



# **Sydney Coastal Councils Group – Sydney Water Water Recycling Opportunities Forum**

Tuesday 23<sup>rd</sup> March 2010  
Marconi Room  
Town Hall House

## **Forum Report and Recommendations**

Report Prepared by the Sydney Coastal Councils Group  
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## Executive Summary

The Sydney Coastal Councils Group (SCCG) has a long history in advocating for improved water quality and the provision of a sustainable water supply for the Sydney region. As a result Sydney Water have worked with and consulted the SCCG and its Member Councils on a range of issues and programs including but not limited to the Sewefix program, the Northside Storage Tunnel and number of site specific stormwater and sewerage re-use projects.

In recent years it had been identified by SCCG Member Councils that the communication between the SCCG, its Member Councils and Sydney Water had become infrequent, project or site specific and was inconsistent between councils. In an attempt to address this, the SCCG 2009 Annual General Meeting resolved that:

*The Group liaise with Sydney Water to deliver a forum that improves communication between SCCG, its Member Councils and Sydney Water as well as identifies water recycling opportunities in the Sydney coastal region.*

In March 2010, the SCCG and Sydney Water partnered to facilitate a forum for SCCG Member Councils and Sydney Water to discuss strategies and actions that facilitate water recycling and re-use projects in Sydney. The overarching intent of the forum was to enable representatives of SCCG Member Councils and Sydney Water to discuss and identify opportunities for the SCCG, its Member Councils and Sydney Water to share information as well as work more collaboratively on projects and capacity building activities.

This report provides a summary of the workshop and associated recommendations to build a relationship with the SCCG Member Councils and Sydney Water on a regional basis. The report is structured into the following chapters:

1. Introduction
2. Pre-workshop Survey
3. Agenda and Presentations
4. Workshops
  - i. Workshop 1 - Scenario Testings
  - ii. Workshop 2- Determining the types projects where Councils and Sydney Water could better collaborate
5. Recommendations and Future Actions

Appendix I: Forum Presentations

Appendix II: Scenario Testing Workshop Worksheet

Specific recommendations coming from the forum were made in relation to the following action or issues:

- The establishment of a joint SCCG Sydney Water Working Group.
- The development of "Handbook" which provides all SCCG Member Councils with information on identifying, evaluating and developing water recycling projects.
- Ongoing collection and access to technical and project specific information.

The SCCG intends to work with Sydney Water on implementing the all actions identified during the forum. This will ensure that the forum achieves its aim of improving collaboration and assisting with the identification and implementation of water recycling and re-use projects.

## 1. Introduction

In March 2010 the SCCG and Sydney Water partnered to facilitate a workshop for SCCG Member Councils to discuss actions and projects that facilitate water recycling and re-use projects in Sydney. The forum was attended by 27 participants from 12 SCCG Member Councils and 10 representatives from Sydney Water. Representatives from the NSW Office of Water, the Department of Climate Change and Water as well as the National Water Commission were also present at the forum.

The content and structure of the forum were prepared to facilitate information exchange, peer to peer learning and consultation through presentations, case studies and facilitated workshops on water recycling strategies, planning and opportunities. This structure allowed for the exchange of information through presentations to be complemented by workshops and interaction between Sydney Water Staff and SCCG Member Councils delegates facilitated through small group discussions.

The outcomes from the day included:

1. The presentation of information on topics including The Metropolitan Water Plan, Sydney Water's water recycling strategy and council case studies.
2. The exchange of experience and ideas through small group discussion.
3. The facilitation of scenario testing to assess the viability of possible projects.
4. The identification of actions and tools to assist the SCCG and its Member Councils work more consistently and collaboratively with Sydney Water.

## 2. Pre-workshop Survey

Prior to the forum, Council participants were asked to complete a survey to assist in identifying their issues and needs in the implementation of sewer recycling and stormwater reuse projects. The survey identified that SCCG Member Councils have made significant advances in implementing water saving and recycling projects over the last 10 years. For example Manly Council has reduced its consumption of potable water by 55% since 2001 through a combination of demand management and alternative water supply projects.

The survey also highlighted two significant concerns for councils. These were:

- a) The financial and staff time cost of designing and implementing sewer recycling and stormwater reuse projects; and
- b) The impacts of climate change on existing and future water sources placing an increased emphasis on identifying and implementing water recycling and re-use projects and with this a need to manage and maintain the associated infrastructure.

Combined with these concerns the two biggest barriers to implementing water re-use and recycling projects were the potential cost and securing the necessary demand for the recycled water. More specifically the issues can be considered in the following categories.

**Funding:** No SCCG Member Councils has a specific budget for water recycling projects. As a result the majority of re-use and recycling projects are funded through one off grants. In some cases monies gained from the Levies including the Stormwater Levy or Environment Levy were utilised for projects.

The uncertainty surrounding the ongoing availability of funding through grants and levies was believed to limit the ability to strategically identify and implement projects as well as undertake

activities related to monitoring of project success and ongoing maintenance. Therefore activities that assisted councils in identifying potential funding and promoting the cost benefit of water recycling and re-use projects are required.

**Assessing the financial viability of projects:** Linked to ongoing costs and identifying funding is the need for projects to be cost effective and economically viable. It was believed that standard methods and tools for assessing the cost and viability of projects would assist with assessing the financial viability of projects. Additionally, respondents noted a desire for assistance with factoring in the social and environmental outcomes of projects into cost benefit frameworks and analysis.

**Assessing environmental risk:** Positively, the majority of respondents noted that they applied the Managing Urban Stormwater Harvesting Guidelines; and the Australian Guidelines for Water Recycling when designing and implementing sewer recycling and stormwater reuse projects. However, not all respondents did, suggesting there may be an opportunity for the SCCG and Sydney Water to promote the use of these documents to all SCCG Member Council to promote and ensure a consistent approach.

**Developing partnerships (with Sydney Water and Others):** A number of respondents noted that partnerships between suppliers and users for water recycling and re-use projects were developed on a project by project basis. Issues associated with identifying adequate demand for water from projects included:

- Identifying possible users close enough to the source of the water for transport of the water to be cost effective; and
- Ensuring that there was adequate long term demand for the water produced.

Due to these issues much of the water generated through council water recycling and re-use projects was being used at council owned facilities or by a single user, such as a golf course. Therefore, a number of respondents sought guidance and strategies for identifying multiple users for water recycling and re-use projects as well as identifying and securing long term demand for the water produced.

Overall the survey highlighted a number of issues that were to be addressed at the forum. This indicated that there was a significant need for the forum and that the proposed content of the participatory workshops were appropriate to meet the aims and objectives of the day as well as the needs of participating SCCG delegates.

Areas for future action and development of resources highlighted in survey such as the need for ongoing information exchange and sharing of resources were addressed during the forum. The resultant recommendations and actions can be found in Chapter 5: Recommendations and Future Actions.

### **3. Agenda and Presentations**

The content and structure of the forum were prepared to facilitate a one day forum including presentations, case studies and facilitated workshops on water recycling opportunities with specific workshop sessions on:

1. Scenario testing: Facilitating participants through a workshop on the delivery and viability of specific recycling projects.
2. Confirming how Councils and Sydney Water could better collaborate on the delivery of water recycling and re-use projects.

The complete content and structure of the forum can be seen in Figure 1. All workshop presentations are included in Appendix 1.

<b>9.00am</b>	<b>Registrations</b>
<b>9.15am</b>	<b>Introduction and Overview of Forum</b>
<b>9.30am</b>	<b>NSW Office of Water</b>
	<ul style="list-style-type: none"> <li>• Metropolitan Water Plan target setting, implementation and funding opportunities</li> </ul>
<b>10.00am</b>	<b>Sydney Water</b>
	<ul style="list-style-type: none"> <li>• Sydney Water's water recycling strategy (context, objectives, actions)</li> <li>• Planning for integrated water services</li> <li>• How Sydney Water assesses project viability</li> <li>• Water recycling opportunities within SCCG Member Council areas</li> </ul>
<b>11am</b>	<b>Morning Tea</b>
<b>11.20am</b>	<b>Overview of SCCG Member Councils issues and needs</b>
	Council Case Studies
	<ul style="list-style-type: none"> <li>• City of Sydney Council</li> <li>• Waverley Council</li> </ul>
<b>11.50am</b>	<b>Sydney Water</b>
	A framework for assessing viability
<b>12.30pm</b>	<b>Lunch</b>
<b>1.30pm</b>	<b>Workshop</b>
	<b>Part One: Scenario Testing:</b> participants work through the technical, financial and funding issues involved in developing recycling projects.
<b>2.15pm</b>	Report back
<b>2.45pm</b>	<b>Afternoon Tea</b>
<b>3.00pm</b>	<b>Part Two: Determining Activities for Better Collaboration:</b> Identifying the types of activities and projects where Councils and Sydney Water could better collaborate.
<b>3.45pm</b>	<b>Closing remarks</b>
<b>4pm</b>	<b>Close</b>

**Figure 1:** Agenda: Water Recycling Opportunities Forum

All presentation slides are available in Appendix 1.

#### 4. Workshops

To assist with the sharing of information and ideas between SCCG Member Council delegates and Sydney Water representatives at the forum two workshops were facilitated after the presentations had been completed:

**Workshop 1-** Scenario Testing

**Workshop 2-** Determining Activities for Better Collaboration

## Workshop 1- Scenario Testing

In this workshop participants worked through the technical, financial and funding issues involved in developing recycling projects. Sydney Water facilitated this workshop

At the beginning of this workshop, Sydney Water gave an overview of the technical and financial considerations when investigating a potential water recycling projects. The technical considerations included:

- Recycled water needs;
- Water efficiency and service levels;
- What will be the source water for the recycled water;
- Interface with existing assets;
- Required quality of the recycled water for the end-use and subsequent treatment needs; and
- Delivery and storage requirements and the needs for safe use of recycled water.

The financial components were also discussed – capital, operating and management costs.

The workshop participants then formed into three groups. Each group assessed one of three different types of potential water recycling projects:

- Recycling from a sewage treatment plant;
- Sewer mining;
- Stormwater harvesting.

The groups agreed on a specific, real scenario within their project type. The groups completed a worksheet (Appendix II) with details of their chosen scenario. The information on the worksheet was used as input into a model, developed by Sydney Water to assess the financial viability of the project and identify factors influencing the cost. The outputs from the model were presented to the workshop and discussed.

The three scenarios investigated were:

1. Sewer mining project at Mona Vale: recycled water could be used for irrigation, car and boat washing, toilet flushing; potential customers are a golf course, Council and a high school.
2. Recycled water from North Head Sewage Treatment Plant: recycled water could be used irrigation, toilet flushing, car and truck washing, council uses, cooling towers; potential customers are Council, golf courses, industries, hospitals, TAFE college, cemetery.
3. Stormwater harvesting at Rushcutters Bay: recycled water could be used irrigation, toilet flushing, street sweeping and boat washing; potential customers are Council and marina.

The results from the model were:

Proposal 1: Irrigation at Mona Vale

Project Specifications	Comments
<p><b>Source:</b> Sewer mining  <b>Treatment:</b> Membrane Bioreactor (MBR)  <b>Volume:</b> 150 kL per day  <b>Est. Capital Cost:</b> \$ 1.6 million  <b>Est. Annual Operating Costs:</b> \$150,000  <b>Est. Cost per kilolitre:</b> \$5.52  <b>Willingness to pay:</b> \$1.50</p>	<ul style="list-style-type: none"> <li>• Small quantity, high quality</li> <li>• If car wash and school is taken out and only controlled irrigation occurs (lower quality) then price is \$ 2.89/kL</li> <li>• Peak demand is 250kL/d, so will need storage</li> <li>• Need to cross Pittwater Rd (increased cost)</li> <li>• Assumes average day demand supplied at site boundary</li> <li>• Excludes management costs, user's onsite costs (storage, real estate, plumbing, communications), land suitability assessments, licences, connection fees, asset replacement costs, legal fees, easements</li> </ul>

Proposal 2: Residential at North Shore Hospital

Project Specifications	Comments
<p><b>Source:</b> North Head Sewage Treatment Plant – use recycled water pipeline in Northside Storage Tunnel (NST)  <b>Treatment:</b> Membrane Bioreactor MBR  <b>Volume:</b> 1000 kL per day  <b>Est. Capital Cost:</b> \$ 2.8 million  <b>Est. Annual Operating Costs:</b> \$191,000  <b>Est. cost per kilolitre:</b> \$ 1.26  <b>Willingness to pay:</b> \$ 1.50 (80% PW)</p>	<ul style="list-style-type: none"> <li>• Large quantity, high quality</li> <li>• Assumes RW pipeline in NST is operational (it is estimated that an additional \$4M is required to make the pipe operational)</li> <li>• Assumes average day demand supplied at site boundary</li> <li>• Excludes management costs, user's onsite costs (storage, real estate, plumbing, communications), land suitability assessments, licences, connection fees, asset replacement costs, legal fees, easements</li> </ul>

Proposal 3: Residential at Rushcutters Creek

Project Specifications	Comments
<p><b>Source:</b> Stormwater  <b>Treatment:</b> Membrane Bioreactor (MBR) + UV  <b>Volume:</b> 50 kL per day  <b>Est. Capital Cost:</b> \$ 1.7 million  <b>Est. Annual Operating Costs:</b> \$ 150,000  <b>Est. cost per kilolitre:</b> \$ 17.00  <b>Willingness to pay:</b> \$ 1.50 (80% PW)</p>	<ul style="list-style-type: none"> <li>• Small quantity, high quality</li> <li>• If only controlled irrigation occurs (lower quality), price is \$5.50/kL</li> <li>• If demand increases to 500kL/d, then price becomes \$1.50/kL (controlled irrigation)</li> <li>• Peak demand 100kL/d so will need storage</li> <li>• Need to cross New South Head Rd (increased cost).</li> <li>• Assumes average day demand supplied at site boundary</li> </ul>



## **Workshop 2- Determining Activities for Better Collaboration**

This workshop sought to identify the types of activities and projects where Councils and Sydney Water could better collaborate as well as the outcomes of improved collaboration on water recycling and re-use projects. To assist in identifying opportunities forum participants were asked to discuss and answer the following four questions in small groups.

1. What are the top 3 outcomes of improved collaboration on water recycling?
2. Where are the opportunities for improved collaboration?
3. What are the barriers to effective collaboration?
4. How could the SCCG and Sydney Water build capacity of Councils to collaborate with Sydney Water (short and long term)?

A summary of the responses to each question and resulting actions can be found in Table 1.

Summary of Responses	Future Actions
<p><b>1. What are the top 3 outcomes of improved collaboration on water recycling?</b>  The primary outcome of improved collaboration on water recycling was seen to be the reduced demand on potable water. Combined with this participants considered a number of benefits relating to the process of identifying, implementation and evaluating projects would result from increased collaboration. These can be considered in the following categories:</p> <p><b>The ongoing exchange of information, knowledge and experience:</b> Maintaining regular communication between Sydney Water, the SCCG and its Member Councils would assist in achieving the following:</p> <ul style="list-style-type: none"> <li>• Establishing clear communication lines and identifying appropriate points of contact within each organisation.</li> <li>• Gaining a better understanding of the constraints and opportunities faced by various organisation and stakeholders.</li> <li>• The opportunity for water professionals from local and state government to share experience and skills.</li> </ul> <p><b>Methodologies for evaluating the economic, social and environmental outcomes of projects:</b> The application of consistent methodologies for evaluating the economic, social and environmental outcomes of projects was seen to be a major outcome of increased collaboration. This was attributed to two factors:</p> <ul style="list-style-type: none"> <li>• Gaining a better understanding and working knowledge of the business case criteria Sydney Water use in assessing the viability of projects would assist councils in identifying water recycling and re-use projects suitable for implementing in partnership with Sydney Water; and</li> <li>• A number of SCCG Member Council representatives noted a desire for assistance with identifying and applying viability and cost benefit criteria that factored in environmental and social outcomes.</li> </ul> <p><b>The identification and delivery of projects:</b> An additional outcome of ongoing communication and liaison between Sydney Water and councils would be the identification and delivery of both local and regionally significant projects. It was considered that existing barriers could be broken into two factors:</p> <ul style="list-style-type: none"> <li>• The identification of projects that involved multiple recycled water users; and</li> <li>• Information about existing infrastructure and assets.</li> </ul>	<ol style="list-style-type: none"> <li>1. Through the establishment of a joint SCCG Sydney Water Working Group facilitate ongoing workshops, meeting and field trips.</li> <li>2. The development of a data base that contains technical information on current or proposed water recycling and re-use projects in Sydney.</li> <li>3. Provide Sydney Water methodologies for business case evaluation of projects to councils.</li> <li>4. Identify strategies and tools that quantify the localised benefits of using recycle water, such as avoided operation and maintenance costs and increased community amenity.</li> <li>5. Prepare a step by step process map so Councils can establish the technical components of recycled water proposals.</li> <li>6. Prepare a process map to guide Councils in developing recycled water proposals together with Sydney Water.</li> <li>7. On request, Sydney Water provide LGA based information on available water resources including the location of sewer carriers, sewage treatment plants, stormwater channels and existing users who might form a market in addition to Council.</li> </ol>

Summary of Responses	Future Actions
<p><b>2. Where are the opportunities for improved collaboration?</b></p> <p>As articulated in the answers to the first question the majority of opportunities for improved collaboration related to activities that resulted in the sharing of information and strategies. The major outcomes coming from such opportunities were seen to be the building of capacity amongst all stakeholders (Councils, Sydney Water, The NSW Government and residents) as well as development of joint projects. Specific opportunities identified included:</p> <ul style="list-style-type: none"> <li>• The development of project case studies.</li> <li>• Ongoing forums and field trips.</li> <li>• The development of “Handbook” identifying common objectives and goals.</li> <li>• Increasing opportunity for council input into projects such as sewerfix.</li> </ul>	<p><i>Establishment joint SCCG Sydney Water Working Group (See Action 1).</i></p> <p>8. Develop “Handbook” which provided all SCCG Member Councils with information on issues including processes for identifying, implementing and evaluation projects.</p> <p>9. Identify projects and opportunities for ongoing consultation with SCCG Member Councils on Sydney Water programs.</p>
<p><b>3. What are the barriers to effective collaboration?</b></p> <p>A number of barriers to effective collaboration were identified. An overarching theme coming from the discussion of barriers was the need for improved communication through more opportunities for dialogue as well as the identification of common goals. A number of communication barriers relating to organisational size, the fractured involvement of stakeholders as well as councils and Sydney Water having differing goal and objectives.</p> <p>Although not strictly related to collaboration other barriers identified included:</p> <ul style="list-style-type: none"> <li>• The cost of projects combined with limited funding.</li> <li>• Competing objectives and time constraints.</li> <li>• The lack of research and demonstration projects.</li> </ul>	<p>10. Identify funding opportunities for water recycling and re-use projects.</p> <p><i>The development of a data base that contains technical information on current or proposed water recycling and re-use projects in Sydney (See Action 2).</i></p>
<p><b>4. How could the SCCG and Sydney Water build capacity of Councils to collaborate with Sydney Water (short and long term)?</b></p> <p>Ongoing training and workshops combined with the provision of project information and assessment criteria were activities that would increase the capacity of councils to collaborate with Sydney Water and ultimately implement water recycling and re-use projects. Identified actions to assist with this included:</p> <ul style="list-style-type: none"> <li>• Regional workshops resulting in information exchange and the identification of projects.</li> <li>• Identified process for engagement and communication.</li> <li>• A checklist process and data base of proposed and successful projects.</li> </ul>	<p><i>Establishment joint SCCG Sydney Water Working Group (See Action 1).</i></p> <p><i>Develop “Handbook” which provided all SCCG Member Councils with information on issues including processes for identifying, implementing and evaluation projects (See Action 8).</i></p>

**Table 1:** Summary of Determining Activities for Better Collaboration workshop discussion and outcome

## 5. Recommendations and Future Actions

Overall, the need for ongoing communication and consultation was raised by forum participants when responding to all four questions in the second workshop. The overarching outcomes of maintained communication between Sydney Water and councils were seen to include collaboration on joint projects, better understanding of criteria for the assessing the viability of projects as well as a clearer understanding of the strategic goals and objectives of the all stakeholders.

The identified tools and methods for achieving these outcomes included the facilitation of ongoing forums, meetings and field trips, the development of a “Handbook” that provides councils with information about the criteria for identifying and assessing the viability of projects as well as the provision of a checklist of issues councils should consider when scoping, designing, implementing and evaluating projects. These actions, as well those identified in Table 1, could be delivered through three areas of activity

### **The establishment of a joint Sydney Water and SCCG Water Recycling Working Group:**

This working group would consist of SCCG Secretariat, SCCG Member Councils and Sydney Water Staff and aim to:

- Facilitate ongoing workshops, meeting and field trips.
- Identify strategies and tools that quantify the localised benefits of using recycle water, such as avoided operation and maintenance costs and increased community amenity.
- Identify funding opportunities for water recycling and re-use projects.
- Identify projects and opportunities for ongoing consultation with SCCG Member Councils on Sydney Water programs.

The Working group will decide the frequency of meetings.

The SCCG will take responsibility for facilitating this Working Group in partnership with Sydney Water. It is expected that the first meeting of this working group will occur before September 2010.

### **The Development of “Handbook” which provides all SCCG Member Councils with information on identifying, evaluating and developing water recycling projects:** The contents for such a handbook would include:

- Provide methodologies for identifying potential projects and evaluating their viability
- Prepare a step by step process map so Councils can establish the technical components of recycled water proposals
- Where to access relevant information. Including the location of sewer carriers, sewage treatment plants, stormwater channels and existing users who might form a market in addition to Council.
- Prepare a process map to guide Councils in developing recycled water proposals together with Sydney Water.

The joint Sydney Water and SCCG Water Recycling Working Group will be responsible for identifying the content and structure of the Handbook. Production of the Handbook will be the responsibility of the SCCG, with Sydney Water providing technical information where appropriate. The joint Sydney Water and SCCG Water Recycling Working Group will identify a specific timeframe for the production of the handbook.

**Ongoing collection and access to technical and project specific information:** The SCCG to work with the NSW Office of Water and other stakeholders including Sydney Water for:

- The development of a data base that contains technical information on current or proposed water recycling and re-use projects in NSW.
- On request, Sydney Water provide LGA based information on available water resources including the location of sewer carriers, sewage treatment plants, stormwater channels and existing users who might form a market in addition to Council.

In consultation with both Sydney Water and the NSW Office of Water the joint Sydney Water and SCCG Water Recycling Working Group will identify the most appropriate mechanisms and timeframes for the delivery of this action.

The SCCG intends to work with Sydney Water and other relevant stakeholders on the implementation of all actions identified during the forum. This will ensure that the forum achieves its aim of improving collaboration and assisting with the identification and implementation of water recycling and re-use projects. Ultimately this will result in the provision of a sustainable water supply for the Sydney region.

# **Appendix 1: Sydney Coastal Councils Group – Sydney Water, Water Recycling Opportunities Forum Presentations**

**Metropolitan Water Plan target setting, implementation and funding opportunities**  
(Mr AJ Jack NSW Office of Water)

**Planning for integrated water services: Sydney Water’s water recycling strategy  
(context, objectives, actions)**  
(Mr Ian Hammerton Sydney Water)

**Strategic Selection of Water Recycling Projects**  
(Dr Bhakti Devi City of Sydney Council)

**Bronte Park’s Stormwater Reuse System**  
(Mr Corey Fox Waverley Council)

## Sydney Coastal Councils Group Forum

AJ Jack  
Recycled Water Project Manager  
Metro Water Branch

## NSW Office of Water

- Formerly part of the Department of Water and Energy
- Now NOW is the W in DECCW (Department of Environment Climate Change and Water)
- Reports through the NSW Water Commissioner to the Minister for Water

## Agenda

- The Metropolitan Water Plan Review
- Regulation of recycling and stormwater harvesting
- Funding opportunities

## Metropolitan Water Plan

- First developed in 2004
- Adaptive approach to meet challenges of
  - drought
  - climate change
  - population growth
- Protect and maintain river health
- Currently being updated to factor in new knowledge and technology
- Reviewed by an Independent Review Panel

Dams +  
Recycling +  
Desalination +  
Water Efficiency =  
Water 4 life

2006 Metropolitan Water Plan

Review of plan to factor in new information

Updating models

Community Input Phase 1

Analysis of options

Community Input Phase 2

Integrating community input & other analyses

2010 Metropolitan Water Plan

### Community Planning Principles

1. Provide water that is affordable and safe to drink
2. Ensure enough water to meet both environmental and human needs – one not more important than the other
3. Ensure a dependable long-term water supply for current and future generations

### Community Planning Principles

4. Maximise water efficiency and recycling, especially capturing stormwater, and invest in research and innovation
5. Restore clean healthy waterways and ensure health of catchments by reducing pollution
6. Ensure government and community take joint responsibility for water management
7. Share water – taking into consideration all relevant sectors and regions

Dams +  
 Recycling +  
 Desalination +  
 Water Efficiency =  
 Water 4 life

### Dams and drought security

Completed deep water access projects

Investigating Shoalhaven transfer options

Completed groundwater investigations

Researching the impacts of climate change

### Recycling

- Current target 70 GI by 2015 (approx 12%)
- Irrigation – rural, golf courses, playing fields
- Industrial, (eg Bluescope Steel 7GI, Camellia 4.3GI)
- Residential non-potable (eg Rouse Hill 1.7GI)
- Replacement flows (18 GI)

### Stormwater

Stormwater re-use projects across Sydney

- The Campaign** - A water-free underground water tank will collect...
- Northmead Golf Course** - Catchment tank built to collect stormwater to irrigate...
- Bank Blue Club** - A collection tank built to collect stormwater runoff from a...
- Lebanon Golf Club** - A collection tank built to collect stormwater runoff from a...
- Lebanon Golf Club** - Stormwater is collected in two 200,000 litre above-ground...
- Lebanon Golf Club** - Stormwater is collected in a purpose-built tank and is...
- Lebanon Golf Club** - A collection tank built to collect stormwater runoff from a...
- Lebanon Golf Club** - Stormwater from the roof and parking area is collected...
- Lebanon Golf Club** - Stormwater is collected in an existing stormwater tank...
- Lebanon Golf Club** - Stormwater is collected in an existing stormwater tank...



Dams + Recycling + Desalination + Water Efficiency

## Desalination – up to 15%

Powered by 100% renewable energy



NSW Office of Water Water for life

Dams + Recycling + Desalination + Water Efficiency


## Water efficiency – 24% by 2015

Rebates & offers

Supporting Business

Fixing leaking pipes

Supporting water wise homes

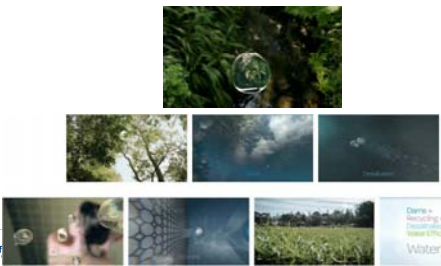


NSW Office of Water Water for life

Dams + Recycling + Desalination + Water Efficiency

## Bringing equation to life

[www.waterforlife.com.au](http://www.waterforlife.com.au)  
[www.waterforlife.nsw.gov.au](http://www.waterforlife.nsw.gov.au)



NSW Office of Water Water for life

Dams + Recycling + Desalination + Water Efficiency

## Recycling and Stormwater Legislation

- Local Government Act
  - s60 council sewer and water works to be approved by the Minister
  - s68 sewer and water works to be approved by a council
  - Neither section applies in Sydney Water area of operations
  - Mentions stormwater drainage but not harvesting

NSW Office of Water Water for life

Dams + Recycling + Desalination + Water Efficiency

## Water Act 1912 & Water Management Act 2000

- Water Act applies in Sydney until water sharing plan is completed, then WMA
- Licence required to take surface water above “harvestable right”
- Water belongs to the State once it hits the ground
- Water extraction licences required to extract from water courses

NSW Office of Water Water for life

Dams + Recycling + Desalination + Water Efficiency

## Water Industry Competition Act 2006

- Promote competition in the water industry
- Allow access to assets of water utilities
- Two types of licence, network operator and retail supplier
- Examples, Rosehill-Camellia, 1 Bligh Street

NSW Office of Water Water for life

## Water Industry Competition Act 2006

- Some exemptions
  - public water utilities
  - licences under Water Act or Water Management Act
  - councils exercising water and sewage functions
  - self supply
- Exemptions regime subject to consultation and review

## Guidelines

- Managing Urban Stormwater Harvesting and Reuse (DECC 2006)
- Australian Guidelines for Water Recycling (Phase 1) – Recycling
- Phase 2 – Stormwater harvesting, Managed Aquifer Recharge, Augmentation of Drinking Water Supplies
- Interim NSW Guidelines for Management of Private Recycled Water Schemes
- NSW Guidelines for Greywater reuse in seweraged single household residential premises
- Sydney Water stormwater harvesting guidelines

- Applicable legislation varies from project to project
- Factors include:
  - Location of project
  - Scope of project
  - Proponent
  - Source and quality of water
  - Destination and use of water

## Funding

- NSW Water Savings Fund
  - Water Savings Fund allocated \$56.8 million to 96 projects, saving 14.4 billion litres of potable water a year
- Recycled Water and Stormwater Harvesting Program
  - \$12m fund, work to be completed by 30 June 2012
  - Projects within MWP area
  - Volume, value for money, expansion, innovation

## NOW - Advice and resources

- Assess s60 applications
- Advice on s68 applications
- Advice on guidelines and legislation (including WICA)
- Proposed database of recycled water and stormwater projects

## Questions




# Water Recycling

Sydney Coastal Councils Group Water Recycling Opportunities Forum  
23 March 2010

## Recycled Water Strategy

To deliver commercially viable recycled water schemes that contribute to MWP target ( 70GL by 2015) & contribute to integrated water services.



## Delivering water recycling projects in Sydney

- Sydney Water
  - Urban Growth: integrated water services to serve growth
  - Non Growth - local schemes developed
  - Sewer mining – supply of source water
- Private sector
  - Water Industry Competition Legislation
- Local Councils
  - Local Government Act

NB water recycling includes sewage & stormwater




## Assumptions


- Schemes meet
  - Australian Guidelines for Water Recycling: Managing Health & Environmental Risks (Phase 1) 2006
  - Australian Guidelines for Water Recycling: Managing Health & Environmental Risks (Phase 2) Stormwater Harvesting and Reuse 2009
- Pricing is based on IPART's 'Pricing arrangements for recycled water and sewer mining' (2006)
- NSW Government's directive of no potable recycling



## Water Recycling for Urban Growth



## Planning for Growth




Level 1 Sydney Wide

Level 2 Regionally Based

Level 3 Area Servicing Plans

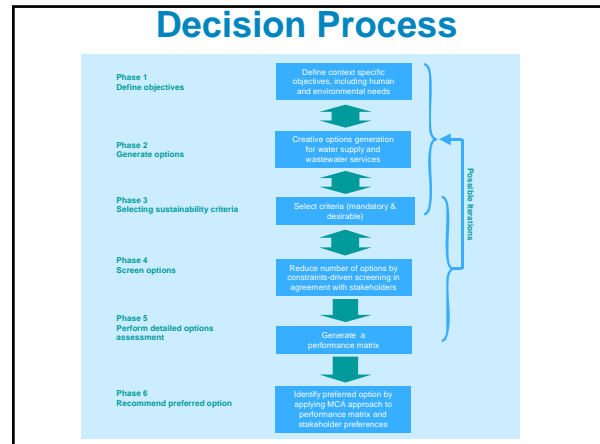
- Area Servicing Plans for Major Growth Areas
- Precinct Area Servicing Plans for Large Scale Development Areas ( > 1000 lots )
- Local Area Servicing Plan for Small Development Areas ( < 1000 lots )



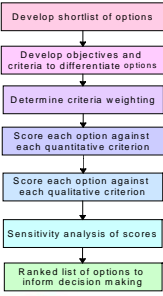
## L3 Area Plans – Planning Approach




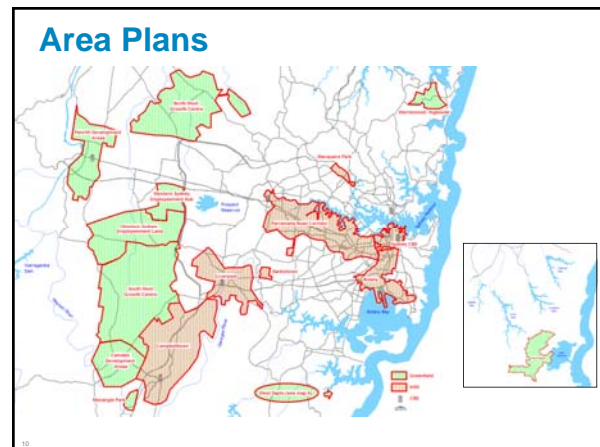
- Integrated water services approach - broad range of initiatives from individual household-scale to fully centralised
- Assessment that values environmental, social, financial and technical performance

## Multi Criteria Analysis process



Objective	Criteria	Weighting Out of 10 (Examples)	Units
Helping develop a water efficient city	Minimise drinking water use	10	Mlit/day
Efficient resource use	Minimise Recycle energy use	10	lit/day
	Resource Recovery	7	Qualitative
Serving customers	Level of acceptance by customers and community	6	Qualitative
	Level of acceptance by regulators	4	Qualitative
	Integration with existing strategies, plans and works of Government and/or Council	7	Qualitative
Contributing to clean beaches, docks, rivers and harbours	Flexibility - Ability to accommodate change (growth rates - change in technology)	7	Qualitative
	Minimise wastewater discharge to the environment	8	Mlit/day
	Ability to contribute to Council's strategic objectives	3	Qualitative
Being an economically efficient business	Minimise life cycle cost (Capital + Operational + avoided)	20	£
	Financial Return to Sydney Water	10	Qualitative
	Impact on Sydney Water Business	8	Qualitative


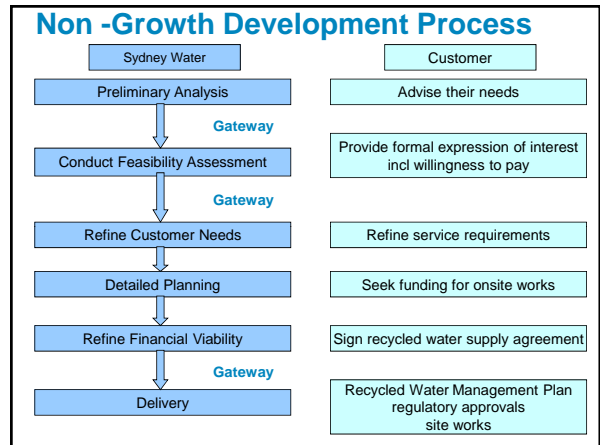
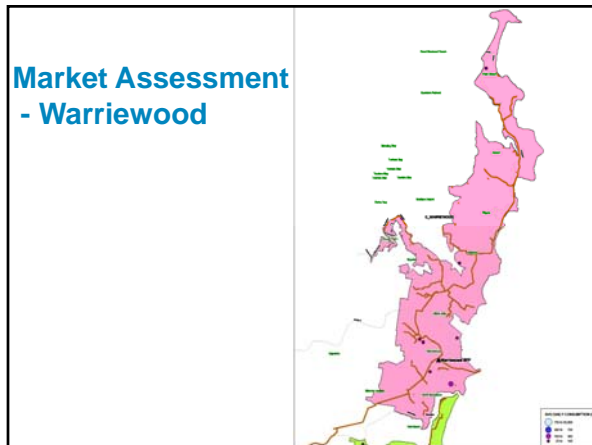
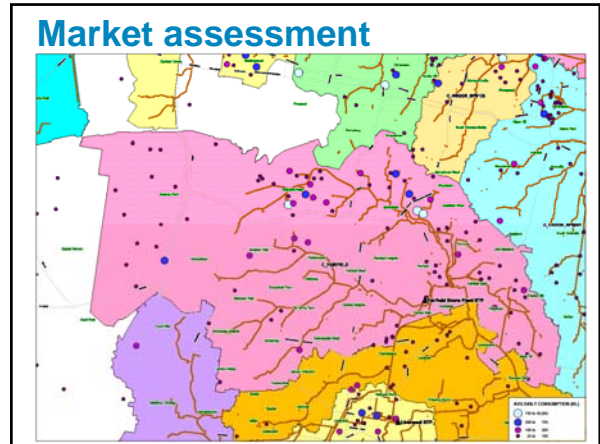



## Current status of area plans

- Growth Recycled Water Schemes – Hoxton Park, North West & South West Growth Centres**
- Area Plans with Rainwater Tanks – West Dapto, Warriewood, Bankstown**
- Lot Scale / Precinct Recycled Water Schemes – Botany, Parramatta Road, Bonnyrigg, City CBD and Macquarie Park**




# Water Recycling for Non-Growth

# Sewer Mining Stormwater Harvesting



## Sewer mining



**Sewer mining**  
How to establish a sewer mining operation

## Stormwater harvesting



**Stormwater harvesting**  
How to harvest stormwater for re-use from Sydney Water's sewerage system



## How to establish a mining/harvesting operation

- Preliminary exploration
- Develop and review your concept
- Decide whether to proceed
- Obtain approvals & enter into Agreement with Sydney Water
- Construct and connect to sewerage system

**Sewer Mining Agreement**


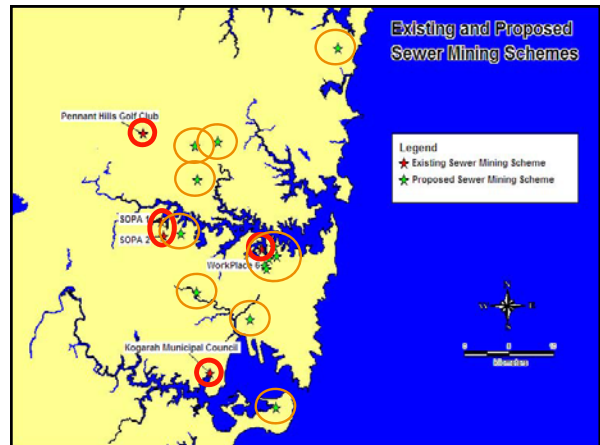
Industry Water Connection

Water

10/04/2004

No. 200

Over 60 sewer mining proposals have been examined since 2003  
23 proposals are being investigated




Australian  
Thursday 19/05/2010  
Page 17  
Region: Australia - Queensland: 131,246  
User: Sydney  
Size: 302.04 kb  
Frequency: 60/60

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### Office tower granted water recycling licence



**SUMMARY**

THE 1 Blich Street tower, built by Grocon and co-owned by Dexis, is due to open in May 2011




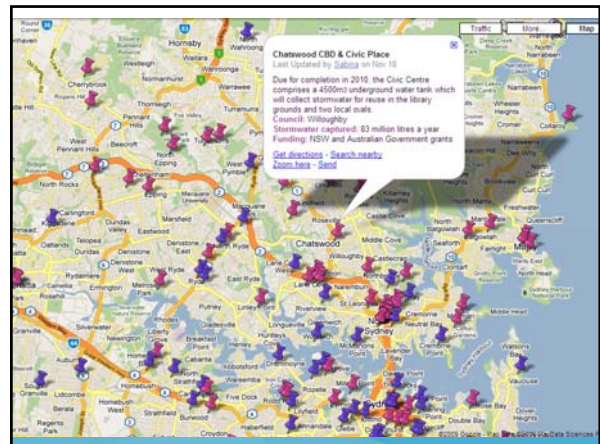

## Stormwater

Sydney Water manages around 5% of the stormwater system with Councils having the lead role






## Stormwater in Sydney

- 70+ stormwater harvesting projects
- Saving around 1.3 billion litres a year





## Sydney Park Harvesting and Reuse





**Partnership between City of Sydney and Sydney Water**

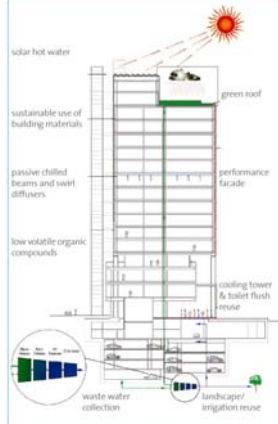
- Bioretention system for treatment
- Existing ponds for storage
- Irrigation reuse
- Stage 1 Council project to commence this year
- Stage 2 on Sydney Water system subject to Stage 1 pilot project



## Water Recycling On-site




## On site water recycling



- Sydney Water building at Parramatta.
- Onsite water recycling plant for toilet flushing, cooling towers, fire testing and irrigation.
- 75% less water in
- 90% less to sewer


## Commercial Viability of Projects

### Funding of Water Recycling Projects



## 'Pricing arrangements for recycled water and sewer mining'

### IPART September 2006



- ▶ Projects must recover their own costs
  - No direct funding from the general customer base
- ▶ Costs avoided or deferred in other parts of water services system
  - Can be recovered from broader customer base subject to IPART review.

**Sydney WATER**

## Funding Framework

- ▶ Non-growth schemes:
  - Usage charge is 80% of potable water price unless otherwise justified
- ▶ Growth schemes:
  - Usage charge is 80% of potable water price
  - Developer charge up to \$6000 per single dwelling
  - Together can fund schemes costing \$4/kL-\$6/kL

**Sydney WATER**

## Other Funding Sources

### Avoided costs

- ▶ Recycling can avoid costs in the potable water and wastewater system ('avoided costs').
- ▶ the cost of recycling schemes can be offset by an amount equal to the 'avoided costs' and this amount can be recovered from the general customer base

### Government direction

- ▶ Government may direct IPART to include costs of recycling in Sydney Water's prices

**Sydney WATER**

## Key factors in commercial viability of project

(Price is set before project delivery)

- ▶ How sure about demand are you really?
- ▶ How do you allocate demand risk? Are customers prepared to accept a 'take or pay' payment?
- ▶ How certain are costs?
- ▶ How are costs passed to customers over what time?
- ▶ Are there avoided costs?
- ▶ What is the customer's willingness to pay?

**Sydney WATER**

## Demand Risks

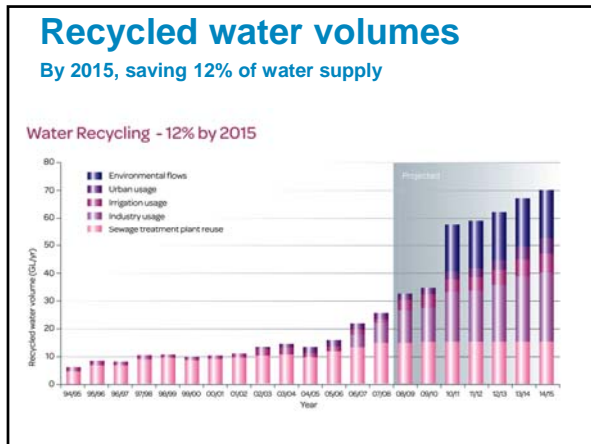
- ▶ Growth Customers
  - Uncertain pace of growth
  - No requirement to connect in some areas
  - Long term demands likely to decrease
- ▶ Non Growth
  - Customers unwilling to sign up for long term agreements
  - Demand is decreasing for industrial & commercial customers
  - Majority of scheme demand is dependent on one or two customers
  - Irrigation demand is weather dependent

**Sydney WATER**

## Sydney's water recycling program

**Sydney WATER**





### Recycled Water

70 GL/year by 2015

- Existing SW Schemes – 30GL/year
  - Rouse Hill residential
  - Wollongong Stage 1 & 2 industrial
  - STP on site use
  - Irrigation

*In one of Australia's largest industrial recycling projects, Wollongong Recycled Water Plant supplies up to 7.3 billion litres of recycled water a year to food processing.*

### Recycled Water

70 GL/year by 2015

- SW Schemes Being Delivered – 23GL/year
  - Replacement Flows
  - Rosehill-Camellia industrial
  - Hoxton Park residential

### Recycled Water

70 GL/year by 2015

- Being Planned
  - Quakers Hill industrial
  - Wollongong Stage 3 industrial
  - Macquarie Park commercial & residential
  - Ropes Crossing residential
  - North Head irrigation
  - Bonnyrigg residential
  - Malabar irrigation
  - Penrith irrigation & commercial

### Recycled Water

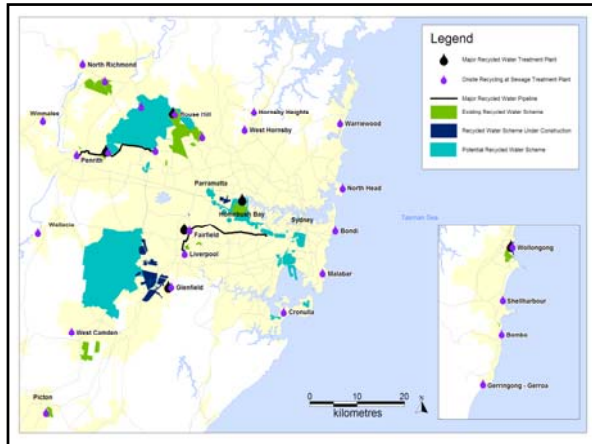
70 GL/year by 2015

- Other Schemes – 11GL/year
  - SOPA & Orica
  - Kurnell industrial
  - Cronulla Irrigation
  - sewer mining,
  - stormwater harvesting.

### Recycled Water

Beyond 2015


- Mainly Urban Growth
  - Uncertain volume because pace of growth, no regulatory requirement and financial viability
    - North West & South West Sector
    - Expansion of LAP: Botany, Parramatta Rd, CBD



CITY OF SYDNEY  
*city of villages*

## Strategic Selection of Water Recycling Projects

**Dr Bhakti Devi**  
Sustainability Unit  
City of Sydney



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*city of villages*

## Overview

- Why strategic selection?
- Selection criteria
  - Parks
  - Infrastructure
  - Sustainability
- Choice of reuse option
- Benefits of strategic selection



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## Why strategic selection?

- Helps prioritize issues
- Helps marry issues with opportunities.
- Brings internal stakeholders together
- Integrated approach




**Strategic = Sustainable**

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*city of villages*

## Selection Criteria - Parks

- Community expectation of amenity levels
- Landscape outcomes to maintain
- Park specific requirements
- Additional non potable demand in the neighbourhood.

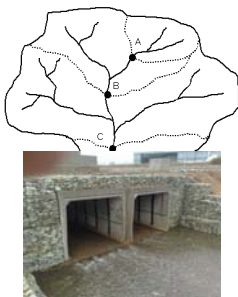


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*city of villages*

## Selection Criteria - Infrastructure

- Stormwater trunk drain in the vicinity
- Catchment area
- Any infiltration/tidal issues
- Known availability of base flow

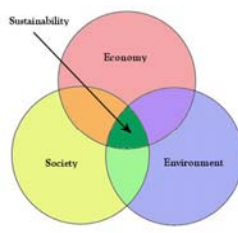


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## Selection Criteria - Sustainability

- Volume of mains water substituted
- Reduction of stormwater pollutant discharged
- GHG emissions associated with operation & maintenance
- Community Education
- Levelised Cost



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## Stormwater or Blackwater?



- Existence of base flow
- Storage (underground vs. above ground)
- Depth of access to sewer
- Value of green space being irrigated
- Volume & scale of reuse

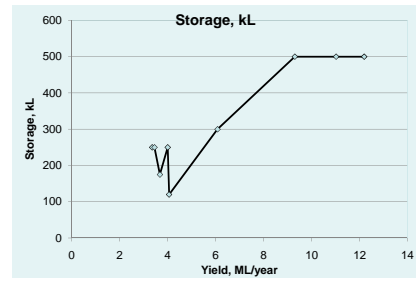


### Site Scale or Precinct Scale?



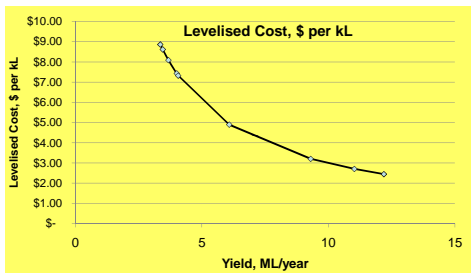
Let's make Sydney green, global and connected.

## Stormwater Reuse Option



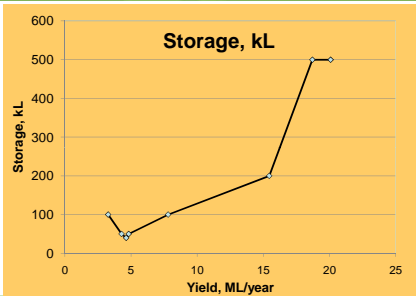
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## Stormwater Reuse Option



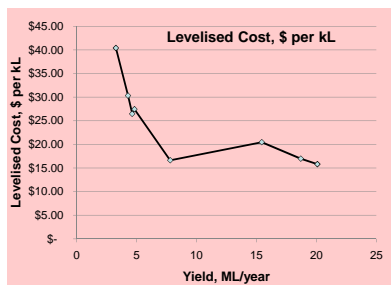
Let's make Sydney green, global and connected.

## Sewer Mining Option



Let's make Sydney green, global and connected.

## Sewer Mining Option



Let's make Sydney green, global and connected.

## Benefits of Strategic Selection





- Involves internal stakeholders
- Clarity on project's contribution to different objectives.
- Prioritized list of projects
- Addresses stakeholder concerns
- Leveraging funding sources
- Informs future capital works program



Let's make Sydney green, global and connected.




# Bronte Park's Stormwater Reuse System



## Back in the day

- Perennial fresh water creek, feeding a series of pools and simple coastal lagoon




## Bronte today

- High population density - second highest LGA in Australia
- High visitation ~ 15,000 on a busy summer day





## Bronte catchment




## Feasibility

- Strong political and community support
- Catchment geomorphology and hydrology ideal
- Water bills indicated a Demand of up to 13 ML / annum
- Sufficient base flow (5l/s) available to supply demand
- Good water quality
- Grant funding available



## Scheme layout



## Outcomes

- Better than expected harvesting capacity
- Solid water re-use results - 12 ML pa
- Traditional LCA shows a cost \$2.33/kL
- Community Costing shows a value of -\$1.67/kL
- Good treated water quality- 100% compliance with DECC level 2 criteria
- Community expectations met by maintaining recreational amenity, access and park aesthetics.
- Low ongoing costs



## Lessons learned

- Success is reliant on partner based solutions
  - External funding – 25% of capital costs
  - Design
  - Implementation
  - Maintenance
- Internal and external commitment are integral
- Staff ownership of the project is vital to ongoing trouble free operation



# **Appendix II: Scenario Testing Workshop Worksheet**



## Sydney Coastal Councils Workshop

### SITE DETAILS

Proposed site: .....

How the recycled water will be used:

Irrigation  Residential (toilets, garden watering, washing machines, car washing)

Industrial processes  Cooling towers  Other commercial  .....

Current water source: .....

Alternative water sources available to the site (as applicable, describe the location of the source and its distance (km) from the site where the recycled water will be used):

- Sewage treatment plant .....
- Sewer main .....
- Stormwater channel or access point .....
- Groundwater access point .....
- Waterways access point .....

Proposed water source: .....

Does the site have existing water storages (eg dams, tanks)? How much water can they hold?..

.....

### PROJECT DRIVERS

Project objectives: .....

.....

What are the expected benefits from using recycled water? Are they quantifiable? Do they have financial value? To whom? .....

.....

.....

.....

**WATER NEEDS**

Can water be used more efficiently at the site? .....

Are there other potential recycled water users nearby? .....

Average daily demand (kilolitres per day): .....

Will demand fluctuate (daily, seasonally)?      Yes       No   
(‘yes’ may affect treatment operations and require onsite water storage to balance supply and demand)

Peak day demand (kL/ day): .....

Will demand increase or decrease over time?      Yes       No   
(may impact viability, project staging, sizing treatment or delivery system, need for backup supply)

Ultimate daily demand (kL/ day) .....

Is a backup water source necessary?      Yes       No

Where obtained from? .....

**DELIVERY SYSTEM**

Pumping:      Source elevation (metres above sea level) .....

                    Highest point en route (metres above sea level) .....

                    Site elevation (metres above sea level) .....

Pipework:      Distance from source to site (metres): .....

Major crossings (main roads, railways, sensitive habitats, waterways, private land) .....

.....

.....

**COMMERCIAL CONSIDERATIONS**

What price would the user pay for recycled water (\$/kilolitre): .....

Would the user pay a fixed monthly charge? .....

    How much? .....      For how long?.....

Other funding sources: .....

What is the required payback period? .....

**PLEASE RETURN COMPLETED WORKSHEET TO FACILITATOR FOR COST ESTIMATION**