**Draft Greater Sydney Water Strategy**

**Submission from Kingspan and Urban Water Cycle Solutions**

**November 2021**

Thank you for the opportunity to make a submission. DPIE are congratulated on preparing a strategy on these important issues at a time when Sydney is not in a water security crisis and we do have some time to carefully consider the options.

There are more than 500,00 rainwater tanks in Sydney and these structures are a critical and cost effective feature of water, stormwater and green infrastructure management for Greater Sydney. Rainwater harvesting is an element of an integrated water management approach that also integrates land use planning and development with water efficiency through the BASIX program.

DPIE are correct in assessing that Sydney is facing water security challenges. These challenges are widespread across the water industry with Infrastructure Australia 2019 noting that the combination of declining water storages and increasing population means that water infrastructure is considered the most at risk of all infrastructure in Australia. Coombes calculates a 30-80% decline in runoff[1]. The urgency is probably greater than that stated in the draft strategy.

The strategy is commended for the discussion around many important ideas including water efficiency, integrated water management, sustainability and resilience, greening Sydney, healthy waterways and reflecting community and Aboriginal interests.

**Business as usual and the economic drivers behind it**

Despite that rhetoric, DPIE has recommended what the water industry has always recommended which is to build more centralised supply infrastructure. The first weir was built in 1869 to pipe water into the city and this principle has been reinvented for 150 years, first as more dams, then as desalination plants and more recently as purified recycled water. The water industry has not recommended a significantly different investment strategy in our lifetime.

Unfortunately, we do not seem to be better off. The water industry continues to experience significant loss of productivity and this strategy highlights that 150 years later we continue to face a water security crisis. We need to consider the very real possibility that we have been following an ineffective investment strategy driven by the financial interests of the water corporations rather than efficient service delivery or water security with respect to the entire urban water market.

The relationship between the size of the regulatory asset base, operational costs and the income of water corporations is transparent through the IPART reports but what seems to be less well understood is that water corporations are required to be successful businesses and the only way they can increase their income is by building more infrastructure. Quite simply the more infrastructure water corporations build and the more it costs to operate that infrastructure the more income water corporations receive. We need to consider that our investment choices have been influenced by the financial wellbeing of our Water Corporations putting the economic efficiency and

[1] Coombes, P., & Barry, M. (2008). The relative efficiency of water supply catchments and rainwater tanks in cities subject to variable climate and the potential for climate change. *Australian Journal of Water Resources*, Vol 12 85-100

water security of Sydney at risk, significantly this almost exactly reflects the finding of the Auditor General on Water Conservation in Sydney.

**Costs and assessment models**

There is also a need to count all costs – and to use the correct cost comparator in strategies. For example, assuming that the 128 ML/day (BOM, 2020) leakage only has a cost/value of $0.07/kL when it is one of the key drivers of high cost augmentation strategies. Comparison to cost of desalination is also inadequate as most of the costs to develop, produce and transfer this water are not currently counted.

But suppose we did count this full produce and supply cost, for use as a comparator, then we will have better/more balanced assessment of water efficiency and leakage reduction strategies. Some the regulatory asset base (if the utility is all about constructing assets) is just part of a sequence of issues. The spatial and temporal costs of water supply in any utility region experience strong variation – with the highest costs distant from water supply and sewage treatment – and where new or infill development is occurring! – the current average assessment is also misleading for the development of effective water strategy. So there is also a need to adequately characterise the urban water market of water sources and savings (utility supply is a market segment) and analyse this joined up system.

Finally the DPIE strategy does not appear to meet the NSW Treasury guidelines for development of a major project with associated cost benefit analysis – it is silent on the comparison of scenarios and options across the entire urban water market, does not provide the details of trade-offs across society, ecosystems and economics, at different scales and does not provide evidence of Pareto Optimum (Society is better off, no one is worse off) decision making – noting that Treasury accept the easier Kaldor Hicks definition of Pareto Optimum which is “society is better off, and the winners can afford to compensate the losers”. Importantly these decision trade-offs must be transparent in the development of government strategy.

**Water Efficiency and Demand Management**

DPIE are commended on their assessment of water efficiency as an efficient, low cost form of water management. This analysis is strongly supported and should be implemented as a major pillar of the strategy. We note that in addition to the discussion about BASIX below and the undoubted success of BASIX water efficiency and demand management go well beyond BASIX and Sydney has a long and strong history of efficient water choices that precede BASIX.

**Informed Choices and costs**

It is poor practice that the draft strategy has not provided indicative costs for the supply infrastructure proposed, a cost based comparison with other options and the expected trade-offs on society, ecosystems and economic outcomes at different scales. The general public will be paying for recommended infrastructure for nearly 100 years and they deserve to know what they will be paying in a detailed price path and how those costs compare to other options.

The costs are remarkable. We estimate that the combined investment required including necessary changes to the existing network, based on the existing desalination augmentation, a new desalination plant and a 385ML/day purified recycled water plant at Prospect Reservoir would be more than $9 billion. If the demand estimates are understated, and they appear to be, this would increase to $14 billion with an additional $5billion desalination plant that could top up Prospect Reservoir. The $9 billion increase in the regulatory asset base, just based on return on capital, will

increase water corporation annual income and therefore customer bills by $300 million annually at a 3.4% WACC and annual operating costs would be even larger.

**Integrated Water Management and Strategic Thinking**

Despite the rhetoric on integrated water management the strategy has not included a discussion on some of the most important water management issues in Sydney. This lack of wider strategic awareness and joined up analysis emphasises the water corporation centric focus applied by DPIE.

Firstly, Sydney operates an extremely effective water and energy efficiency program through the BASIX State Environmental Planning Policy. In light of the discussion about the Regulatory Asset Base above the biggest problem with BASIX is that it has been too successful in reducing demand and the need for more infrastructure and represents a major threat to the future income of Water Corporations. The current estimated water savings from BASIX are 79GL annually, 49GL from water efficient appliances and 30GL from rainwater harvesting. The draft strategy goal of 49GL for water efficiency by 2040 was therefore already achieved a decade ago. The statement that BASIX has not been as effective as it should be is contested.

This highlights the need for DPIE's water strategy to include the must needed changes in regulation regimes and policy to meet future challenges of climate change, population growth, ecosystem decline and economic shocks. For example, price regulation should have regard to the entire urban water market and the biosphere – this may include abolishing fixed charges and sunk cost assumptions from last century.

Secondly there is long record of warnings about an impending urban stormwater crisis including the Australian Senate Enquiry in 2015[2], the Improving Stormwater Management Advisory Committee in Victoria in 2018[3], the Neighbourhood Discussion Paper in South Australia in 2019[4] and the sobering AIG insurance risk report in 2020[5]. It is extraordinary that DPIE have not discussed the urgent issue of managing stormwater impacts on the built and natural environment as a major pillar of this document.

It is possible based on the South Australian government inquiry that most of the stormwater infrastructure in Sydney will not meet future demand and 30% will need to be replaced by 2030. The cost of this infrastructure will dwarf the cost of water security infrastructure, in existing urban areas the costs of upgrading stormwater infrastructure are so high they may not be feasible and alternative solutions will be needed.[6] It is also surprising that the draft strategy does not discuss the Australian Rainfall and Runoff Guide 2019[7] which is the new Australian standard for stormwater management from Engineers Australia and significantly changes business as usual for stormwater

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[2] Senate, A. (2015). *Stormwater Management in Australia.* Environment and Communications References Committee of the Australian Senate, Commonwealth Government of Australia

[3] State of Victoria. (2018). *Improving Stormwater Management Advisory Committee Final Report.* East Melbourne: Department of Environment, Land, Water and Planning

[4] State Planning Commission. (2019). *People and Neighbourhoods Policy and Discussion Paper.* Adelaide: Government of South Australia

[5] Bruyère, C., Buckley, B., Prein, A., Holland, G., Leplastrier, M.,. (2020). Severe weather in a changing climate, 2nd Ed. Insurance Australia Group. doi:10.5065/b64x-e72

[6] Coombes P. J., (2018), Systems Analysis quantifies urban stormwater resources and market mechanisms for pricing stormwater and environmental management, Stormwater 2018, Stormwater Australia, Sydney, Australia

[7] Coombes, P. J., Roso, S., & Editors. (2018). Book 9: Runoff in Urban Areas, Australian Rainfall and Runoff, . Commonwealth of Australia (Geosciences Australia), Australia.

management. This is particularly important given that stormwater discharges drive the responses of Sydney's wastewater network.

Thirdly while the strategy touches on the health of waterways it does not address the likelihood that urban development in western Sydney will permanently destroy the ecology of those waterways if directly connected impervious area in the catchment is greater than 3%[8]. DPIE is to be congratulated on some really interesting typologies for water sensitive urban design in western Sydney but there is a threshold for runoff and if 'better' stormwater management exceeds that threshold waterway ecologies will still be permanently destroyed.

**Limits to Growth**

There is a deeper philosophical and ecological issue DPIE could be considering. Long term, sustainable cities exist in equilibrium with their surroundings. The resource needs of greater Sydney should be largely met by the resources within the urban catchment. Because Sydney is a national capital the natural catchment for Sydney is quite large but it is still finite.

A high growth policy for Sydney is not a fact, it is a policy choice. A water security crisis is a warning signal that Sydney is out of equilibrium with its natural environment. We are facing many similar signals. Pursuing expensive and energy intensive supply solutions to increase supply sounds like good risk management but there is evidence that indicates centralised infrastructure and a high growth scenario is actually a high risk solution.

Systems thinking, established by Forrester and Meadows in the early 1970s has been grappling with these issues for decades[9]. Their finding is a high growth scenario is very dangerous for our civilisation, we should be pursuing a low growth scenario as we hurtle towards our natural limits to growth. In greater Sydney increasing our reliance on high technology water supply solutions increases our dependence on the electricity network, IT security and increases our vulnerability to natural disasters, economic and environmental shocks, military and social disruption. Greater reliance on natural systems, particularly decentralised infrastructure, reduces our dependence on fragile artificial networks and reduces our vulnerability to supply shocks.

The tail may be wagging the dog here. Perhaps we shouldn't double our water infrastructure to meet population growth projections, perhaps we should temper our population growth in balance with our changing natural environment, including water, food, waste production, loss of natural habitat and a host of other concerning indicators. Perhaps if we are facing a crisis we shouldn't run towards it at top speed, but approach it cautiously and give ourselves time to adapt and change to reduce the damage.

**Greater Sydney Alternative Water Plan**

A summary of the plan is provided below.

Greater Sydney is the premier Australian city and it faces profound urban water challenges. Sydney must manage its infrastructure efficiently and sustainably to compete internationally as a Global city. Sydney has a strongly performing water services sector but has a traditional approach to water service management. Significant challenges include long transfer distances for water and sewage

[8] Walsh, C., Leonard, A., Ladson, A., & Fletcher, T. (2004). *Urban stormwater and the ecology of streams.* Canberra: CRC for Freshwater Ecology, CRC for Catchment Hydrology

[9] Meadows, D; Meadows D; Randers, J; Behrens III, W. (1972). *The Limits to Growth; A Report for the Club of Rome's Project on the Predicament of Mankind.* New York: Universe Books

services, inadequate sewage treatment, severe urban heat island problems in the rapidly growing west and inadequate urban stormwater infrastructure management. These problems appear to be intractable using traditional water analysis approaches however a Systems Framework investigation can identify efficient solutions.

The Systems Framework methodology was recognised in 2018 by Engineers Australia as leading water resource research.[10]

The Systems Framework is used to model and then compare four Options. The Business as Usual (BAU) Option considers current water cycle (water, sewage, stormwater and environment) management practices and BASIX policies across the Greater Sydney region. The second Option (NoBasix) examines the impacts of removing the BASIX policy in 2010 to document the benefits of the state planning policy. A third Option is a new BASIX (NewBasix) that includes stormwater volume targets and improved online tools designed to address key Greater Sydney challenges. The final Option (BSX_Price) applies a single usage tariff for water and sewage services, and a single impervious area tariff for stormwater management. This option abandons fixed tariffs to provide greater incentives to utilities and citizens for efficient water use and stormwater management.

The key insight is that a combination of supply and demand management is more efficient than relying entirely on supply solutions when considering whole of society benefits. These demand management solutions include behaviour change, water efficient appliances and rainwater harvesting. An example of these benefits is the 5 year deferral of the multi-billion dollar desalination augmentation provided by the BASIX policy. The inclusion of rainwater harvesting as a stormwater management solution has both infrastructure and demand management benefits and is an efficient decentralised infrastructure asset that improves the performance of the whole system.

This report finds that Greater Sydney, despite significant challenges, currently has the most efficient and sustainable water services in Australia.[11] This has been achieved through the strategic alignment of water demand management, rainwater harvesting and urban development. The BASIX state environmental planning policy has built-in demand management and stormwater management in most new buildings in the Greater Sydney region since 2004 and this 'bottom up' approach has a major legacy impact on the efficiency of water services. BASIX policies will save the Greater Sydney region about 100 billion litres of water annually by 2050.

This investigation has identified water and sewage transfer distances of over 50 km across Greater Sydney. Transporting a heavy liquid over these distances and significant changes in ground elevations represents high capital and operational costs and potential economic inefficiencies. In some parts of Greater Sydney, the shadow cost (medium run marginal cost) of delivering water and sewage services is greater than $16/kL, which is nearly 800% more than the household usage tariff, as shown in Figure 1.

[10] Barry M.E., and Coombes P.J., (2018), Planning resilient water resources and communities: the need for a bottom-up systems approach, Australasian Journal of Water Resources, 22(2), 113-136 - Awarded the GN Alexander Prize for Hydrology and Water Resources 2018

[11] Coombes, P.J., Barry, M., & Smit, M. (2018). Systems Analysis And Big Data Reveals Benefit Of New Economy Solutions At Multiple Scales. WSUD 2018 & Hydropolis conference, Engineers Australia, Perth.

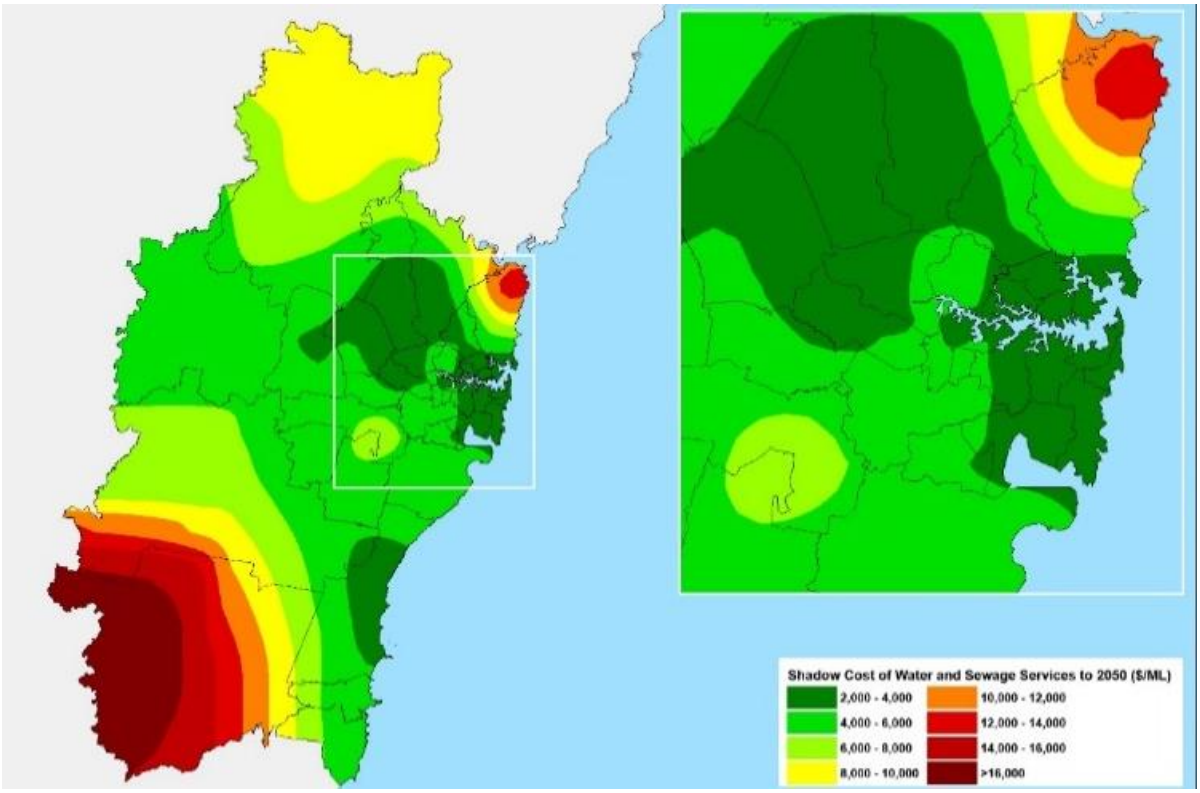


Figure 1 Medium run spatial costs of utility water and sewage services map

Stormwater management is emerging as one of the most significant urban infrastructure challenges[12]. The stormwater infrastructure established often more than 50 years ago is inadequate for modern challenges.[13][14] However, it is prohibitively expensive to retrofit traditional infrastructure into existing urban areas. Greater Sydney is experiencing a higher than expected level of urban infill development which increases impermeable surface areas and generates greater urban stormwater runoff. Climate Change predictions from the IPCC are for more intense rainfall events from summer storms that significantly increases the flooding risk.[15] Importantly the improved BASIX program to 2050 provides $4.3B NPV through at source controls improving stormwater service costs, nutrients and flood risk compared to not having BASIX at all. If you include legacy benefits this increases to $6.6B

The options for future water cycle management examined in this study shows reveals that an improved form of BASIX with stormwater and green infrastructure will further reduce water and sewage utility costs by over $1B and provide nett benefits of over $1.6B to 2050. The difference between no BASIX policy and improved BASIX policy from 2010 to 2050 is a net present benefit of $7 billion. Improved water and sewage charges to deliver accurate price signals would have even greater benefits.

[12] Australian Senate (2015), Stormwater Management in Australia. Environment and Communications References Committee of the Australian Senate, Commonwealth Government of Australia

[13] Coombes P. J., (2018), Status of transforming stormwater drainage to a systems approach to urban water cycle management – moving beyond green pilots, Australasian Journal of Water Resources, 22:1, 15-28.

[14] State of Victoria. (2018). Improving Stormwater Management Advisory Committee Final Report. East Melbourne: Department of Environment, Land, Water and Planning.

[15] Coombes P. J., Roso S., (2018), Editors, Book 9: Runoff in Urban Areas, Australian Rainfall and Runoff, Commonwealth of Australia (Geosciences Australia), Australia

**Discussion: Capping Greater Sydney at 500GL of Grid Water**

The proposal is a radical policy change to reinvent water management in Sydney and an overdue assessment of our sustainable future. The proposal is to permanently cap water corporation production of potable water in Greater Sydney at 500GL/year, a little less than we used in 2019-20.

The likely demand for water in Sydney by 2050 will be 1000GL so we will need to reduce demand and find alternative sources to make up the additional 500GL. This is in the context that the sustainable supply of surface water is likely to be less than 250GL annually in dry periods. We will still need to find about 250GL of additional rainfall independent supply but that is considered more economically efficient and sustainable than finding another 750GL of rainfall independent water in dry periods.

How much will this cost? The proposal is based on the realistic assumption that it will cost considerably less than the estimated $9 billion of the infrastructure solutions proposed in the draft Greater Sydney Water strategy. The proposal is also based on the principle that the people of Sydney will have enough water to meet all of their needs, but they will use different technology and different water sources to do so.

We recognise that in order to achieve this outcome there is a long list of barriers to be overcome.

The first and most important barrier is the financial model for water management in Australia that provides an overwhelming incentive to build infrastructure and increase annual income to water corporations. The more expensive the infrastructure and the more expensive it is to operate the more income the water corporations, who are required by legislation to be successful businesses, receive. This counter intuitive incentive to build more infrastructure in spite of the public good must be stopped.

We therefore recommend that we change the financial model for water corporations and water utilities to a service charge per property. The service charge is not based on the building block method but on the current income of the water corporations as a benchmark and future submissions by water utility providers on their operating costs and suitable profit margins.

This immediately changes the financial consideration for the water corporation, if the needs of the customer can be met with less water or cheaper water, and therefore less cost, they increase their profit margin and become a more successful business. Interestingly the model for customer payments is based on an entirely variable charge for water and sewage services determined by IPART.

Water security and investment infrastructure decisions would continue to be made by government rather than water corporations whose business interest overrides the public good. Water corporations would operate but not own the infrastructure which would remain the property of the people of New South Wales.

Barriers and opportunities would therefore be addressed by the following programs

- Change the income model for water corporations from rewarding them for building the most expensive infrastructure available and shift to payment based on a per customer service charge. The focus is on the needs of the customer, not providing them with more water. If the customer uses less water to meet their needs, the water corporation reduces its operational costs.

- Commit to fully user pays customer charges for water and sewage services, this ensures that price signals the true cost of the service and rewards customers for every litre of water they do not use
- Water corporations would process customer charges but Treasury would hold these water payments as a fund to pay the service charge to water utilities, with a comfortable safety margin and a transaction charge equivalent to the current dividend of about $1 billion annually.
- Commit $1 billion to a water efficiency fund in NSW similar to the Australian Renewable Energy Agency (ARENA) and provide a financial and regulatory context where water efficiency will be incentivised and rewarded.
- Improved BASIX to increase water efficiency targets and stormwater management through land use development controls
- Green infrastructure should use green, local water. The use of potable water for irrigation is heavily discouraged and the focus shifted to rainwater, stormwater and greywater to provide far more urban water for irrigation than is currently provided. This initiative alone will reduce potable water use by more than 20% or about 100GL.
- Water security and infrastructure investment decisions are made by government rather than water corporations with a business conflict of interest.
- Performance bonuses for senior management in government departments and water corporations based on reductions in potable water demand and reductions in operating costs.
- This model does not preclude further infrastructure investment and rainfall independent supply as recommended by independent analysis and changing circumstances.

**Targets**

The following targets are proposed based on Coombes 'No Basix' demand estimates 2019.

2022 Commence implementation of a new financial model for water corporations, customers and Treasury to be implemented in the 2024 IPART Price determination for 2024-2028

2022 Establish a government department structure to determine water infrastructure investments required for efficient service delivery and water security

2022 Set up the Australian Water Efficiency Agency (AWEA) with $1 billion of funding to be renewed if water efficiency is found to cost less than the estimated $28 billion (as revised over time) for centralised infrastructure to achieve the desired level of water security.

2022 Include achieving water efficiency targets in executive remuneration and performance bonuses for executives in both government and water corporations

2024 Implement a new financial model for water corporations and customers and Treasury

2025 Achieve a 10% - 100GL saving or actual production of 520GL/year through pricing and changing the income model for water corporations

2030 Achieve a 30% - 300GL saving or actual production of 460 GL/year through the establishment of green water supplies.

2040 Achieve a 40% - 400GL saving or actual potable production of 500GL/year through the ongoing operation of AWEA

2050 Achieve a 50% -500GL saving or actual potable production of 500GL/year through the ongoing operation of AWEA.

**Conclusion**

Thank you for the opportunity to comment and your consideration.

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