leaks and set targets for water reductions.

### **Post development**

Create and implement awareness, education and training programs to encourage water saving practices by users.

### **Water Reuse**

Around 30% of household reticulated water is used for outdoor uses, using greywater for this purpose instead of reticulated water could save that 30%.

Water reuse can be sourced from stormwater runoff from ovals and roadsides, greywater from shower amenities at sports fields and blackwater from toilet blocks at sports ovals.

### **Reclaimed water quality (from NSW Guidelines for Urban and Residential Use of Reclaimed Water).**

The following information is quoted from the review by Dr John C Radcliffe, Study Director and author of [Water Recycling in Australia](#) of the Australian Academy of Technological Sciences and Engineering.

Faecal Coliforms <1 in 100 mL

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Coliforms	<10 in 100 mL
Virus	<2 in 50L8
Parasites	<1 in 50L
Turbidity	<2 NTU
pH	6.5 to 8.0 (7.0 to 7.5 desirable range)
Colour	<15 TCU
Chlorine	<0.5 mg/L

According to 'Water Recycling in Australia', the minimum treatment level for irrigation of parks to protect public health is disinfected tertiary treatment. Tertiary treatment involves chemical coagulation and filtration, activated carbon (to absorb hydrophobic organic compounds), lime (precipitate various cations and metals at high pH), and membrane processes (microfiltration, reverse osmosis; the pores in the membrane are large enough to allow water molecules to pass through but too small to permit the passage of salt, other minerals and large organic molecules).

#### **6.4 Water Quality Goals**

After assessing the ICLEI Water Campaign™ Checklist, the Hornsby Shire Water Management Action Plan was developed so that Council could achieve at a minimum, 115 points of the ICLEI actions from the Corporate Checklist, and a minimum 105 points from the Community Checklist, by the year 2006. (See [Appendix E: Corporate and Community Checklist](#)).

#### **6.5 Priority Areas - Corporate and Community**

In order to set a qualitative water quality goal for Milestone 2, Hornsby Shire Council has identified three sectors in our Corporate Checklist in Milestone 1 that we would address as our priority areas. These are:

##### **Corporate**

##### **Stormwater recycling**

Council has established a number of initiatives to recycle both stormwater and rainwater (roof water) at community owned and managed facilities. Stormwater collection, treatment and reuse systems have been established at three of Council's parks in the suburbs of Pennant Hills, Epping and Cherrybrook. Funded under Council's Energy Performance Contract in 2003, the 180kL tanks at each site are equipped with pressurised pumps, high/low level sensors, ultra-violet disinfection units and plumbing connection in accordance with Sydney Water requirements. Stormwater is

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collected from adjacent hard surface carparks, tennis courts and amenity areas, treated/stored in the tanks and then re-applied to playing fields, court surfaces and turfed passive areas (estimated to be 1.5 megalitres per year).

### **Leachate treatment**

Instead of using the traditional technologies available for the treatment of leachate, Council has looked to more sustainable and innovative methods that can achieve pollution reductions and serve as a model for leachate treatment at a local government, state and national level. Leachate remediation and reuse projects have been established on former landfills located at Mt Colah and Aracdia. The sites are significant by way of the methodology which mimics natural processes of nitrification and denitrification at a very affordable cost with maximum benefits. Council staffs have worked together in a trans-disciplinary manner, together with specialised scientific consultants. Council is committed to the long-term maintenance, monitoring and management of the two facilities in order to justify and apply the technological benefits to other landfills within the Shire. Monitoring to date has revealed a 95% reduction in ammonia (nitrogen) which has maximised the opportunities for reuse (irrigation) on adjoining open space and landscapes (estimated to be 1 megalitre per year).

### **Nursery operations**

The major aim of the project is to use water sensitive best management practices at Council's nursery and parks depot in order to demonstrate and educate nursery operators and the general community. The project began operation in November 2003 with the purpose of creating a sustainable stormwater reuse system incorporating conveyance swales, a small constructed wetland and specialised biological media tank for treatment, a series of pumps and flow meters and two 107kL concrete storage tanks. Complete with town water back up, the system is currently being monitored for performance over a 12 month period. The recycled water is used for all nursery growing and parks maintenance activities (estimated to save 1 megalitre of water per year).

## **Community**

### **Community access to water quality data**

Community can access Hornsby Shire's water quality data through the Water Quality Annual Report which is on our website.

### **Development of stormwater quality treatment systems**

Development applications are currently conditioned in such a way as to minimise ongoing water quality degradation. Developers are required to install stormwater quality treatment systems and

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incorporate water sensitive urban design principles into all new development.

Council's Environment Division is currently developing a divisional-wide education strategy in order to integrate the objectives and actions of several detailed Branch education plans.

**Expansion of bushcare education**

The Bushcare program in Council commenced in 1989 with 9 Bushcare groups. At present there are over 750 registered volunteers represented by 130 Bushcare groups. The environmental aim of the program is to improve and conserve degraded bushland. One of the major components of the Bushcare program is education. Volunteers registered with Council are given introductory bushcare training in the form of an Introductory Bushcare Workshop, and on-site training by qualified trainers. Much bush regeneration is associated with riparian works and has a definite catchment focus.

At present, 10 one-day workshops are being conducted every year. 140 volunteers attended workshops in 2004. At the Workshop, volunteers also received a training manual, legislation booklet, herbicide information and OH&S information, as well as safety gear.

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## **7. Monitoring and Evaluation**

The principles relating to the Monitoring and Evaluation of all the actions within the Hornsby Shire Water Management Action Plan have been incorporated into the Action Plan in Section 8. This is so that people assessing the Plan can instantly gain an understanding of how Council is monitoring the performance of any given action as a feedback for ongoing management.



## 8. Hornsby Shire Water Management Action Plan

HORNSBY SHIRE COUNCIL AND ICLEI WATER CAMPAIGN					
LOCAL ACTION PLAN					
<b>WATER QUALITY</b>					
STRATEGY	ACTIONS	STAKEHOLDERS	MONITORING	COST ESTIMATE	TIMEFRAME
<b>1. Join the ICLEI Water Campaign</b>	Complete the required tasks to achieve milestones 1 through 5.				
	<b>Milestone 1</b> Collate water consumption data for Council and community.	Hornsby Council, Sydney Water , Hornsby community.	Base year 1999 to 2001, to be re-assessed in 2011.	1 month 1 full time staff.	Completed in 2003.
	<b>Milestone 2</b> Set water consumption reduction and water quality goals for community and Council.	Hornsby Council, Hornsby community.	Annual review.	1 month 1 full time staff.	October 2004.

# HORNSBY SHIRE COUNCIL AND ICLEI WATER CAMPAIGN

## LOCAL ACTION PLAN

### WATER QUALITY

STRATEGY	ACTIONS	STAKEHOLDERS	MONITORING	COST ESTIMATE	TIMEFRAME
	<p><b>Milestone 3</b></p> <p>Prepare a Water Management Strategy (Local Action Plan LAP).</p>	Hornsby Council, Sydney Water, Hornsby community.	Annual review.	2 months 1 full time staff.	October 2004.
	<p><b>Milestone 4</b></p> <p>Implement policies and measures.</p>	(To be determined)			
	<p><b>Milestone 5</b></p> <p>Monitor and report results.</p>	(To be determined)			

# HORNSBY SHIRE COUNCIL AND ICLEI WATER CAMPAIGN

## LOCAL ACTION PLAN

### WATER QUALITY

STRATEGY	ACTIONS	STAKEHOLDERS	MONITORING	COST ESTIMATE	TIMEFRAME
<b>2. Conduct a water quality monitoring program</b>	❖ Implement a water quality monitoring program designed to assess the “health” of aquatic systems across the Shire.	Hornsby Council, Sydney Water, Department of Environment and Conservation, Department of Infrastructure, Planning and Natural Resources, Estuary Committees, Hawkesbury Nepean Local Government Advisory Group, and Sydney Coastal Councils Councils Group.	Key Performance Indicators (KPI) in Council Management Plan, Percentage of monitored healthy streams in Hornsby Shire. See definition of "Healthy" in Water Quality Annual Reports.	1.5 people, \$120,000 per annum.	Ongoing.
	❖ Monitoring physio chemical, macroinvertebrate and diatom indicators.  ❖ Produce annual water quality reports and display them on the web with an interactive map. <a href="http://www.hornsby.nsw.gov.au">www.hornsby.nsw.gov.au</a>	As above.  Water Catchments Team, Hornsby Council.	As above.  Annual production.	As above.  1 full time staff for 1 month.	As above.  Ongoing.

## HORNSBY SHIRE COUNCIL AND ICLEI WATER CAMPAIGN

### LOCAL ACTION PLAN

#### WATER QUALITY

STRATEGY	ACTIONS	STAKEHOLDERS	MONITORING	COST ESTIMATE	TIMEFRAME
	<ul style="list-style-type: none"> <li>❖ Conduct load monitoring every 5 years in the catchment.</li> <li>❖ Conduct sediment monitoring every 5 years at various land use sites.</li> <li>❖ Monitor algal blooms both physically and remotely using a permanent chlorophyll probe moored in Berowra Creek.</li> <li>❖ Apply Life Cycle Management Principles to waterway assets.</li> </ul>	<p>Hornsby Council, Sydney Water.</p> <p>Hornsby Council, Water Catchments Team and Estuary Management Committees.</p> <p>Water Catchments Team, Manly Hydraulics Laboratory (MHL), Berowra Creek Estuary Management Committee.</p> <p>Hornsby Council, Water Catchments Team.</p>	<p>5 yearly review by Manager, Water Catchments.</p> <p>5 yearly review by Manager, Water Catchments.</p> <p>Annual review of program by Manager, Water Catchments.</p> <p>Annual review by Manager, Water Catchments.</p>	<p>\$40,000.</p> <p>\$50,000.</p> <p>Initial capital cost \$70,000. Development Cost \$40,000. Annual Maintenance Cost \$20,000.</p> <p>6 months of 1 full time staff.</p>	<p>Ongoing.</p> <p>Ongoing.</p> <p>Ongoing.</p> <p>To be completed in June 2005.</p>

# HORNSBY SHIRE COUNCIL AND ICLEI WATER CAMPAIGN

## LOCAL ACTION PLAN

### WATER QUALITY

STRATEGY	ACTIONS	STAKEHOLDERS	MONITORING	COST ESTIMATE	TIMEFRAME
<b>3. Conduct a stormwater quality improvement program</b> (See <a href="#">Appendix iv, CRR devices in the Shire</a> and <a href="#">Appendix v CRR 5 year Plan</a> )	<ul style="list-style-type: none"> <li>❖ Conduct the Catchment Remediation Rate water quality improvement capital works program as per the rolling 5 year plan.</li> <li>❖ Produce annual financial and performance reports for the Catchment Remediation Rate.</li> </ul>	Water Catchments Team, Environment Division and Works Division.  Water Catchments Team, Environment Division and the Finance Branch, and Catchment Remediation Rate Expenditure Review Committee.	KPI in Council's Management Plan - Target of 350 cu metres of gross pollutants p.a.  6 monthly review by the CRR Committee.  Review by CRR Project Manager.	2 full time staff, \$1.2 million per annum.  1 month of 1 staff member	Ongoing.  Ongoing, 5 year - Capital Works Program.
<b>4. Apply WSUD techniques / principles / controls in the assessment of development applications incorporating site planning, residential design, commercial, industrial and construction site management.</b>	<ul style="list-style-type: none"> <li>❖ Condition development applications for the installation of water quality treatment devices</li> </ul>	Water Catchments Team, Hornsby Council, Planning Division, Environmental Health and Protection Team and Developers.	Hornsby Council Management Plan, KPI, Percentage of applications met 21 days turnaround.	1 full time staff per annum.	Ongoing.

# HORNSBY SHIRE COUNCIL AND ICLEI WATER CAMPAIGN

## LOCAL ACTION PLAN

### WATER QUALITY

STRATEGY	ACTIONS	STAKEHOLDERS	MONITORING	COST ESTIMATE	TIMEFRAME
	<ul style="list-style-type: none"> <li>❖ Condition development applications for the protection and remediation of urban streams.</li> <li>❖ Condition development applications for the initiation of soil and water management plans.</li> </ul>	<p>Water Catchments Team, Hornsby Council, Planning Division, Environmental Health and Protection Team and Developers, and Department of Infrastructure Planning and Natural Resources (DIPNR).</p> <p>Water Catchments Team, Hornsby Council, Planning Division, Environmental Health and Protection Team and Developers, and DIPNR</p>	<p>Hornsby Council Management Plan, KPI, Percentage of applications met 21 days turnaround.</p> <p>Hornsby Council Management Plan, KPI, Percentage of applications met 21 days turnaround.</p>	<p>1 full time staff per annum.</p> <p>1 full time staff per annum.</p>	<p>Ongoing.</p> <p>Ongoing.</p>
<p><b>5. Conduct an estuary management program</b> (<a href="#">Appendix F</a>)</p>	<ul style="list-style-type: none"> <li>❖ Implement the <a href="#">Berowra Estuary Management Plan</a>.</li> </ul>	<p>Water Catchments Team, Estuary Manager, Berowra Creek Estuary Management Committee, DIPNR.</p>	<p>6 monthly review by Committee and 5 yearly review of the Estuary Management Plan.</p>	<p>Various.</p>	<p>25 year Management Plan.</p>

# HORNSBY SHIRE COUNCIL AND ICLEI WATER CAMPAIGN

## LOCAL ACTION PLAN

### WATER QUALITY

STRATEGY	ACTIONS	STAKEHOLDERS	MONITORING	COST ESTIMATE	TIMEFRAME
	<ul style="list-style-type: none"> <li>❖ Develop the <a href="#">Brooklyn Estuary Management Plan</a>.                             <ul style="list-style-type: none"> <li>○ Establish Estuary Management Committees.</li> </ul> </li> </ul>	Community, Businesses, Sydney Water, NSW Fisheries, Waterways, State Rail, DIPNR, Oyster Farmers Association, Boatowners Association, Marinas Association, and professional fishermen.	Bi-monthly meetings of the Committee.	\$10,000 per annum.	Established in June 2002.
	<ul style="list-style-type: none"> <li>○ Conduct Process Studies (See Appendix G)</li> </ul>	Hornsby Council, Water Research Laboratory, Manly Hydraulics Laboratory and Brooklyn Estuary Management Committee.	Monthly milestone assessment by Estuary Manager..	\$180,000.	Completed December 2003.



## HORNSBY SHIRE COUNCIL AND ICLEI WATER CAMPAIGN

### LOCAL ACTION PLAN

#### WATER QUALITY

STRATEGY	ACTIONS	STAKEHOLDERS	MONITORING	COST ESTIMATE	TIMEFRAME
	<ul style="list-style-type: none"> <li>○ Conduct Management Option Study and Produce Management Plan.</li> </ul>	Hornsby Council, WB Oceanics, Brooklyn Estuary Management Committee.	Monthly milestone assessment by Estuary Manager.	\$60,000.	To be completed in June 2005.
<b>6. Onsite sewage management across the Shire</b>	<ul style="list-style-type: none"> <li>❖ Develop and implement an inspection/licencing program for onsite sewage management across Hornsby Shire.</li> </ul>	Environmental Health and Protection Team, Waste Management Team, Sydney Water and property owners with onsite sewage systems.	Annual program review by Manager, Environmental Health and Protection.	1 full time staff member.	Ongoing
<b>7. Manage the priority sewage management program with Sydney Water across the Shire</b>	<ul style="list-style-type: none"> <li>❖ To assist Sydney Water in the implementation of their Priority Sewerage Program across the unsewered areas of the Shire.</li> </ul>	Environmental Health and Protection Team, Sydney Water, Gosford Council, Department of Environment and Conservation, and the Resident Sewage Committee..	As per Priority Sewage Management Committee.  Review by Manager, Environmental Health and Protection.	N/A	Ongoing till all areas are sewerred.

**HORNSBY SHIRE COUNCIL AND ICLEI WATER CAMPAIGN**

**LOCAL ACTION PLAN**

**WATER QUALITY**

<b>STRATEGY</b>	<b>ACTIONS</b>	<b>STAKEHOLDERS</b>	<b>MONITORING</b>	<b>COST ESTIMATE</b>	<b>TIMEFRAME</b>
<p><b>8. Instigate a Water Cycle Management Strategy and Water Cycle Model for the Shire</b></p>	<ul style="list-style-type: none"> <li>❖ Let a consultancy to assist Council in the development of the Water Cycle Management Strategy which will integrate all work of all agencies associated with water infrastructure and use across the Shire. The Strategy will address all elements of the water cycle.</li> <li>○ Produce the Water Cycle Management Strategy.</li> </ul>	<p>Hornsby Council., Institute of Sustainable Futures-Sinclair Knight and Merz, Sydney Water, Department of Infrastructure Planning and Natural Resources, RTA, Rail Infrastructure Corporation, Department of Environment and Conservation, Sustainable Actions Committee, the Statement of Joint Intent Committee (SoJI)-Steering</p>	<p>Monthly milestones assessed by the Statement of Joint Intent Committee (SoJI).</p>	<p>\$200,000 and 0.5 of staff time.</p>	<p>To be completed by July 2005.</p>

HORNSBY SHIRE COUNCIL AND ICLEI WATER CAMPAIGN

LOCAL ACTION PLAN

**WATER QUALITY**

STRATEGY	ACTIONS	STAKEHOLDERS	MONITORING	COST ESTIMATE	TIMEFRAME
	<ul style="list-style-type: none"> <li>○ Develop a Water Cycle Model for the Shire.</li> </ul>	Committee. Hornsby Businesses and Residents.			
<p><b>9. Implement a non piping, conservation and protection of the Shire's natural streams and watercourses.</b></p>	<ul style="list-style-type: none"> <li>❖ Develop a protection and remediation of urban streams element for incorporation into all Hornsby DCPs. Watercourses shall be retained or restored to their natural condition and shall be integrated into the urban design of the development that will encourage and support habitat and aid visual amenities and water quality improvements.</li> </ul>	Water Catchments Team (HSC), Strategic Planning Team (HSC), Environment Division and Planning Division of Council, and the development industry.	DCPs reviewed every 5 years by Manager, Water Catchments.	2 months of 1 full time staff per annum.	Implemented 1997.

## HORNSBY SHIRE COUNCIL AND ICLEI WATER CAMPAIGN

### LOCAL ACTION PLAN

#### WATER QUALITY

STRATEGY	ACTIONS	STAKEHOLDERS	MONITORING	COST ESTIMATE	TIMEFRAME
<b>10. Develop a Water Sensitive Urban Design DCP for the Shire</b>	❖ Develop an internal virtual team to put together the Water Sensitive Urban Design DCP and a Best Practices Manual for the Shire.	Environment Division, Planning Division, Works Division, and the development industry.	5 yearly review of DCPs by Manager, Strategic Planning.	1 full time person for 6 months	Implemented 1999.
<b>11. Conduct a Streamwatch monitoring program with local schools</b>	❖ Develop a program in conjunction with Sydney Water which supplies and maintains Streamwatch Kits and assists with educational material for local schools.	Sydney Water, Environmental Health and Protection Team, local schools, CRR/Water Catchments.	Annual review in the Management Plan by Manager, Environmental Health and Protection.	0.5 staff member per annum, \$25,000. \$5,000 CRR allocation.	Ongoing.
<b>12. Conduct bush regeneration across the Shire</b>	<ul style="list-style-type: none"> <li>❖ Develop and implement a Contract Bush Regeneration Program.</li> <li>❖ Develop and implement Volunteer Bush Regeneration Program.</li> </ul>	Bushland and Biodiversity Team, Water Catchments Team, the Catchment Remediation Unit, and the Shire community.	Annual review of program through the Management Plan by Manager, Bushland and Biodiversity.	4 full time staff. Budget \$700,000 per annum, and \$500,000 in-kind labour.	Ongoing.

## HORNSBY SHIRE COUNCIL AND ICLEI WATER CAMPAIGN

### LOCAL ACTION PLAN

#### WATER QUALITY

STRATEGY	ACTIONS	STAKEHOLDERS	MONITORING	COST ESTIMATE	TIMEFRAME
<b>13. Include water quality data in the State of the Environment Report (SoE)</b>	❖ Supply and interpret data from Council's aquatic systems monitoring program to a dedicated section of the Statement of Environment Report (SoE).	Water Catchments Team, Environmental Health and Protection Team, Environment Division, Community Relations (Corporate and Community Division).	Annual review of report format and findings.	1 full time staff for 3 months. \$50,000 per annum.	Ongoing annual reporting.
	❖ Develop an Interactive Water Quality Map of the Shire to put on the web in the SoE. (See Appendix D).	Manager, Water Catchments and Manager, Environmental Health and Protection.	Manager, Water Catchments and Manager, Environmental Health and Protection.	\$20,000.	Implemented 2002/2003.
<b>14. Develop an education program on water quality for residents of the Shire. Developed as part of Divisional Education</b>	❖ Develop and implement a school-based water quality awareness program.	Environment Division at HSC.	Annual review with the Management Plan, plus ongoing monitoring by the	3 full time staff , budget: various.	To be completed by June 2005.

# HORNSBY SHIRE COUNCIL AND ICLEI WATER CAMPAIGN

## LOCAL ACTION PLAN

### WATER QUALITY

STRATEGY	ACTIONS	STAKEHOLDERS	MONITORING	COST ESTIMATE	TIMEFRAME
<b>Strategy</b>	<ul style="list-style-type: none"> <li>❖ Develop and instigate a community-based water quality awareness program.</li> </ul>		Environment Educators Review Group.		
<b>15. Instigate a pollution investigation and compliance program for the Shire</b>	<ul style="list-style-type: none"> <li>❖ Employ Environment Protection Officers to conduct educational / compliance programs relating to pollution incidents.</li> </ul>	Environmental Health and Protection Team, Hornsby Council.	Annual review at Management Plan stage and by the Manager, Health and Protection Team.	4 full time staff and \$50,000 annual budget.	Ongoing.
	<ul style="list-style-type: none"> <li>❖ Environmental Reviews</li> <li>❖ Develop and monitor a Pollution Hotline for the Shire.</li> </ul>	Environmental Health and Protection Team.	Same as above.	Contract Call Centre \$15,000 per annum.	Same as above.

## HORNSBY SHIRE COUNCIL AND ICLEI WATER CAMPAIGN

### LOCAL ACTION PLAN

#### WATER QUALITY

STRATEGY	ACTIONS	STAKEHOLDERS	MONITORING	COST ESTIMATE	TIMEFRAME
<b>16. Maintain certification to ISO 14001 (Environmental Management) and ISO 9001 (Quality Management)</b>	❖ To maintain the Environmental Management (ISO14001) certification currently held by the Water Catchments Team, Environmental Health and Protection Team, Bushland and Biodiversity Management Team, the Information Technology Team within Hornsby Council.	Water Catchments Team, Environmental Health and Protection Team, Bushland and Biodiversity Management Team, Information Technology Team, and NCS International Pty Ltd.	6 monthly internal audit and annual external audit.	\$15,000 per annum.	Ongoing.

## HORNSBY SHIRE COUNCIL AND ICLEI WATER CAMPAIGN

### LOCAL ACTION PLAN

#### WATER QUALITY

STRATEGY	ACTIONS	STAKEHOLDERS	MONITORING	COST ESTIMATE	TIMEFRAME
	❖ To maintain the Quality Management System (ISO9001) Certification currently held by the Water Catchments Team, Environmental Health and Protection Team, Bushland and Biodiversity Management Team, and the Information Technology Team and the Legal Services Team.	Water Catchments Team, Environmental Health and Protection Team, Bushland and Biodiversity Management Team, Information Technology Team, and NCS International Pty Ltd.	Same as above.	Same as above.	Ongoing.
<b>17. Integrate Council works with the Hawkesbury-Nepean Catchment Blueprint</b>	❖ Work with the Department of Infrastructure, Planning and Natural Resources (DIPNR) to develop and implement the Catchment Blueprint for the Hawkesbury Nepean.	HSC, DIPNR, Hawkesbury Nepean Local Government Advisory Group.	2 monthly meetings of the Hawkesbury Nepean Local Government Advisory Group.	1 month of 1 person per annum.	Ongoing.



# HORNSBY SHIRE COUNCIL AND ICLEI WATER CAMPAIGN

## LOCAL ACTION PLAN

### WATER QUALITY

STRATEGY	ACTIONS	STAKEHOLDERS	MONITORING	COST ESTIMATE	TIMEFRAME
<b>18. Develop water quality and quantity monitoring program to assess health of Berowra Creek and performance of management strategies</b>	❖ Develop co-operative program to monitor results of STP upgrade and other catchment remediation works.	Sydney Water, Environment Protection Authority, Hornsby Shire Council.	Statement of Joint Intent (SoJI) Committee.	N/A	2005
	❖ Establish monitoring stations for instream flow gauging and sampling.	As above.	As above.	As above.	As above.
	❖ Establish joint records and databases systems.	As above.	As above	As above	As above.
	❖ Determine hydrological flow regime for freshwater creeks.	Sydney Water, Hornsby Shire Council, Department of Land and Water Conservation (now DIPNR).	Manager, Water Catchments	Various	Ongoing.
	❖ Determine tidal flows and investigate fresh water pollution in marine section of the Creek.	Berowra Creek Estuary Management Committee.	Manager, Water Catchments.	\$100,000	Completed 1999.

## HORNSBY SHIRE COUNCIL AND ICLEI WATER CAMPAIGN

### LOCAL ACTION PLAN

#### WATER QUALITY

STRATEGY	ACTIONS	STAKEHOLDERS	MONITORING	COST ESTIMATE	TIMEFRAME
<b>19. Establish baseline data on Creek aquatic habitats – flora and fauna</b>	❖ Audit waterways for plant and animal populations and habitat status.	Hornsby Shire Council, Berowra Creek Estuary Management Committee, Department of Land and Water Conservation (now DIPNR).	Manager, Water Catchments.	\$50,000.	Completed 2002.
	❖ Develop database for information.	As above.	As above.	As above.	As above.
<b>20. Investigate and measure pollutant loads and dynamics</b>	❖ Determine pollutant budget on basis of monitoring results and other investigations, and review annually.	Hornsby Shire Council, Environment Protection Authority (now DEC) Sydney Water Corporation.	SoJI Committee.	Various.	2010.
	❖ Monitor nutrient budget performance.	As above.	As above.	As above.	As above.
<b>21. Establish research program on pollutant dynamics and interactions.</b>	❖ Identify and quantify the relationship between pollutant concentrations, loads and impacts.	Hornsby Shire Council, Berowra Creek Estuary Management Committee, Department of Land	Berowra Creek Estuary Management Committee.	Various.	Ongoing.

# HORNSBY SHIRE COUNCIL AND ICLEI WATER CAMPAIGN

## LOCAL ACTION PLAN

### WATER QUALITY

STRATEGY	ACTIONS	STAKEHOLDERS	MONITORING	COST ESTIMATE	TIMEFRAME
		and Water Conservation (now DIPNR).			
<b>22. Control pollutant loads from Sydney Water Sewage Treatment Plants (STPs)</b>	❖ Monitor effectiveness of nutrient reduction upgrade.	Sydney Water, Environment Protection Authority (now DEC), Hornsby Shire Council.	Manager, Water Catchments.	\$15,000	Ongoing.
<b>23. Reduce household, industrial and commercial water use so pressure on STPs is reduced.</b>	❖ Make water sensitive urban design, including the use of water saving devices mandatory in new buildings and renovations.	Hornsby Shire Council.	Planning Division.	N/A.	Ongoing.
	❖ Promote reduced water use and greater wastewater reuse at industrial and commercial premises through a dedicated audit program.	Hornsby Shire Council, Sydney Water Corporation.	Environmental Health and Protection Team	Various.	Ongoing.

## HORNSBY SHIRE COUNCIL AND ICLEI WATER CAMPAIGN

### LOCAL ACTION PLAN

#### WATER QUALITY

STRATEGY	ACTIONS	STAKEHOLDERS	MONITORING	COST ESTIMATE	TIMEFRAME
<b>24. Improve management of leachate and runoff from disused waste disposal sites.</b>	❖ Develop inventory and audit waste disposal sites with regard to leachate and runoff problems.	Hornsby Shire Council, Environment Protection Authority (now DEC).	Manager, Water Catchments.	\$20,000	Completed 1999
<b>25. Improve knowledge of existing stormwater drainage system.</b>	<ul style="list-style-type: none"> <li>❖ Identify and map stormwater drains.</li> <li>❖ Educate community on relationship between stormwater system and receiving water impacts.</li> <li>❖ Develop and implement litter reduction campaign</li> </ul>	<p>Hornsby Shire Council, Schools.</p> <p>Hornsby Shire Council, Environment Protection Authority (now DEC), Berowra Creek Estuary Management Committee, Hawkesbury Nepean Catchment Management Trust (now Catchment Management Authority).</p> <p>Hornsby Shire Council.</p>	<p>Works Division.</p> <p>Environment Division.</p> <p>Environment Division.</p>	<p>Various.</p> <p>Various</p> <p>Various.</p>	<p>Completed 2002.</p> <p>Ongoing.</p> <p>Ongoing.</p>

## LOCAL ACTION PLAN

### WATER QUALITY

STRATEGY	ACTIONS	STAKEHOLDERS	MONITORING	COST ESTIMATE	TIMEFRAME
<b>26. Reduce stormwater pollution from residential areas.</b>	❖ Educate community on the adverse impacts of household and residential land use practices.	Hornsby Shire Council, Berowra Creek Estuary Management Committee, Hawkesbury Nepean Catchment Management Trust (now Catchment Management Authority).	Environment Division, Virtual Education Team.	Various.	Ongoing.
	❖ Investigate opportunities for on-site stormwater reuse.	Hornsby Shire Council.	Environment Division.	Various.	Ongoing.
<b>27. Ensure application of Best Management Practices to control stormwater pollution.</b>	❖ Maximise the retention of natural watercourse and buffer zones in new developments.	Hornsby Shire Council, Department of Urban Affairs and Planning (now DIPNR) Proponent.	Water Catchments Development Application Assessor.	N/A.	Ongoing.

## LOCAL ACTION PLAN

### WATER QUALITY

STRATEGY	ACTIONS	STAKEHOLDERS	MONITORING	COST ESTIMATE	TIMEFRAME
<b>28. Identify problem sites and industries.</b>	❖ Audit existing intensive agricultural sites to determine and quantify problems.	Hornsby Shire Council, Environment Protection Authority (now DEC), NSW Agriculture.	Manager, Environmental Health and Protection.	Various.	Ongoing.
	❖ Determine types of agricultural activity in catchment for which Best Management Practices required.	Hornsby Shire Council, Environment Protection Authority (now DEC), Department of Land and Water Conservation (now DIPNR), NSW Agriculture, Hawkesbury-Nepean Catchment Management Trust (now Catchment Management Authority).	As above.	As above.	As above.

## LOCAL ACTION PLAN

### WATER QUALITY

STRATEGY	ACTIONS	STAKEHOLDERS	MONITORING	COST ESTIMATE	TIMEFRAME
<b>29. Develop and implement appropriate Best Management Practices.</b>	❖ Develop Best Management Practices for control of stormwater pollution from agricultural activities.	Hornsby Shire Council, Environment Protection Authority (now DEC), Department of Land and Water Conservation (now DIPNR), NSW Agriculture, Berowra Creek Estuary Management Committee, Hawkesbury Nepean Catchment Management Trust (now Catchment Management Authority).	Manager, Environmental Health and Protection.	Various.	Ongoing.

## LOCAL ACTION PLAN

### WATER QUALITY

STRATEGY	ACTIONS	STAKEHOLDERS	MONITORING	COST ESTIMATE	TIMEFRAME
<b>30. Improve management of runoff from degraded urban and peri-urban bushland.</b>	❖ Audit fire trails, walking tracks and other access routes for erosion problems.	Hornsby Shire Council, National Parks and Wildlife Service, Department of Land and Water Conservation (DIPNR).	Manager, Water Catchments.	\$10,000.	Completed 2002.
	❖ Manage bushfire hazard reduction on a catchment basis with regard to erosion control and water quality.	Hornsby Shire Council, Department of Land and Water Conservation (now DIPNR).	Manager, Bushland and Biodiversity.	N/A.	Ongoing.
<b>31. Restore degraded sites within the catchment.</b>	❖ Compile inventory of degraded sites and monitor and quantify problems.	Hornsby Shire Council.	Manager, Environmental Health and Protection.	\$20,000.	Completed 1997.
	❖ Develop remediation measures for priority sites	Hornsby Shire Council, Department of Land and Water Conservation (now DIPNR).	Manager, Water Catchments.	Various.	Ongoing.



## LOCAL ACTION PLAN

### WATER QUALITY

STRATEGY	ACTIONS	STAKEHOLDERS	MONITORING	COST ESTIMATE	TIMEFRAME
<b>32. Increase and enhance vegetation cover on degraded bank sites to improve stability of bank and maintain biodiversity.</b>	❖ Audit creek and stream banks and identify degraded and vulnerable sites.	Hornsby Shire Council, Community Groups.	Manager, Water Catchments.	\$50,000.	Completed 2002.
	❖ Regenerate and replant degraded sites with native species.	Hornsby Shire Council, Community Groups.	Manager, Bushland and Biodiversity, Manager, CRR	\$100,000. per annum.	Ongoing.
	<b>33. Improve management to ensure stability of banks.</b>	❖ Increase community awareness of the value of stream bank vegetation in the maintenance of bank stability and improvement of water quality.	Hornsby Shire Council, Hawkesbury Nepean Catchment Management Trust (now Catchment Management Authority) Department of Land and Water Conservation (now DIPNR).	Manager, Bushland and Biodiversity.	Various.

## LOCAL ACTION PLAN

### WATER QUALITY

STRATEGY	ACTIONS	STAKEHOLDERS	MONITORING	COST ESTIMATE	TIMEFRAME
<b>34. Develop an information base for use in community water quality education programs.</b>	❖ Collate information available about the current water quality in the Creek and its tributaries.	Hornsby Shire Council, Hawkesbury Nepean Catchment Management Trust (now Catchment Management Authority), Environment Protection Authority (now DEC), Sydney Water Corporation, Department of Land and Water Conservation (now DIPNR).	Manager, Water Catchments.	Various.	Ongoing.
	❖ Identify and prepare information on the key factors affecting water quality and symptoms of poor water quality (e.g. nutrients, sediment, bacteria, flows / tides).	Hornsby Shire Council, Estuary Management Committee, Hawkesbury Nepean Catchment Management Trust (now Catchment Management Authority).	As above.	As above.	Ongoing.

## LOCAL ACTION PLAN

### WATER QUALITY

STRATEGY	ACTIONS	STAKEHOLDERS	MONITORING	COST ESTIMATE	TIMEFRAME
	<ul style="list-style-type: none"> <li>❖ Identify and assess the nature and importance of human impacts on water quality and develop information on these inter-relationships (e.g. land use, waste disposal, land disturbance, household practices)..</li> </ul>	Hornsby Shire Council, Estuary Management Committee, Hawkesbury Nepean Catchment Management Trust (now Catchment Management Authority).	Manager, Water Catchments.	Various.	Ongoing.
<b>35. Report to community on results of investigations and progress made in relation to the Berowra Creek Water Quality Management Strategy.</b>	<ul style="list-style-type: none"> <li>❖ Disseminate information through appropriate media channels at regular intervals.</li> </ul>	Hornsby Shire Council, Environment Protection Authority (now DEC), Sydney Water Corporation, Hawkesbury Nepean Catchment Management Trust (now Catchment Management Authority).	Water Quality officers.	Various.	Ongoing.

## LOCAL ACTION PLAN

### WATER QUALITY

STRATEGY	ACTIONS	STAKEHOLDERS	MONITORING	COST ESTIMATE	TIMEFRAME
<p><b>36. Develop and employ appropriate mechanisms to provide information to various audiences.</b></p> <p><b>37. Develop ways to encourage groups and individuals to take action that will result in improved water quality.</b></p>	<ul style="list-style-type: none"> <li>❖ Identify available ways of providing information (e.g. newsletters, radio programs, newspaper articles, talks, interactive displays, etc.)</li> </ul>	Hornsby Shire Council, Hawkesbury Nepean Catchment Management Trust (now Catchment Management Authority).	Environment Division, Virtual Education Team.	Various.	Ongoing.
	<ul style="list-style-type: none"> <li>❖ Promote ways of reducing household waste and recycling and reuse (e.g. composting, mulching).</li> </ul>	Hornsby Shire Council, Environment Protection Authority (now DEC), Hawkesbury Nepean Catchment Management Trust (now Catchment Management Authority).	As above.	As above.	As above.
	<ul style="list-style-type: none"> <li>❖ Encourage the identification of stormwater drainage systems and drain labelling.</li> </ul>	Hornsby Shire Council.	As above.	As above.	As above.

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## LOCAL ACTION PLAN

### **WATER QUALITY**

STRATEGY	ACTIONS	STAKEHOLDERS	MONITORING	COST ESTIMATE	TIMEFRAME
<b>38. Use of street sweeping as a water quality improvement strategy.</b>	❖ Design and implement a street sweeping program to improve water quality.	Waste Management Team	Executive Manager, Environment	\$200,000 per annum	Ongoing

HORNSBY SHIRE COUNCIL AND ICLEI WATER CAMPAIGN

LOCAL ACTION PLAN

**WATER  
CONSUMPTION**

STRATEGY	ACTIONS	STAKEHOLDERS	MONITORING	COST ESTIMATE	TIMEFRAME
<p><b>1. Maintain membership to the ICLEI Water Campaign</b></p>	<p>To develop a water users group within Hornsby Council.</p>	<p>Building Maintenance Manager, Parks Manager, Finance Manager, Manager, Aquatic Centres, Property Development Manager, Commercial Property Manager, Manager, Water Catchments, Manager, Environmental Health and Protection, Manager, Waste Management</p>	<p>Quarterly Meetings.</p>	<p>Nil.</p>	<p>Ongoing.</p>

**HORNSBY SHIRE COUNCIL AND ICLEI WATER CAMPAIGN**

**LOCAL ACTION PLAN**

**WATER  
CONSUMPTION**

<b>STRATEGY</b>	<b>ACTIONS</b>	<b>STAKEHOLDERS</b>	<b>MONITORING</b>	<b>COST ESTIMATE</b>	<b>TIMEFRAME</b>
	Actions to achieve Milestone 1 Actions to achieve Milestone 2 Actions to achieve Milestone 3 Actions to achieve Milestone 4 Actions to achieve Milestone 5	Building Maintenance Manager, Parks Manager, Manager, Finance, Manager, Aquatic Centres, Property Development Manager Manager, Commercial Property, Manager, Water Catchments, Manager, Environmental Health and Protection, Manager, Waste Management, and Community.	ICLEI Water Campaign Executive.	Various.	Milestone 1 – 2003 (completed) Milestone 2 – 2004. Milestone 3 – 2004. Milestone 4 – 2005. Milestone 5 – 2006.

**HORNSBY SHIRE COUNCIL AND ICLEI WATER CAMPAIGN**

**LOCAL ACTION PLAN**

**WATER  
CONSUMPTION**

<b>STRATEGY</b>	<b>ACTIONS</b>	<b>STAKEHOLDERS</b>	<b>MONITORING</b>	<b>COST ESTIMATE</b>	<b>TIMEFRAME</b>
<b>2. Join the Sydney Water Every Drop Counts Program</b>	<ul style="list-style-type: none"> <li>❖ Formerly signed on to the Program.</li> <li>❖ Completed a water diagnostic exercise by Sydney Water Consultants.</li> <li>❖ Compiled results of Corporate water diagnostic via an Action Plan.</li> </ul>	<p>Hornsby Shire Council, and Sydney Water.</p> <p>Hornsby Shire Council and Sydney Water.</p> <p>Sydney Water and Hornsby Council.</p>	<p>6 monthly assessment by Sydney Water.</p> <p>Sydney Water regular checks.</p> <p>Quarterly water use committee meetings.</p>	<p>Nil.</p> <p>Nil.</p> <p>Yet to be determined.</p>	<p>2002.</p> <p>2003.</p> <p>Ongoing.</p>



**HORNSBY SHIRE COUNCIL AND ICLEI WATER CAMPAIGN**

**LOCAL ACTION PLAN**

**WATER  
CONSUMPTION**

<b>STRATEGY</b>	<b>ACTIONS</b>	<b>STAKEHOLDERS</b>	<b>MONITORING</b>	<b>COST ESTIMATE</b>	<b>TIMEFRAME</b>
<b>3. Assess current consumption rates within Council and the community</b>	Selected 1999, 2000 and 2001 as Council's baseline years.	Hornsby Shire Council and Sydney Water.	Annually through Council's finance system.	1 month 1 staff member's time.	Ongoing until 2011.
	Contacted Sydney Water for water consumption data, as well as checking invoices for costs from Sydney Water that Council incurred on a calendar year basis from 1999 to 2002.	Hornsby Shire Council and Sydney Water.	As above.	As above.	As above.
	Water consumption of various Council owned premises were recorded on a per capita basis, and the Top 20 water consumers within Council for each year identified.	Various Council Branches and Teams.	As above.	As above.	As above.
	Recruited a data entry person from an employment agency to enter all the data into the ICLEI database.	Hornsby Shire Council and contractor for data entry.	Regular monitoring of ICLEI database.	1 data entry person. \$600.	4 days

**HORNSBY SHIRE COUNCIL AND ICLEI WATER CAMPAIGN**

**LOCAL ACTION PLAN**

**WATER  
CONSUMPTION**

STRATEGY	ACTIONS	STAKEHOLDERS	MONITORING	COST ESTIMATE	TIMEFRAME
<b>4. Develop a water conservation policy and goals / targets for Council</b>	Draft a Water Conservation Policy after consultation with various Council, Agency and Community representatives.	Hornsby Council, Agency and Community representatives.	The entire Policy is being monitored by EXCO and Council.	Nil	October 2004.
	Report to Council for endorsement of the Water Conservation Policy.	EXCO and Hornsby Council.	As above.	Nil.	October 2004.
	Submit Water Conservation Policy / Goals and Targets to ICLEI for endorsement.	Hornsby Council and ICLEI.	EXCO, Hornsby Council and ICLEI.	Nil.	October 2004.

**HORNSBY SHIRE COUNCIL AND ICLEI WATER CAMPAIGN**

**LOCAL ACTION PLAN**

**WATER  
CONSUMPTION**

STRATEGY	ACTIONS	STAKEHOLDERS	MONITORING	COST ESTIMATE	TIMEFRAME
<b>5. Produce a Local Action Plan to be used to achieve Goals outlined in the Strategy above</b>	Draft the Hornsby Shire Water Management Plan.	Council, Agency and Community.	Various Committees of Council.	To be advised.	October 2004.
	Do report to Council to gain endorsement of the Hornsby Shire Water Management Plan.	As above.	As above.	Nil.	October 2004.
	Submit the approved Hornsby Shire Water Management Plan to ICLEI for endorsement for Milestone 3.	As above.	As above.	Nil.	End of October 2004.

## HORNSBY SHIRE COUNCIL AND ICLEI WATER CAMPAIGN

### LOCAL ACTION PLAN

#### WATER CONSUMPTION

STRATEGY	ACTIONS	STAKEHOLDERS	MONITORING	COST ESTIMATE	TIMEFRAME
<b>6. Develop a Water Reuse Strategy for the West Hornsby Sewage Treatment Plant (WHSTP)</b>	Develop a Brief and let a consultancy.	Hornsby Shire Council, Sydney Water, Agency and Community.	Manager, Water Catchments Team.	\$15,000.	December 2004.
	Write to the Minister for Energy and Utilities to seek funding to expand this project.	Hornsby Shire Council and the Minister for Energy and Utilities.	Manager, Water Catchments Team.	Nil.	November 2004.
<b>7. Develop a Water Reuse Strategy for the Hornsby Heights Sewage Treatment Plant (HHSTP)</b>	Develop a Brief and let consultancy	Sydney Water and Hornsby Shire Council.	Manager, Water Catchments Team.	\$15,000.	July 2005.
	Seek support from the Minister for Energy and Utilities for this project.	Hornsby Shire Council and the Minister for Energy and Utilities.	Manager, Water Catchments Team.	Nil.	July 2005.

HORNSBY SHIRE COUNCIL AND ICLEI WATER CAMPAIGN

LOCAL ACTION PLAN

**WATER  
CONSUMPTION**

STRATEGY	ACTIONS	STAKEHOLDERS	MONITORING	COST ESTIMATE	TIMEFRAME
<b>8. Develop Water Reuse Strategy for the 3 public pools (Hornsby, Epping and Galston) within the Shire</b>	Reinstate / Optimise the Reverse Osmosis (RO) Filtration systems at Hornsby Pool	Environment Division, Works Division.	Executive Manager, Environment Executive Manager, Works.	\$10,000.	September 2004.
	Reinstate / Optimise the Reverse Osmosis (RO) Filtration systems at Epping Pool	Environment Division, Works Division.	Executive Manager, Environment Executive Manager, Works.	To be advised.	February 2005.
	Reinstate / Optimise the Reverse Osmosis (RO) Filtration systems at Galston Pool	Environment Division, Works Division.	Executive Manager, Environment Executive Manager, Works.	To be advised.	May 2005.
	Write the Water Reuse Strategy for the 3 Public Pools, Hornsby Epping and Galston.	Environment Division, Works Division.	Executive Manager, Environment Executive Manager, Works.	To be advised.	November 2005.

**HORNSBY SHIRE COUNCIL AND ICLEI WATER CAMPAIGN**

**LOCAL ACTION PLAN**

**WATER  
CONSUMPTION**

STRATEGY	ACTIONS	STAKEHOLDERS	MONITORING	COST ESTIMATE	TIMEFRAME
<p><b>9. Instigate a Water Cycle Management Strategy and Water Cycle Model for the Shire</b></p>	<ul style="list-style-type: none"> <li>❖ Let a consultancy to assist Council in the development of the Water Cycle Management Strategy which will integrate all work of all agencies associated with water infrastructure and use across the Shire. The Strategy will address all elements of the water cycle.                             <ul style="list-style-type: none"> <li>○ Produce the Water Cycle Management Strategy.</li> <li>○ Develop a Water Cycle Model for the Shire.</li> </ul> </li> </ul>	<p>Hornsby Council, Institute of Sustainable Futures-Sinclair Knight and Merz, Sydney Water, Department of Infrastructure Planning and Natural Resources, RTA, Rail Infrastructure Corporation, Department of Environment and Conservation, Sustainable Actions Committee, the Statement of Joint Intent Committee (SoJI)-Steering Committee. Hornsby businesses and residents.</p>	<p>Monthly milestones assessed by the Statement of Joint Intent Committee (SoJI).</p>	<p>\$200,000 and 0.5 of staff time.</p>	<p>To be completed by July 2005.</p>

**HORNSBY SHIRE COUNCIL AND ICLEI WATER CAMPAIGN**

**LOCAL ACTION PLAN**

**WATER  
CONSUMPTION**

STRATEGY	ACTIONS	STAKEHOLDERS	MONITORING	COST ESTIMATE	TIMEFRAME
<b>10. Develop Water Reuse Strategy for all the Parks within the Shire</b>	Draft Reuse Strategy in consultation with relevant Council Branch Managers.	Executive Manager, Environment, Manager, Parks and Landscape, Manager, Water Catchments, Manager, Environmental Health and Protection.	Executive Manager, Environment Manager, Water Catchments Manager, Parks and Landscape.	\$20,000.	July 2005.
<b>11. Develop a Reuse Strategy for Council's Nursery</b>	Designed and Installed a Reuse scheme for Council's Nursery at Pennant Hills.	Environment Division, Parks and Landscape Team, Water Catchments Team, Bushland and Biodiversity Management Team.	Executive Manager, Environment.	\$330,000 plus \$5,000 /year for maintenance.	Completed March 2004. Ongoing.

**HORNSBY SHIRE COUNCIL AND ICLEI WATER CAMPAIGN**

**LOCAL ACTION PLAN**

**WATER  
CONSUMPTION**

STRATEGY	ACTIONS	STAKEHOLDERS	MONITORING	COST ESTIMATE	TIMEFRAME
<b>12. Develop a Reuse Strategy for the two major tip sites in the Shire, i.e. Foxglove Oval and Arcadia Oval</b>	Design and construct collection and reuse facilities for the leachate from Arcadia and Foxglove Ovals.	Water Catchments Team, Parks and Landscape Team, Bushland and Biodiversity Team, and Works Division.	Executive Manager, Environment.  Executive Manager, Works.	\$350,000 for Foxglove Oval.  \$1.6 Million for Arcadia Oval.	To be completed by December 2004.  To be completed by July 2005.
<b>13. Include water consumption data in the State of the Environment Report (SoE)</b>	Collect water consumption data for Hornsby Shire Council via either Sydney Water or Council Accounts.	Hornsby Shire Council, Sydney Water, Finance Branch, Water Catchments Team, Environmental Health and Protection Team.	Via SoE Co-ordinating Officer. Manager, Water Catchments.	Not Applicable.	Annually, started in 2002/2003.



**HORNSBY SHIRE COUNCIL AND ICLEI WATER CAMPAIGN**

**LOCAL ACTION PLAN**

**WATER  
CONSUMPTION**

<b>STRATEGY</b>	<b>ACTIONS</b>	<b>STAKEHOLDERS</b>	<b>MONITORING</b>	<b>COST ESTIMATE</b>	<b>TIMEFRAME</b>
<b>14. Develop a Water Conservation Education Program for residents of the Shire</b>	Develop a Virtual Environmental Education Unit within the Environment Division at Council.  Develop an Education Strategy	Water Catchments Team, Waste Management Team, Parks and Landscape Team, Bushland and Biodiversity Management Team, Environmental Health and Protection Team.	Executive Manager, Environment.	N/A  \$10,000	Implemented.  December 2004.
<b>15. Investigate the possible use of the Old Man's Valley quarry as a water storage and reuse facility</b>	Develop a Brief and let consultancy for a Master Plan for Old Man's Valley.  Conduct a regular water quality monitoring program for the Quarry to ascertain its potential reuse capacity.	Environment Division, Planning Division, Works Division, Strategy Division.  Water Catchments Team.	Via the Strategic Planning Team and the Manager, Strategic Planning.  Monthly.	To be advised.  \$4,000 per month.	December 2004.  Ongoing.

**HORNSBY SHIRE COUNCIL AND ICLEI WATER CAMPAIGN**

**LOCAL ACTION PLAN**

**WATER  
CONSUMPTION**

STRATEGY	ACTIONS	STAKEHOLDERS	MONITORING	COST ESTIMATE	TIMEFRAME
<b>16. Keep up certification to ISO 14001 Environmental Management and ISO 9001 (Quality Management)</b>	<ul style="list-style-type: none"> <li>❖ To maintain the Environmental Management (ISO14001) certification currently held by the Water Catchments Team, Environmental Health and Protection Team, Bushland and Biodiversity Management Team and the Information Technology Team within Hornsby Council.</li> </ul>	Water Catchments Team, Environmental Health and Protection Team, Bushland and Biodiversity Management Team, Information Technology Team, and NCS International Pty Ltd.	6 monthly internal audit and annual external audit.	\$15,000 per annum.	Ongoing.

HORNSBY SHIRE COUNCIL AND ICLEI WATER CAMPAIGN

LOCAL ACTION PLAN

**WATER  
CONSUMPTION**

	❖ To maintain the Quality Management System (ISO9001) Certification currently held by the Water Catchments Team, Environmental Health and Protection Team, Bushland and Biodiversity Management Team, and the Information Technology Team and the Legal Services Team.	Water Catchments Team, Environmental Health and Protection Team, Bushland and Biodiversity Management Team, Information Technology Team, and NCS International Pty Ltd.	Same as above.	Same as above.	Ongoing.
<b>17. Integrate Council works with the Hawkesbury-Nepean River Management Forum findings.</b>	❖ Work with DIPNR to develop and implement the Catchment Blueprint for the Hawkesbury Nepean.	HSC, DIPNR, Hawkesbury-Nepean Local Government Advisory Group.	2 monthly meetings of the Hawkesbury Nepean Local Government Advisory Group.	1 month of 1 person per annum.	Ongoing.

**LOCAL ACTION PLAN**

**WATER  
CONSUMPTION**

<b>STRATEGY</b>	<b>ACTIONS</b>	<b>STAKEHOLDERS</b>	<b>MONITORING</b>	<b>COST ESTIMATE</b>	<b>TIMEFRAME</b>
<b>18. Develop ways to encourage groups and individuals to take action that will result in improved water quality.</b>	Establish water use reduction campaign (e.g. water saving devices, use of roof water for gardening, etc.)	Hornsby Shire Council, Sydney Water.	Environment Division, Virtual Education Team	Various.	Ongoing.

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## Appendices

[Appendix i Report to Council \(Attached\)](#)

[Appendix ii Map of Catchments \(Attached\)](#)

[Appendix iii Sustainable Water DCP\)](#)

[Appendix iv CRR devices Map and location \(Attached\)](#)

[Appendix v CRR Five Year Plan \(Attached\)](#)

[Appendix vi Parks locations in the Shire \(Attached\)](#)

[Appendix A: Statement of Joint Intent \(Attached\)](#)

[Appendix B: ICLEI Hornsby Map.](#)

[Appendix C: Water Quality Annual Report 2002-2003](#)

[Appendix D: Interactive Map](#)

[Appendix E: Corporate and Community Checklist \(Attached\)](#)

[Appendix F: Estuary Management Plan for Berowra](#)

[Appendix G: Brooklyn Estuary Processes Study](#)

[Appendix H: Catchment Remediation Rate Annual Report 2002-2003](#)

[Appendix I: Water Conservation Policy Cost Benefit Analysis \(See separate file on disk\)](#)

## *The Shire of Hornsby*

Executive Manager's Report No. EN32/02

Environment Division

Date of Meeting : 12/06/2002

Item No:      Subject:

**6                    INVITATION FROM THE INTERNATIONAL COUNCIL FOR LOCAL  
ENVIRONMENTAL INITIATIVES (ICLEI) TO JOIN THE  
WATER CAMPAIGN - AUSTRALIA**

### **INTRODUCTION/BACKGROUND**

As a member of the International Council for Local Environmental Initiatives (ICLEI), Hornsby Council has recently received an invitation to join the Water Campaign developed by ICLEI. ICLEI is a membership organisation of local governments and their associations. ICLEI is dedicated to building and supporting a worldwide movement of local governments to achieve tangible improvements in global environmental conditions through the cumulative impact of local governments.

The Water Campaign in Australia is based on the highly successful Cities for Climate Protection (CCP) Program. Hornsby Council has already been actively involved in the CCP projects such as the Energy Performance Contract; installation of solar energy at Council's Nursery Cottage and the initial purchase of a hybrid energy car for Council use. The Water Campaign is an innovative program which helps local government and their communities to reduce water consumption and improve water quality discharges. The Water Campaign was launched at the Global Cities 21 ICLEI World Congress in June 2000 as a strategic approach to water management in the Local Government sector.

The Water Campaign is being trialed by five pilot councils from three different states in Australia. The ICLEI Melbourne office is taking a lead role in the international development of this campaign.

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## **PURPOSE/OBJECTIVE**

This report is to seek Council's endorsement to participate in the ICLEI Water Campaign which will commence on 1 July 2002.

## **DISCUSSION**

Local government's role in natural resource management has been widely recognised over the past decade. All municipalities lie within water catchments and many of the processes that impact upon the local hydrology are within local government's jurisdiction. There are, therefore, many actions that councils can take to address the issue of water quality monitoring and the reduction of water consumption.

Hornsby Shire lies within several catchments (i.e. the Lower Hawkesbury Nepean catchment, Berowra catchment, Cowan catchment and the Lane Cove River catchment). As there are programs already in place within Council to promote catchment management (e.g. the Water Quality Monitoring Program and the Catchment Remediation Rate Program), the participation in ICLEI's Water Campaign would provide the opportunity to show the way and be part of a growing number of local governments which support the concept that integrated water resource management makes good economic, environmental and social sense. The achievement of these milestones for Hornsby Council would be quicker because of its existing catchment management programs.

The Water Campaign program is based on the following five milestones:

- an assessment of the current state of water quality and quantity consumed;
- setting of goals to improve the current situation;
- adoption of an Action Plan to achieve the goals set;
- implementation of the Action Plan; and
- monitoring and evaluation of the actions being implemented.

There are also a number of benefits for Council in joining the Water Campaign, such as to:

- save money by lowering Council's water bills;
- develop new markets and industries and provide local employment and business opportunities;
- reduce water consumption through the approved use of stormwater and wastewater;
- provide social and environmental benefits including supporting activities such as Streamwatch;
- promote local leadership in water resource management initiatives; and
- identify opportunities for partnerships with industry, residents and other governments at a regional, national and international level.

On joining the Water Campaign, ICLEI will provide support to Council in the form of technical advice and training. The Water Campaign software and other tools for calculating the consumption of water and setting a reduction goal will be given to Council, as well as providing training workshops in the milestones and assistance in the development of action plans. The Water Campaign provides a forum for Council to access a network of expertise from other councils, to exchange ideas/solutions, and obtain advice on other funding opportunities and programs.

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## **BUDGET**

The cost for the Water Campaign is a one-off participation fee which is determined by the size and population of individual councils. As Hornsby Council is already a member of ICLEI with more than 50,000 residents, the participation fee is \$1,750. This registration fee can be met from within the Water Catchments budget 2001/2.

## **POLICY**

There are no policy implications.

## **CONSULTATION**

Consultation has been undertaken with the Manager, Environmental Health and Protection.

## **RESPONSIBLE OFFICER**

The responsible officer is Mr Ross McPherson, Manager, Water Catchments, telephone 9847 6708, hours 9 am to 5 pm, Monday to Friday.

## **RECOMMENDATION**

THAT

1. Council participate in the ICLEI Water Campaign
2. Council forward a letter to ICLEI (see Attachment) indicating its intention to join the Water Campaign and enclose a cheque for \$1,750 as a one-off participation fee

ROSS MCPHERSON  
Manager  
Water Catchments Team

Endorsed by

STELLA WHITTAKER  
Executive Manager  
Environment





Attachments: Draft letter to ICLEI (1 Page) EN32.pdf

File(s) required for Meeting: P70/0163

**RECO PRECIS**

THAT

1. Council participate in the ICLEI Water Campaign
2. Council forward a letter to ICLEI (see Attachment) indicating its intention to join the Water Campaign and enclose a cheque for \$1,750 as a one-off participation fee

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**Appendix ii Map of Catchment (Please see opposite page)**

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Wisemans Ferry

Maroota

Loughtondale

Canoelands

Milsons Passage

Forest Glen

Fiddletown

Cowan

Brooklyn

Glenorie

Arcadia

Berrilee

Berowra

Galston

Mt Kuring-Gai

Dural

**LEGEND**

- - HSC Shire Boundary
- / - Drainage Lines
- - Cowan Creek Catchment
- - Hawkesbury River Catchment



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## Breakdown of landuse for the major catchments within Hornsby Shire

### CATCHMENT

Catchment	Total Hectares		Percentage
Berowra Creek Catchment	30526.62	Hectares	
Special Uses	745.749		2.44
Rural	6463.01		21.17
Residential	2916.49		9.55
Open Space	1952.41		6.40
Industrial	109.949		0.36
Horticulture	628.745		2.06
Environmental Protection	17366.57		56.89
Business	77.4971		0.25
			<b>99.13</b>
Cowan Creek Catchment	5671.01		
Special Uses	391.744		6.91
Residential	415.23		7.32
Open Space	96.2004		1.70
Industrial	59.283		1.05
Environmental Protection	3786.85		66.78
Business	25.9985		0.46
			<b>84.21</b>
Hawkesbury River Catchment	11934		
Special Uses	196.607		1.65
Rural	951.934		7.98
Residential	26.4849		0.22
Open Space	138.839		1.16
Horticulture	170.232		1.43
Environmental Protection	8328.86		69.79
Business	3.68641		0.03
			<b>82.26</b>

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**Breakdown of landuse for the major catchments within Hornsby Shire – continued.**

<b>CATCHMENT</b>		<b>Hectares</b>	<b>Percentage</b>
Lane Cove River Catchment		2071.82	
	Special Uses	184.334	8.90
	Residential	1391.05	67.14
	Open Space	255.233	12.32
	Environmental Protection	234.525	11.32
	Business	22.482	1.09
			<b>100.76</b>

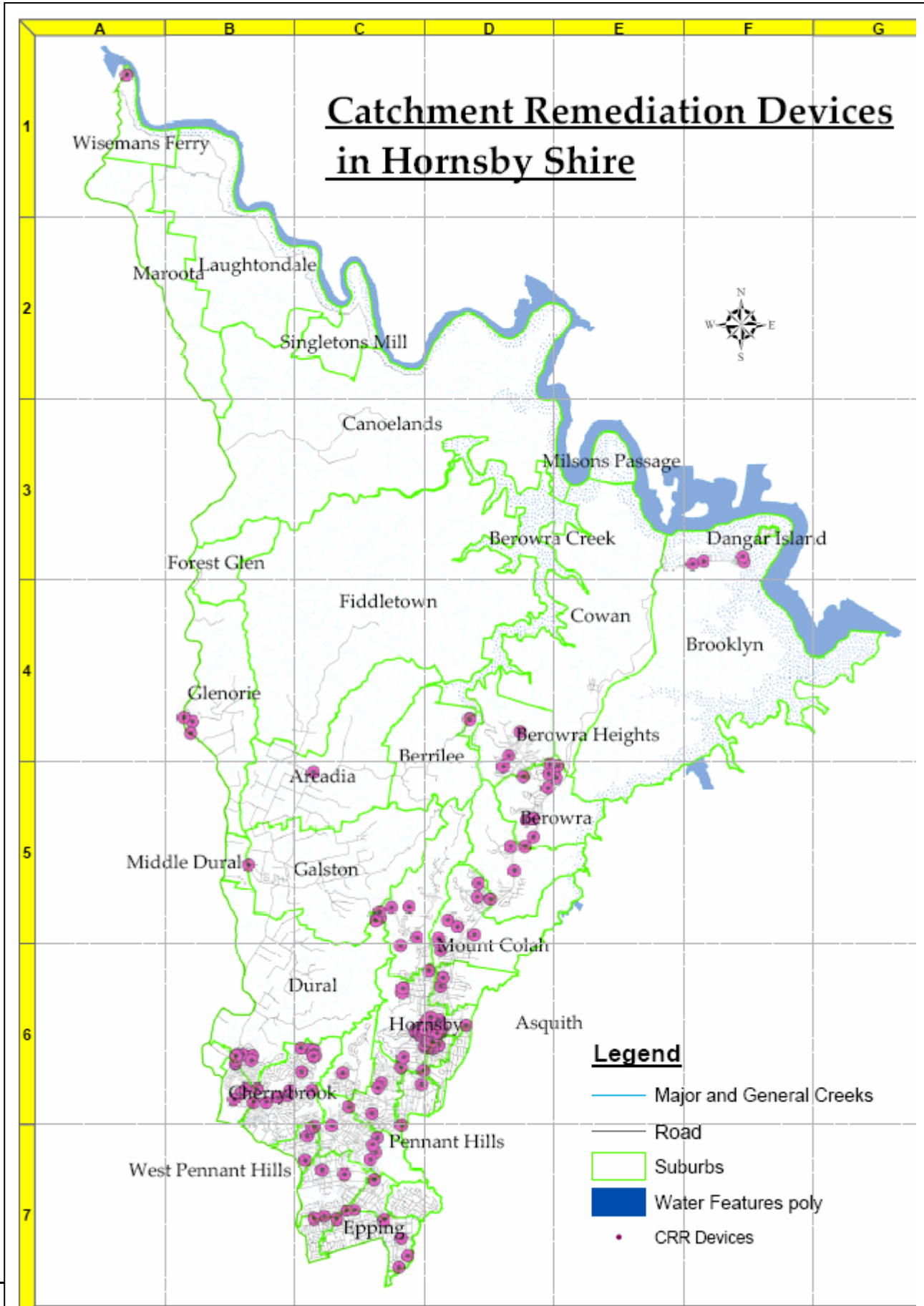
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### **Appendix iii Sustainable Water DCP**

(Please click on link to access Appendix iii Sustainable Water DCP).



# Catchment Remediation Devices in Hornsby Shire







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### Locations of Catchment Remediation Devices

ID	TYPE	CONSTRUCTI	MAINTENENC	STREET	SUBURB	UBD
1	Litter Basket	HSC	CRR	Wattle St	Asquith	133 K10
2	Litter Basket	HSC	CRR	Mittabah Ave	Asquith	133 K8
3	Litter Basket	HSC	CRR	Sutherland Rd	Beecroft	172 L6
4	Wetland	HSC	CRR	Plympton Rd	Beecroft	172 H12
5	Trash Rack	HSC	CRR	Norwood Ave Beecroft	Beecroft	172 F12
6	Trash Rack	HSC	CRR	The Gully Rd	Berowra	94 L12
7	CDS	DEV	CRR	64 The Gully Rd	Berowra	94 M11
8	Litter Basket	HSC	CRR	Berowra Waters Rd	Berowra	94 E8
9	Wetland	HSC	CRR	Brooklyn Rd	Brooklyn	56 C11
10	Humeceptor & Sand filter	HSC	CRR	George St	Brooklyn	56 K11
11	Shelter	HSC	CRR	Cheltnham Oval	Cheltenham	172 M11
12	Trash Rack	HSC	CRR	Odney Pl	Cherrybrook	151 K10
13	SR/Trash Rack	HSC	CRR	Woodgrove Rd	Cherrybrook	151 N11
14	Stream Remediation	DEV	CRR	Westeria Close	Cherrybrook	152 E6
15	Gross Pollutant Trap	HSC	CRR	Beecroft Road	Epping	173 B12
16	Sediment Basin	HSC	CRR	Abuklea Rd	Epping	193 E1
17	Sediment Basin	HSC	CRR	Essex St	Epping	193 D3
18	Wetland	HSC	CRR	Sallaway Rd	Galston	111 L7
19	Trash Rack	HSC	CRR	Tecoma Dr	Glenorie	91 C3
20	Gross Pollutant Trap	HSC	CRR	NorthcoteSt	Hornsby	133 K16
21	Trash Rack	HSC	CRR	Water St	Hornsby	133 K15
22	Trash Rack	HSC	CRR	Old Berowra Rd	Asquith	133 H8
23	Stream Remediation	HSC	CRR	Stewart Ave	Hornsby	133 D11
24	NetTech	HSC	CRR	Pacific Hwy	Hornsby	133 F16
25	Constructed Wetland	HSC	CRR	Clovelly Rd	Hornsby	153 D6

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26	Sediment Basin	HSC	CRR	Valley Rd	West Hornsby	153 A1
27	Litter Basket	HSC	CRR	Burdett St	Hornsby	153 K1
28	Wetland	DEV	CRR	Sydney Rd	Hornsby Heights	133 D4
29	Stream Remediation/Sed Basin	HSC	CRR	Parklands Rd	Mt Colah	133 M1
30	Leachate	HSC	CRR	Foxglove Rd	Mt Colah	114 A13
31	Trash Rack	HSC	CRR	Hamley Rd	Mt Kuring-gai	114 E5
32	Trash Rack/Stream Remediation	HSC	CRR	Denman Pde	Normanhurst	153 G8
33	Wetland Gross Pollutant Trap/Oil	HSC	CRR	Orchard St	Pennant Hills	153 A16
34	separator	HSC	CRR	Larool Cres	Thornleigh	153 A8
35	Litter Basket	HSC	CRR	Janet Ave	Thornleigh West Pennant Hills	152 Q13 152 E15
36	Stream Remediation	HSC	CRR	John Savage Cres	West Pennant Hills	152 E15
37	Stream Remediation	HSC	CRR	Eloura Rd	Westleigh	152 L6
38	Ski-Jump Litter Trap	HSC	CRR	Old Northern Rd	Wisemans Ferry	52 L10
39	Litter Basket	HSC	CRR	Shepherds Drive	Cherrybrook West Pennant Hills	152 C9 152 F15
40	Trash Rack	HSC	CRR	New Farm Rd	West Pennant Hills	152 F15
41	Trash Rack/Wetland/Creekline	DEV	CRR	Belltree Pl	Castle Hill	151 K5
42	Litter Basket/Stream Remed.	HSC	CRR	The Comenarra Parkway	Thornleigh	153 D14
43	Wetlands	DEV	CRR	Kalang Rd	Mt Colah West Pennant Hills	133 K4 152 F14
44	Wetland	HSC	CRR	Boundary Rd	West Pennant Hills	152 F14
45	Wetland	HSC	CRR	Laurence St	Pennant Hills	152 J15
46	Sed Basin	HSC	CRR	Hull Rd	Beecroft	172 H5
47	Wetland	HSC	CRR	Hastings Rd	Castle Hill	151 K5
48	Leachate, Salt Pan Res	HSC	CRR	Brooklyn Rd	Brooklyn	56 B12

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49	Leachate	HSC	CRR	Arcadia Rd	Arcadia	92 F10
50	Sediment Basin	DEV	CRR	Purchase Rd	Cherrybrook	152 E3
51	Sediment Basin	DEV	CRR	Patricia Pl	Cherrybrook	152 F4
52	Sediment Basin	DEV	CRR	Mary Wall Cres	Berowra	94 M9
53	Sediment Basin (Nth cul-de-sac)	DEV	CRR	Bambil Rd	Berowra	114 H2
54	Sediment Basin	DEV	CRR	opp. 33 Jaranda St	Berowra	94 L9
55	Sediment Basin	DEV	CRR	Galahad Cl	Mt Colah	114 A11
56	Trash Rack	DEV	CRR	Myall Rd	Mt Colah	133 Q3
57	Sediment Basin	DEV	CRR	Barrington Dr	Dural	151 N4
58	Wetland	DEV	CRR	Millstream Grove	Dural	151L4
59	Wetlands	DEV	CRR	Shepherds Dr	Cherrybrook	152 C9
60	Wetlands	HSC	CRR	Off Britannia Ave	Pennant Hills	172 Q3
61	Wetland	HSC	CRR	Parklands Rd (Oval)	Mt Colah	113 L16
62	Sediment Basin	HSC	CRR	James Henty Dr	Cherrybrook	151M5
					West Pennant	
63	CDS	HSC	CRR	Cardinal Ave	Hills	172 E3
64	Trash Rack	HSC	CRR	Berkley Cl	Berowra	94 D9
65	NetTech	HSC	CRR	off New Line Rd (6 Glenoak Way)	Cherrybrook	151N9
66	Sediment Basin/Wetland	HSC	CRR	Dinmore Place	Cherrybrook	151 L9
67	Nettech (Channel net)	HSC/RTA	CRR	815 Pacific Hwy (west)	Mt Kuring-gai	114 F9
68	Nettech (Channel net)	HSC/RTA	CRR	Pacific Hwy (North)	Mt Kuring-gai	114 J4
69	Nettech (Channel net)	HSC/RTA	CRR	Pacific Hwy (South)	Mt Kuring-gai	114 H5
70	Nettech (Channel net)	HSC/RTA	CRR	Galston Rd (HP1)	Hornsby Heights	113 C14
71	Nettech (Channel net)	HSC/RTA	CRR	Galston Rd (HP2)	Hornsby Heights	113 B15
72	Nettech (Channel net)	HSC/RTA	CRR	Galston Rd (HP3)	Hornsby Heights	113 A15
73	Nettech (Channel net)	HSC/RTA	CRR	Galston Rd (HP5)	Hornsby Heights	113 A16
74	Nettech (Channel net)	HSC/RTA	CRR	Galston Rd (HP6)	Hornsby Heights	112 Q16

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75	Ecosol Unit	DEV	CRR	opp.144 Woodcourt Rd	Berowra	94 G4
76	Litter basket	HSC	CRR	Clovelly Rd	Hornsby	153E4
77	Trash rack	HSC	CRR	End of Bellamy St	Pennant Hills	152L11
78	Wetland	HSC	CRR	Clarinda St	Hornsby	133D10
79	Rocla DD2400	HSC	CRR	Dangar Rd	Brooklyn	56K10
80	CDS	HSC	CRR	Hunter St	Hornsby	153H1
81	Nettech	HSC	CRR	Clarinda St	Hornsby	133D10
82	Trash rack	HSC	CRR	Clarinda St	Hornsby	133D10
83	Nettech	HSC	CRR	Ti Tree Cres	Berowra	114J1
84	Litter Baskets (twins)	HSC	CRR	Bambil Rd	Berowra	114J1
85	Litter Basket (& small sed basin)	HSC	CRR	Bambil Rd	Berowra	114J1
86	Ski-jump trap/Stream Remed.	HSC	CRR	Heights Place	Hornsby Heights	113E14
87	Nettech 1200 & Sed Basin	HSC	CRR	Stanley Rd (cnr Pembroke)	Epping	173D15
88	Sediment Basin	DEV	CRR	Cnr Evanda & Jaranda St	Berowra	94 L10
89	CDS	DEV	CRR	End Lockyer Close	Dural	151K3
90	Sediment Basin	DEV	CRR	Kenburn Ave	Cherrybrook	152B10
91	Sediment Basin	DEV	CRR	Trevors La	Cherrybrook	152F3
92	Sediment Basin	DEV	CRR	Carmen Cres	Cherrybrook	152D3
93	Sediment Basin	DEV	CRR	Patricia Pl (opp. Philip Pl)	Cherrybrook	152G4
94	Trash Rack	HSC	CRR	Malsbury Rd	Hornsby	153G6
95	Stream Remediation	HSC	CRR	Plympton Rd (Ray Park)	Carlingford	172K12
96	Sediment Basin	HSC	CRR	End Malton Rd	Cheltenham	172Q7
97	Ecosol Pit Basket RSF100-gsp	HSC/RTA	CRR	2a Dural St (pit 666)	Hornsby	153F1
98	Ecosol Pit Basket RSF100-gsp	HSC/RTA	CRR	3a Dural St (pit 667)	Hornsby	153F1
99	Ecosol Pit Basket RSF100-gsp	HSC/RTA	CRR	2 Dural St (pit 668)	Hornsby	153F1
100	Nettech (Channel net)	HSC/RTA	CRR	New Line Rd (sw) intersection with Hastings Rd	Dural	151K5

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101	Nettech (Channel net)	HSC/RTA	CRR	New Line Rd (nw)	Dural	151K4
102	Nettech (Channel net)	HSC/RTA	CRR	New Line Rd (se)	Dural	151K5
103	Nettech (Channel net)	HSC/RTA	CRR	New Line Rd (ne)	Dural	151K4
104	Rocla DD1200	HSC	CRR	Dusthole Bay boatramp	Berowra Waters	93Q2
105	Rocla DD 2400	HSC	CRR	Sefton Rd (HSC depot)	Thornleigh	153A9
106	PitBull Pit Basket & insert	HSC	CRR	Dusthole Bay carpark	Berowra Waters	93Q2
107	Sediment Basin	DEV	CRR	Patricia Place (off fire trail)	Cherrybrook	152G4
108	Sediment Basin	DEV	CRR	End Grey Gum Rd	Mt Colah	133K3
109	Sediment Basin	DEV	CRR	Grey Gum Rd (opp. Piperita Cl)	Mt Colah	133K3
110	Ski-Jump trap	HSC	CRR	End George St	Pennant Hills	172Q1
111	Rocla CleansAll CL375	DEV	CRR	Rosemary Pl	Cherrybrook	152A10
112	Ecosol 6000	DEV	CRR	Foley Pl	Castle Hill	151J11
113	Ecosol pit basket RSF-100	DEV	CRR	8 Sue Place	Mt Colah	114B13
114	Ecosol pit basket RSF-100	DEV	CRR	21 Sue Place	Mt Colah	114B13
115	Wetland/Sed Basin	CRR	CRR	Midson Rd	Beecroft	172L11
116	Enviropod 1, pit#10105	HSC	CRR	Hunter St (opp Albert Ln)	Hornsby	133H15
117	Enviropod 2, pit#10106	HSC	CRR	Hunter St (20 m sth of pod 1)	Hornsby	133H15
118	Enviropod 3, pit#10144	HSC	CRR	Hunter St (SE corner of Hunter and Linda St; 4m sth of TP)	Hornsby	133H16
119	Enviropod 4, pit#10143	HSC	CRR	Hunter St (outside No. 77).	Hornsby	133H16
120	Enviropod 5, pit#10151	HSC	CRR	Hunter St (10-15m from telegraph pole at intersection of Linda and Hunter St)	Hornsby	133H15
121	Enviropod 6, pit#10149	HSC	CRR	Linda St at intersection with Hunter Ln NW side of Hunter Ln, outside PCA in kerb	Hornsby	133H16
122	Enviropod 8, pit#10135	HSC	CRR	Hunter Ln (outside Access Asphalt Paving)	Hornsby	133H15
123	Enviropod 9, pit#10137	HSC	CRR	Hunter Ln, outside Pedders Suspension	Hornsby	133H15
124	Enviropod 10, pit#10138	HSC	CRR			

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125	Enviropod 13, pit#10279	HSC	CRR	Cnr of Beatie and Jersey Ln	Hornsby	133G16
126	Enviropod 14, pit#10276	HSC	CRR	Jersey Ln, outside rear of police stn	Hornsby	133G16
127	Enviropod 17, pit#10264	HSC	CRR	Cnr of Coronation and Jersey St	Hornsby	133G16
128	Enviropod 18, pit#10265	HSC	CRR	Coronation St, Opp Jersey St	Hornsby	133G16
129	Enviropod 19, pit#10266	HSC	CRR	Station St, at intersection of Jersey and Coronation	Hornsby	133G16
130	Enviropod 21, pit#10270	HSC	CRR	Station St, edge of Bus Bay	Hornsby	153G1
131	Enviropod 20, pit#10267	HSC	CRR	Station St, 10-15m from telegraph pole Northern most pit in bus bay (under	Hornsby	153G1
132	Enviropod 22, SRA pit	HSC	CRR	Route 589 & 632 sign)	Hornsby	153G1
133	Enviropod 23, SRA pit	HSC	CRR	Southern most pit in bus bay	Hornsby	153G1
134	Enviropod 24, SRA pit	HSC	CRR	Middle pit in bus bay (under under Route 588 sign)	Hornsby	153G1
135	Enviropod 25, pit#10268	HSC	CRR	Station St, outside Coronation Ln	Hornsby	153G1
136	Enviropod 26, pit#10269	HSC	CRR	Station St outside Habitat Homemakers SE Cnr of Albert St & intersection of	Hornsby	153G1
137	Enviropod 27, pit#9869	HSC	CRR	Linda St	Hornsby	133J16
138	Enviropod 28, pit#9868	HSC	CRR	Albert St (SW Cnr)	Hornsby	133J16
139	Enviropod 29, pit#9889	HSC	CRR	Albert Ln, Nth	Hornsby	133H16
140	Enviropod 30, pit#9884	HSC	CRR	Albert Ln, Sth	Hornsby	133H16
141	Enviropod 31, pit#9878	HSC	CRR	Muriel Ln	Hornsby	133J16
142	Enviropod 32, pit#10486	HSC	CRR	NW Cnr of Burdett & Muriel St	Hornsby	153J1
143	Enviropod 33, pit#10408	HSC	CRR	Cnr Burdett St and Murial Ln	Hornsby	153J1
144	Enviropod 34, pit#10457	HSC	CRR	Burdett St, Opp Albert St	Hornsby	153J1
145	Enviropod 35, pit#10483	HSC	CRR	Cnr Burdett and Hunter St	Hornsby	133H16
146	Enviropod 36, pit#10482	HSC	CRR	Cnr Burdett and Hunter St	Hornsby	133H16
147	Enviropod 37, pit#10484	HSC	CRR	Cnr Burdett and Hunter St (SW)	Hornsby	133H16
148	Enviropod 38, pit#10262	HSC	CRR	Albert Ln	Hornsby	153J1

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149	Enviropod 39, pit#10226	HSC	CRR	Florence St & cnr of Albert St	Hornsby	153H1
150	Enviropod 40, pit#10224	HSC	CRR	Cnr of Albert and Florence St	Hornsby	153H1
151	Enviropod 41, pit#10507	HSC	CRR	Edgeworth David Rd, outside Park Lodge	Hornsby	153J2
152	Enviropod 44, pit#9532	HSC	CRR	Waitara Av, 100m Sth od Edgeworth David	Hornsby	153K3
153	Enviropod 46, pit#9524	HSC	CRR	SW Cnr of Romsey & Leonard St	Hornsby	153J3
154	Enviropod 47, pit#9525	HSC	CRR	NW Cnr of Romsey & Leonard St	Hornsby	153J3
155	Enviropod 48, pit#9515	HSC	CRR	Thomas St, opp tennis court carpark	Hornsby	153J2
156	Enviropod 49, pit#9521	HSC	CRR	Thomas St, 100 Sth of Edgeworth David int.	Hornsby	153J2
157	Enviropod 50, pit#10221replaced	HSC	CRR	NW cnr Albert St & Edgeworth David	Hornsby	153H2
158	Enviropod 52, pit#10219	HSC	CRR	Albert St, 100m nth of Edgeworth David Int	Hornsby	153H2
159	Enviropod 53, pit#10220	HSC	CRR	Albert St, 10m nth of Edgeworth David Int	Hornsby	153H2
160	Enviropod 54, pit#10505	HSC	CRR	Edgeworth David & Muriel St Int	Hornsby	153J2
161	Enviropod 55, pit#9498	HSC	CRR	SE Cnr James & Pattison St	Hornsby	153H3
162	Enviropod 56, pit#9497	HSC	CRR	SE Cnr James & Pattison St	Hornsby	153H3
163	Enviropod 59, pit#9486	HSC	CRR	Cnr Leonard & Hornsby St	Hornsby	153H3
164	Enviropod 60, pit#9481	HSC	CRR	Nth end Hornsby St	Hornsby	153H2
165	Enviropod 61, pit#10589	HSC	CRR	Edgeworth David, outside tennis courts	Hornsby	153H2
166	Enviropod 62, pit#10474	HSC	CRR	Florence St, next to phone box	Hornsby	153G1
167	Enviropod 63, pit#10473	HSC	CRR	Florence St, outside hot bread shop	Hornsby	153G1
168	Enviropod 64, pit#10490	HSC	CRR	Cnr George & Florence St	Hornsby	153G1
169	Enviropod 65, pit#10098	HSC	CRR	Hunter Ln	Hornsby	153H1
170	Enviropod 66, new pit	HSC	CRR	Edgeworth David, 5 m west of Traffic lights	Hornsby	153H2
171	Enviropod 68, new pit	HSC	CRR	Edgeworth David, 50 m east of Pacific	Hornsby	153H2

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				Hwy		
172	Enviropod 69, pit#10498	HSC	CRR	Hunter Ln	Hornsby	133H16
173	Enviropod 74, pit#10222replaced	HSC	CRR	Cnr Albert & Edgeworth David, east side	Hornsby	153H2
174	Enviropod 75, pit#9701	HSC	CRR	Cnr Muriel & Edgeworth David	Hornsby	153J2
175	Enviropod 76, pit#9702	HSC	CRR	Cnr Muriel & Edgeworth David	Hornsby	153J2
176	Enviropod 77, pit#9925	HSC	CRR	33/35 Sherbrook (west side)	Hornsby	133K16
177	Enviropod 78, pit#9935	HSC	CRR	33/35 Sherbrook (east side)	Hornsby	133K16
178	Enviropod 79, pit#9936	HSC	CRR	29/31 Sherbrook (east side)	Hornsby	133K16
179	Enviropod 80, pit#9924	HSC	CRR	29/31 Sherbrook (west side)	Hornsby	133K16
180	Enviropod 82, pit#9858	HSC	CRR	Bridge St	Hornsby	133J14
181	Enviropod 84, pit#9918	HSC	CRR	Linda St	Hornsby	133K16
182	Enviropod 85, pit#9905	HSC	CRR	May St	Hornsby	133K16
183	Enviropod 86, pit#9908	HSC	CRR	May St	Hornsby	133K16
184	Enviropod 87, pit#9876	HSC	CRR	Muriel St	Hornsby	133J16
185	Enviropod 89, pit#9686	HSC	CRR	Burdett St	Hornsby	133J16
186	Humeceptor?	DEV	CRR	opp 4 Pike Rd	Hornsby Heights	133F2
187	Stormwater reuse system	HSC	CRR	Britannia Street (nursery)	Pennant Hills	172Q3
188	NetTech	HSC	CRR	Gleneagles Cr	Hornsby	133P15
189	NetTech	HSC	CRR	Joalah Cr (end)	Berowra Heights	94G11
190	Humeguard Sediment basin (x 2) creek	DEV	CRR	26 Monterey Pl	Cherrybrook	151P11
191	remediation	HSC	CRR	Old Northern Rd (Sth of Timaru St)	Glenorie	91B2
192	Ecosol Pit Basket RSF100-gsp	HSC	CRR	Cairnes Rd	Glenorie	91C5

# **HORNSBY SHIRE COUNCIL**



## **CATCHMENT REMEDIATION PROGRAM Five-Year Plan Capital Investment 2002-2007**

June 2002

**Table 1: Proposed remediation devices and their locations for 2002/03 to 2006/07.**

LOCATION	WARD	DEVICE	CAPITAL COST	ANNUAL COST	LIFE CYCLE COST
			(\$,000's)	(\$,000's)	(\$,000's)
<b>2002/2003</b>					
BROOKLYN 56 H11, Dangar Rd	A	GPD	5	1	19
BEROWRA WATERS 94A3 (east)	A	GPD	50	3	91
BEROWRA 94 G11, End of Joalah Cr	A	WM	70	5	138
BEROWRA 94 H4, Londsdale Ave	A	GPD	80	3	121
BEROWRA 94 L10, Cnr Evanda & Balaclava Rds	A	GPD	20	1	34
BEROWRA 94 L13, The Gully Rd	A	GPD/SR	30	2.5	64
HORNSBY 153 F6, Greenvale St	B	GPD/SR	50	4	104
HORNSBY 153 E7, Avery St	B	GPD	50	1.5	70
HORNSBY 133 P15, Gleneagles Cres	B	WM	110	5	178
NORMANHURST 153 E12, Capella Pl	B	GPD	50	1.5	70
NORMANHURST 153 F12, Cnr Osborn & Currawong Rds	B	GPD	30	1.5	50
THORNLEIGH 153 A6, Koorringal Ave	B	GPD	40	1.5	60
THORNLEIGH 152 Q11, Headdon Park	B	GPD	25	1.5	45
PENNANT HILLS 152 J15, Phills High School	C	GPD	30	3	71
BEECROFT 172 L11, Midson Rd	C	WM/SR2	120	6	202
HORNSBY CBD	B	GPD's	70	7	165
Sub-total			830	48	1482
<b>PRE-CONSTRUCTION FOR 2003/04</b>			80		
		<b>CAP. Related</b>			
<b>ASSET MAINTENANCE (includes all assets to date)</b>			218*		
			30		
<b>ASSET MONITORING</b>					
			30		
<b>INTEGRATED CATCHMENT EDUCATION</b>					
			358		
<b>Sub-total</b>					
			1188		
<b>Total</b>					
<b>2003/2004</b>					
BEROWRA 94 J9, End Warrina St	A	GPD	60	1.5	80
BEROWRA WATERS 94 A2/3, Kirkpatrick Way	A	ST2	50	1	64
BEROWRA 94 L13/F8 CBD		GPD's	20	4	74
MT COLAH 113 P15, End Jessica Pl	A	GPD	40	1.5	60
ASQUITH 133 P10/11, Baldwin Rd/Stratford Cl	A	WM/SR2/GPD	90	7.5	192
ASQUITH 133 K10 CBD		GPD's	10	2	37
HORNSBY 153 E3, Reddy Park (Pretoria Pde)	B	GPD/SR2	40	2.5	74
THORNLEIGH 153 B15, End of Short St	B	ST2/SR2	70	2	97
THORNLEIGH 153 D14, Off The Comenarra Pky	B	GPD	50	1.5	70
WESTLEIGH 152 J7/8/9, Duneba Dr	B	ST2's	50	1	64
WESTLEIGH 152 K9, Elouera Dr	B	GPD	40	1.5	60
WEST PENNANT HILLS 172 E1, Wilga St	C	SR2	40	1	54
WEST PENNANT HILLS 152 F15	C	ST1/SR1	80	2	107
BEECROFT 172 K3, Sutherland Rd	C	ST1	40	1	54

EPPING 172 P14, Kent St	C	GPD/SR1	90	2.5	124
EPPING 173 H11, Bedford St	C	ST2/SR2	40	2	67
Sub-total			810	35	1278
<b>PRE-CONSTRUCTION FOR 2004/05</b>			80		
		<b>CAP. Related</b>			
<b>ASSET MAINTENANCE (includes all assets to date)</b>			253*		
			30		
<b>ASSET MONITORING</b>					
			30		
<b>INTEGRATED CATCHMENT EDUCATION</b>					
			393		
<b>Sub-total</b>					
			<b>1203</b>		
<b>Total</b>					
<b>2004/2005</b>					
MT KURING-GAI 114 G12		ST2	30	1	44
MT COLAH 133 M1, Parklands Rd		GPD	50	1.5	70
ASQUITH 133 K8, Mittabah Rd/Gardenia St Park		GPD/SR2	70	2.5	104
HORNSBY 133 H15, Linda St		GPD	80	3	121
HORNSBY 133 K15, Water St		GPD (oil boom)	20	1.5	40
WAITARA 153 J5, Unwin Rd		GPD	70	2.5	104
NORMANHURST 153 G9, CBD		GPD's	10	1.5	30
THORNLEIGH 153 B9 CBD		GPD'S	50	4	104
THORNLEIGH 153 C12, End Loch Maree St		GPD	50	2.5	84
WESTLEIGH 152 L8, CBD		GPD's	30	2.5	64
CASTLE HILL 151 K5, Belltree Cl		GPD (modify)	50	1.5	70
CHERRYBROOK 151 L9, End Baydon St		GPD	40	1.5	60
PENNANT HILLS 152 M16/N16 CBD		GPD's	40	4	94
BEECROFT 172 E10, Lamorna Av		SR1	60	2	87
BEECROFT 172 G6, Fearnley Park (Hannah St)		GPD/SR2	70	2.5	104
CARLINGFORD 172 G16, Anthony St		SR2/GPD	60	2.5	94
CARLINGFORD 192 F1 CBD		GPD's	30	3	71
Sub-total			810	40	1345
<b>PRE-CONSTRUCTION FOR 2005/06</b>			80		
		<b>CAP. Related</b>			
<b>ASSET MAINTENANCE (includes all assets to date)</b>			293*		
			30		
<b>ASSET MONITORING</b>					
			30		
<b>INTEGRATED CATCHMENT EDUCATION</b>					
			433		
<b>Sub-total</b>					
			<b>1243</b>		
<b>Total</b>					
<b>2005/2006</b>					
COWAN 75 B13, Cnr Alberta & View St		ST2	30	1	44
BEROWRA 94 N9, End The Gully Rd		W2/GPD	250	10	386

MT KURING-GAI 114 H10, End Merrilong Ave	ST2/GPD	70	2.5	104
MT KURING-GAI 114 H12, End High St	ST2	30	1	44
HORNSBY 153 K1, Burdett St	SR2/GPD	60	2.5	94
HORNSBY 133 B15, End Rosemead Rd (outlet)	ST2/SR2	50	2	77
GLENORIE 91 B2, Old Northern Rd (Glenorie Pk)	SR2/ST2	30	2	57
GALSTON 112 B11, Galston CBD	GPD	30	1.5	50
WESTLEIGH 152 L3/L4, Off Barkala PI (x3)	GPD	40	1.5	60
CHERRYBROOK 152 C13, Off Flametree CI	SR1/GPD	60	2	87
BEECROFT 172 K5/6 CBD	GPD's	20	2	47
EPPING 173 B15/16, CBD	GPD's	40	4	94
EPPING 173 E15, Epping Rd	SR1	60	1.5	80
EPPING 193 D4, End Essex St (Vimiera Pk)	SR2/GPD	50	2.5	84
Sub-total		820	36	1308
<b>PRE-CONSTRUCTION FOR 2006/07</b>		80		
	<b>CAP. Related</b>			
<b>ASSET MAINTENANCE (includes all assets to date)</b>		329*		
		30		
<b>ASSET MONITORING</b>				
		30		
<b>INTEGRATED CATCHMENT EDUCATION</b>				
		469		
<b>Sub-total</b>				
		1289		
<b>Total</b>				
<b>2006/2007</b>				
BROOKLYN 56 B12, Brooklyn Rd (Saltpan Res.)	Leachate	250	5	318
BEROWRA 94 H15, End Acacia PI	SR2/ST2	30	2	57
MT KURING-GAI 114 D14, Mt Kur. Oval	ST2	10	1	24
HORNSBY HTS 133 F3, End Raphael Dr	GPD/ST2	50	2.5	84
HORNSBY HTS 113 L7, End Binya/Oakwood PI	ST2	20	1	34
MT COLAH 113 M15, End Murralong Rd	ST2/SR2	30	1.5	50
MT COLAH 114 A13, Foxglove Oval (Stage 3)	Leachate	170	5	238
ASQUITH 133 N11, Baldwin Ave (Asq.Girls HS)	GPD/SR1	70	2.5	104
HORNSBY 133 F14, Fern Tree CI (outlet)	SR2/GPD	20	1	34
PENNANT HILLS 172 Q1, End George St	GPD	30	1.5	50
PENNANT HILLS 152 H13, End Morrison PI	ST2	20	1	34
CHERRYBROOK 152 D8/9, Gavin/McKinley PI	ST/GPD	50	2.5	84
BEECROFT 172 Q11, End Lyne Rd	ST2/GPD	30	2	57
EPPING 193 E1, End Stanley St	ST2/GPD	40	2.5	74
Sub-total		820	31	1242
<b>PRE-CONSTRUCTION FOR 2007/08</b>		80		
	<b>CAP. Related</b>			
<b>ASSET MAINTENANCE (includes all assets to date)</b>		360*		
		30		
<b>ASSET MONITORING</b>				
		30		
<b>INTEGRATED CATCHMENT EDUCATION</b>				

<b>Sub-total</b>				500
<b>Total</b>				<b>1320</b>
<b>TOTAL FIVE YEARS 2002_07</b>	<b>CAPITAL RELATED WORKS*</b>	<b>CAPITAL</b>	<b>ANNUAL</b>	<b>LIFECYCLE CAPITAL</b>
	<b>2153*</b>	<b>4090</b>	<b>190</b>	<b>6655</b>

\* Capital related works including cumulative asset maintenance cost on annual basis (pre-1994 to 2007). See Table 6 for details. Total excludes Non-capital works including costs associated with project management, street sweeping, water quality monitoring, emergency spill response and GIS/Streamwatch support.

**Note:**

1. Capital costs per device are generic only. Prices may vary depending on site specific conditions and detailed survey & design.

2. All prices are costed in 2002 \$

3. No allowance has been made for inflation, rate pegging or GST

4. Annual recurrent costs based on HSC performance reports for CRR devices

5. Life cycle costing is based on a 20yr lifetime and 4% discount rate.

**Device**

Wetland >100ha catchment		W1
Wetland 100ha>x>20ha catchment		W2
Wetland <20ha catchment		WM
Gross Pollutant Device >5ha catchment	GPD1	
Gross Pollutant Device <5ha catchment	GPD2	
Sediment Trap >5ha catchment		ST1
Sediment Trap <5ha catchment		ST2
Stream/Riparian Remediation >100 metre length		SR1
Stream/Riparian Remediation 100m>x>25 metre length		SR2
Stream/Riparian Remediation <25 metre length		SR3
Leachate Remediation (contaminated lands)		LCH

Table 2: Water Quality Capital Assets Cumulative Costs

YEAR	CAPITAL COST		CUMULATIVE ANNUAL COST	LIFE CYCLE COST	CUMULATIVE LIFE CYCLE COST
	ANNUAL COST	ANNUAL COST			
	\$,000's	\$,000's	\$,000's	\$,000's	\$,000's
Pre 1994*	260	3	3	300	300
Post 1994*	847	19.75	22.75	1111	1411
1994/95	-	-	22.75	-	1411
1995/96	622	19	41.75	823	2234
1996/97	648	22	63.75	948	3182
1997/98	611	19	82.75	869	4051
1998/99	412	14	96.75	565	4616
1999/2000	702	22	118.75	878	5494
2000/01	292	16.5	135.25	515	6009

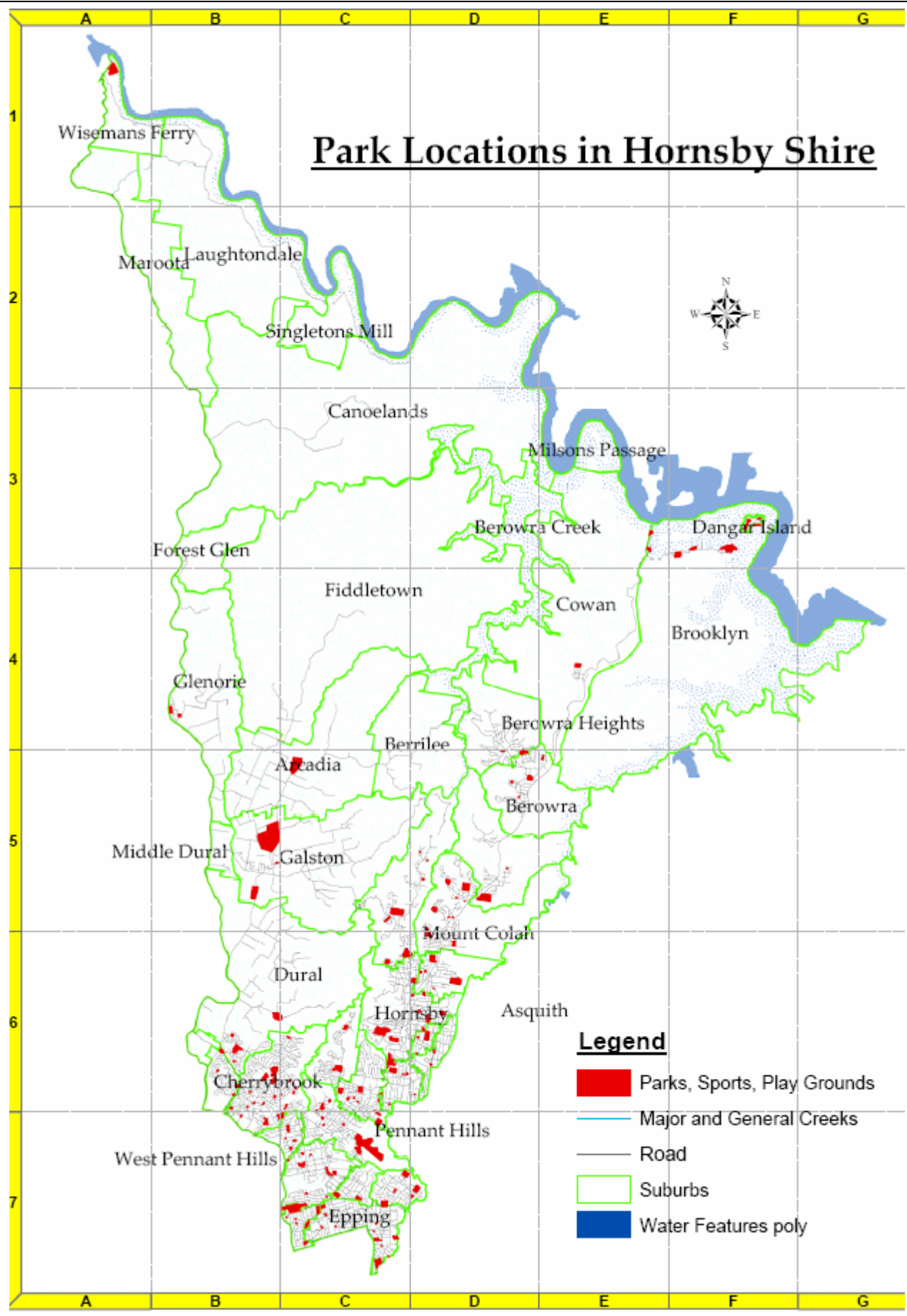
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2001/02	1656	34.5	169.75	2124	8133
2002/03	830	48	217.75	1482	9615
2003/04	810	35	252.75	1278	10,893
2004/05	810	40	292.75	1345	12,238
2005/06	820	36	328.75	1308	13,546
2006/07	820	31	359.75	1242	14,788
<b>Less</b>					<b>(478)#</b>
<b>Total</b>	<b>10,140</b>		<b>359.75</b>		<b>14,310</b>

\* Non-CRR constructed water quality assets

# Restricted assets externally funded (rta, landcom & developers)

# Park Locations in Hornsby Shire





**Appendix vi Reference for Parks in Horsby  
Shire Council**

NAMES	Grid Ref.	NAMES	Grid Ref.
Wisemans Ferry Recreational Park	A1	Acadia Park	C5
Glenorie Park	B4	Elderberry Place Playground	C6
Cairns Rd Playground	B4	Wearne Ave Playground	C6
Fagan Park	B5	Hartree Place Playground	C6
Galston Recreation Reserve	B5	Dogson Drive Playground	C6
Nancy Place Park	B5	Carmen Cres Public Reserve	C6
Dural Park / Dural Park Tennis Courts	B6	Jack Thompson Reserve	C6
Moorfield Hills Reserve	B6	Eddy Street Open Space	C6
James Henty Park	B6	Wanawong Drive Playground	C6
Hastings Park	B6	Fiona Street Playground	C6
Hickory Place Publis Reserve	B6	Oakleigh Park	C6
Tahlee Park	B6	Headen Park	C6
Westminster Park	B6	Rannoch Park	C6
Upper Pyes Creek Bushland	B6	Nelson Street	C6
Darlington Drive Playground	B6	Charles Curtic Park	C6
Greenway Park	B6	Davidson Park	C6
The lakes of Cherrybrook	B6	Normanhurst Park	C6
Myson Drive Platground	B6	Ruddock Park	C6

Franklin Drive	B6	Reddy Park	C6		
Roslyn Place Park	B6	Florence Cotton Park	C6		
Treetops Park	B6	Lisgar Gardens	C6		
Robert Rd Playground	B7	Western Cres Playground	C6		
Edward Bennet Oval	B7	Hopeville Park	C6		
Trinity Close Park	B7	Rofe Park	C6		
Thomas Thompson Park	B7				
Name	Grid Ref.				
Campbell Park	C7	Epping Oval	C7	Saltpan at Brooklyn	F3
Tallgums Ave Playground	C7	Nirimba Ave Playground	C7	Brooklyn Park McKell Park	F3
Kelly Park	C7	Woods street Oval	C7		F3
Samuel Oxley Park	C7	Pennent Hills park	C7	Kilparra Park Yallaroi Park	F3
Dame Mary Gilmore Park	C7	Thornleigh Oval	C7		F3
Lyndon Way Reserve	C7	Dawson Ave Park	C7	Barooka Street Park	F3
Gunbalanya Ave Playground	C7	Wollundry Park	C7		
Fearnley Park	C7	Malahide Road Playground	C7		
Lynbrae Park	C7	Lilian Fraser gardens	C7		
Orchard Road Park	C7	Playfair Road Reserve	D5		
Tripoli Ave Park	C7	Orr Park	D5		
Derna park	C7	Parklands Oval	D5		
Robin Street Park	C7	Seaview Street Playground	D5		
Dunrossil Park	C7	Mt.Kuring-gai Park	D5		
Kilpack Park	C7	Foxglove Oval	D5		
Dent Street Park	C7	Hunt Reserve	D5		

West Epping Park	C7	Stonehaven Road Playground	D5
Leicester Street Park	C7	Oxley Drive Park	D5
Ray Park	C7	Leonora C1 Playground	D5
Bingarra Road park	C7	Scribbly Gum Playground	D5
The Village green	C7	Wooninga Rd Playground	D5
Cheltenham Oval	C7	Yarrabin Park	D5
Lyne Road Park	C7	Berowra Park	D5
Pembroke Street Public Reserve	C7	Warrina Street Oval	D5
Forest Park	C7	Crosslands Park	D5
Somerville Park	C7	Brooklyn Rd Reserve	E3
Upper Terrys Creek Bushland	C7	Kangaroo Point	E3
Dense Park	C7	Cowan Oval	E4

# STATEMENT OF JOINT INTENT

## COMMUNITY CONTRACT FOR BEROWRA CREEK

It is hereby agreed that

Department of Planning  
 Environment Protection Authority  
 Hawkesbury-Nepean Catchment Management Trust  
 Hornsby Council  
 Water Board

*Endorsed,  
 Peter Webster  
 27/4/94.*

will henceforth work together to achieve, within the framework of the current Urban Development Program, the ecologically sustainable development of the Berowra Creek catchment and the recovery of the environmental health of the Creek. To this end it is agreed that the initial goal for Berowra Creek at Fishponds Waterhole and downstream shall be consistent with the pursuit of recreational activities such as swimming, canoeing and boating. Furthermore, it is agreed that fishing with confidence and safety and the protection of the shellfish industry are longer term goals. The values to be protected are defined by the Australian Water Quality Guidelines for Fresh and Marine Waters and are characterised as Primary Contact Recreation and Protection of Modified Aquatic Ecosystems for Fish, Crustacea and Shellfish.

It is also agreed that a Water Quality Management Strategy and a Plan of Management to achieve this initial goal will be jointly prepared and progressively implemented. All parties to this agreement will cooperate to ensure that a draft Water Quality Management Strategy for Berowra Creek is prepared and placed on exhibition by end of September 1994.

It is acknowledged that Berowra Creek contains excessive levels of nitrogen and high levels of phosphorus. Accordingly appropriate nutrient reduction measures will be implemented forthwith.

To this end the Water Board will install by end July 1994 measures at West Hornsby Sewage Treatment Plant to endeavour to achieve an arithmetic mean of 20 to 25mg/L Total Nitrogen concentration in the discharged effluent. Also the Water Board will make immediate operational changes to reduce phosphorus and faecal coliform concentrations in discharged effluent from West Hornsby Sewage Treatment Plant and Hornsby Heights Sewage Treatment Plant. Furthermore the Water Board will prepare and exhibit by end September 1994 an options study for Hornsby Heights Sewage Treatment Plant and West Hornsby Sewage Treatment Plant. The options study will propose technically feasible measures for further nitrogen reduction. The options of 15mg/L, 10mg/L and 5mg/L Total Nitrogen (90 percentile) in discharged effluent and pumping effluent out of the catchment are to be specifically considered. The Water Board will prepare and publicly exhibit by end June 1995 an EIS for each of those options which the Technical Working Party established by the Minister for Planning considers feasible and warranting such examination. The Board undertakes that the option approved by the Minister for Planning will be put in operation expeditiously.

Hornsby Council undertakes that it will impose and enforce controls on construction sites so as to significantly reduce the sediment and other pollutants reaching the Creek from these sources. To this end Hornsby Council will prepare and exhibit by end September 1994 a draft Erosion and Sediment Control Code. Hornsby Council will prepare and exhibit by end September 1994 a revised Stormwater Management Code, a revised Stormwater Design Manual and an Issues Report on the remediation of the existing stormwater system. As part of implementing the Water Quality Management Strategy, Hornsby Council will also expeditiously prepare an options study, environmental assessment and an implementation strategy for reducing storm water nutrient ingress to Berowra Creek. Hornsby Council will utilise the principle of water sensitive urban design in its consideration of future developments.

The Hawkesbury-Nepean Catchment Management Trust will prepare and exhibit by end September 1994 a draft public education strategy.

The Water Board, Environmental Protection Authority and Hornsby Council shall forthwith commence a catchment survey to identify and quantify sources of pollution so that appropriate remediation and enforcement action can be taken.

The Water Board, Environmental Protection Authority and Hornsby Council shall forthwith establish a cooperative monitoring program for the waterways of Berowra Creek so that the effectiveness of changes can be measured and assessed.

The Department of Planning undertakes that it will not introduce any planning measures that are incompatible with the ecological sustainability of Berowra Creek.



*Department of Urban Affairs and Planning  
 Peter Webster  
 Robert Johnson  
 [Signature]  
 [Signature]  
 Chris Meany*

Appendix A  
 Statement of Joint  
 Intent







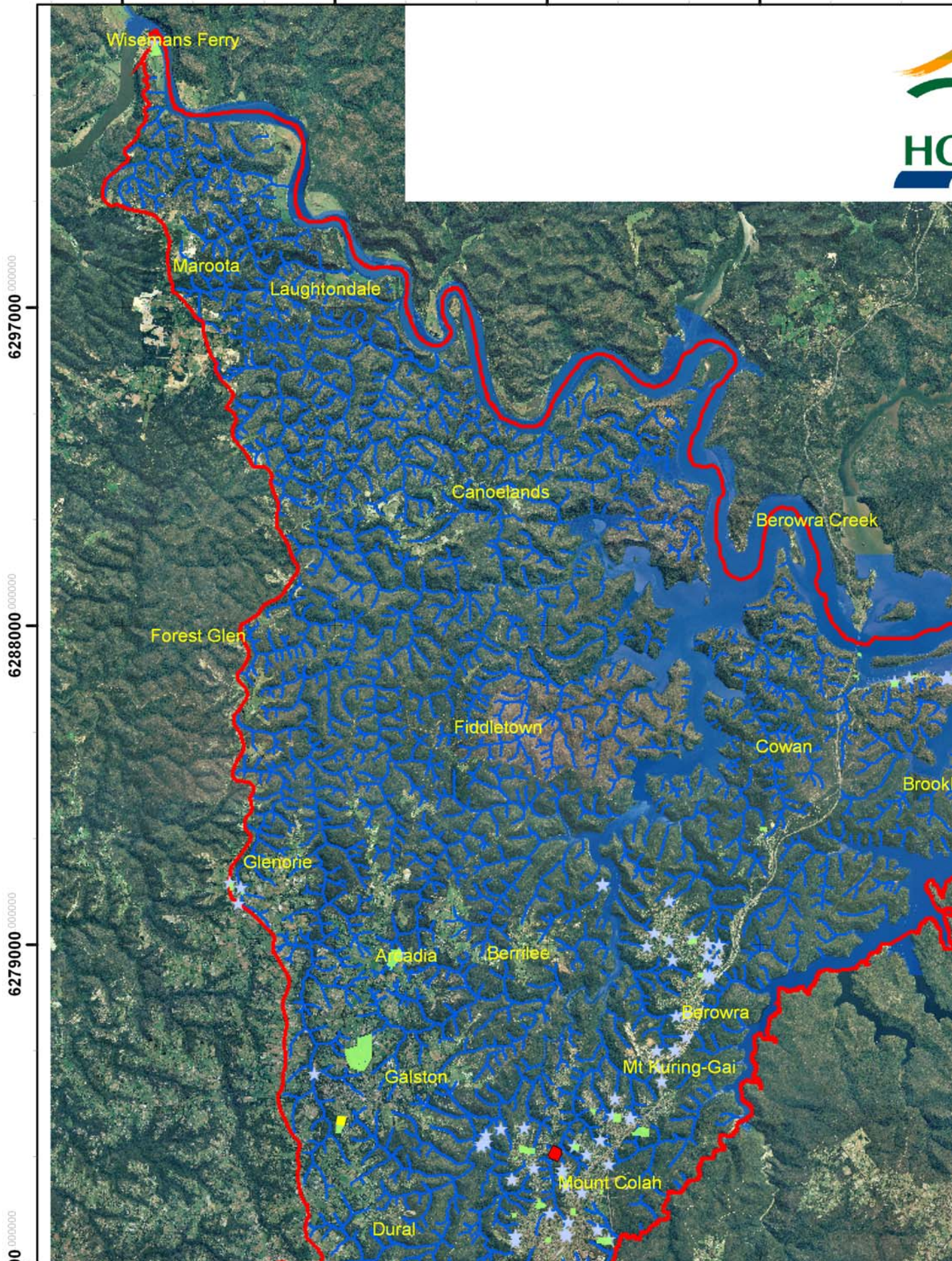
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**LEGEND**

- HSC Pools







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**Appendix C          Water Quality Annual Report 2002-2003**  
**(Please click on link to access within the Water Management Plan)**

**Appendix D          Interactive Map**  
**(Please click on link to access within the Water Management Plan)**

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**Appendix E: Corporate and Community Checklist**

**(Please see attached information from ICLEI)**

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**Insert council name Hornsby**

The following checklists have been developed to identify issues affecting water quality and management opportunities, which Council can help to reduce the impact on receiving waters.

Please click on the link and enter yes, no or N/A for each question in each checklist. There is room for comment at the end of each section should you wish to clarify any answers. Following completion could you please [email to jnechwatal@iclei.org](mailto:jnechwatal@iclei.org)

***Erosion and sediment control***

Suspended solids are sediments (soil and other fine solid organic particles) suspended in water and often have other pollutants attached to them. A quantitative measure to determine the presence of suspended solids in the water column is to filter, dry and weigh the particles, however this requires a laboratory. A qualitative assessment of turbidity, which looks at the presence of fine particles, algae and detritus, can be undertaken using a tube or disc, requiring visual interpretation of the readings or a turbidity electrode. A turbidity electrode could also assist in the qualitative sampling of suspended solids. Suspended solids in urban stormwater are typically two to ten times greater than in undisturbed catchments. The particulate forms of phosphorus, nitrogen and toxicants such as heavy metals and pesticides can be attached to sediment particles. The combined use of the filtration method of suspended solids and the turbidity electrode will provide more accurate results.

Soil erosion also has the potential for downstream impacts on creeks, rivers, reservoirs, lakes, and estuarine and marine environments. Water-borne erosion increases the supply of sediment to rivers. High concentrations of suspended sediments in rivers can:

- \* reduce stream clarity;
- \* inhibit respiration and feeding of stream biota;
- \* diminish light needed for plant photosynthesis;
- \* require treatment of water for human use;
- \* smother the stream bed; and
- \* increase land flooding.

Increased supply of sand and gravel from gully and riverbank erosion has led to deposition of sand and gravel beds (*sand slugs*). Sand slugs smother aquatic habitat. They can prevent fish passage, fill pools and other refugia and are unstable substrates for river bed life.

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For detailed information, please refer to the attached Hornsby Checklist pdf. File.



<b>Non-Residential Water Consumption</b>		
<b>Hornsby 2001/2002</b>		
<b>Industrial</b>		
	<b>Consumption (kl)</b>	<b>% of Industrial Consumption</b>
Manufacturing	401,277	93.0
Construction	14,028	3.3
Agriculture	11,161	2.6
Gas, electricity & water	5,049	1.2
Mining	0	0.0
<b>Industrial Total</b>	<b>431,515</b>	
<b>Commercial</b>		
	<b>Consumption (kl)</b>	<b>% of Commercial Consumption</b>
Health & community services	262,860	27.7
Education	208,830	22.0
Cultural and recreational services	157,238	16.6
Retail trade	89,065	9.4
Government administration & defence	79,792	8.4
Accommodation, Cafes & Restaurants	69,222	7.3
Personel and other services	58,547	6.2
Property and business services	9,711	1.0
Transport & storage	5,562	0.6
Wholesale trade	4,834	0.5
Finance and insurance services	3,451	0.4
Communication Services	367	0.0
<b>Commercial Total</b>	<b>949,479</b>	

**NOTE:** Total industrial consumption and commercial consumption figures have been supplied by Sydney Water. The further breakdown is taken from from a Victorian Council classified as a Urban Fringe Very Large. Please contact Fernando Ortega on (02) on **9552 3636** to further discuss details of high consumers in your LGA

#### **GRAPH OPTIONS**

Industrial Consumption Graph

Commercial Consumption Graph

Commercial and Industrial Consumption Graph

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Industrial	431,515
Commercial	949,479

**Base year water consumption - RESIDENTIAL  
SUMMARY**

**Hornsby  
2001/02**

	Flats	Houses	Total
Consumption (kl)	1,943,775	11,909,341	13,853,116
Number of properties in LGA	10,988	38,859	49,847
Consumption/property (kl)	177	306	278
Consumption/capita (kl)			#DIV/0!

82% of water consumption in the LGA is for residential purposes.

Data Source: Sydney Water

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## Corporate and Community Improvement Quality Checklist

Corporate Water Quality Areas		Key Initiatives	Points
Sediment and Erosion control	1a	Develop and implement erosion and sediment control guidelines based on best management practices for Council staff and contractors on all Council's construction sites.	
	1b	Contract managers/supervisors to undertake training in the interpretation of the erosion and sediment guidelines	5
	2	Identify/appoint an officer who is responsible for fully implementing and enforcing Council's policies for erosion and sediment control.	10
	3a	Include a clause to all Council tenders for construction activities, which incorporates erosion and sediment control guidelines or management plans.	
	3b	Undertake footpath maintenance works which prevents the creation of concrete slurry	
	3c	Contract managers/supervisors to ensure that Council tenders are strictly adhered to with respect to erosion and sediment control.	10
	4	Restore 500 lineal metres of degraded riparian environments per annum. This can involve the removal of exotics (many deciduous), bank stabilization and revegetation with indigenous.	5
Gross litter trapping	1a	Undertake a litter hot spot audit, which identifies locations of high gross litter generation.	
	1b	Collect and collate data on the quantity and type of litter trapped for use in education and awareness raising.	
	1c	Review the type of gross litter device that provide best capture of your Council's litter profile	5
	2a	Respond to a litter audit results by the appropriate selection and placement of litter traps	.
	2b	Implement a maintenance regime that works on optimum efficiency of the litter trap device installed.	5
	3a	Provide a level of maintenance to street litter bins that prevents overflow into nearby drains.	
	3b	Use alternative system to recycle crates, that contains recycled material, i.e. bins	5
	4a	Evaluate and remove unnecessary rubbish bins in parks and install education signage 'Please take your litter home'.	
	4b	Develop litter training package for appropriate in-house staff to improve understanding of the issuing of notices.	
	4c	Review current street sweeping programs, and implement best management practices in street sweeping	5
Herbicide, pesticide and fertiliser use	1a	Undertake a review of herbicide, pesticide and fertiliser use and demonstrate any reductions in applied chemical use.	
	1b	Educate staff on the impacts of fertiliser and pesticide use through induction and EMS training.	5



	2	Identify and implement alternatives to spraying herbicides along concrete kerb and channel and plantation areas.	5
Nutrients	1a	Remove all organic matter generated during all Council operations.	
	1b	Contain mulch and soil stockpiles within bunded areas.	5
Council Swimming Pools	1a	Review Council's procedure in connecting pool backwash to sewer	
	1b	Utilise pool backwash for irrigation of open space or toilet flushing to minimise sewer discharge.	5
Wastewater treatments	1a	Fulfil the requirements of your trade waste or licence agreement for wastewater discharge	
	1b	Review existing practices of wastewater management and rectify environmental concerns that may arise from wastewater exfiltration.	5
	1a	Install sewage pumpout facilities for boats at all Marinas within our LGA	
	1b	Implement a program that will see all Council properties connected to a sewer or the effective containment of septic system by target year.	5
	2	Identify and manage leachate from current and disused landfill sites to prevent contamination of surrounding soil and water bodies both surface and ground.	5
	1a	Develop a Council guideline that supports the use of residential and commercial generated greywater on site that meet health regulations for our state.	
	1b	Develop a guideline that supports the treatment and use of sewage from residential and commercial developments that meet health regulations for our state.	5
Groundwater management	1a	Develop a planning policy to protect groundwater quality from the impact of de-watering of areas and exposure of acid sulphate soils.	
	1b	Undertake a review that assesses the environmental cost of de-watering of sites and establishment of canals for urban development on groundwater quality.	
	1c	Development of a 'dewatering' fact sheet for building and construction sites.	5
	2a	Develop a planning policy, which protects remaining indigenous vegetation to protect water quality of groundwater resources.	
	2b	Develop a policy that promotes the establishment of plant species that reduces saline discharge areas.	5
Water Sensitive Urban Design	1a	Develop WSUD policy and guidelines for LGA which focuses on improving water quality.	5
			<b>Total: 105</b>

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## Appendix E Corporate and Community Improvement Quality Checklist

<b>Community Water Quality Areas</b>	<b>Key Initiatives</b>	<b>Points</b>	
Sediment and Erosion Control	1a	Develop and implement erosion and sediment control guidelines based on best management practices for developers / contractors working on construction sites.	10
	1b	Include the preparation of erosion and sediment control plans with all subdivision planning permits	
	2	Develop, inform and enforce a local law that prevents sediment laden runoff from leaving a construction site.	5
	3a	Develop and circulate a series of educational brochures for erosion and sediment control in the building and construction sectors working in our Council area for site management	5
	3b	Develop and conduct an induction training session for erosion and sediment control for the building and construction businesses working in our Council area.	
	4a	Develop and circulate a series of educational brochures for erosion and sediment control and containment of landscape materials for the nursery and landscape industry working in our Council area.	5
	4b	Develop and conduct induction training session for nursery and landscape industries in our Council area to adhere to best management practice.	
	5a	Develop and implement an education campaign focused on sediment and erosion control.	5
	5b	Develop and implement a planning control that maintains and promotes a vegetated buffer strip along drainage lines during and post construction.	
	Gross litter trapping	1a	Undertake a periodic review of recycling services provided to ratepayers to promote appropriate separation of materials.
1b		Undertake a periodic review of the effectiveness of the recycling method undertaken in the Council area and respond to improvements necessary to prevent litter generation.	
1c		Develop educational material on the appropriate sorting of recyclable material for ratepayers.	
2a		Develop a bylaw that prevents the dumping of rubbish on public land.	5
2b		Remove dumped rubbish immediately from public land and attempt to identify persons involved.	
2c		Install local laws signage on public land to deter the dumping of rubbish	
3a		Develop a cigarette butt education program to educate the community about the problems associated with polluting waterways with cigarette butts.	5
3b		Implement cigarette butt education campaign including both incentives and enforcement (eg fines)	

Herbicide, pesticide and fertiliser use	1a	Develop and circulate educational brochures on ways to minimise herbicide, pesticide and fertiliser use in private gardens.	
	1b	Develop and circulated educational materials to farmers on ways to minimise herbicide, pesticide and fertiliser use in paddocks.	
	1c	Develop and circulate educational brochures on ways to minimise herbicide, pesticide and fertiliser use in nursery industry.	5
	2a	Develop and implement workshop program to minimise herbicide, pesticide and fertiliser use in private gardens, paddocks and industry.	
	2b	Develop educational material to reflect environmental benefits through gardening practices.	
	2c	Development of rooftop garden and leadership projects.	5
	3a	Engage with the local permaculture and organic gardening groups to run sessions for the community on ways to minimise herbicide, pesticide and fertiliser use in private gardens.	
	3b	Engage with local landcare groups to run sessions for farmers on ways to minimise herbicide, pesticide and fertiliser use in paddocks.	
	3c	Engage with organic nursery producers to run session for mainstream nurseries on ways to minimise herbicide, pesticide and fertiliser use in nurseries.	5
	4a	Council to supply free or subsidised mulch to their ratepayers for private garden use.	
4b	Council to supply free indigenous plants with maintenance sheets on the redemption of a rates voucher.	5	
Nutrients	1a	Develop and circulate educational material that promote the collection of organic litter for composting or recycling.	
	1b	Develop a local law that prevents an owner leaving dog faeces in public spaces.	
	1c	Install local laws signs at public open spaces on the collection and appropriate disposal of dog faeces.	
	1d	Install bins for dog faeces at public open space where dog exercise is approved by Council	5
Private Swimming Pools	1a	Develop a building control that requires the connection of pool backwash to sewer.	
	1b	Inspect that the pool backwash is connected to sewer.	5
Wastewater treatments	1a	Promote Council guidelines that support the use of residential and commercial generated greywater and rainwater on site that meet health regulations for our State in residential and commercial developments.	
	1b	Promote Council guidelines that support the treatment and use of sewage from residential and commercial developments that meet health regulations.	5

	2a	Monitor the effectiveness of sewage pump out facilities for boats at all marinas within our LGA through periodic user surveys.	
	2b	Develop an industry specific program that may target marinas, dry cleaners, service stations.	
	2c	Implement a program that will see all private properties connected to sewer or the effective containment of septic system by target year.	5
	3	Promote WSUD leadership projects in infill and greenfield sites.	5
Groundwater management	1	Enforce the planning control that protects the retention of native vegetation in designated areas.	5
	2	Support the activities of local landholder groups engaged in the restoration of saline discharge areas: through, e.g. advice, materials, officer supervision.	5
	3a	In conjunction with the water authority promote the installation of bore check meters.	
	3b	In conjunction with the water authority develop and circulate educational material to owners of bores for effective management and recording.	5
Other	1a	identify an integrated education program targeting water quality and water consumption	
	1b	Develop and implement an integrated education program targeting water quality and water consumption for an identified community sector.	10
			<b>Total 115</b>

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**Appendix F      Estuary Management Plan for Berowra**  
**[\(Please click on link to access within the Water Management Plan \)](#)**

**Appendix G      Brooklyn Estuary Processes Study**  
**[\(Please click on link to access within the Water Management Plan\)](#)**

**Appendix H      Catchment Remediation Rate Annual Report 2002-2003**  
**[\(Please click to download CRR Annual Report from webpage\)](#)**

**Appendix I      [Water Conservation Policy Cost Benefit Analysis \(see attached\)](#)**

