



## **Infrastructure NSW**

Input into the 20 year water infrastructure strategy

13 June 2012

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# 1. Introduction

## 1.1 Purpose and background

The NSW 20 year State Infrastructure Strategy will identify long term strategies to improve water, transport and energy infrastructure provision in NSW. GHD has been commissioned to assist INSW to understand the adequacy of future programs to meet the challenges facing the water sector over the next 20 years. This work will help to inform the INSW 20 year water sector strategy.

This study provides a qualitative assessment of future State water infrastructure programs (using available information) across the potable water, ground water, wastewater and stormwater sectors. Given that work is underway to consider the modernisation of the irrigation sector and the NSW response to the draft Murray Darling Basin Plan, the irrigation sector does not form part of this study.

This study will seek to answer the following questions:

- Are the current and planned programs adequate to ensure that the urban and non-urban water supply, wastewater, and drainage systems are sufficient to deliver agreed levels of service for the next 20 years?
- Are the current and planned programs adequate to ensure NSW is able to respond to and manage increases in demand due to population growth, and risks associated with climate variability, including drought and flood events over the next 20 years?
- Do the current and planned programs to manage water infrastructure seek to minimise the costs to customers and capital programs?
- Are there unexplored opportunities to engage with the private sector to ensure a secure, sustainable and reliable water sector for the future?

## 1.2 Report structure

The remainder of this report is structured as follows:

Section 2 – Input into the 20 year water infrastructure strategy including high level recommendations for investment.

Section 3 – Evidence to support Section 2 including the assessment of future capital programs and plans.

Appendices – Reference list and stakeholder consultation list

## 2. Input into the 20 year water strategy

### 2.1 Summary

This study sought to answer five key questions. These questions, along with our response are outlined below

***Are the current and planned programs adequate to ensure that the urban and non-urban water supply, wastewater, and drainage systems are sufficient to deliver agreed levels of service for the next 20 years?***

Overall, the metropolitan water supply and wastewater sector is in reasonable shape with respect to meeting future growth in demand from forecast population increases and assuming that climate variability will continue but there will be no return of the recent decade long drought over this period. Due to unprecedented levels of capital investment in new water sources and the implementation of demand management programs, Greater Sydney now has a more resilient and robust water supply system. The addition of climate independent sources such as desalination and water recycling means that Sydney is no longer totally reliant on surface run-off into dams.

Over recent years, water demand has been declining due to a number of factors such as drought restrictions and water wise rules and the implementation of demand management programs in both the household and commercial sectors.

While the metropolitan water system performs to a high standard and is well placed to meet the demands of growth in the next ten to fifteen years, there are weaknesses in the non-metropolitan water arrangements, associated with the small size of many Local Water Utilities.

Water and wastewater services in regional NSW are delivered by 106 local governments. Governance and management arrangements at the local government level have been the subject of many reviews and investigations; however it appears little progress has been made to implement the recommendations of these reviews.

***Are the current and planned programs adequate to ensure NSW is able to respond to and manage increases in demand due to population growth, and risks associated with climate variability, including drought and flood events over the next 20 years?***

Current planned programs appear to be adequate to address forecast increases in population growth in metropolitan areas however it is difficult to predict future changes in demand in some regional areas that are growing rapidly due to ongoing investment in the resources and energy sectors.

There is still considerable uncertainty about the future risks and impacts of climate variability on water supply security, flooding impacts and wastewater management.

A repeat of severe drought is likely to mean that water supplies could need to be augmented in Sydney before 2025 and in the Hunter before 2020.

***Do the current and planned programs to manage water infrastructure seek to minimise the costs to customers and capital programs?***

The pricing oversight of the metro sector by IPART places a strong onus on utilities to justify the costs of capital expenditure. As the Sydney Water supply system becomes increasingly complex it is evident that investment decisions will require a system wide view rather than separate planning undertaken by Sydney Water and Sydney Catchment Authority in isolation. The current review of the 2010 Metropolitan Water Plan by the Metropolitan Water Directorate is particularly important in ensuring a coordinated long term planning process to optimise investment decisions from a whole of system perspective.

***Are there unexplored opportunities to engage with the private sector to ensure a secure, sustainable and reliable water sector for the future?***

There are 17 WICA licences currently in place and to date all of the licences relate to wastewater projects which generally deliver recycled water for local uses. Future developments in this area are likely to be evolutionary rather than revolutionary. A key impediment to greater private sector involvement in the water sector is the very slim profit margins at the retail level. As future augmentation of Sydney's water supply is likely to involve further desalination and recycling schemes, associated with either Indirect Potable Reuse or non-potable reuse, the future viability of private sector schemes will depend on the benchmark costs of these alternative technologies, which will vary from large centralised schemes to smaller decentralised schemes, and prices to customers regulated by IPART. There do not appear to be any legislative or institutional impediments to private sector involvement at present.

## **2.2 Current situation**

### **2.2.1 Metropolitan water supply and wastewater management**

Overall, the metropolitan water supply and wastewater sector is in reasonable shape with respect to meeting future growth in demand from forecast population increases. Water and wastewater systems are now reasonably robust as there is now greater reliance on climate independent sources of water such as desalination and recycling.

The priority for these systems is to optimise asset management and become more efficient. Over recent years, water demand has been declining due to a number of factors such as drought restrictions, water wise rules and other demand management programs.

Water conservation measures implemented in Sydney and a number of regional areas have been outstandingly successful in reducing demand. The total demand of the metropolitan region is similar to the level in the 1970's despite an additional one million increase in population of Sydney.

However caution is required as since water restrictions have been removed, Sydney has experienced two wet summers resulting low water consumption. On the other hand the demand curve has been 'hardened' due to the uptake of water efficient appliances and plumbing fixtures which 'lock in water efficiency'. Future demand management gains may be more difficult and costly to achieve. Water supply modelling indicates that Sydney's water supply is secure to at least 2025, assuming that drought conditions will not return. If drought conditions do prevail and water demand continues to increase, the new sources of water may need to be brought forward.

The Hunter region's water supply is far less secure than the Sydney metropolitan area. Water storages in the Hunter are relatively small and subject to rapid depletion if drought conditions prevail over the catchment area. Unlike metropolitan Sydney, the Hunter region has some minor groundwater resources.

During the recent drought experienced on the Central Coast, a water transfer pipeline was constructed which now connects the Hunter Region with the Central Coast. The ability to move water between these two regions increases security of supply and resilience. It will be important to formalise capacity sharing and water trading arrangements of the combined system to provide greater planning certainty for both water providers.

Now these systems are connected, it is worth investigating whether the current institutional arrangements are appropriate given that there are economies of scale in aggregating utilities given they have large fixed costs.

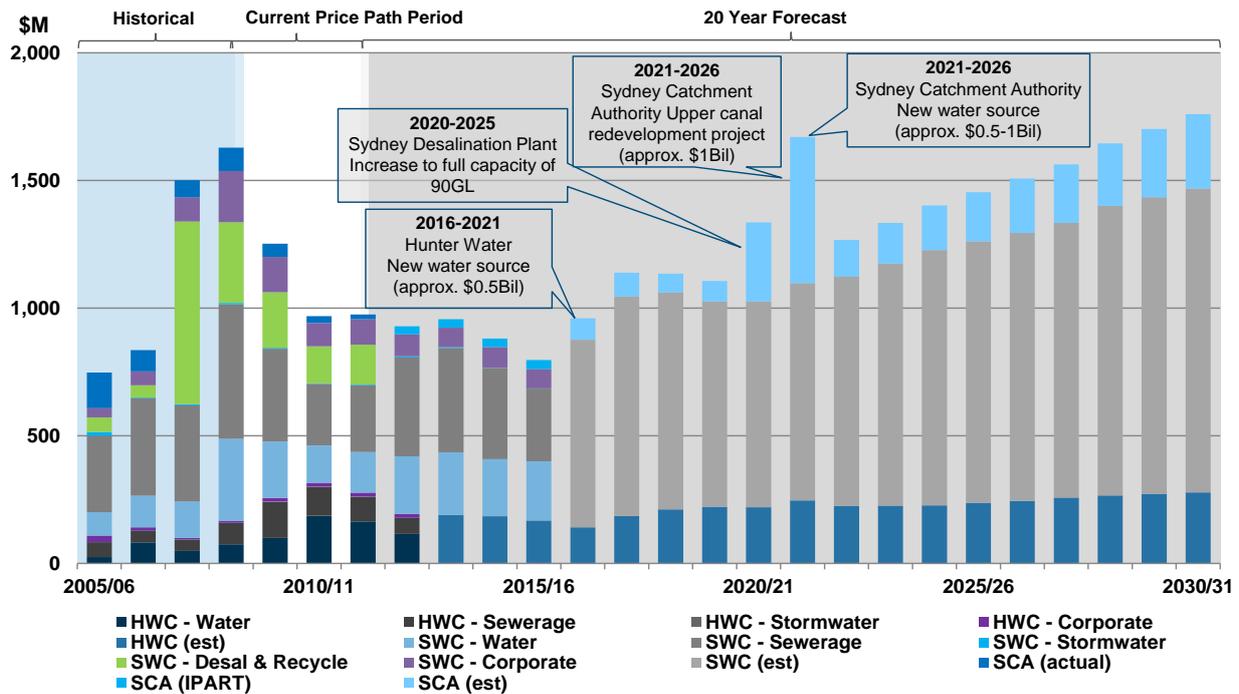
The decision not to proceed with the Tillegra Dam means that a further augmentation of supply is likely to be required within the next 10 years.

The Metropolitan Water Directorate has just commenced the process of preparing a Lower Hunter Water Resources Plan. This process will consider all demand and supply side options for securing and managing Hunter's water supply and is expected to be completed by 2014.

Over the last 12 months, Hunter Water has been developing an Interim Drought Management Plan. This plan outlines measures that can be undertaken on the demand and supply side for commercial, industrial and residential customers should the Hunter region experience dry conditions.

The 2010 Metropolitan Water Plan is also being reviewed to take account of changing contexts. It is imperative that this review takes account of flat water demand, environmental flows, climate variability, and the extent to which recycled water schemes and demand management programs are continued.

**Figure 1 – Historical and forecast capital expenditure for the metropolitan water sector (nominal \$)**



Aggregate capital investment in the metropolitan water sector has been declining since 2007/08 and 2008/09. Investment is expected to continue to decline until 2015/16. From 2016/17, capital investments in the metropolitan water sector are projected to increase as investments in new water sources and significant asset renewal projects take place (Figure 1 – sources included in reference list).

### 2.2.2 Non metropolitan water supply and wastewater management

The non metropolitan water supply and wastewater management systems are jointly funded by state and local governments and have not seen the same increases in infrastructure spending as the metropolitan network.

Generally, water quality and wastewater performance is lower than metro water utilities (particularly in relation to water quality) but comparable with similar regional utilities in other jurisdictions.

State Government funds the Country Town Water Supply and Sewerage Program (CTWSSP). There is a \$300M gap in current funding to complete 125 projects identified as backlog works. The majority (70%) of these projects relate to sewerage works required to address health and environmental requirements.

The current criteria for determining priorities for funding under the CTWS&WP are sound. However they do not give preference to smaller LWAs and do not consider the potential risks to water security of climate change.

Generally smaller more remote LWAs have most difficulty in meeting best practice performance guidelines established by NOW.

There is generally an adequate focus on long term infrastructure planning by most LWAs through completion of 30 year IWCM Strategies. Total capital expenditure projected over the next 30 years across all LWAs is \$3.4 B (excluding renewals). However the current cycle of plans has not considered the impacts of climate change on system security (estimated adaptation capital cost \$1.3 billion, 69% of which would be for inland areas).

### **2.2.3 Flood mitigation and drainage**

The condition and capacity of flood protection and storm water systems is difficult to assess due to fragmented responsibilities across different levels of government.

Flood protection and storm water management assets appear to be subject to less rigorous long term planning than other water infrastructure partly due to a fragmentation of responsibilities and less clearly defined policies and regulation of local councils.

Climate change will place increased pressure on ageing drainage assets in existing development as a result of more extreme rainfall events.

## **2.3 Future challenges and needs**

### **2.3.1 Metropolitan water supply and wastewater management**

While the metropolitan water supply and wastewater systems are performing well currently, the industry is facing significant challenges and increased uncertainty in the future. Population growth, climate change, and more stringent environmental flows, drinking water quality and other regulatory requirements will be significant drivers for future capital investment.

Given the complexity of current systems, the long lives of water infrastructure assets and the long lead times for infrastructure projects, the industry would benefit from a more integrated and longer term approach to planning.

The Metropolitan Water Plan is currently being updated and it is proposed that it will take a longer term view to 2050. The metropolitan water industry must continue to invest in state of the art modelling to take into account a range of long term scenarios on both the demand and supply side to manage risk and develop more resilient systems.

There are a number of potential infrastructure options proposed to ensure greater resiliency in the Sydney catchment such as:

- The design doubling of the desalination plant – This is likely to be required to meet demand beyond 2025, together with further augmentations such as additional recycling schemes including indirect potable reuse
- Expansion of the Shoalhaven transfer pipeline – When Sydney storages decline to 60%, water is transferred from the Shoalhaven system. If the transfer threshold changes, then an upgrade to the pipeline may be required (estimated to cost \$550M)
- Upgrade of the Upper Canal in conjunction with upgrades to coastal dams – Sydney Catchment Authority's capital program includes investment of \$1bn to upgrade the Upper Canal, a key water infrastructure connection between the coastal dams and Prospect Reservoir. Investment plans are driven by increasing maintenance costs, encroaching development and water quality standards. SCA is currently reviewing its capital program and is investigating options for extending the life of the Upper Canal.
- Development of a new dam at Welcome Reef – this is unlikely to be a viable option given distance to pipe (>\$550M cost) and the shallow nature of the storage which would be vulnerable to climate change.

There are a number of potential options that are currently being investigated to ensure greater resiliency in the Hunter region such as:

- Formalising water sharing arrangements with the Central Water recycling initiatives
- Use of ground water reserves during times of drought and then allowing the reserves to recover during rainfall periods.
- Demand management and water conservation initiatives involving residential, commercial and industrial users.

The greatest uncertainty confronting the wastewater sector is the extent to which environmental regulations become more stringent. There is a need for the OEH to provide more clarity about future changes to regulation and to adopt a consistent and 'outcomes based' form of regulation to minimise costs and to maximise environmental outcomes whilst providing certainty for utility planning.

Wastewater systems are expensive to construct and operate and planning for future systems needs to take account of all the factors that can influence river health outcomes. It is important that regulators and planners take a system perspective to optimise environmental outcomes by improving environmental flows, investigate the potential for nutrient trading and establish whether non-point solutions can be used to enhance river health. Wastewater systems are also the source for recycled water which can be used for a variety of non-potable uses.

Outside of the growth corridors there are no major wastewater projects on the horizon, however Sydney Water intends to conduct further scenario modelling to establish the optimum means of improving river health. It is too early to conclude whether wastewater systems will require upgrading in the 20 year planning horizon.

### **2.3.2 Non metropolitan water supply and wastewater management**

Climate variability is a major issue when forecasting how secure water supplies might be. The Office of Water has conducted pilot studies that indicate that LWAs face varying levels of threat to system yield from projected impacts of climate change over the next 30 years. Impacts are predicted to be lowest on the Central and North Coast and highest (up to 30 % reduction in yield) in the South West.

As water supply and wastewater treatment options become increasingly more complex the difficulty of small remote LWAs to attract and retain qualified staff with the requisite skills can be expected to become more of a problem.

Future demographic changes including declining populations in some areas and the impacts on demand of new mining and energy developments in other areas will require regular reviews of asset plans to avoid under or over investment in infrastructure.

### **2.3.3 Flood mitigation and drainage**

There is an urgent need to manage stormwater on a catchment basis in NSW. Both Sydney Water and Hunter Water have some relatively small drainage and flood protection responsibilities and it is difficult to optimise stormwater management when catchment management and drainage services are split between utilities and local government. Based on forecast scenarios for climate variability it is likely that more intense storms will become more common resulting in more flash flooding that will result in damage to homes and infrastructure. Upgrading the design capacity of ageing drainage infrastructure in existing development would involve major capital investment.

The recent experience in QLD with the controversy over operating rules for Wivenhoe Dam during the recent severe floods raises issues about the level of flood mitigation capability provided by major storages such as Warragamba. If additional flood mitigation capacity were to be provided by either changing operating rules to provide more air space or to increase the height of dam wall this would have major infrastructure cost implications.

Consideration should be given to developing a state wide flood policy and mapping initiative for NSW based on a comprehensive audit of emerging flood risks and adequacy of current flood management plans and flood mitigation infrastructure.

## **2.4 Water infrastructure strategy recommendations**

Based on the future challenges and needs facing the water sector over the next 20 years, a number of strategies are recommended across three key areas including:

- Metropolitan water supply and wastewater management
- Non metropolitan water supply and wastewater management
- Flood mitigation and drainage

The key strategies for each area are outlined in more detail below.

### **2.4.1 Metropolitan water supply and wastewater management**

- Given the now multi-source complexity of water supply systems and the long lead times in commissioning infrastructure projects, it is recommended that metropolitan water sector planning take a more holistic and longer term view than in the past, to consider the pipeline of infrastructure projects beyond 20 years. This is a significant change in approach as much of the planning undertaken now relates to the 5 year IPART price path
- Water supply in Sydney is reasonably secure and is adequate to meet demand until at least 2025. Investment to secure Sydney's water supply beyond 2025 will be required and planning should commence now in order to ensure the most efficient allocation of capital from now into the future
- New supply for the Hunter region will be required in the next 5-10 years. Planning and option identification are underway
- To build more resilient water systems utilities need to develop a strategy in the medium term to develop local sources of water including Indirect Potable Reuse (IPR)
- There is a need to prepare a strategy for maximising the opportunities to optimise the connecting pipeline between the Central Coast and Hunter Water
- The current review of the Metropolitan Water Plan 2010 should:
  - Include the latest modelling of climate change impacts on yields from catchments in assessing the timing and size of future augmentations to secure Sydney's supply beyond 2025 and Hunter's water supply beyond 2015
  - Clearly identify any proposed changes to policy regarding the emphasis on recycling ( including policy on indirect and direct potable reuse schemes), and decentralised water sources such as rain water tanks and stormwater harvesting, as these will impact on Sydney Water's future capital investment strategy
  - Review the water supply and wastewater requirements for growth areas and ensure these are factored into Sydney Water's future capital investment Plans
- Increased certainty is required about future environmental regulations that might apply to wastewater treatment, bio solids disposal and environmental flows, to ensure appropriate infrastructure choices into the future.
- Prepare a strategy for maximising the engagement with the private sector

### **2.4.2 Non metropolitan water supply and wastewater management**

- In the interests of equity and public health and environmental objectives, all non-metropolitan systems should meet national standards for water supply and sewerage.

- Arrangements between levels of Government should be reviewed to ensure that water infrastructure is provided in a timely and efficient manner (ie - The residual backlog projects under the CTWS&SP should be completed within 5 years)
- The business case prepared by NOW for State Government funding for a program of works to address the potential impacts of climate change on system security should be considered for implementation in 2 stages. Stage 1 - funding over 2 years to undertake a review of 30 year IWCM strategies to identify cost-effective adaptation strategies (at an estimated cost of \$5-10M for up to 50 most effected LWAs) and Stage 2 – funding to implement priority capital works that are assessed as required to address the impacts of climate scenarios (current preliminary estimate \$1.3B).
- The models for regionalisation of the NWUW sector should be assessed and a preferred model implemented as a priority step in enhancing the capacity and resilience of the sector.

### **2.4.3 Flood mitigation and drainage**

- The costs and benefits of all major flood mitigation options in the Hawkesbury Nepean Valley (including but not limited to upgrading Warragamba Dam) should be assessed
- Water utilities in conjunction with appropriate local governments need to prepare a 20 year comprehensive strategy on flood risk management.

### 3. Supporting material

This section outlines the material to support Section 2 of this report. This section draws heavily on interviews with key representatives from the Sydney Catchment Authority, Sydney Water, Hunter Water, the NSW Office of Water and Metropolitan Water Directorate to assess the appropriateness of water infrastructure investment programs and plans beyond the current five year IPART price path.

The list of key references and interviews conducted is outlined in Appendix A.

#### 3.1 Assessment criteria

In order to assess the appropriateness of water infrastructure investment programs and plans and identify key gaps for program delivery a set of criteria were developed. The following criteria were used to assess the capital investment programs for the metropolitan water service providers (WSPs) and non-metropolitan programs in NSW:

- Alignment with State Government objectives
- Strength of rationale and business case/ options
- Engagement with stakeholders/ customer participation
- Assessment of risk
- Value for money

Each criterion is then ranked against a qualitative ranking framework. Each criterion and their associated rankings are defined in Table 1.

**Table 1 – Assessment criteria**

Criteria	Description					
Alignment with government objectives	The extent to which the program objectives are aligned with and will meet government objectives for the water sector	No alignment	Marginal alignment	Moderate alignment	Significant alignment	Full alignment
Strength of rationale/ options	The robustness of option analysis and the case for investment	No analysis of options	Marginal analysis of option	Moderate analysis of options	Significant analysis of options	Robust analysis of options
Engagement with stakeholders	The extent to which stakeholders are engaged	No engagement	Marginal engagement	Moderate engagement	Significant engagement	Robust engagement
Risk assessment	The extent to which risk management and assessment drives investment	No consideration of risk	Marginal consideration of risk	Moderate consideration of risk	Significant consideration of risk	Robust consideration of risk
Value for money	The extent to which value for money drives investment	No consideration of value for money	Marginal consideration of value for money	Moderate consideration of value for money	Significant consideration of value for money	Robust consideration of value for money

Every effort to apply these criteria and rankings was made, however there was generally insufficient information available to the review team to rigorously assess the appropriateness of future water investment programs. Where possible, qualitative rankings have been applied for each entity, however a more robust analysis should be performed to verify this preliminary assessment.

## **3.2 Sydney Catchment Authority**

### **3.2.1 Current situation**

Sydney Catchment Authority (SCA) manages a catchment area of nearly 16,000 km<sup>2</sup>, providing water from rain fed sources to over 4.5 million households in Sydney, the Illawarra, the Blue Mountains and the Southern Highlands. The vast majority (99%) of SCA's water supply is consumed by Sydney Water with the remaining being distributed to local water utilities.

In light of Sydney's reliance on rain fed water sources managed by SCA, climate change modelling is critical for future planning. Significant efforts have been made by SCA (Climate Change and its Impacts on Sydney's Water Supply, 2009 and Climate Change Impact Assessment, 2010) and by the NSW Office of Water (through the Metropolitan Water Plan 2010 and its iterations) to improve the process through which future scenarios are developed.

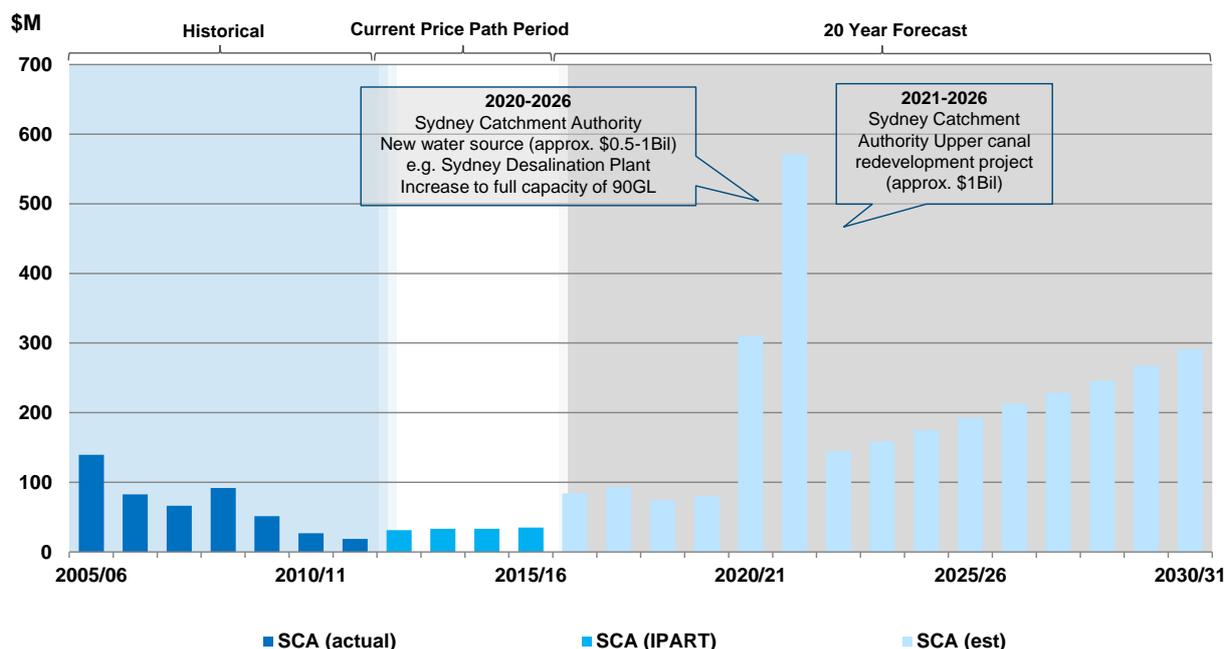
Modelling methods need to be reviewed regularly to ensure continued improvements to climate predictions in order to adequately plan for future water security. The SCA is continuing to develop greater accuracy in yield modelling out to 2030, through the OEH NACLIM project.

In recent years SCA has seen a reduction in water supplied to Sydney Water. The key factors that have contributed to reduced per capita water consumption include:

- Comprehensive and well targeted demand management programs implemented by Sydney Water resulting in customer behavioural change and a large proportion of Sydney households have now been fitted out with water efficient appliances and plumbing fixtures
- Water restrictions imposed during the drought have now been lifted, however water saving rules have been introduced to ensure that a water saving ethos remains
- Increases in water prices
- Two recent wet summers

Figure 2 outlines SCA's historical and forecast capital expenditure profile to 2030/31. Capital investment by Sydney Catchment Authority has been in decline since 2005/06 with the exception of 2008/09. Capital investment is projected to continue its flat growth until 2020/21 when planned works on the Upper Canal will commence and investments will be made in a new water source for Sydney (Refer to reference list for sources).

**Figure 2 – Historical and forecast capital expenditure for SCA (nominal \$)**



**3.2.2 Assessment of future infrastructure investment plans**

The investment appraisal process at SCA is comprehensive and robust but the planning horizons adopted are too short. It is imperative that Sydney Water and the SCA jointly prepare long term strategic plans with Sydney Water contributing water demand projections and the SCA contributing system yield projections.

The review of Metropolitan Water Plan 2010 will ensure that an integrated planning climate is fostered and that future challenges are identified and incorporated into long term planning processes.

**Table 2 – Assessment of Sydney Catchment Authority Program**

Criteria	Description and rationale	Rating
Alignment with government objectives	<ul style="list-style-type: none"> <li>SCA’s investment plans and asset management plans are aligned to key government objectives in current planning documents (eg – Metropolitan Water Plan)</li> <li>The current capital planning process has a 5 to 10 year horizon. SCA does not currently have a comprehensive capital investment plan beyond 10 years. However, SCA acknowledges the need for a 50 year plan which would need to be developed in close consultation with Sydney Water</li> </ul>	
Strength of rationale/ options	<ul style="list-style-type: none"> <li>It is understood that the background analysis behind the Metropolitan Water Plan included a triple bottom line assessment of a large number of supply and demand management options. However this analysis was not available to this study</li> <li>One of the limitations of the Metropolitan Water Plan 2010 was the strong focus on the immediate problem of maintaining supply during the prolonged drought and the commissioning of the desalination plant. Consequently, there is less detailed consideration of planning out to 2030 and beyond. The Plan does</li> </ul>	

Criteria	Description and rationale	Rating
	conclude that the current portfolio of options will provide reasonable security of supply through to 2025.	
Engagement with stakeholders	<ul style="list-style-type: none"> <li>• The main vehicle for consideration of environmental and social impacts of SCA capital works is through formal EIS processes associated with particular infrastructure proposals</li> <li>• SCA has an active consultation program with landholders in its catchments and other interest groups</li> <li>• SCA does not directly engage with Sydney Water's customers other than through broad public education programs</li> <li>• Much of the planning undertaken by SCA is internal and there has been limited engagement with the public on long term infrastructure issues.</li> </ul>	
Risk assessment	<ul style="list-style-type: none"> <li>• SCA actively manages water quality risks (such as algal blooms) through its asset management framework and has taken steps to improve its asset management framework by incorporating life cycle costing and corporate wide risk management</li> <li>• There is more work to be done on managing risks associated with climate change, dam safety and flood mitigation (particularly in the Hawkesbury Nepean Valley)</li> <li>• Work has commenced on modelling impacts of climate change on catchment yield but this work has yet to translate into specific adaptation plans (eg - SCA (2010),Climate Change Impact Assessment)</li> <li>• Since Sydney relies on Warragamba Dam for close to 80% of its water supply Sydney is vulnerable to reductions in catchment yield due to climatic variability and water quality problems such as blue-green algal blooms. SCA has identified the need for further diversification of supply sources to mitigate risk.</li> <li>• Another key area of risk for SCA is dam safety. SCA has actively pursued dam upgrades, most recently the spillway at Warragamba Dam to meet ANCOLD dam safety standards. However potential future revision of these standards to cater for new estimates of Maximum Probable Floods under climate change scenarios could require further capital investment.</li> </ul>	
Value for money	This study did not have access to the detailed business cases for infrastructure proposals beyond the 5 year IPART price path or the economic analysis behind the current Metropolitan Water Plan 2010 so it was not possible to provide an assessment for this criterion	N/A

## 3.3 Sydney Water

### 3.3.1 Current situation

Sydney Water is the largest water utility in Australia. Sydney Water makes its capital investments according to its business strategy, consistent with its Statement of Corporate Intent, Operating Licence compliance requirements and State Government metropolitan plans.

To date Sydney Water's investment programs have delivered a high level of service to its customers as indicated by the performance against the KPIs in its operating licence. As acknowledged in its 2010-11 Annual Report, the IPART 2012-16 price path review and the most recent performance data reported in the National Water Commission, 2010-11 National Performance Report, Sydney Water has achieved 100% compliance against the drinking water guidelines, water pressure of 76% under the reference level and continuity at 35% under the reference level, where the number of burst mains, infrastructure leaks and sewerage mains breaks and chokes were lower compared to historical levels.

Water security has increased significantly over the last decade due to the diversification of the water supplies to include rainfall independent sources such as desalination and recycled water to mitigate climate risk. Sydney's water supply system under current assumptions will not require augmentation until around 2025 when a new source of water will be required. The desalination plant plays a critical role in providing drought insurance because it is a source of water that is climate independent. If the capacity of the desalination plant was doubled from 45 GL per annum to 90GL per annum (as planned for in the original design of inlet and outlet pipes) another source of water would still be required as by 2025 as 90 GL of desalinated water at 2025 would represent a relatively small percentage of total water demand for the Sydney basin.

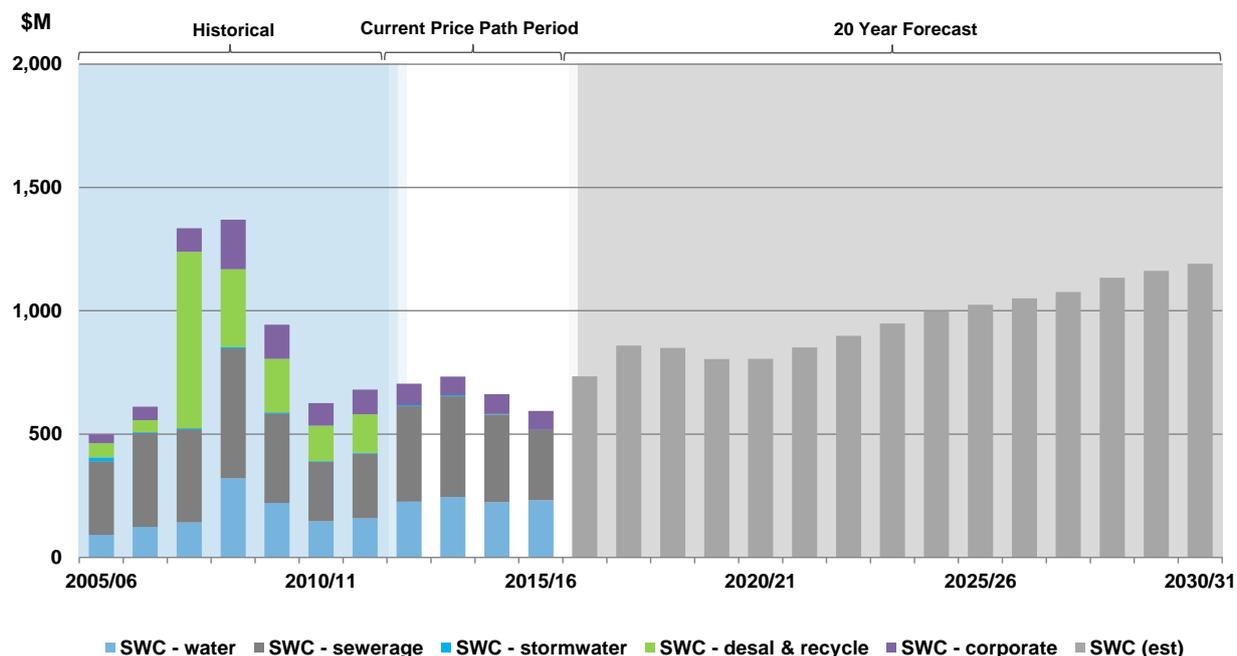
In the current environment of high storage levels and a return to higher rainfall, it appears there is less emphasis on water conservation/demand management, except where this is driven by regulations in new developments i.e. BASIX.

Sydney Water has experienced a reduction in the consumption of water predominantly due to demand management initiatives that have reduced aggregate consumption to levels seen in the 1970's despite an increase in population of one million over this period. Further efficiency gains are likely to be harder to achieve, as the cheap and effective water efficiency measures have largely been adopted in households and commercial properties leaving only expensive options to be pursued. More local sources of water such as storm water are likely to be developed and indirect potable schemes should not be ruled out following community consultation.

Councils are responsible for managing flood risk and preparing flood risk management plans for their local government areas. However, about 497,000 properties or 25% of metropolitan Sydney drainage services are provided by Sydney Water through a system comprising 447 km of stormwater channels (mainly located in the eastern suburbs, south and south west of Sydney, as well as management of flood-prone land and trunk drainage in the Rouse Hill Development Area).

Sydney Water participates in Floodplain Management Committees to ensure that a combined effort is made in stormwater management when resources and decisions made by one entity can impact on another.

**Figure 3 – Historical and forecast capital expenditure for SWC (nominal \$)**



Sydney Water’s capital investments have been relatively stable since 2005/06 excluding lumpy investments attributable to the construction of the Sydney Desalination Plant.

The majority of the ongoing capital investment will be replacement of existing assets (approx. \$320 million pa) and investments in new assets in growth centres (approx. \$113-\$340 million pa).

Other major investments include \$40 million per annum for ongoing reliability upgrades, \$160 million for access replacement program, and \$150 million for Malabar wastewater treatment plant.

### 3.2.2 Assessment of future infrastructure investment plans

The investment appraisal process at Sydney Water is comprehensive and robust but the planning horizons adopted are too short. It is imperative that Sydney Water and the SCA jointly prepare long term strategic plans with Sydney Water contributing water demand projections and the SCA contributing system yield projections.

The review of Metropolitan Water Plan 2010 will ensure that an integrated planning climate is fostered and that future challenges are identified and incorporated into long term planning processes.

Significant growth is expected, particularly the north west and south west growth areas. Sydney Water’s capital investment plan for the next 5 years (to 2016/17) is expected to see, on average, 24% of capital investment on growth works to service urban development.

**Table 3 – Assessment of Sydney Water Program**

Criteria	Description and rationale	Rating
Alignment with government objectives	There appears to be strong alignment with current government plans and objectives for the water sector, particularly through the provisions of the operating licence for Sydney Water.	

Criteria	Description and rationale	Rating
	Current planning processes appear to be focused on the IPART 5 year price path and there is a need for Sydney Water to adopt longer planning frameworks given that many water assets have long lives	
Strength of rationale/ options	The 2010 Metropolitan Water Plan covers a wide range of options on both the demand and supply side and the Metropolitan Water Directorate will undertake a through and robust process to ensure all options on both the demand and supply sides are evaluated.	
Engagement with stakeholders	Sydney Water has wide ranging processes in place to ensure that there are robust programs in place to minimise environmental and social issues. All major capital works programs have a communication and stakeholder strategy prepared which provides the opportunity for stakeholders to be engaged. . Sydney Water is a leader on sustainability and environmental protection and water utilities from across Australia often adopt programs first pioneered by Sydney Water. Sydney Water has won many awards both nationally and internationally for their demand management and sustainability programs  Sydney Water undertakes regular surveys of their customers and stakeholders so they understand and respond to customer concerns	
Risk assessment	Management of risks is a key component of operating a water utility and Sydney Water is very good in managing risks. Sydney Water has senior staff dedicated to managing the risks confronting the organisation. A robust process for updating the risk matrix to identify new risks and measures to mitigate risks is reported to the Sydney Water Board on a regular basis.	
Value for money	This study did not have access to the detailed business cases for infrastructure proposals beyond the 5 year IPART price path or the economic analysis behind the current Metropolitan Water Plan 2010 so it was not possible to provide an assessment for this criterion	N/A

## 3.4 Hunter Water

### 3.4.1 Current situation

As indicated by the performance against the KPIs in its Operating Licence as acknowledged in its 2010-11 Annual Report and the most recent performance data reported in the 2010-11 National Performance Report Hunter Water has achieved 100% compliance against the drinking water guidelines. However the average frequency of unplanned interruption to water services remained high. Overall Hunter Water customers receive a high level of service based on national benchmarks.

Water supply in the Hunter region has been very reliable over the last two decades despite most of eastern Australia experiencing drought conditions. The catchment, historically, has experienced reliable rainfall which has meant the Hunter Water has not had to impose water restrictions in recent times.

Water storage capacity however does not appear to be adequate to cater for population growth and the risk that the region could enter drought conditions.

The recent commissioning of the pipeline connecting the Hunter Region with the Central Coast increases security of supply and resilience for both communities. It will be important to formalise capacity sharing and water trading rules to provide greater planning certainty for both water providers.

Hunter Water has shared responsibilities for drainage and flood protection with local government and the Hunter region is flood prone.

Figure 4 shows historical and forecast capital expenditure for Hunter Water.

Capital investments for the recent period seem to be declining since it peaked in 2010/11.

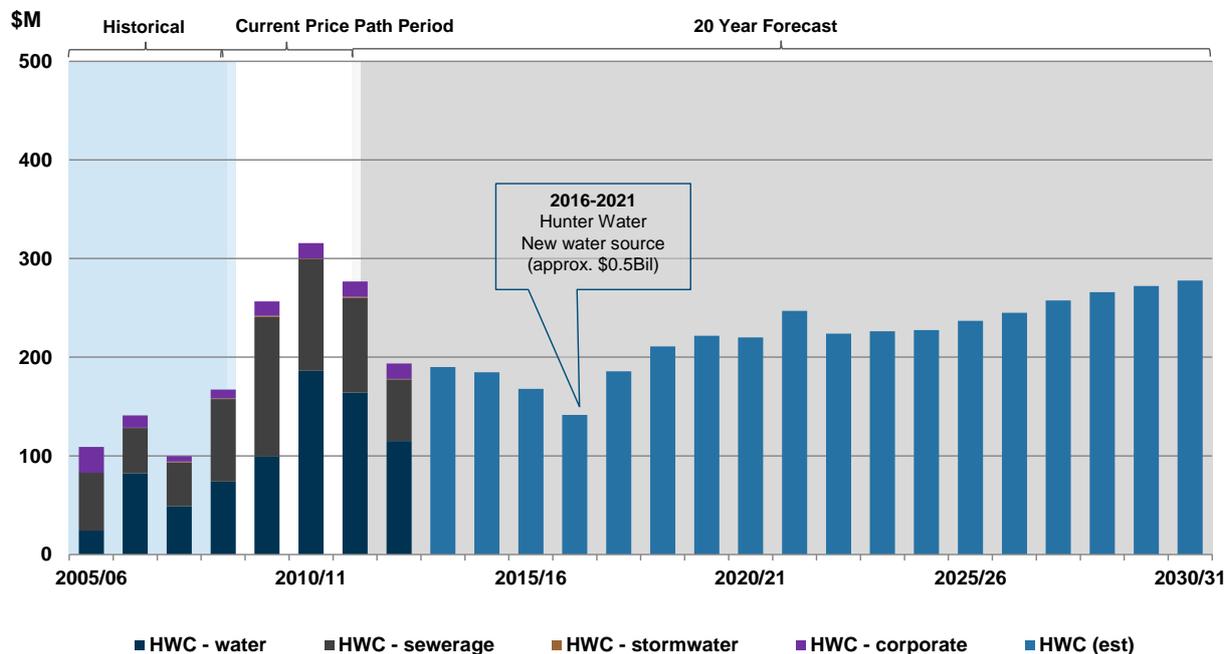
With the exception of 2005/06 and 2009/10, water services comprises the highest proportion of Hunter Water’s overall capital investments, followed by investments in wastewater treatment and wastewater transport.

Following the NSW Premier’s announcement of the cancellation of the Tillegra Dam proposal, water security is a top priority for Hunter Water with the construction of a new water source to be started as early as 2016.

The key driver for the next five years is maintain the regulatory / statutory standards, while for the five years starting 2017/18 will be growth – with approximately \$142 million to be used for Grahamstown water treatment plant upgrades.

Two thirds of the funding required for the next ten years will be from borrowing with a third coming from other sources (Refer to reference list for sources).

**Figure 4 – Historical and forecast capital expenditure for Hunter Water (nominal \$)**



### 3.4.2 Assessment of future infrastructure investment plans

As part of its capital investment planning process, Hunter Water maintains a 20-year investment plan which is a record of forecast expenditure against proposed schemes and the details of relevant investment drivers

for each scheme. However, Atkins-Cardno (2009) found disconnects between the Strategic Business Plan and the 20-year investment plan.<sup>1</sup>

Approximately 53% of its current 10-year capital investment program is for new assets while the remainder 47% is planned asset renewals

While Hunter Water follows a Capital Works Gateway Approval Process for its capital planning and procurement, its process for prioritising capital investments is unclear.

**Table 4 – Assessment of Hunter Water Program**

Criteria	Description and rationale	Rating
Alignment with government objectives	Hunter Water generally appears to be complying with relevant state and federal objectives. The Metropolitan Water Directorate will be overseeing the development of the Lower Hunter Water Resources Strategy.	
Strength of rationale/ options	<ul style="list-style-type: none"> <li>Hunter Water when undertaking the Interim Drought Response Plan has considered an extensive range of options on both the demand and supply sides</li> <li>Work is underway through Lower Hunter Water Resources Plan to consider the case for the next augmentation.</li> <li>The Metropolitan Water Directorate will be making sure that all supply and demand options are evaluated in a thorough manner during the development of the Lower Hunter Water Resources Plan.</li> </ul>	
Engagement with stakeholders	<ul style="list-style-type: none"> <li>Hunter Water is aware of its environmental and social obligations and implements processes to ensure the community has input and that the environment is protected. Hunter Water actively engages with its commercial and industrial customers to assist them in implementing water conservation measures</li> <li>Hunter Water has ongoing community consultation programs to ensure the community can be involved in major and minor projects</li> </ul>	
Risk assessment	<ul style="list-style-type: none"> <li>The management of risk is an essential element of running a water utility and Hunter Water have programs to minimise business risks</li> <li></li> </ul>	N/A
Value for money	This study did not have access to the detailed business cases for infrastructure proposals beyond the 5 year IPART price path or the economic analysis behind the current Metropolitan Water Plan 2010 so it was not possible to provide an assessment for this criterion	N/A

<sup>1</sup> Atkins-Cardno (2009) *Review of Capital and Operating Expenditure of Hunter Water Corporation (2009 Determination)* – Final Report.

## 3.5 Country Town Water Supply and Sewerage Program

### 3.5.1 Current situation

Following transfer of the responsibilities for water supply and sewerage to Local Government, the State Government has been funding the Country Town Water Supply and Sewerage Program to address a backlog of infrastructure required to bring these systems in line with minimum standards. However, Office of Water estimates show that nearly \$1bn is needed to bring all systems to minimum standards.

The program aims to 'provide appropriate, affordable, cost effective water and sewage services in urban non metropolitan areas to provide for community needs, protect community health, ensure sustainable outcomes and use regional resources in the best possible way'

NSW 2120, released in 2011 by the NSW State Government pledged its continued support for the program to ensure NSW water sector continues to meet reliability standards for water supply and quality

The program provides funding for capital backlog works under the Country Towns Water Supply and Sewerage Program, administered by the NSW Office of Water

Backlog projects are defined as those that that are required to provide water and wastewater services adequate to meet the demand or standards stipulated in 1996.

Since the CTWS&S Program commenced, 464 projects have been completed with \$935 million of program funds spent.

Across all NMUs in the State the water and sewerage infrastructure replacement cost is \$21 billion.

The total capital cost for water supply systems, excluding renewals over the next 30 years is estimated to be \$3.4 billion and \$2.7 billion for wastewater systems.

**Figure 5 – Capital expenditure projections for Water Supply and Sewerage Plan for next 30 years (\$M)**

Works Program	Water Supply	Sewerage	Total
Backlog works (LOS improvement)	729	747	1,476
New Works for Growth	2,660	1,935	4,595
<b>Total New Capex</b>	<b>3,389</b>	<b>2,682</b>	<b>6,071</b>
Renewals	2,441	2,220	4,661
<b>Total Capex</b>	<b>5,830</b>	<b>4,902</b>	<b>10,732</b>

A total of 122 eligible backlog projects for which submissions have been received under the CTWS&S program are currently unfunded worth \$300 million

Current program budget is \$1.209 billion - due conclude in 2016/17

### 3.5.2 Assessment of future infrastructure investment plans

The Local Water Utilities (LWUs) do not have operating licences like metropolitan based water providers. However the NOW has established Best-Practice Management of Water Supply and Sewerage Guidelines to provide a governance framework to assist Councils achieve acceptable levels of performance in line with the requirements identified in the National Water Initiative and the NSW policy in regards to the application of the National Competition Policy to Local government. (NOW (2011) NSW Performance Monitoring Report)

Under this framework LWUs are required to prepare a range of plans including an Integrated Water Cycle Management Strategy and a Strategic Business Plan incorporating a 30 year asset management plan.

The Program aligns with the NSW Government NSW 2021 target of ‘meeting reliability standards for water continuity and quality’.

The requirements and activities under each component of the program, when brought together aim to help local water utilities meet reliability performance standards for water and sewerage service provision and to offset the disadvantages of small scale of many LWUs.

‘NSW 2021’, the NSW Government’s state plan, identifies continuing commitment to deliver the Country Towns Water Supply and Sewerage Program as a priority action.

**Table 5 – Assessment of Country Town Water Supply and Sewerage Program**

Criteria	Description and rationale	Rating*
Alignment with government objectives	<ul style="list-style-type: none"> <li>The CTWS&amp;S Program and the performance reporting guidelines administered by NOW is consistent with State and National policies for the water sector.</li> <li>Around 90% of LWUs have prepared Strategic Business Plans covering 30 year cost effective capital works program which discloses each of the growth, improved standards and renewals component, together with an operation and maintenance plan.</li> <li>It is beyond the scope of this study to assess the quality of individual investment plans.</li> </ul>	
Strength of rationale/ options	<ul style="list-style-type: none"> <li>The NOW uses a robust set of eligibility criteria to screen projects for funding consideration under the CTWS&amp;S program and applies a comprehensive set of investment criteria in determining priorities for funding under the program.</li> <li>The planning framework established by NOW for LWUs is based on best practice principles of business and strategic investment planning. The extent to which individual councils prepare robust plans was out of scope for this study</li> <li>Overall compliance with the guidelines is good, 86% for water supply and 85% for sewerage. (Source: NOW (2011) NSW Performance Monitoring Report)</li> </ul>	
Engagement with stakeholders	<ul style="list-style-type: none"> <li>NOW consults extensively with Councils in relation to the requirements of the CTWS&amp;S Program and performance reporting guidelines.</li> <li>The LWUs are required to prepare Water Conservation and Demand Management Plans and Drought Management Plans which include consideration of social and environmental impacts of plans.</li> <li>The criteria for prioritising eligible projects for funding under the CTWS&amp;S program include environmental and public health considerations.</li> <li>The LWUs are required to prepare Customer Service Plans and Levels of Service statements. It is beyond the scope of this study to assess the adequacy of stakeholder engagement by individual LWUs.</li> </ul>	

Criteria	Description and rationale	Rating*
Risk assessment	<ul style="list-style-type: none"> <li>The SBPs prepared to date do not generally consider the potential impacts of climate change on future capital works requirements.</li> <li>Work has commenced by NOW to assess the risks of climate change to catchment yield and is currently preparing new guidelines to assist LWUs to develop adaptation plans as part of the next cycle of IWCM strategies.</li> <li>Most LWAs have developed a drought management plan with appropriate trigger points to ensure timely intervention/implementation</li> </ul>	
Value for money	<ul style="list-style-type: none"> <li>The CTWS&amp;S Program has assisted in driving improvements in performance of the NMU sector. While there does not appear to have been a comprehensive review of the economic benefits of the program, the process for allocating funding to projects appears robust</li> <li>LWUs are required to prepare a sound 20/30 year financial plan and IWCM Strategies require a triple bottom line assessment of alternative scenarios</li> <li>The majority of LWAs have completed a Strategic Business Plan (SBP) including a 30 year asset management plan. These plans are required to set out a cost effective capital works program which discloses each of the growth, improved standards and renewals components, together with an operation and maintenance plan.</li> <li>The extent to which these processes are implemented by individual councils is not within the scope of this study</li> </ul>	N/A

- \*Note: The ranking applies to the planning and decision framework for the administration of the CTWS&S program. It was beyond the scope of this review to assess the investment plans of individual Councils.



# References

## Stakeholders consulted

Stakeholder	Representatives	Date
Independent Pricing and Regulatory Tribunal (IPART)	James Cox – CEO Amanda Chadwick – Director Water and Licensing	11 May 2012
Office of Water	Colin McLean – Executive Director Urban Water Sam Samra – Senior Manager Water Utility Performance	11 May 2012
Metropolitan Water Directorate	Alison White	14 May 2012
Sydney Water Corporation	Kaia Hodge – A/GM Liveable City Solutions Nefley Hetherington – A/Mgr Strategic Planning – Business Strategy & Regulation	17 May 2012
Sydney Catchment Authority	Ian Tanner – A/ CEO	17 May 2012
Hunter Water Corporation	Kim Wood – Managing Director Chris Turnbull – Chief Operating Officer	17 May 2012

## Reference list

- AECOM (2010) *Review of Regional Water Quality and Security* (Volume 1).
- Central Coast, Gosford City Council & Wyong Shire Council (2007) *Water Plan 2050: A long-term water supply strategy for the Central Coast*.
- Central NSW Councils (2010) *Centroc Water Security Study Summary Brochure*.
- Department of Infrastructure, Planning and Natural Resources (2005) *Floodplain Development Manual: the management of flood liable land*.
- Department of Water & Energy (2008) *Report of the Independent Inquiry into Secure and Sustainable Urban Water Supply and Sewerage Services for Non-Metropolitan NSW*.
- Department of Water & Energy (2008) *Future Climate and Runoff Projections (~2030) for New South Wales & Australian Capital Territory*.
- Environment, Climate Change & Water (2010) *NSW Climate Impact Profile: The impacts of climate change on the biophysical environment of NSW*.
- Gosford/Wyong Councils' Water Authority (2007) *Water Plan 2050: Options Report for the Long Term Water Supply Strategy*.
- Halcrow (2012) *Review of Operating and Capital Expenditure of the Sydney Catchment Authority – Review Report*.
- Hunter Water Corporation (2008) *H<sub>2</sub>50 Plan Securing Our Water Future: A long-term strategy to meet water supply needs for the Lower Hunter*.
- Hunter Water Corporation (2011) *Statement of Corporate Intent 2011/12*.
- Hunter Water Corporation (2011) *Annual Report 2011*.
- Independent Pricing and Regulatory Tribunal (IPART) (2008) *Review of prices for Sydney Water Corporation's water, sewerage, drainage and other services for 2008-12 – Final Report*.
- IPART (2009) *Review of prices for Sydney Catchment Authority for 1 July 2009 to 30 June 2012 – Final Report*.
- IPART (2009) *Review of prices for water, sewerage, stormwater and other services for Hunter Water Corporation – Final Report*.
- IPART (2010) *Review of the Productivity Performance of State Owned Corporations – Other Industries – Final Report*.
- IPART (2011) *Water Industry Competition Act 2006 – section 20(1) Licence Register*.
- IPART (2012) *Review of prices for Sydney Catchment Authority for 1 July 2012 to 30 June 2016 – Final Report*.
- IPART (2012) *Review of prices for Sydney Water Corporation's water, sewerage, drainage and other services for 2012-16 – Draft Report*.

LECG Limited Asia Pacific (2011) 'Competition in the Australian Urban Water Sector', *Waterlines Report Series No 42*, April 2011.

Living Victoria Ministerial Advisory Council (2012) *Living Melbourne, Living Victoria – Implementation Plan*.

Natural Resources Commission (2007) *Climate Change Impacts on Future Water Resource Availability*, Presentation Slide.

NSW Government (2010) *Metropolitan Plan for Sydney 2036*.

NSW Government (2011) *NSW 2021: A plan to make NSW number one*.

NSW Treasury (2008) *State Infrastructure Strategy 2008-09 to 2017-18 NSW*.

NWC (2012) *National Performance Report 2010-11: Urban water utilities*.

NWC (2012) *National Performance Report 2010-11: Rural water service providers*.

NWC (2012) *Water Policy and Climate Change in Australia*.

Office of Water (2011) 'NSW Utilities lead the way in sound water and sewerage planning', Media Release 8 August 2011.

Office of Water (2010) *2010 Metropolitan Water Plan – Water for people and water for the environment*.

Office of Water (2010) *Climate Change and its Impacts on Water Supply and Demand in Sydney – Summary Report*.

Office of Water (2011) *NSW Water Supply and Sewerage – Performance monitoring report 2009-10*.

Office of Water (2011) *NSW Water and Sewerage Strategic Business Planning Guidelines*.

Office of Water (2011) 'Letter to Infrastructure Australia in Response to the AECOM' *Review of Regional Water Quality and Security*.

Office of Water (2011) *2009-10 NSW Water supply and sewerage – NSW Benchmarking report*.

Office of Water (2012) *2010-11 NSW Water supply and sewerage – NSW Benchmarking report*.

Office of Water (2012) *NSW Water Supply and Sewerage – Performance monitoring report 2010-11*.

Productivity Commission (2011) *Australia's Urban Water Sector*.

Samra, S & Cloke, P (2010) *NSW Response for Addressing the Impact of Climate Change on the Water Supply Security of Country Towns*.

Sydney Catchment Authority (2009) *Climate Change and its Impacts on Water Supply and Demand in Sydney – Technical Report*.

Sydney Catchment Authority (2010) *Corporate Sustainability Strategy 2010 – 2015*.

Sydney Catchment Authority (2010) *Climate Change Impact Assessment*.

Sydney Catchment Authority (2011) *Annual Report 2011*.

Sydney Water Corporation (2009) *Collaborative Climate Change Study – Demand side impacts – Final Report*.

Sydney Water Corporation (2010) *Sydney Water's Growth Servicing Plan July 2010 to June 2015*.

Sydney Water Corporation (2011) *Statement of Corporate Intent: 2011-12 to 2015-16*.

Sydney Water Corporation (2011) *Annual Report 2011*.

Water Factory Company (2012) *Private Water Sector Cost Benefit Models*.

Water Factory Company (2012) *Response to IPART's Draft Determination and Report for Sydney Water's Prices*.

Water Factory Company (2011) *Response to the Productivity Commission Draft Report Australia's Urban Water Sector*.

WS Atkins International Ltd & Cardno (2011) *Detailed Review of Sydney Water Corporation's Operating and Capital Expenditure – Final Report*.

WS Atkins International Ltd & Cardno (2011) *Review of Capital and Operating Expenditure of Hunter Water Corporation (2009 Determination) – Final Report*.

**Figure 1 – Historical and forecast capital expenditure for the metropolitan water sector (nominal \$)**

ABS (2012) *Consumer Price Index*, Cat. No. 6401.0.

GHD Analysis and stakeholder consultation

IPART (2008) *Review of prices for Sydney Water Corporation's water, sewerage, drainage and other services for 2008-12*, Final Report.

IPART (2009) *Review of prices for water, sewerage, stormwater and other services for Hunter Water Corporation*, Final Report.

IPART (2009) *Review of prices for Sydney Catchment Authority for 1 July 2009 to 30 June 2012*, Final Report.

IPART (2011) *Review of water prices for Sydney Desalination Plant Pty Limited*, Final Report.

IPART (2012) Review of prices for Sydney Water Corporation's water, sewerage, drainage and other services, 2012-16, Draft Report.

IPART (2012) Review of prices for Sydney Catchment Authority for 1 July 2012 to 30 June 2016, Draft Report.

**Figure 2 – Sydney Catchment Authority capital expenditure profile**

ABS (2012) *Consumer Price Index*, Cat. No. 6401.0.

GHD Analysis and stakeholder consultation

IPART (2009) Review of prices for Sydney Catchment Authority for 1 July 2009 to 30 June 2012, Final Report.

IPART (2012) Review of prices for Sydney Catchment Authority for 1 July 2012 to 30 June 2016, Draft Report.

**Figure 3 – Sydney Water capital expenditure profile**

ABS (2012) *Consumer Price Index*, Cat. No. 6401.0.

GHD Analysis and stakeholder consultation

IPART (2008) Review of prices for Sydney Water Corporation's water, sewerage, drainage and other services for 2008-12, Final Report.

IPART (2011) Review of water prices for Sydney Desalination Plant Pty Limited, Final Report.

IPART (2012) Review of prices for Sydney Water Corporation's water, sewerage, drainage and other services, 2012-16, Draft Report.

**Figure 4 – Hunter Water capital expenditure profile**

ABS (2012) *Consumer Price Index*, Cat. No. 6401.0.

GHD Analysis and stakeholder consultation

IPART (2009) Review of prices for water, sewerage, stormwater and other services for Hunter Water Corporation, Final Report.

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OfficeAddressLine2

T: OfficeTelephone F: OfficeFax E: OfficeEmail

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