



ENGINEERS  
AUSTRALIA

# Queensland Water Policy

Water governance for a resilient future



February 2023



## Preamble

Water is essential to our continued prosperity. Our scarce and valuable water resources are best governed with coherent policies in the same way as health, education and transport. Yet, governance of water has been fragmented into various departments, legislative instruments and codes, leading to suboptimal engineering, economic, environmental, social and cultural outcomes.

Engineers Australia have developed this water policy statement to suggest a way toward a prosperous, sustainable and resilient future. We recommend taking the OneWater approach to manage all water sources and the uses and discharge of water in a holistic manner. It is envisaged this approach will be supported by the centralisation of governance and management of water by a single Queensland Water Department. This would function similarly to the Department of Transport and Main Roads in the oversight of roads and traffic. A single Water Department would provide a suitable framework for:

- Better governance and management of all water sources, water uses and discharge in a sustainable manner,
- Improvements in water security, drought response and systems resilience to cope with future trends and major shocks,
- Better use of data, science, research and technologies as the basis for defensible decision-making, and
- Ensuring suitably qualified and experienced engineers are leading and coherently undertaking professional engineering services to protect our community and to secure a better future.



## For this update

Engineers Australia, other peak bodies and individuals have made recommendations to Government on water in the past. Better governance and management of water assists in providing for a better and more secure future. Government must take a significant leadership role in progressing water policy reform pathways.

The Engineers Australia Queensland Division published a water policy statement in 2017. The current update has been prepared by a working group, comprising experienced water professionals from the Queensland Division Committee, the Queensland Water Panel, the National Committee on Water Engineering and the industry.

This update presents seven key recommendations, with desired outcomes, benefits, risks and proposed actions with the intention of facilitating further discussions with Government.

The over-arching concern of the working group is the fragmented approach to managing water resources. The OneWater concept is intended to introduce a holistic water cycle approach that will align the governance of water to the physical distribution and movement of water through the landscape and through its diverse uses by the community, from flood to drought, from source to reuse and discharge.

## OneWater

- The OneWater concept is an integrated planning and implementation approach to managing our finite water resources for long-term resilience and reliability, meeting both community and ecosystem needs. It also protects us from major threats and safeguards our economic and social wellbeing for our future generations.
- The governance of water should reflect the physical realities of all sources of water and its catchment, use, reuse and replenishment, impact (storms and flooding) and discharge into the environment. Water includes ground water, surface water, ocean water, stormwater, sewage and recycled water which are used for potable, agricultural, industrial, mining and fisheries, environmental, recreational, tourism and cultural uses.



# 1. Holistic Governance of OneWater by State Government

## Outcomes / Benefits

- OneWater approach undertaken by State Government for holistic governance all water sources, water uses and discharge.
- Integrated decision making, consistent regulation and standards for management of the water cycle.
- Risk based assurance and prioritisation of programs and projects based on science and engineering.
- Changes made to suit new thinking and innovative way of meeting the needs of stakeholders.
- Strengthened professional and technical expertise in Government.
- Professional engineering services undertaken by Registered Professional Engineers Queensland (RPEQ). High-risk practices, such as dam engineering, undertaken by RPEQ with additional recognition such as Chartered Professional Engineers or registration on a recognised international engineering register with adequate relevant local experience.

## Current risks

1. Fragmented decision making restricting optimal outcomes.
2. Lack of clear overarching responsibilities and consistency in flood plain management.
3. Inconsistent regulation (referable and regulated dams) putting the community at risk.
4. Business as usual not meeting the new thinking and needs of all stakeholders.
5. Technical standards/best practice guidelines, necessary to guide decision-making and/or innovation, are not applied consistently and appropriately across different areas of government leading to suboptimal outcomes and increased or incomplete management of risk to the community.
6. There is a risk, particularly in some areas of state and local government, entities and academia, that professional engineering services in water may not be undertaken by RPEQ and may breach state law.

## Immediate actions

1. Develop roadmap for unified approach for holistic governance and management of OneWater.
2. Learn from the experience of TasWater, Water Corporation WA and PUB Singapore which manage diverse water sources and services.

## Follow up actions

1. Develop and implement a plan to consolidate all water agency functions across state government (excluding existing bulk water entities and water service providers) into a single water department. This department is to have an overarching responsibility for the holistic governance and regulation of OneWater.
2. Ensure that professional engineering services in state departments are undertaken by RPEQ. This should extend to engineering decisions regarding regulation of infrastructure, development of business cases and purchase of professional services.
3. Give legislative effect to suitable and appropriate technical standards and guidelines to drive consistency in methodology across state agencies, local governments and other entities.
4. Engineering services involving high public safety risk, including dam engineering, be undertaken by RPEQ with additional recognition such as Chartered Professional Engineers or registration on a recognised international engineering register with adequate relevant local experience.



## 2. OneWater Management by Regional Entities (Government owned)

### Outcomes / Benefits

- Regional entities managing and implementing OneWater approach for all water sources, water uses and discharge.
- Regional entities have sufficient funding and expertise to manage all engineering and operational aspects of water, and to look after the smaller councils.
- Water is considered upfront in the Planning Process.
- Flood plain management is improved with better overarching planning considerations and coordination across organisations.
- Professional engineering services undertaken by RPEQ. Engineering services involving high public safety risk, including dam engineering, undertaken by RPEQ with additional recognition such as Chartered Professional Engineers or registration on a recognised international engineering register with adequate relevant local experience.

### Current risks

1. Floodplain management is delegated to regional entities and councils without adequate power and funding.
2. Asset owners, particularly smaller councils, are underfunded with deteriorating and outdated infrastructure.
3. Water received little consideration in the land use planning process. Regional water entities have limited or no referral and approval powers to take a holistic catchment to tap approach.
4. There is a risk, particularly in some areas of state and local government and academia, that professional services may not be undertaken by RPEQ and may breach state law.

### Immediate actions

1. Develop roadmap for unified approach for holistic management and implementation of OneWater.
2. Learn from the experiences of TasWater, Water Corporation WA and PUB Singapore, which manage diverse water sources and services.

### Follow up actions

1. Strengthen regional entities: Seqwater holds responsibility for water quality, dam engineering, hydrological assessments and water security, etc., for SEQ. Seqwater's water security program should extend to include all other uses in addition to potable and industrial uses.
2. Strengthen regional entities: Sunwater should hold similar responsibilities across the rest of the state but needs to ensure a water security program is in place to meet all water needs.
3. Establish new regional entities and strengthen in-house technical expertise with RPEQ and additional recognition, such as Chartered Professional Engineers or registration on a recognised international register, where needed to manage all engineering and operational aspects of the complete water cycle.
4. Implement enabling legislation to allow regional entities to consolidate assets into more expert-based entities following the example of electricity. The aim is to get more consistency in risk management, design, construction, operation and maintenance of assets to reduce risks to employees and consumers.
5. Task and fund regional entities with responsibilities for water security planning for all uses, direct influence in local and regional planning (including necessary power), waterway restoration and other issues that affect and are affected by the total water cycle.



# 3. State Government's Leadership in Total Water Cycle Management

## Outcomes / Benefits

- Water availability enabling the healthy, liveable, and sustainable futures for the state.
- All facets of the water cycle are planned and managed to maximise social, environmental and economic outcomes.
- Treated stormwater and recycled water are used to augment potable water use. Pressure on drinking water supplies reduced while improving the liveability of our communities.
- Institutional, policy and regulatory arrangements in place that drive integrated and collaborative approaches to Total Water Cycle Management (TWCM).
- Community recognises that water cannot be taken for granted, and rather needs to be planned and used sustainably.

## Current risks

1. State strategy focuses on traditional ways of sourcing water from dams and weirs, but this approach is vulnerable to the impacts of climate change.
2. Disjointed institutional arrangements and lack of state leadership fail to deliver total water cycle outcomes that benefit the community and the natural environment to the full extent possible.
3. There is a lack of commitment to pursuing consistent whole-of-region outcomes.
4. Many decentralised schemes failed to perform as expected.
5. Regulations prohibit the use of treated stormwater as a source of potable water.

## Follow up actions

1. State Government to provide leadership and direction on driving TWCM outcomes.
2. Determine and implement TWCM business model and funding arrangements.
3. Ensure that institutional, policy and regulatory arrangements and incentives in place to drive integrated and collaborative approaches to TCWM.
4. Actively engage the community in the implementation of TWCM.

## Immediate actions

1. Identify and reform policy barriers to TWCM.
2. Develop road map for state and local governments and regional entities to adopt TWCM.



# 4. State-wide Water Security and Drought Response

## Outcomes / Benefits

- Sustainable use of water resources meeting the need for potable, agricultural, industrial, mining and fisheries, environmental, recreational, tourism and cultural uses.
- Drought response and long-term planning available across the state for both today and our future generations.
- Water security program developed with a focus on TWCM.
- New supply source and infrastructure in place to meet with future growth in population, economy and other needs.
- The Western Corridor Recycled Water Scheme (WCRWS) is restarted for drought response and long-term use (including direct potable reuse in the future) for SEQ.

## Current risks

1. Since late 2013 more than half of Queensland has been under drought declaration which adversely impacts the community's economic and social wellbeing.
2. There is a lack of water security planning for most areas of the state.
3. There is insufficient water to meet agricultural demand.
4. The lack of investment in water infrastructure by government, particularly by the state, leads to ad hoc arrangements sponsored by special-interest groups that may not be in the long-term interest of the broader community.
5. Water security planning is focussed on potable and industrial uses only.
6. The delay in the full restart of the WCRWS for augmenting potable use may undermine its capability to cope with the current drought.

## Immediate actions

1. On 18 Sept 2020, the SEQ Water Grid Storage dropped to 60%. As per the current Water Security Program (WSP), the WCRWS should have been restarted to supplement potable use for SEQ.
2. Develop a plan to assist the delegated regional entities to develop water security and drought plans across the state for now and the future.

## Follow up actions

1. Require entities across the state to plan the development of water infrastructure for a horizon of at least 50 years, considering the expected impacts of climate change, underlying climate variability, a growing population and advances in technology.
2. Amend legislation to enable water security planning to include other water sources such as stormwater for potable use.
3. Expedite the construction of infrastructure in a proactive and adaptive manner to meet demand and to help with economic growth.
4. The community is more supportive of indirect potable reuse. The long-term use of the WCRWS could save the need for spending billions of dollars on building a water source in the Central sub-region of SEQ.
5. Enable governance and legislation for direct potable reuse.
6. Secure water supplies for regional agricultural use ensuring a high level of food security for local consumption.



# 5. State-wide Resilient Planning

## Outcomes / Benefits

- Our capability strengthened to respond to long term challenges by considering a holistic range of influences including cross-sectoral, regional and global drivers.
- Plan in place for a range of plausible futures, trends and shocks (including climate change and natural underlying climate variations).
- Funding available for improving systems resilience.

## Current risks

1. Water pricing regulation requires a least cost approach.
2. Asset owners find it difficult to collaborate due to funding and policy obstacles.
3. Flood plain management and construction of flood mitigation works is inadequately prioritised in infrastructure planning.
4. The implications of climate change on planning and assets may not be fully understood.

## Immediate actions

1. Understand the effects on long term planning caused by climate change and the underlying natural variability of Queensland's climate.
2. Form alliances (state and local governments, entities, service providers, etc.) to develop a common framework for long term planning.
3. Develop a suite of holistic drivers and possible futures.

## Follow up actions

1. Set a preference for resilient systems, which provide cost effective solution for long term challenges. Avoid the trap of minimal investment and infrastructure deferral, currently driven by shorter term political cycles and poor funding.
2. Paleoclimate data indicates that our historical climate records, currently used as a basis of planning, may not account for all the variability we may experience and therefore design criteria for climate related features should be reviewed state-wide to account for such variability.
3. Undertake collaborative approaches, with understanding and coordination of systems and stakeholder interactions, to provide a win-win result for entities in shared costs and benefits, as demonstrated in exemplary cities such as San Francisco, Toronto, Copenhagen and Melbourne.
4. Plan resiliently through a proactive approach, which reduces the cost burden of reactive approaches such as currently seen in flood events and drought situations.
5. Implement systems for cross-sectoral and cross-regional collaboration to share costs and benefits.
6. Develop portfolio solutions which address a range of possible outcomes. Develop adaptive plans which chart a pathway with triggers and responses, enabling entities to steer toward the preferred future state.

# 6. Open Data and Digital Transformation for Better Decisions Making

## Outcomes / Benefits

- Collection, curation and accessibility of water data and reports expanded and maintained.
- Use of advanced data analytics, artificial intelligence (AI), machine learning and visualisation to produce real-time insights, data collection and sensor systems.
- More rapid and robust decision making supported by data and evidence with less uncertainty.

## Current risks

1. The Queensland Government's spatial data portals provide limited access to key information.
2. Many other types of data and reports are unavailable.
3. Ownership and retention of raw and modelled water data and technical reports is still fragmented across entities and not readily or consistently accessible or available to support improved water planning and management at local and catchment scales.
4. Investments in digital technology are lagging and will prevent us from progressing forward. AI machine learning is disrupting many industries and water can be the same. The recent NSW Bushfire report revealed the sad situation created by the lack of modern communications systems and data sharing.

## Immediate actions

1. Carry out a review to determine if we have enough data to meet the specific needs of users now and in the future.
2. Develop and implement a strategy for prioritizing and addressing gaps for open data.

## Follow up actions

1. Implement good data management to save money by facilitating good policymaking and decision-making, based on sound analysis and best value-engineering.
2. Establish common standards for data and model record keeping, so that retracing others' work is less cumbersome or obscure.
3. Expand the collection of water data, currently largely limited to compliance assessment, and often unsuitable for use in scientific analysis or in making policy. The supply of data of sufficient granularity, quantity and quality is essential for the modelling and science that should be used to inform investment decisions.
4. Solicit and collate information from individual entities, who often hold useful investigations and studies which are not readily shared or known to the broader water community.
5. Collect, curate, store and make freely available all the water data required to build models.
6. Publish and maintain an accessible library of all technical reports underpinning planning frameworks and decisions associated with all water sources and resources.



# 7. Research and Development for Improvements

## Outcomes / Benefits

- New areas of academic and industrial research and technical development identified, supported and promoted.
- State Government proactively supporting research and development and making allowance for funds needed in the pricing and costing structure.
- Well-researched and equipped with advanced technologies for instrumentation, telemetry and remote sensing. Advanced computing techniques, such as artificial intelligence (machine learning) developed to improve the efficiency of asset management by learning from experience.
- Water service providers creatively collaborating with insurance companies, health services, other utilities or private investors where appropriate to develop diverse service offerings. Investing in research to support the development of such business opportunities.
- Best practice water management developed to improve system efficiencies and strengthen the capacity to cope with a range of conditions. Learnings are available globally from leading cities and utilities.

## Current risks

1. Water service providers throughout Queensland operate at varying levels of sophistication.
2. Underfunded entities are falling behind.
3. Available technical standards/best practice guidelines, necessary to guide decision-making and/or innovation, are not applied consistently and appropriately across different areas of government, leading to suboptimal outcomes with increased risks to the community.

## Follow up actions

1. Provide funding to close gaps in existing services across the state.
2. Foster partnership between the State Government and water service providers to co-develop research priorities and business opportunities
3. Encourage cross sector collaboration in research and application, for example, a supply chain model where recycled water can be used to generate Hydrogen as fuel for transport, and Oxygen for water treatment with an added benefit of reducing carbon emission.

## Immediate actions

1. Articulate and prioritise the desired benefits of innovation.
2. Identify potential research and development areas that deserve funding.



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