
STORMWATER STRATEGY

THE FUTURE OF
STORMWATER
MANAGEMENT

WATER
IS
GOOD



Government
of South Australia

DEPARTMENT FOR WATER

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FOREWORD



South Australians understand the value of water and have become great innovators, working to maximise the water resources available to them. As a result, our State is an acknowledged leader in recycling treated wastewater and stormwater capture and reuse and we have the highest per capita rainwater tank ownership in Australia. Yet we must do more if we are to achieve our goal of becoming a truly 'water sensitive state'.

Around the country we have witnessed the severe impacts of extreme weather events which are likely to occur more frequently under anticipated climate change scenarios. We need to be able to adapt to the extremes of Australia's climate by managing drought and flood to minimise the effects on our communities whilst ensuring that natural systems receive the range of flows they require to remain healthy. When rain falls in abundance, we must be adept at capturing stormwater and storing it for later use. Importantly, we must design our urban centres to provide water security for future generations.

The State Government cannot meet these challenges alone – all levels of government, the community and industry must work together, each contributing where they have the knowledge, experience and resources to do so. That is why, in September 2010, I established a Stormwater Taskforce to develop a strategy for stormwater management.

The Taskforce included senior representatives from the Stormwater Management Authority, SA Water, the Adelaide and Mount Lofty Ranges Natural Resources Management Board, the Local Government Association and the Goyder Institute for Water Research. Chaired by the Chief Executive of the Department for Water, the Taskforce was charged with developing a plan to guide stormwater management in the Greater Adelaide region.

In particular, it was asked to provide a 'road map' for achieving the stormwater-related targets in the Government's water security plan, *Water for Good*, released in June 2009. To that end, the Taskforce agreed on four key objectives:

- to manage water resources in an integrated way
- to better mitigate flood risk
- to clarify roles and responsibilities, and
- to move towards water sensitive urban design.

In becoming a water sensitive city with mandated water sensitive urban design and integrated water management, South Australia will maintain the leading edge in water management. *Water for Good* has set ambitious targets for stormwater and wastewater harvesting and reuse. This Strategy outlines how those targets could be achieved through an integrated approach to water management. While the focus, for now, is on Greater Adelaide, the principles in the Strategy also apply in regional South Australia.

Experience has shown that we can no longer manage individual urban water resources in isolation. Stormwater should not be managed independently of wastewater; strong flood-mitigation measures must be incorporated into our urban design; and all water resources need to be managed on a catchment-wide basis.

We must be bold in our vision and resolute in our commitment to better management of our urban water resources. Population and export growth are key to South Australia's future economic prosperity and, unquestionably, water security underpins them both.

I thank Taskforce members for their work on this Strategy and for their commitment to the better management of our urban water resources for future generations.

A handwritten signature in blue ink, appearing to read 'Paul Caica'.

The Hon Paul Caica MP

Minister for Water

Minister for the River Murray

BACKGROUND

Stormwater – under South Australia’s *Natural Resources Management Act 2004* (NRM Act), and for the purposes of this Strategy – is ‘surface water’ or ‘run-off’ from urban areas.

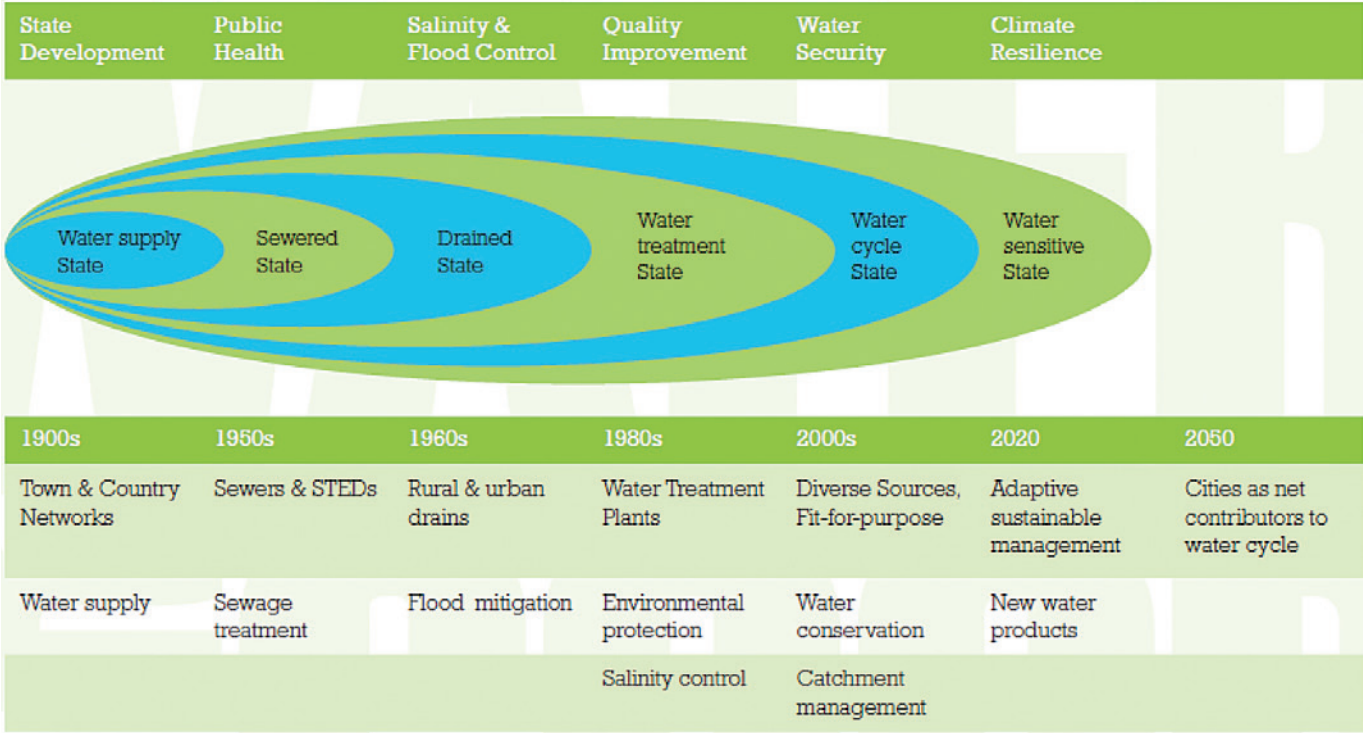
In South Australia, the management, access to and use of stormwater is subject to the same regulatory provisions (called a scheme in the Act) as all other naturally occurring water. At present, in the Greater Adelaide region, some water resources are subject to an access regime and some are not (see Page 8, Who owns stormwater?). Stormwater is also subject to the same regulation as all other water in relation to the protection of water quality as outlined in the *Environment Protection Act 1993* and its associated policies.

Historically, stormwater has been managed as a drainage issue, essentially to minimise nuisance inundation across urban areas and to control and mitigate flooding. Infrastructure was originally put in place to move water through the urban landscape and out to sea as quickly as possible, to make roads and transport safe, minimise the damage of flooding to infrastructure, protect and promote economic activity and enable urban growth. Much of our urban form is a legacy of the planning and infrastructure priorities of decades ago.

Since the negative impacts of discharging stormwater run-off into coastal environments and urban watercourses and lakes have been recognised and better understood, there has been an increased focus on improving the quality of stormwater run-off. Catchment water management programs from the mid 1990s to mid 2000s achieved much, with the support of the community.

Moving towards a ‘Water-sensitive State’ (adapted from Urban Water Management Transitions Framework)

Brown, R, Keath, N & Wong, T 2008, ‘Transitioning to Water Sensitive Cities: Historical, Current and Future Transition States’, 11th International Conference on Urban Drainage, Edinburgh, Scotland, UK



The recent drought caused a shift in attitudes towards the way stormwater is managed and it is now regarded as a valuable resource. This has led to new thinking about how to capture and store rainwater and stormwater in urban environments – to minimise the impact of run-off on sensitive coastal ecosystems and to improve the water security of cities and towns.

A number of stormwater harvesting and reuse projects already operate in Greater Adelaide and eight large schemes are currently under construction through partnerships between the Commonwealth Government, the State Government and councils. In addition, local companies and universities are developing clever ways to store water in and under buildings, under roads and under car parks.

Capturing and storing stormwater has, however, largely occurred on an ad-hoc basis. This Strategy aims to remedy this by developing an integrated approach to stormwater management as we transition to the water sensitive state envisaged in *Water for Good*. It is logical and practical that the Strategy initially focuses on Greater Adelaide and that the initiatives and policies it recommends be applied first in the city. In the medium to longer-term, their reach will be widened to include regional South Australia, particularly larger urban centres.

A water sensitive city uses its water resources sustainably. It seeks to be resilient to climate change through a diverse range of water supplies, such as watercourses, groundwater, stormwater, rainwater tanks, wastewater and desalinated water.

Our city will need to change so that buildings and urban developments actively contribute to the water cycle and far more stormwater is captured for reuse over time. Although development and urban form in South Australia are guided by the Planning Strategy, which includes *The 30-Year Plan for Greater Adelaide*, the way we, as a community, manage water is set to significantly shape the way our city evolves.



WHO OWNS STORMWATER?

In South Australia, rights to take and use water are statutory rights set out in the NRM Act. The State has responsibility for managing natural water resources and has powers to control water-affecting activities, prescribe water resources and issue rights to access water in prescribed resources. Once a resource is prescribed, a water allocation plan is developed to establish, among other things, the rules relating to taking water from it.

While the State has the power to control all water resources in South Australia, these resources are not owned by, or vested in the State. Ownership of water derives from the nature and extent of rights to access water that apply in particular circumstances. Rights to access water that may be relevant include, but are not limited to:

- the right of an occupier of land to take water from non-prescribed water resources (subject to not detrimentally affecting the rights of others with lawful access to enjoy the use and benefit of that water);
- water licences (rights to defined shares of the water made available for extraction from a prescribed water resource – these rights are not connected to land ownership), and
- water allocations (the volume of water that can be taken on account of a water licence in a twelve month or lesser period).

In practical terms, this means that once a person has taken water they are legally entitled to access, they 'own' the stored water in the sense that they may sell, use or dispose of it (subject to other relevant legislation, including the *Environment Protection Act 1993* and the *Public and Environmental Health Act 1987*). However, ownership is dependent on exclusivity of access.

Where a water resource is not prescribed and there are no prohibitions or other regulations in place, a person is able to take water from a water resource they can legally access, to the extent that it does not prevent other landholders (who also have legal access) from enjoying the use and benefit of that resource. For example, all landholders (owners or lessees) in the catchment have lawful access to surface water (run-off) and so do others who may have access rights under statutes. In another example, a council may harvest surface water or watercourse water from stormwater infrastructure where it has lawful access to the water. Once collected and in the council's possession (e.g. in storage tanks, wetlands), the council 'owns' this water. However, should the council inject the water into an aquifer, it would need to have a licence or permit (in a prescribed groundwater area) to later extract it. This is because once the stormwater has been injected into an aquifer it becomes 'groundwater'. Where the groundwater is not prescribed, water injected into an aquifer could be accessed by any occupier of land who may be authorised to access that aquifer.

Where a resource is prescribed, the person taking water must have a right to access it under the NRM Act. This right will generally take the form of a water licence, water allocation, authorisation (section 128 of the NRM Act) or other right (for example stock or domestic right). Where a person or council wants to take water from a prescribed resource (for example, the River Torrens) a licence, water allocation, statutory right or authorisation again is required. Any water taken in accordance with such an instrument would be 'owned' by the person taking it.

It is recognised that the key issue of 'ownership' relates to certainty of investment and protecting the interests of those who invest in stormwater harvesting and reuse infrastructure. There are a number of legislative mechanisms to achieve this and other options will be fully explored as part of the development of an integrated 'blue print for urban water' (see page 12).

THE FUTURE OF STORMWATER MANAGEMENT

According to *Water for Good*, there are strong indications that significant parts of southern Australia are experiencing a changing climate and that we can expect longer hot, dry spells and less reliable rain patterns in future. According to the CSIRO, we can anticipate an overall decline in rainfall of between 15% and 30% by 2050 and a consequential reduction in run-off into our storages. In some years, however, we may still experience heavy falls and even flooding.

Reduced inflows into the Mount Lofty Ranges reservoirs and the River Murray inevitably affect the availability of supply from these sources in the Greater Adelaide region, as well as potential supplies from stormwater harvesting and reuse schemes. Prolonged hot weather triggers increases in demand and water consumption. Conversely, more intense and regular storms increase the potential for:

- more severe flooding, with consequent safety, economic and property impacts
- a decrease in water quality within both watercourses and receiving waters (for example, Gulf St Vincent)
- channel erosion and increased sedimentation in watercourses
- loss of vegetation through erosion and replacement by invasive species, and
- a reduction in the health of aquatic habitats, both watercourses and receiving waters.

Given the possible range of changes in weather patterns and the associated uncertainty of the extent of impacts, it is critical that we build robust stormwater systems that are part of a more integrated management regime for our water resources and will improve the ecological status of our urban watercourses and coastal environment.

Strong and well-managed population growth will be a key driver of prosperity and good economic performance in South Australia. It will also affect the way we manage our water resources. More water will be required to sustain more people and increased urban development has the potential to generate larger volumes of run-off and wastewater.

The next stage of stormwater management therefore needs to focus on total water cycle management and integrated land and water management through water sensitive urban design. This requires a catchment-based approach, integrated with the planning process and must be considered at a range of scales – including property, precinct, catchment and regional. In line with policy directions at both international and national levels, planning for land-use, development, infrastructure and natural resource management must be far better integrated if Adelaide is to become a truly water sensitive city.

The aim is for water from rainfall events to move through the landscape in a controlled way to:

- minimise the threat of flooding
- ensure water is captured and used for productive purposes, and
- optimise the environmental outcomes for urban waterways and coastal environments.

To achieve this, the Stormwater Strategy provides a high level road map for future stormwater management. Key components include:

- developing an integrated blueprint for stormwater and wastewater for Greater Adelaide
- transitioning Adelaide to a water sensitive city and acknowledging the need to manage urban water in this integrated way
- achieving the *Water for Good* targets for stormwater harvesting (see Appendix 2), including the capacity to harvest 60 GL a year by 2050, where economically and technically feasible
- addressing flood risk in existing and future developments
- supporting appropriate research and encouraging innovation
- allowing greater use of markets in stormwater management while still providing protection for public health and the environment, and
- providing leadership and an effective institutional framework to implement this Strategy.

Although this Strategy is designed for the Greater Adelaide region, it should also provide the basis for stormwater management in regional areas of the State. (*Water for Good* sets a target of 15 GL a year to be harvested in regional areas by 2050.)

Water for Good identifies a need to develop master plans for effectively managing stormwater and wastewater in Greater Adelaide. This Strategy is a precursor to a more detailed ‘blueprint for urban water’, which will bring together stormwater and wastewater and examine matters such as the costs and benefits of various strategic water projects and products, a demand study to identify possible users of various water products and land-use planning considerations for strategic infrastructure investment (including investment related to mitigating flood risks).

To manage our water resources in a sustainable and economic way, we need to better integrate the management of various sources of water. Groundwater, surface run-off (including stormwater), watercourses, drinking water and wastewater must be recognised as being part of the same cycle.

Water needs to be managed for a range of values, including critical human needs, economic development, environmental benefits, recreation and amenity and safety of property and life. Sound stormwater management can contribute positively to all of these.

Stormwater harvesting for reuse contributes to our water security by providing a range of water products from a range of sources. However, the end use, location of schemes, amounts harvested, storage options and prevailing hydro-geological conditions must be carefully considered when proposing harvesting schemes, as other sources of water may be available to better fit the need.

The construction of stormwater harvesting projects to date has occurred largely according to the availability of funding. However, it is important that future stormwater management be strategically aligned to the goal of Adelaide becoming a water sensitive city.

Water management can occur on a site, precinct, catchment or regional scale and activities at all levels should help to achieve that goal. Urban water projects should be prioritised on a catchment basis and planning should be undertaken at a catchment scale, where feasible.



A BLUEPRINT FOR URBAN WATER

To provide a framework for planning and prioritisation of projects, a 'blueprint for urban water' will be developed for stormwater and wastewater. It will summarise investigations relating to the costs and benefits of various water sources and document projected demands for alternative water resources in the Greater Adelaide region. It will also analyse current land use and strategic infrastructure planning to determine future infrastructure requirements. All of this will enable a more strategic approach to infrastructure investment and take into account the different scales at which stormwater can be managed. The blueprint will need to take a risk-based approach to ensure existing and future flood impacts are considered.

While *Water for Good* proposes two master plans, one for wastewater and one for stormwater, it is proposed that these plans be combined into the one 'blueprint' to provide a high level cost-benefit analysis and/or multi-criteria assessment of various water projects and products. The 'blueprint' will also provide a demand study to identify possible users, including the demands of agriculture north and south of metropolitan Adelaide.

It will complement the work being undertaken in relation to land use planning and strategic infrastructure investment. It is likely also to explore:

- the creation of urban linear parks on urban water courses
- priority flood management projects
- priority stormwater and wastewater reuse projects, including supply infrastructure (third pipe) opportunities
- adapting urban water management to climate change
- coordinating surface water and groundwater allocation and licensing policies in water allocation plans, and
- priority water quality improvement projects.



For the blueprint to succeed, its development will require all tiers of Government and, where relevant, the private sector, to work together. Collaboration not only improves the opportunity to achieve multiple outcomes, it can be an insurance against isolated decision making leading to unintended consequences.

ACTION 1

Building on the vision set by this Strategy, by 2014, develop an integrated ‘blueprint for urban water’ for stormwater and wastewater for Greater Adelaide, incorporating the water sensitive city theme and addressing priority issues.



STORMWATER IN A WATER SENSITIVE CITY

The combination of population growth and a changing climate has significant implications for Australia's economy, environment and society, particularly in its cities. For Adelaide to become a water sensitive city, many changes will be required – to water resource management, community expectations and behaviours and urban design.

The Centre for Water Sensitive Cities (an initiative of the Monash University, Victoria) is undertaking research to provide socio-technical empirical evidence for guiding the formulation of an overall policy blueprint for Water Sensitive Australian Cities. The Centre's research identifies three key principles:

1. **Cities as Water Supply Catchments** – meaning access to water through a diversity of sources at a diversity of supply scales;
2. **Cities Providing Ecosystem Services** – meaning the built environment functions to supplement and support the function of the natural environment; and
3. **Cities Comprising Water Sensitive Communities** – meaning socio-political capital for sustainability exists and citizens' decision-making and behaviours are water sensitive.

According to its draft *Stormwater Management in a Water Sensitive City: Blueprint 2011*, in such a city 'stormwater flow is conveyed through a series of green/blue corridors that serve as open spaces and productive landscapes that also detain flood water for flood protection of downstream communities.'

The vision for Adelaide in this context includes mandating in new developments sustainable water management features at an on-site, precinct and catchment scale. We are likely to see significant changes in both the existing urban form (that is, physical layout and design) and styles of infrastructure (from building and suburb design to the use of alternative materials). In the meantime, opportunities will be taken wherever possible to retrofit existing urban areas with water sensitive facilities.

WATER SENSITIVE URBAN DESIGN

Water sensitive urban design (WSUD) is an approach to urban planning and design that integrates the management of the total water cycle into the land use planning and development process. For example, technologies such as permeable surfaces can be used to reduce run-off and allow greater natural groundwater recharge; and water can be passively directed into amenity areas to slow water movement from heavy rainfall events and reduce flood risk. WSUD also includes features such as wetlands and other 'biofiltration' (treatment through biological means) methods for cleaning water flowing through the urban landscape. Cleaner rivers and creeks mean less ecological damage to coastal waters, such as Gulf St Vincent.

Retrofitting WSUD into existing developed areas will be a challenge, but opportunities will be grasped when and where they arise. While WSUD in new developments will be mandated in South Australia, State and Local Government agencies will need to show leadership in their infrastructure programs, for example, by ensuring that WSUD water quality and quantity stormwater management features are embedded into roads and streetscapes in Adelaide.

In a water sensitive city, we should expect a vibrant water and urban development sector, embracing sustainable water management from diverse sources. Opportunities for the development of innovative solutions lie in existing problems like flooding and the flow of poor quality water into receiving environments such as estuaries and Gulf St Vincent. In the longer term, Adelaide's treated wastewater might be blended post treatment with stormwater to stimulate and support additional food production close to, or even within, populated areas.

Water management includes:

- the delivery of drinking water
- water for amenity, industry and food production
- flood mitigation
- stormwater management and harvesting
- waterways health
- the collection of sewage
- sewage treatment, and
- recycling.

With visionary urban landscape and building design, many of the issues currently experienced in relation to stormwater management can be avoided. For example, linear parks along major urban waterways can reduce the risk and impacts of flooding – they provide easier access for authorities to ensure creeks and rivers are clear of obstructions and they provide a floodway when waters rise.

Wide-scale implementation of WSUD will help transition Adelaide to a water sensitive city by protecting environmental values, maintaining aquatic ecosystems and conserving potable water resources.

There are numerous international examples of city projects moving beyond the water cycle to address broader sustainability problems, such as sludge disposal, materials consumption, energy demand and agricultural productivity. They demonstrate that good management of stormwater and wastewater can encourage innovation and resolve many of these issues.

Although the adoption of WSUD concepts has been growing, there are still many impediments to institutionalising the practice. Among them are insufficient institutional skills and knowledge, lack of community understanding, perceived risks and limited incentives. The South Australian Government will be working with Local Government and industry to build capacity to reduce these impediments to the uptake of WSUD and institutionalise it into new development and urban renewal.

ACTION 2

Before the end of 2011, introduce interim targets for water sensitive urban design, ahead of developing and implementing the best regulatory approach to mandate water sensitive urban design.

URBAN RUN-OFF IN THE ENVIRONMENT

Alterations to land use result in changes to the quality of water, where it flows, how often and how much. In natural catchments, relatively small quantities of rain runs off into local waterways. The rest soaks into the ground and is largely used by plants before it reaches the water table. However, in an urban catchment covered with hard surfaces such as roads, footpaths and buildings, up to 95 per cent of rainfall can run off the land into waterways.

The environmental requirements of urban waterways differ to those of rural ones, nevertheless urban rivers, creeks and waterways need some level of flow to stay healthy and maintain aesthetic values. Even if parts of Adelaide's watercourses are heavily modified, water flowing through them and out to sea is not necessarily wasted. It can be a valuable resource for native plants and animals and vital for fish species whose life cycle alternates between marine and freshwater environments.

Traditional urbanisation leads to increased impermeable areas and run-off that collects sediments and a variety of pollutants from suburban blocks, industrial sites, footpaths and roadways. This is in addition to the increased volume of water passing through waterways which can lead to erosion and further sediment loads. Instead of this water being cleansed of pollutants by natural processes, as it would be in non-urban areas, it is discharged directly into estuaries and coastal waters. The Adelaide Coastal Waters Study found that 'Adelaide's coastal marine environment has undergone significant modification and degradation as a result of many years of near-continuous inputs of nutrient rich, turbid, and coloured water and wastewater... these constituents have long been implicated in the loss of around 5000 hectares of seagrasses off Adelaide's metropolitan coast since 1941.'

To achieve improvement in water quality in our urban water environments and receiving waters, various strategies need to be adopted. Increasing the amount of stormwater collected is one way to decrease pollutant loads and this should be pursued where harvesting for reuse is feasible and adequate customers for the water harvested can be found. However, WSUD and improved pollution controls must also be much more widely adopted to minimise the creation of pollutants in the first place.

Before it can be termed a water sensitive city, Adelaide must first be recognised as being a water supply catchment. It must also respond to the environmental pressures placed on iconic receiving waters, including the metropolitan coast, Barker Inlet and urban water bodies such as the River Torrens and the Torrens Lake.

The next steps are to define the actions arising from water quality programs such as the Adelaide Coastal Waters Water Quality Improvement Plan and the Torrens Taskforce so that these can be properly integrated into the blueprint for urban water. A fundamental component of the blueprint will be articulating water quality objectives and priorities resulting from the Environment Protection Authority's Healthy Waters Program, which has recently been completed.

ACTION 3

By 2015, identify what changes are required to stormwater infrastructure to improve water quality outcomes in line with the Adelaide Coastal Waters Water Quality Improvement Plan and the Torrens Taskforce Initiative.

STORMWATER USE

Historically, stormwater has been managed as a drainage issue, in particular to control and mitigate flooding. Today it is acknowledged as an important part of the diverse portfolio of water resources needed in a water sensitive city.

According to the independently produced *Urban Stormwater Harvesting Options Study*, stormwater harvesting schemes in 2009 produced approximately 6 gigalitres a year (GL/a) of captured water. A further 11 GL/a is expected to be harvested when currently committed schemes are completed. Another 5 GL/a is expected from recently announced joint projects between the Australian Government, the State Government and Local Government. These existing, committed and new schemes will enable the short-term harvesting target in *Water for Good* (20 GL/a captured by 2013) to be exceeded. However, the long-term target is to harvest 60 GL/a by 2050, subject to economic and technical feasibility.

WHY IS MORE STORMWATER NOT BEING CAPTURED?

The Adelaide and Mount Lofty Ranges Integrated Natural Resources Management Plan estimated that urbanised areas in the region produce about 86 GL/a of stormwater run-off, given average rainfall. The targets for stormwater capture outlined in *Water for Good* are based on the work contained in the *Urban Stormwater Harvesting Options Study*, released along with *Water for Good* in June 2009. This study suggests potential for up to 60 GL/a to be harvested in the Greater Adelaide area through 'large-scale' schemes at specific locations. However, further work is needed to adequately assess the viability of harvesting concepts suggested in the study.

Stormwater is an important part of increasing water supply diversity. However, it is still a climate-dependent resource and, as such, it cannot be the only answer to water security.

Stormwater projects typically require substantial investment and the water harvested requires substantial treatment, a suitable storage option (for example, in an aquifer) and then new 'third-pipe' distribution mains to get it to consumers. The cost to benefit ratio is generally very high.

The Government has chosen to invest in stormwater as well as recycled wastewater, desalination and the River Murray. These multiple sources will provide for improved security through diversity and will ensure urban rivers maintain an appropriate level of water flow to stay healthy.



On-site stormwater harvesting for private use and community benefit is encouraged, where it is sensible to do so. For example, where storage options are poor, it may be more appropriate to use reclaimed wastewater schemes rather than capturing and treating stormwater.

Stormwater harvesting and reuse projects should be developed particularly where demand exists, or there is a realistic expectation of future demand. According to the Centre for Water Sensitive Cities, ‘treatment technologies for harvested stormwater should be selected by applying fit-for-purpose principles, with sustainable treatment technologies given priority’. Using water that is fit-for-purpose has numerous benefits. For example, using lower quality water for irrigating open spaces reduces the demand on the potable water supply. There are also major cost and energy savings in treating water to a lower-quality level if it is being used for non-potable purposes.

A three-year study was recently undertaken in South Australia to determine whether wetland-treated stormwater could be stored in an initially brackish aquifer and successfully recovered at drinking water quality. While the outcomes were encouraging, more research is required to better explore potential hazards, appropriate preventative measures, operational requirements and costs so that risks can be reduced to an acceptable level, consistent with current drinking water guidelines. Further research is being undertaken by the South Australian-based Goyder Institute for Water Research, in collaboration with the CSIRO.

SHOULD WE DRINK STORMWATER?

Drinking water must go through a rigorous quality controlled treatment process to ensure it is fit for human consumption. Our drinking water is currently sourced from large defined catchments and the River Murray and it will soon include desalinated water from Gulf St Vincent. Drinking water is extensively monitored and processed in large water-quality treatment plants, in accordance with strict standards.

Urban stormwater is sourced from and passes through a variety of landscapes, including suburban housing, industrial sites, parks and gardens and roadways. Urban catchment areas vary considerably across the metropolitan area. Pollutants that are gathered by stormwater may also vary considerably so preventative measures and treatment systems need to be tailored accordingly. Most existing treatment options are not good at dealing with rapidly changing source water quality. Further research will determine the extent to which stormwater in Adelaide can be used safely and viably for drinking in the future.

In the interim, capturing water and reusing it for non-potable purposes is actively encouraged where harvesting, cleansing and storage are viable and reuse opportunities are available.



The development of a blueprint for urban water will enable future investments in stormwater and wastewater infrastructure to be undertaken in the context of water supply needs and availability, flood risks and broader urban land use and infrastructure planning.

It is important that existing investment in stormwater schemes be protected and new investments actively facilitated where appropriate. To this end, the South Australian Government will, as part of other projects currently underway, investigate the best options for creating certainty of access for investors in stormwater schemes.

ACTION 4

Develop access rights to stormwater for re-use scheme owners to provide certainty for stormwater resources, thereby creating incentives for investment in stormwater capture, treatment, storage and use.

ACTION 5

By 2013, complete further studies to improve the knowledge and management of public health risks relating to the recycling of stormwater, including assessing the risk of augmenting drinking water supplies.



REDUCING FLOOD RISK

While stormwater can be regarded as a water resource to be captured and stored, recent events in other parts of Australia have highlighted the impacts of floods on public safety and property.

Managing water in the urban landscape is complex. It is critical that flood risks are managed as part of an integrated approach to water management. Even with increased stormwater harvesting, some existing flood prone areas will require specialised flood mitigation works.

Water runs through the landscape and below it, without regard to administrative boundaries (for example, between council districts). Development in one part of a catchment may have impacts far away, often in other council districts. Local Government is therefore closely involved in and often affected by stormwater management activities. Indeed, Local Government has traditionally held the role as the principal manager of stormwater, although the State Government has become involved at various times in response to specific events and requests for assistance.

Stormwater and its associated impacts, such as flooding, need to be managed in areas that are already well established. A range of existing stormwater infrastructure needs to be maintained adequately and upgraded as physical conditions such as run-off amounts change. This presents a number of challenges administratively, technically and financially.

Water moving through the landscape can be difficult to manage because it flows across and through both publicly and privately-owned land and infrastructure. Stormwater flowing through watercourses can also at times cause flooding. As watercourses often pass through private land, designing, implementing and managing appropriate flood mitigation measures can be problematic as private land is not always accessible for such purposes. Ongoing responsibility for maintenance of watercourses on privately owned land has therefore been an issue.

Dealing with flood risk is a fundamental part of stormwater management. Existing flood mapping for South Australia shows that in a one-in-100-year flood event, up to 8500 buildings (including residential and non-residential) could be affected. Approximately 7000 of these buildings are in Greater Adelaide. The vast bulk (approximately 5000) are in the Brownhill-Keswick Creek catchment, which flows out to sea through the Patawalonga and Barcoo Outlet. The area of the eastern suburbs containing First to Fifth Creeks is also high risk. Just under 1000 properties are likely to be inundated in a one-in-100-year flood.

The councils in the Brownhill-Keswick Creek catchment are currently working to develop a stormwater management plan, under the direction of the Stormwater Management Authority. This plan will articulate the catchment-specific actions that need to be undertaken to mitigate flood risks. It is known that they will be high cost and require a collaborative, whole-of-government approach.

The behaviour of water in the landscape, including the function of floodplains, was not well understood in the early days of Adelaide's development. Now that we better understand hydrology, it is critical that development is guided by a risk minimisation approach. To this end, floodplains need to be defined for all catchments and minimum standards for risk must be set. For example, it may be acceptable for open space to be flooded once every 10 years, whereas for essential services such as hospitals a one-in-500 year risk may only be acceptable.

As has occurred in the past, there will be circumstances and events too large or complex for individual councils to manage. In such circumstances, an independent organisation should have the power to coordinate the resolution of issues (see *Roles and Responsibilities*).

Coordination, cooperation and a catchment approach are all critical to achieving the greatest community benefit from mitigating against flood risk.

ACTION 6

By 2012, evaluate options for management of urban watercourses on public and private land to further minimise flooding risk.

ACTION 7

By 2015, further improve the management of flood risk by prioritising flood mitigation scheme proposals and by evaluating the possibility of:

- ensuring information about flood risk is available at the time of property purchase
- adequate insurance cover
- investing in flood preparedness, and
- ensuring the State's planning system includes minimum risk standards for all types of developments.



RESEARCH

South Australia has historically been a leader in innovative approaches to water conservation and stormwater and wastewater treatment and reuse. Cities around the world are implementing strategies to improve their resilience to climate change and it is important that our State continues to sponsor both local and national research into improving integrated urban water management.

To meet the challenges of productivity, sustainability and the liveability of Adelaide into the future, we need to support education, research and innovation. Projects are currently under way with the CSIRO and others in relation to the reuse of stormwater and with a range of partners as part of the Centre for Water Sensitive Cities' research into cities as water supply catchments.

In May 2010, the State and Federal Governments announced the establishment of the new Adelaide-based Goyder Institute for Water Research, which will enhance South Australia's water research and innovation capacity to provide best practice approaches to water resource planning and management. The Goyder Institute is charged with providing independent scientific advice about South Australia's water system to improve the State Government's ability to forecast threats to water security and develop an integrated approach to water management.

To facilitate the greater, sustainable uptake of WSUD in the Greater Adelaide region, significant knowledge gaps and policy/governance mechanisms need to be addressed. The Goyder Institute has identified a number of areas which should be the focus for further research, including:

1. Physical systems: planning, design, validation and modelling;

- Identify knowledge and data gaps for the implementation of WSUD planning and design guidelines
- Investigate the impact of climate variability and change on the planning and design of WSUD options
- Investigate the blends of integrated WSUD systems that deliver the most suitable multifunctional land use in South Australian urban landscapes
- Develop an understanding of how vegetated WSUD systems survive and perform in the South Australian climate
- Develop a better understanding of how to incorporate storage in both non-vegetated and vegetated WSUD systems
- Develop or improve existing technologies that improve the effectiveness of WSUD, including sensors for the early detection of various contaminants and ecological impacts
- Validate the effectiveness and efficiency of various WSUD options through monitoring and modelling (e.g. rainwater tanks, bio-retention basins and bio-filtration systems, cluster and development-scale treatment technologies), and
- Identify and develop suitable modelling tools to understand water quality and nutrient balances associated with various WSUD options.

2. Triple bottom line assessment of WSUD options and methods for evaluating externalities using Integrated Systems Analysis Methods;

- Drawing from the existing national and international literature, develop and/or modify suitable triple bottom line assessment methodology, including methodologies for evaluating externalities (benefits and costs not reflected in the market price) of WSUD policy options to understand full life-cycle costs of different WSUD options, and
- Identify suitable models for the equitable distribution, among various stakeholders, of the costs associated with WSUD options.

3. Policy, governance and institutional arrangements;

- Conduct research and analysis essential for the state to develop a strong WSUD policy statement, including identifying policy links with urban water management responsibilities
- Investigate current management and governance models for the long-term operation and maintenance of WSUD options and systems, and explore ways to facilitate third party access to water systems (including investigating associated risks), and
- Understand the drivers for public perceptions and behavioural changes in water use, and investigate current water end-use in South Australia.

In addition, the Goyder Institute has also identified the need for a more rigorous evaluation tool to assist manage water resources across the urban landscape in an integrated way. Such a model will ensure that the best approaches are adopted across the whole of the water cycle as against the various policy objectives required of government in managing water in urban settings.

ACTION 8

Commission a scientific research program to:

- **underpin urban water policy, in particular, the integrated management of water resources, and**
- **support the development of policies to encourage the widespread adoption of water sensitive urban design.**



ROLES AND RESPONSIBILITIES

Roles and responsibilities related to managing water in the urban landscape are complex and span multiple organisations including Local and State Government. (A summary list of current roles and responsibilities is provided in Appendix 3).

For example, water quality policies are managed by the Environment Protection Authority, while water access policies are managed by the Department for Water and Natural Resources Management Boards. SA Water and local councils manage the infrastructure system, although some parts of the stormwater system (for example creeks) are privately owned. The Department of Planning and Local Government and local councils have a significant impact on the creation and movement of stormwater by regulating the type and location of built infrastructure. Human health impacts are managed by SA Health and SA Water, while flood related issues involve the Department for Water, local councils and State Emergency Services.

In 2007, a Stormwater Management Authority was established to implement the *State-Local Government Stormwater Management Agreement* and operate as the planning, prioritising and funding body in accordance with that Agreement. However, it is now considered that, for a number of reasons including legislative impediments, the Authority is not being fully utilised. It is generally agreed that current arrangements lack clarity and that the Authority needs more vigour.

Both the Stormwater Management Authority and the *State-Local Government Stormwater Management Agreement* are currently being reviewed. The Stormwater Taskforce believes there are significant opportunities to reform the role and governance arrangements of the Authority to improve State and Local Government coordination of stormwater management and the administration of the Stormwater Management Fund¹. Despite the good work of the Authority to date, there is scope to further strengthen South Australia's management of stormwater issues.

During 2011, the Government will be working with the Local Government Association and councils to develop a new operational model for the Stormwater Management Authority and to formalise a new *State and Local Government Stormwater Management Agreement*.

Consultation will focus on providing the 'new' Authority with:

- mechanisms and opportunities to play a more strategic coordination and leadership role
- the ability to have a greater emphasis on stormwater infrastructure planning and the prioritisation of infrastructure projects
- promoting flood preparedness
- opportunities for it to leverage additional funding for strategic infrastructure projects (from sources including the Australian Government and other private parties)
- alternative funding mechanisms, including appropriate market based models
- improved support arrangements and the availability of key skills to enable it to fulfil its functions
- appropriate legislative powers and provisions to ensure the timely delivery of stormwater management projects, and
- appropriate membership and operational procedures to support its new functions.

Its roles could include:

- developing the blueprint for urban stormwater and wastewater (refer pages 11 and 12), in collaboration with stakeholders
- helping councils to develop and implement stormwater management plans, and
- capacity building across a range of organisations to build a culture of WSUD and integrated water management.

¹ The State Government contributes \$4 million per annum (CPI indexed for a period of 30 years) to the Stormwater Management Fund for the purpose of subsidising the cost of floodplain mapping, preparation of stormwater management plans and priority stormwater infrastructure works throughout South Australia.

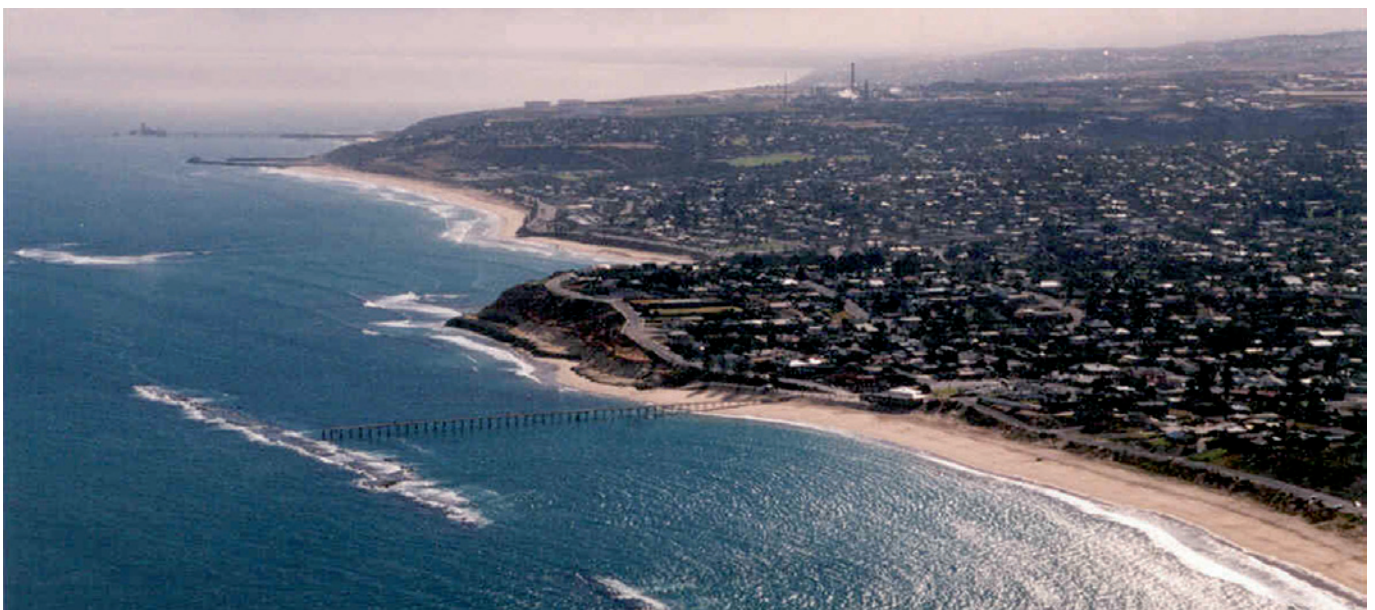
The revamped entity's powers could be largely similar to the current Authority but it should have the power to manage issues that cross council boundaries and be able to compel councils to act when there is a strategic necessity to do so.

The Department for Water will support the integrated work of the revamped Authority by working towards developing a platform to share stormwater management data among stakeholders. As well as sharing existing data, a statewide flood intelligence system could be developed to provide both catchment-scale identification of issues and real-time information to facilitate responsive management decisions.

ACTION 9

In 2011, complete the review of current Stormwater Management Authority governance arrangements with a view to establishing an appropriate governance body that has the power to:

- ensure the timely delivery of stormwater management projects
- set priorities and standards for stormwater planning and infrastructure investment
- assign maintenance and management for all urban watercourses
- attract funding for stormwater management, and
- develop and implement the blueprint for urban stormwater and treated wastewater.



THE NEXT STEPS

Adelaide's natural geological advantages, including aquifers suitable for water storage in the west, south and north, put us in an excellent position to transition the city to being 'water sensitive'.

The long-term aim is to achieve truly integrated water management so that strategic policies and targets, such as those outlined in *Water for Good* and *The 30-Year Plan for Greater Adelaide*, can be attained. In the short to medium term a number of actions are needed to protect the city from flood damage, ensure appropriate governance arrangements are in place and move it closer to being a water sensitive city.

This Stormwater Strategy will guide the work of the Government for the next five years, after which it will be reviewed, evaluated and updated as required, in partnership with the organisations responsible for contributing to its implementation.

Action Number	Action	Due	Lead Responsibility
1	Building on the vision set by this Strategy develop an integrated 'blueprint for urban water' for stormwater and wastewater for Greater Adelaide, incorporating the water sensitive city theme and addressing priority issues.	2014	Department for Water and the new Stormwater Management Authority in collaboration with other partners such as the Environment Protection Authority and SA Water
2	Introduce interim targets for water sensitive urban design, ahead of developing and implementing the best regulatory approach to mandate water sensitive urban design.	End 2011	Department for Water
3	Identify what changes are required to stormwater infrastructure to improve water quality outcomes in line with the Adelaide Coastal Waters Water Quality Improvement Plan and the Torrens Taskforce Initiative.	2015	Environment Protection Authority / Adelaide and Mount Lofty Ranges Natural Resources Management Board
4	Develop access rights to stormwater for re-use scheme owners to provide certainty for stormwater resources, thereby creating incentives for investment in stormwater capture, treatment, storage and use.	2013	Department for Water
5	Complete further studies to improve the knowledge and management of public health risks relating to the recycling of stormwater, including assessing the risk of augmenting drinking water supplies.	2013	Goyder Institute for Water Research
6	Evaluate options for management of urban watercourses on public and private land to further minimise flooding risk.	2012	Department for Water in partnership with the Local Government Association, the Adelaide and Mount Lofty Ranges Natural Resources Management Board and the State Emergency Services

Action Number	Action	Due	Lead Responsibility
7	<p>Further improve the management of flood risk by prioritising flood mitigation scheme proposals and by evaluating the possibility of:</p> <ul style="list-style-type: none"> ensuring information about flood risk is available at the time of property purchase adequate insurance cover investing in flood preparedness, and ensuring the State's planning system includes minimum risk standards for all types of developments. 	2015	Department for Water, the Department of Planning and Local Government and the State Emergency Services
8	<p>Commission a scientific research program to:</p> <ul style="list-style-type: none"> underpin urban water policy, in particular, the integrated management of water resources, and support the development of policies to encourage the widespread adoption of water sensitive urban design. 	2011	Goyder Institute for Water Research
9	<p>Complete the review of current governance arrangements with a view to establishing an appropriate governance body that has the power to:</p> <ul style="list-style-type: none"> ensure the timely delivery of stormwater management projects set priorities and standards for stormwater planning and infrastructure investment assign maintenance and management for all urban watercourses attract funding for stormwater management, and develop and implement the blueprint for urban stormwater and treated wastewater. 	2011	Department for Water and the Local Government Association

APPENDIX 1 – OTHER POLICIES AND PLANS

This document complements a range of other existing policies and plans, including the following:

The *National Water Initiative* which includes objectives to transition to water sensitive cities through integrated water cycle management and WSUD. Coordination of urban water cycle planning, especially at the catchment scale, has been identified as a priority area of focus.

South Australia's Strategic Plan provides strategic direction for the State. The Plan includes targets related to the protection of water resources and population growth, both of which impact on water management decisions.

Water for Good is the State's water security plan. It sets policies and targets designed to secure South Australia's water supply to 2050, and contains specific stormwater targets.

The 30 Year Plan for Greater Adelaide sets strategic policy directions for urban planning in the Greater Adelaide area, identifying key directions, such as in-fill development, urban growth boundaries and transit-oriented development.

The *State Natural Resources Management Plan* enables the sustainable management of the State's natural resources, including water resources.

The Adelaide and Mount Lofty Ranges Natural Resources Management Plan sets out policies for the management of the region's natural resources, including water. It includes specific stormwater capture targets.

Development Plans, prepared by local councils, are key documents in the South Australian planning and development system. They contain the zones, maps and written policies to guide property owners and others about what can and cannot be done in the future, on any piece of land in the area covered by the Development Plan. They are critical to stormwater management because development of any kind has impacts on the water cycle. Whether impacts are positive or negative can depend on the policies in a Development Plan.

Stormwater Management Plans are prepared by councils to ensure that stormwater management is addressed on a total catchment basis. The plans ensure that the relevant Natural Resources Management Board, Local Government authorities and State Government agencies work together to develop, implement and fund a coordinated and multi-objective approach to the management of stormwater for the area. These stormwater management plans are voluntary and currently are undertaken as a prerequisite for funding support from the Stormwater Management Authority.

The *Stormwater Management Agreement*, signed by the State Government and the Local Government Association on behalf of Local Government in March 2006, sets out roles, responsibilities and shared governance arrangements for the management of stormwater in South Australia. The Agreement is currently being reviewed.

The *Urban Stormwater Management Policy* for South Australia was released in 2005 and provides a multi-objective framework for the management of stormwater in the urban areas of the state. The policy articulates a complex interplay of state and local government responsibilities.

The proposed *Water Industry Bill* provides for an independent regulator for water, in relation to services and pricing. It is important that investors in stormwater schemes, whether they are councils or private providers, factor in the independent regulator's rules and make themselves aware of their obligations before making investment decisions.

APPENDIX 2 – WATER FOR GOOD ACTIONS

Water for Good contains a number of targets related to stormwater and wastewater.

Action	Completion Date	Lead Agency	Partners
11. Complete existing committed stormwater projects, including Cheltenham Park, to provide an additional harvesting capacity of almost 12 GL/a by 2013.	2013	Project proponents: LMC AMLR NRM Board DENR SA Water	Local Government Developers DFW SMA Adelaide Airport Ltd
12. Update, by 2010, State water recycling guidelines to reflect the Australian Guidelines for Water Recycling, and include stormwater.	2010	SA Health	EPA SA Water DFW PIRSA
13. Subject to Commonwealth assistance and in partnership with local government, stormwater harvesting and recycling will be underway, including: <ul style="list-style-type: none"> the western metropolitan area including Cheltenham Park, Riverside Golf Club, Old Port Road and Adelaide the southern metropolitan area, building on the first stage of Water Proofing the South Playford and Salisbury, creating further capacity in the northern area, building on Waterproofing Northern Adelaide the Adelaide Botanic Gardens, and the Barker Inlet. 	2013	DFW	SA Water DENR Local Government AMLR NRM Board Adelaide Airport Ltd Commonwealth Government
14. Work with local government to update the State-Local Government Stormwater Management Agreement, clarify the roles of State agencies and local government, reinforce the importance of collaboration, and strengthen governance arrangements.	2011	DFW	DP&LG LGA SMA
15. Work with local government, the Stormwater Management Authority and other stakeholders (including the Commonwealth Government and private enterprise) to identify and develop new stormwater recycling projects in the Adelaide region, in line with the findings of the Urban Stormwater Harvesting Options Study.	Ongoing	DFW	SMA Local Government SA Water LMC Private sector NRM Boards Commonwealth Government
16. Develop a master plan for effectively managing stormwater in Adelaide. Include interim milestones and water quality targets to support recommendations in the Adelaide Coastal Waters Study Final Report, to provide up to 60 GL/a of recycled stormwater, in Greater Adelaide, by 2050.	2012	DFW SMA	Local Government SA Water LMC NRM Boards

STORMWATER STRATEGY – THE FUTURE OF STORMWATER MANAGEMENT

Action	Completion Date	Lead Agency	Partners
17. As part of regional water demand and supply planning, develop and implement plans to provide up to 15 GL/a of stormwater harvesting potential in South Australia's regional areas, by 2050.	2050	DFW	SA Water, NRM Boards Local Government
18. Develop State guidelines for greywater recycling, consistent with the Australian Guidelines for Water Recycling, by 2010.	2010	SA Health	EPA SA Water
19. Develop a master plan for effectively managing wastewater in Adelaide, in concert with the stormwater recycling master plan, to ensure optimum use of both water sources.	2014	SA Water	Local Government DFW NRM Board SMA DP&LG
20. Encourage decentralised wastewater recycling schemes in new developments, in partnership with the implementation of the Plan for Greater Adelaide.	Ongoing	DP&LG	SA Water Local Government DFW
21. Expand recycling of rural community wastewater management schemes (council operated) to 12 GL/a by 2050.	2050	DP&LG	Local Government DFW
22. Complete wastewater recycling projects, including Glenelg to Parklands (open space irrigation), Blakeview (housing development), Southern Urban Recycling Project (housing development), by 2013.	2013	SA Water	SA Health EPA LMC Local Government Private sector
67. By 2013, develop and implement the best regulatory approach for South Australia to mandate water-sensitive urban design, dovetailing with the Plan for Greater Adelaide.	Ongoing	DFW	SA Water DPLG
68. Introduce targets for water-sensitive urban design by 2010.	2010	DFW	SA Water SA Health DPLG
69. Work with research institutions and industry to enhance co-ordination of the research effort and improve collaboration to identify priorities and ensure timely delivery.	Ongoing	DFEEST	PIRSA DTED DFW SA Water NRM Research Alliance
94. Continue to support world-leading research to assess the potential for treating stormwater to a very high quality and monitor future scientific developments and technological innovations.	Ongoing	DFW	SA Health DFEEST

APPENDIX 3 – EXISTING ROLES AND RESPONSIBILITIES

Organisation	Role
Department for Water	<p>Ensure that there are always sufficient and sustainable water resources in South Australia for our health, our economy, our environment and our lifestyle.</p> <p>Flood Hazard Leader – ensure statewide coordination of flood prevention preparation, response and recovery in South Australia among relevant Commonwealth, State, and Local Government agencies and other non-government organisations, as required. Also, flood information coordinator and lead agency for dealing with farm dam failure.</p> <p>Urban Water Policy – stormwater, integrated water management, WSUD.</p> <p>Asset Management – Patawalonga assets, including Glenelg Gates, Collection Pond and Diversion Pond, Northern Gates and Footbridge, Patawalonga Outlet Duct (Barcoo outlet and associated pipework).</p> <p>Major projects – assist the Commonwealth to deliver the Stormwater Program, which comprises eight stormwater harvesting and reuse projects in the Greater Adelaide Region .</p> <p>Regulatory – water licensing and compliance.</p>
SA Water	<p>As agent of the Minister for Water, SA Water is responsible for asset maintenance activities associated with the following specific metropolitan drainage assets:</p> <ul style="list-style-type: none"> ● Sturt Creek Catchment – Concrete lined section of the Sturt River Channel (East of Patawalonga Basin to just upstream of Sturt Rd), Sturt River Flood Control Dam ● Brownhill/Keswick Creek System – Airport drain (part). Those areas of the Torrens and Sturt Rivers and the Keswick and Brownhill Creeks for which the State has maintenance responsibility (as defined in the <i>Metropolitan Drainage Act 1935</i> and the plan referred to in that Act) ● River Torrens – The whole of the main channel (below pool level) of the Torrens, from Gorge Weir in the foothills to the sea. (Note that the Torrens Lake and part of the Torrens upstream to the Albert Bridge is managed by the Adelaide City Council), and ● Barker Inlet and Adelaide Airport – Stormwater Harvesting and Reuse Schemes <p>SA Water is also the lead agency for large dam failure and for pipe failure.</p>
Stormwater Management Authority	<p>The Authority is responsible for ensuring the proper operation of the <i>State-Local Government Stormwater Management Agreement</i> in accordance with administrative and funding arrangements and powers conferred on it under Schedule 1A of the <i>Local Government Act 1999</i>.</p> <p>The Authority is responsible for administering the Stormwater Management Fund to which the State has committed to providing \$4 million a year, indexed for 30 years. The Authority may use the Fund for a range of purposes, including preparation of stormwater management plans, stormwater works, investigations and research and for payment of operational costs of the Authority.</p> <p>The Stormwater Management Authority is also required to issue guidelines for the preparation of stormwater management plans by local councils.</p>

Organisation	Role
Natural Resources Management Council	<p>Under the <i>Stormwater Management Agreement</i>, the Natural Resources Management Council must:</p> <ul style="list-style-type: none"> • promote the use of stormwater to further environmental objectives and address issues of sustainability • further environmental objectives and address issues of sustainability, and • approve guidelines (issued by the Stormwater Management Authority) for the preparation of stormwater management plans by local councils.
Regional Natural Resources Management Boards	<p>Regional NRM Boards are responsible for developing and implementing their regional Natural Resources Management Plan. (These plans may consider stormwater as a natural water resource.)</p> <p>Some boards have regulatory responsibilities and infrastructure programs related to stormwater. For example, the Adelaide and Mount Lofty Ranges (AMLR) NRM Board's Plan includes specific stormwater targets (eg. to reuse 75% of stormwater in the region in the next 20 years and to reduce the average annual cost of flood damage).</p> <p>The AMLR NRM Board works with partners to undertake projects to:</p> <ul style="list-style-type: none"> • develop stormwater management plans • investigate the feasibility of multi-objective stormwater management projects • promote and demonstrate water sensitive urban design • develop floodplain maps • undertake urban watercourse restoration projects • assist in strategic policy development • provide funds for and/or undertake infrastructure projects to improve stormwater quality and management • monitor and evaluate stormwater flow and quality and aquatic health, and • undertake education and training programs. <p>The AMLR NRM Board is a joint investor in a number of past and present stormwater harvesting and re-use projects. It has facilitated the Torrens Taskforce and Christies Creek Taskforce initiatives which have focused on stormwater quality issues.</p> <p>Regulatory – water affecting activities.</p> <p>Policy – Regional NRM Plan, Water Allocation Plans.</p> <p>Asset Management – Gross Pollutant Traps and silt traps in the urban Torrens and Patawalonga catchments.</p> <p>Advisory – Board staff assist local government, state government, industry and the public with advice on stormwater management issues.</p>

Organisation	Role
Department of Environment and Natural Resources	<p>Conservation of the environment and sustainable use of natural resources, including freshwater systems.</p> <p>Flood – lead agency for coastal flooding.</p> <p>Policy – stormwater management schemes are frequently built on crown land, Department of Environment and Natural Resources administers the <i>Crown Lands Act 2009</i>.</p> <p>Asset Management – Botanic Gardens Stormwater Harvesting and Reuse Scheme (currently under construction).</p>
Department for Transport, Energy and Infrastructure	<p>Building and maintaining infrastructure, particularly transport infrastructure, which must be drained and protected from flooding.</p> <p>Flood Hazard – lead agency for riverine flooding, stormwater flooding, infrastructure failure.</p> <p>Technical advice – provides technical (hydrological/stormwater engineering) advice to the Stormwater Management Authority.</p>
Environment Protection Authority	<p>Ensures environmental water quality, including meeting legislative requirements set out in the <i>Environment Protection Act 1993</i> and associated regulatory tools, policies and guides.</p> <p>Responsible for:</p> <ul style="list-style-type: none"> developing the <i>Adelaide Coastal Water Quality Improvement Plan</i>, which is expected to include actions to improve the quality of stormwater run-off to Adelaide's coastal waters (in line with relevant findings and recommendations in the Adelaide Coastal Waters Study final report) the development of the <i>Adelaide Watershed Water Quality Improvement Plan</i> strategic and technical input into the stormwater planning, projects and research activities of other agencies in relation to water quality and Managed Aquifer Recharge, and licensing some aspects of stormwater projects (eg. recharge of Managed Aquifer Recharge schemes).

Organisation	Role
SA Health	<p>Responsible for developing policy and providing advice to other agencies and the public to prevent or minimise the adverse health effects of environmental hazards in the South Australian community. Responsibility focuses on the health impact of the human environment.</p> <p>Provides a range of scientific, engineering and technical services related to public and environmental health, specifically in the areas of sanitation and wastewater management:</p> <ul style="list-style-type: none"> • administers the <i>Waste Control Regulations</i> • assesses and issues approvals for wastewater systems (both collection and treatment) which come under the <i>Waste Control Regulations</i> • assesses and issues approvals for reclaimed water reuse systems for all schemes, including SA Water systems • support for local government on the administration of the <i>Public and Environmental Act</i> and Regulations • production of codes of practice, guidelines, health promotional publications, brochures and fact sheets , and • assessment of land development activities. <p>Flood Hazard – lead agency for human disease hazards.</p>
State Emergency Services	<p>Flood control agency.</p> <p>Extreme weather hazard leader.</p>
Local Government	<p>Under the <i>Local Government Act 1999</i>, each council has responsibility 'to take measures to protect its area from natural and other hazards and to mitigate the effects of such hazards'. This is taken to include mitigation of flood hazard.</p> <p>Some councils also have certain responsibilities under State drainage acts.</p> <p>Unless specified or otherwise in an adopted <i>Stormwater Management Plan</i>, local councils are also solely responsible for funding local drainage works where the catchment area is less than 40 hectares.</p> <p>Local Government also has certain responsibilities under the <i>State-Local Government Stormwater Management Agreement</i>.</p> <p>Mostly, councils decide what services they will provide locally, however there are some services they are required, by legislation, to provide. These include:</p> <ul style="list-style-type: none"> • planning and development services, including building assessment, and • some environmental health services. <p>Following is a list of other non-legislated services provided, and activities undertaken or funded, by many councils in SA:</p> <ul style="list-style-type: none"> • monitoring of insanitary conditions • roads (local roads, not national highways or state arterial roads)

Organisation	Role
Local Government <i>(cont)</i>	<ul style="list-style-type: none"> • footpaths • stormwater drainage • parks and gardens • reserves and picnic areas • recreation facilities and centres • ovals • environmental management • wetlands • Coastcare and Dunecare projects • Local Area Water Catchment Plans • Landcare programs, and • septic tank effluent disposal schemes. <p>Whether a service is a legislative requirement of councils, or is provided by local choice, the <i>Local Government Act 1999</i> requires that a council is 'responsive to the needs, interests and aspirations of individuals and groups within its community'.</p>
Department of Planning and Local Government	<p>State Government's advisory agency on land use planning, development policy and strategy, the building code, and urban design and open space policy.</p> <p>The Department undertakes strategic land use planning for the State Government. The Planning Strategy provides direction for land use and development across the State.</p>
Department of Families and Communities	Flood recovery coordinator.

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WATER IS GOOD