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Resilient Water Futures for Greater Adelaide – a strategy supported by integrated water system modelling

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Abstract: South Australia will face major challenges over the next 50 years, with demand for water increasing due to growth and our changing needs, while our drying climate will reduce available water resources. The resilience of our water systems is expected to be tested by increasing frequency and duration of extreme events (flood, bushfire, drought), impacting local systems as well as the Murray Darling Basin more broadly. Driven by this challenge, SA Water is leading the collaborative delivery of a 50-year urban water strategy for Greater Adelaide, on behalf of the Government of South Australia.

The resulting Resilient Water Futures Strategy (the strategy) outlines the vision and objectives of a collaborative, integrated approach to water management, including adaptive pathways and frameworks to guide decision-making processes and must balance affordability with continued water security for all. The strategy balances the use of more expensive, manufactured water with less expensive, traditional water sources, making prudent capital investment to manage water security risks across the whole water supply system and operational life cycle. It endeavours to maximise equitable access to resources, facilitate state growth and improve liveability outcomes, whilst embedding the voices and lived experience of Traditional Owners in water planning and management through strong collaboration with stakeholders. The strategy will:

- facilitate collaboration between key stakeholders including the Department of Environment and Water, the Environmental Protection Authority, Local Government Association of South Australia, Green Adelaide, and Planning and Land Use Services as key members of a Strategic Advisory Committee.
- identify a clear direction for the broader water industry on long-term water security.
- be underpinned by an adaptive plan that considers all options to address our future supply and demand deficit and provide long-term water system resilience.
- design a clear decision-making and investment framework which ensures efficient water management structures, ownership, and governance.
- develop political and community support for the water supply options.

This strategy must be supported by integrated water system modelling which considers, all options, scales, and outcomes with a clear process for investment decision-making. System, catchment, and local-scale options must be considered together to effectively deliver community and environmental outcomes, such as cooling and greening, managing flood risks, healthier waterways, resources for agriculture, economic development, and strong communities.

Our drinking water network is a critical component of the integrated water system for Greater Adelaide, with complexities in the policy, costs and capacities determining optimal operation. The Headworks Optimisation Model for Adelaide (HOMA) was enhanced to allow more complete integrated water system modelling to be undertaken for the strategy. HOMA was used to consider scenarios of climate change and population growth for Greater Adelaide to 2075 with the aforementioned ‘all options’ approach. System augmentations were manifested as changes to model structure, costs, constraints, and demand and were simulated to determine their contribution to water security, capital and operational costs, water use efficiency (spills, evaporation), state growth and industrial activity, liveability and water availability for environmental and cultural water use. Suitable options were collated into portfolios for further consideration in an Adaptive Pathways Planning approach that identified pathways for possible augmentation and investment for Greater Adelaide.

This presentation will show how a flexible modelling approach was applied to support the changing priorities of the strategy development and outline the future of integrated modelling for adaptive planning in South Australia.

Keywords: *Water supply, adaptive planning, integrated system modelling.*