



Attachment 7

Project summaries for top 10 major projects

30 September 2024

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1 Introduction

WaterNSW plays an essential role in the capturing, storing and releasing water resources across NSW. In fulfilling this role, infrastructure and Digital projects play a crucial role in shaping organisational efficiency, delivering customer outcomes, and achieving compliance with a range of regulatory expectations.

Attachments 6 and 18 identified the process utilised by WaterNSW to establish the program of capital works proposed for delivery in the FY26-30 period. This attachment nominates a sub-set of this program as the 'Top 10' programs/projects. The selection of the top 10 projects involved careful consideration of several key factors, including total forecast project cost, project complexity and technological innovation, and overall customer benefits and strategic impact.

1. Total Cost:

One of the primary considerations in selecting the projects that form the organisation's Top 10 projects is the total cost. This includes initial investment, maintenance expenses, and potential future costs associated with scaling or upgrading the project. Projects that demonstrate cost-effectiveness over their lifecycle are prioritized, as they align with financial objectives and resource allocation strategies.

2. Complexity and Technological Innovation:

The level of complexity and technological innovation embedded within a project is another critical criterion. Projects that introduce innovative solutions are important projects in an organisational context.

3. Customer Benefits and Strategic Impact:

Perhaps the most significant criterion is the impact on customers and stakeholders. Projects that directly enhance customer experience, improve service delivery, or streamline operations to better meet customer outcomes are highly valued. Strategic impact encompasses the broader implications of the project on the organisation's longer-term objectives and regulatory drivers.

2 Top 10 Major Programs/Projects

Based on consideration of the criteria above the following table identifies the Top 10 major programs / projects. All costs are in Real \$2024-25.

Table 1 - Summary of Top 10 Major Programs/Projects

Program Name	Projects	Forecast FY26-30*
Warragamba Dam Resilience	<ul style="list-style-type: none">WG270028 - Warragamba Dam Resilience Stage A	\$609,116,701
Warragamba E-Flows	<ul style="list-style-type: none">WG330000 - Warragamba Eflows Construction	\$301,755,410
Warragamba Pipeline Renewals	<ul style="list-style-type: none">WG320039 - Warragamba Pipeline & Corridor Tranche 2 WP1WG320040 - Warragamba Pipeline & Corridor Tranche 2 WP2WG320110 - Warragamba Pipeline & Corridor FY 26-30 Works - Tranche 4 - CoatingsWG320111 - Warragamba Pipeline & Corridor FY 26-30 Works - Tranche 4 - CivilWG320112 - Warragamba Pipeline & Corridor FY 26-30 Works - Tranche 4 - MechanicalWG320113 - Warragamba Pipeline & Corridor FY 26-30 Works - Tranche 5 - Coatings	\$97,761,524

Program Name	Projects	Forecast FY26-30*
Fishways	<ul style="list-style-type: none"> GW280009 - Tyreel Weir Fishway GW280008 - Tyreel Regulator Fishway GW280011 - Tareelaroi Weir Fishway GW280010 - Boolooroo Weir Fishway LA280020 - Lake Brewster Diversion Weir Fishway LA280024 - Booberoi Weir Fishway MA280008 - Gin Gin Weir Fishway MA280007 - Dubbo North Weir Fishway LA280019 - Lake Cargelligo Inlet Regulator Fishway MA280006 - Marebone Break Regulator Fishway NO280010 - Gunidgera Weir Fishway 	\$100,788,687
Cold Water Pollution	<ul style="list-style-type: none"> GW280015 - Copeton Dam Cold Water Pollution (CWP) MA280009 - Burrendong Dam - Cold Water Pollution MB280007 - Blowering Dam Cold Water Pollution (CWP) NO280011 - Keepit Dam Cold Water Pollution (CWP) 	\$46,844,821
Cataract Dam Safety	<ul style="list-style-type: none"> UN270011 - Cataract Dam Safety and Upgrade 	\$35,739,761
Torrigan Weir Upgrade	<ul style="list-style-type: none"> LA320073 - Torrigan Weir Upgrade and Fishway 	\$29,536,877
Oberon to Duckmaloi Stage 2 Pipe Renewals	<ul style="list-style-type: none"> FR320105 - Renewal of Remaining Original Stage 2 Pipeline Oberon to Duckmaloi 	\$29,178,408
Asset Lifecycle Management & Planning	<ul style="list-style-type: none"> AL900638 - Asset Lifecycle Management & Planning 	\$15,397,656
Water Insights	<ul style="list-style-type: none"> AL900679 - Water Insights Portal - GSYD AL900680 - Water Insights Portal - RURL 	\$7,812,922
	Total:	\$1,273,932,766

* Includes allocation of overheads

2.1 Major Program/Project Drivers

The following table identifies the mapping of the Top 10 programs/projects to the primary driver and the primary alignment to a nominated Customer Outcome.

Table 2 - Top 10 Program/Project Drivers and alignment to Customer Outcomes

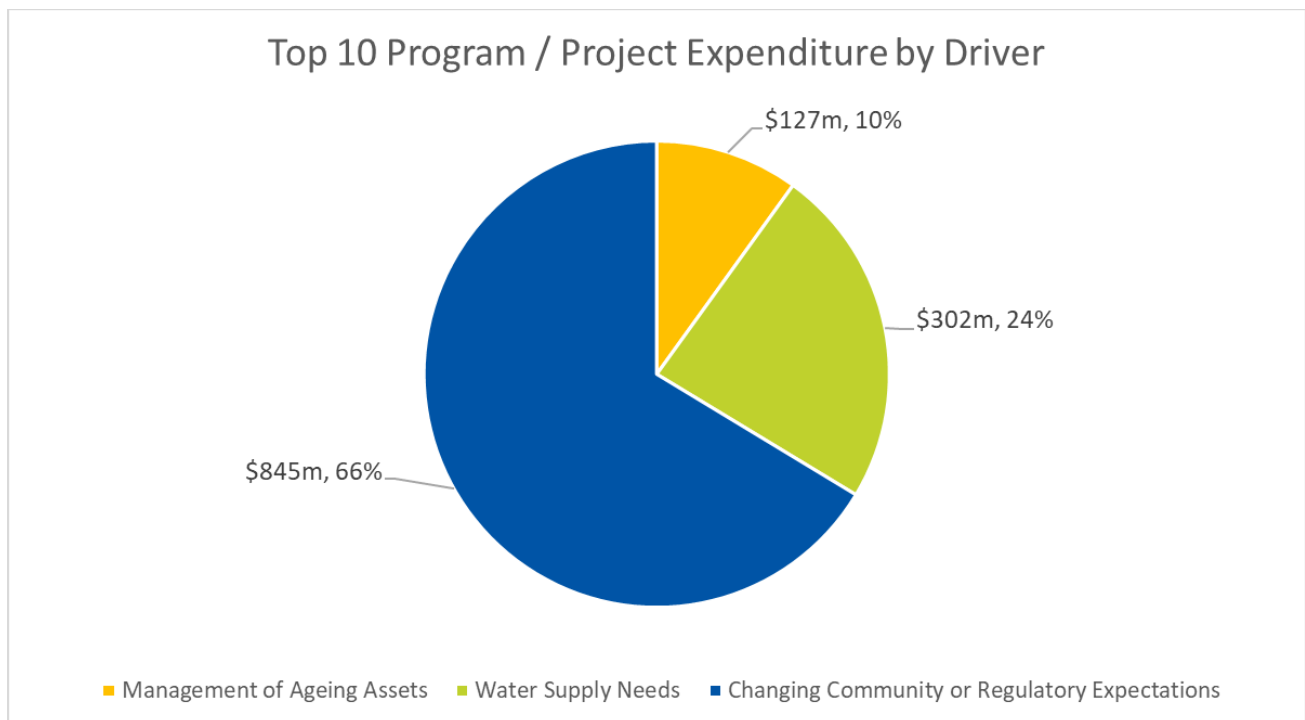
Program Name	Primary Driver Alignment	Primary Customer Outcome Alignment
Warragamba Dam Resilience	Changing Community or Regulatory Expectations	WNSW will provide secure and reliable water delivery
Warragamba E-Flows	Water Supply Needs	Sustainable land and water management
Warragamba Pipeline Renewals	Management of Ageing Assets	WNSW will provide secure and reliable water delivery
Fishways	Changing Community or Regulatory Expectations	Sustainable land and water management
Cold Water Pollution	Changing Community or Regulatory Expectations	Sustainable land and water management
Cataract Dam Safety	Changing Community or Regulatory Expectations	WNSW will provide secure and reliable water delivery

Program Name	Primary Driver Alignment	Primary Customer Outcome Alignment
Oberon to Duckmaloi Stage 2 Pipe Renewals	Management of Ageing Assets	WNSW will provide secure and reliable water delivery
Torrigan Weir Upgrade	Changing Community or Regulatory Expectations	WNSW will provide secure and reliable water delivery
Asset Lifecycle Management & Planning	Changing Community or Regulatory Expectations	WNSW will be efficient and keep costs as low as possible
Water Market Systems	Changing Community or Regulatory Expectations	WNSW will be efficient and keep costs as low as possible

2.2 Top 10 Project as a component of the WNSW Program

The identified major programs/projects represent a critical investment for WaterNSW aligned to with the following key drivers:

Figure 1 - Top 10 Program/Project expenditure by Driver



WaterNSW has sought to carefully consider the most appropriate implementation of these large programs/projects to balance the realisation of program/project benefits whilst also managing any financial impacts to our customers. We have achieved this through:

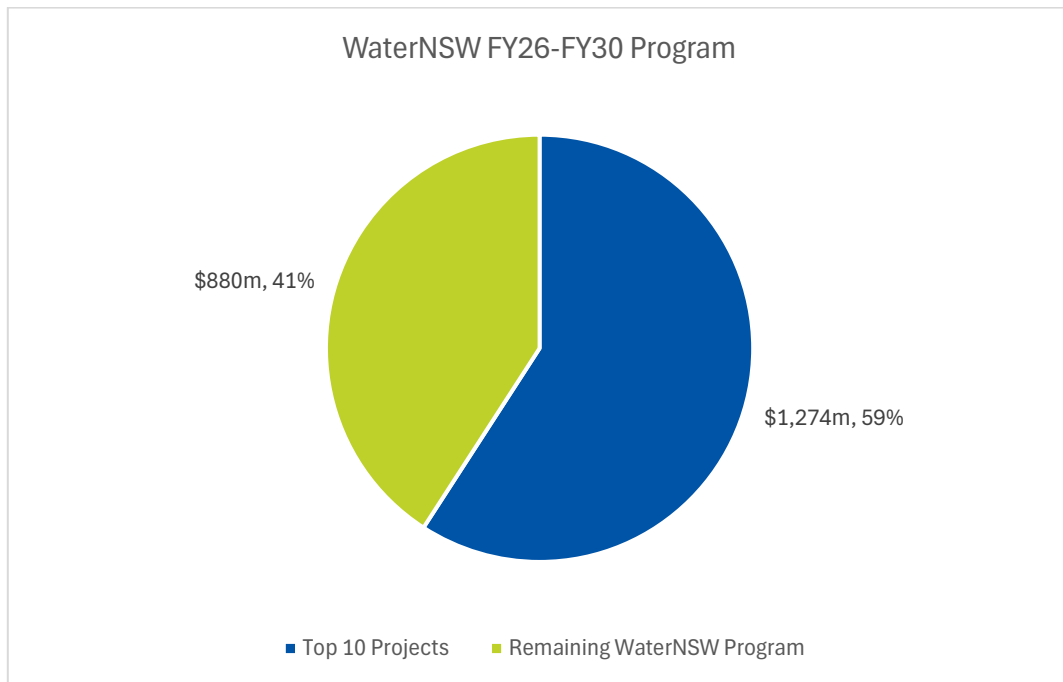
- Phased implementation of the Warragamba Dam Resilience Program – Implementation of this program will be completed over two determination periods.
- Continuation of the phased implementation of the Warragamba Pipeline renewals – WaterNSW has commenced this important renewal program and it is proposed to continue over the next two determination periods.
- Through discussion with NSW Fisheries and WaterNSW customers we have staged the implementation of the Fishway program. This will result in the design and construction of five fishways in FY26-30, with

design completed for a further six sites. The construction activities for those six sites is proposed to occur in FY31-35.

- Phased implementation of the Cold-Water Pollution Program – WaterNSW will complete the upgrades on the Burrendong site in FY26-30 and utilise these learnings to further inform the design (to be complete in FY26-30) and construction (proposed for FY31-35) for a further three sites.
- Phased implementation of the Oberon to Duckmaloi Stage 2 Pipe Renewals – It is proposed that this be completed in two equal phases across the next two determination periods. This will ensure that the highest priority sites can be completed to realise some of the service improvements whilst balancing cost impacts for the small customer base in Fish River.

The graph below shows that in total, the top 10 major projects/programs contribute to 59% (\$1,273.9m) of the overall WaterNSW Capital program.

Figure 2 – Top 10 programs/projects as a proportion of WNSW program



3 Program/Project Summaries

A project summary has been provided for each of the nominated programs/projects.

Warragamba Dam Resilience Project Summary



Overview

Located about 65 kilometres west of Sydney in a narrow gorge on the Warragamba River, Warragamba Dam is one of the largest domestic water supply dams in the world.

Warragamba Dam supplies water to more than 5 million people living in Sydney and the lower Blue Mountains.

Australia is experiencing increases in the frequency and severity of extreme rainfall events. A changing climate is predicted to result in these increases continuing in the decades ahead. These events could present a potential risk to the ongoing safety and resilience of dams. The NSW Dam Safety Regulations require WaterNSW, as the dam owner, to address such risks and remain compliant with the regulations.

A detailed risk assessment of Warragamba Dam indicates strong justification to consider strengthening aspects of the dam to ensure compliance with the regulations and the ongoing ability to handle the most extreme rainfall events, now and into the future.

WaterNSW has proposed to further refine and develop dam-strengthening options through the development of a detailed Final Business Case, including the risk profiles associated with these options, and make a recommendation to Government.

Should the work proceed it will take at least four years to complete the business case investigation and move through the funding, procurement, planning and design phases.

Scope for FY2026-FY2030

Develop and implement a solution to reduce the risk of dam failure whilst not compromising Sydney's long term water supply.

The overall benefit will be able to mitigate a potential dam failure that has significant social and economic consequences including the loss of Sydney water supply.



WaterNSW must consider how to reduce the risk to within acceptable safety limits which is likely to require modification to strengthen the dam. Extensive investigations and studies have been undertaken to address the options for both non-infrastructure and infrastructure measures to reduce the risk of dam failure.

Approach

The infrastructure solutions under consideration that do not require any raising of the dam include the construction of a concrete buttress on the downstream face and/or installing post tensioned anchors along the top of the dam.

Opex Costs

At this stage there has been no identification of opex costs, this will be undertaken for the final business case to be developed in 2025, with project completion expected after FY2030.

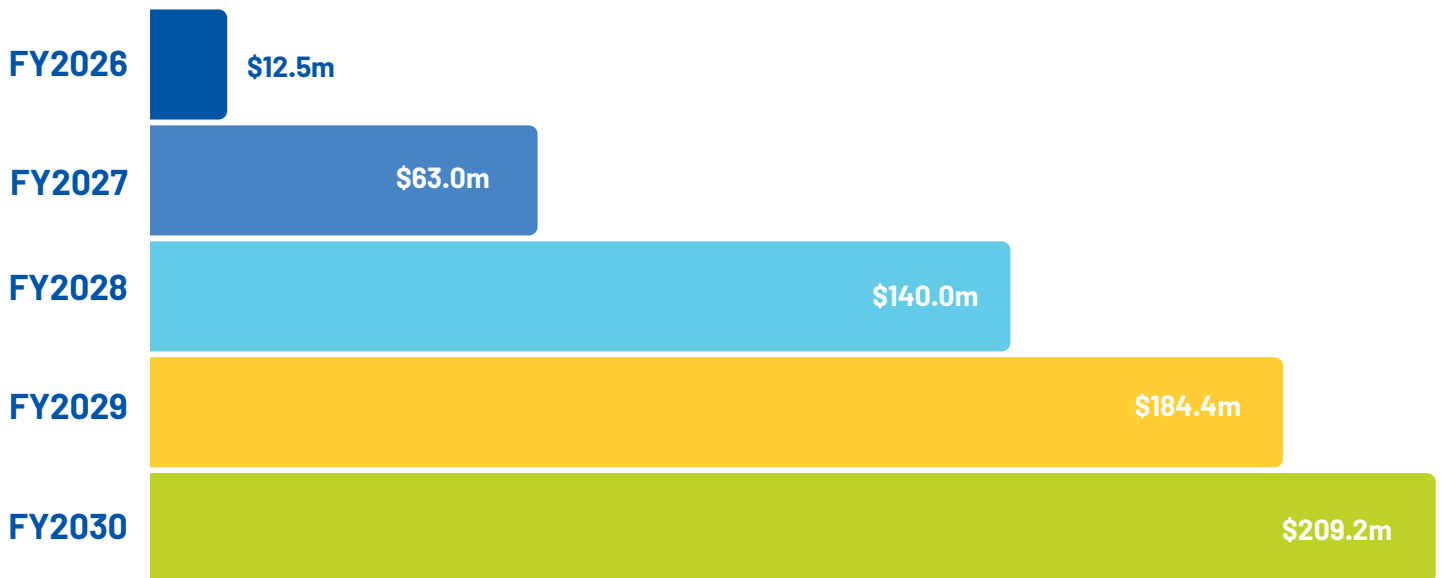
Options, Assessment & Procurement

Preliminary analysis has identified a preferred list of options that will mitigate risk.

These include post tensioned anchoring or concrete buttressing on the downstream face to strengthen the dam and improve capability to safely operate in an extreme flood.

These options will be further tested for optimising with engineering analysis that will be undertaken for a final business case to be developed in 2025.

Project Cost Estimate FY26-FY30



Benefits

The overall benefit will be able to mitigate a potential dam failure caused by extreme floods associated with climate change, that has significant social and economic consequences including the loss of Sydney water supply.

Dam Safety



Legislative Compliance



Customer Outcomes



This project aligns with WNSW Outcome 1:
WaterNSW will be efficient and keep its costs as low as practical



This project aligns with WNSW Outcome 2:
Provide secure and reliable water delivery



This project aligns with WNSW Outcome 4:
Sustainable water and land management

Overview

Warragamba Dam has a major impact on river health in the lower Hawkesbury-Nepean River. Its location within the catchment results in significant environmental impacts on the river below the dam with substantially reduced stream flows for prolonged periods of time.

These reduced flows contribute to low water quality and extensive aquatic weed growth and algal blooms. These conditions compromise boating, fishing and swimming uses of the waterway, as well as impacting the amenity of the river for picnicking and other on-bank recreation activities.

The Warragamba E-flows project contributes to downstream river health, a key outcome of the 2017 Metropolitan Water Plan as well as forming an integral part of the Greater Sydney Water Strategy as it contributes to the dual goals of water security and environmental sustainability.

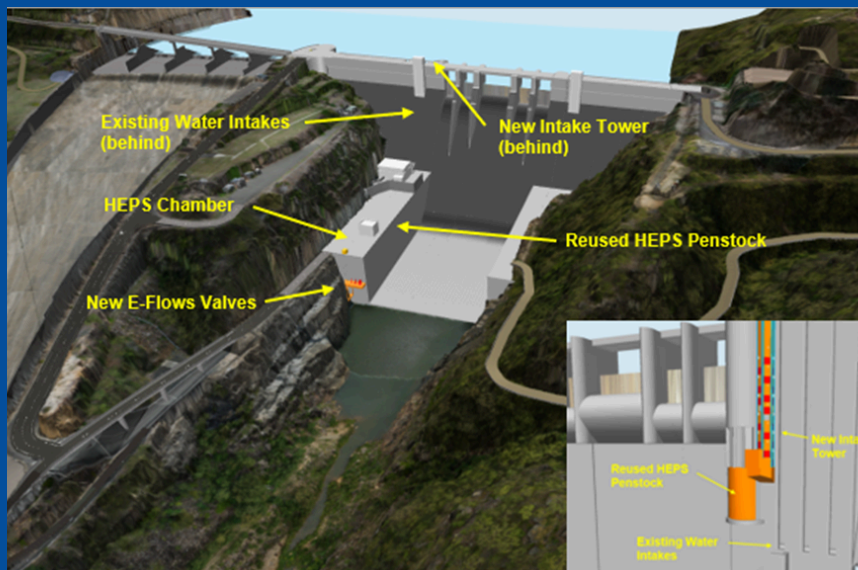
Challenges

- The need for active and ongoing management of the water environment is well recognised, especially as pressures continue and demands escalate with Sydney's urban growth.
- Construction delivery involves high risk activities such as confined space, saturation diving methods, working over water and at heights and dewatering the existing large diameter penstock.



Scope for FY2026-FY2030

This project involves modifications to Warragamba Dam to enable the release of variable environmental flows which will improve river health and recreational opportunities in the Hawkesbury-Nepean River downstream of Warragamba Dam.



The e-flows infrastructure would include:

- A multi-level offtake tower on the upstream face of the dam to draw suitable quality water from Lake Burrangorang
- Modifying the existing large diameter penstock to draw water through the dam and discharging at the downstream end of the Hydro Electric Power Station (HEPS)
- Modifications to the existing HEPS to allow for new pipework and valve configuration for releasing variable e-flows

Approach

Healthy rivers need flows and temperatures that retain or mimic natural conditions. The E-Flows Project will achieve this by:

- Reintroducing flow variability
- Improving water quality
- Reducing problems caused by excessive growth of algae and aquatic weeds
- Improving fish populations

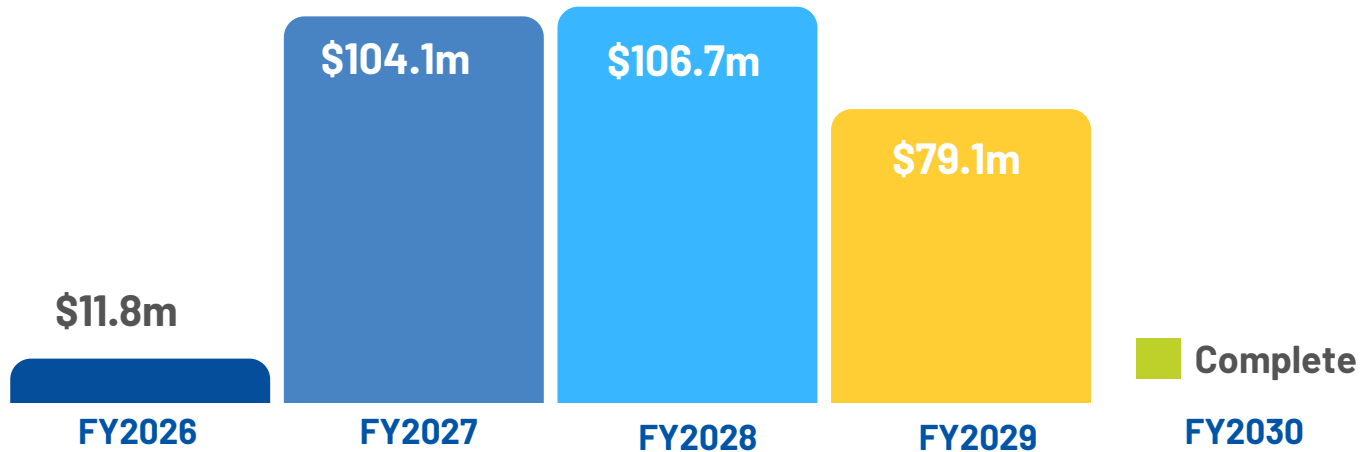
Options, Assessment & Procurement

The delivery model and procurement strategy considered three delivery models (Construct Only, Design & Construct, and Alliance) against evaluation criteria. The Alliance model was determined to be the optimal model.

Opex Costs

Additional operation and maintenance costs will be required with the introduction of new and existing infrastructure equipment to be installed for the E-Flows Project.

Project Cost Estimate FY26-FY30



Benefits

The strategic benefits of the E-Flows Project are:

- Improved downstream river health and recreational amenity
- Increase in length of river suitable for swimming and other recreational activities
- Reduction in average fisher time to catch an Australian bass due to increased abundance
- Increase in river length free of invasive water weed infestations allowing improved boating access

Customer Outcomes



This project aligns with WNSW Outcome 1: **WaterNSW will be efficient and keep its costs as low as practical**



This project aligns with WNSW Outcome 2: **Provide secure and reliable water delivery**



This project aligns with WNSW Outcome 4: **Sustainable water and land management**

Overview

The Warragamba Pipeline is a vital piece of Sydney's raw water infrastructure. It moves water from the source at Warragamba Dam to treatment plants at Warragamba, Orchard Hills, and Prospect to supply over five million people in Greater Sydney.

WaterNSW is carrying out the next phase of the Warragamba Pipeline Upgrade to ensure the reliable and efficient operation of the pipelines, and provide a resilient and safe water supply to customers in Greater Sydney.



Installed 2.1m diameter pipeline



Completed upgraded valves

Work will include:

- replacement or refurbishment of major valves and control systems
- Pipe re-coating
- Mechanical components renewed
- Civil renewal, including drainage and embankment stabilisation
- improvement of security systems and access
- installation of pressure monitoring and fault-detection systems.

The works are critical to ensure continued delivery long term. Significant capital investment into the corridor and the two pipelines is required to:

- Extend asset life for the two pipelines and the associated assets
- Reduce / manage failure mechanisms that impact service of the assets

Challenges

- Ensuring continuous water supply during construction works, as these pipelines supply some 5 million customers with drinking water
- Construction delivery involves high risk activities such as confined space, heavy lifting, hydraulic energy isolation and fatigue.

Scope for FY2026-FY2030

The focus for the program of works during the period FY26-30 will be the continuation of pipeline external coating, civil and drainage improvements and stabilisation, selected mechanical upgrades, internal lining rehabilitation and selected pipeline structural stabilisation.

	Tranche 2 - WP1-3	-----	\$12.6m
	Tranche 4 - Coatings	-----	\$35.4m
	Tranche 4 - Civil	-----	\$31.5m
	Tranche 4 - Mechanical	-----	\$16.5m
	Tranche 5 - Coatings	-----	\$1.7m

Approach

The scope of works for the Warragamba Pipeline Corridor Tranches is a continuation of the Corridor Restoration as defined in the 2019 MasterPlan.

Due to the dynamic impact of weather events and geographic expanse of the corridor, risk locations and priorities are continuously evolving.

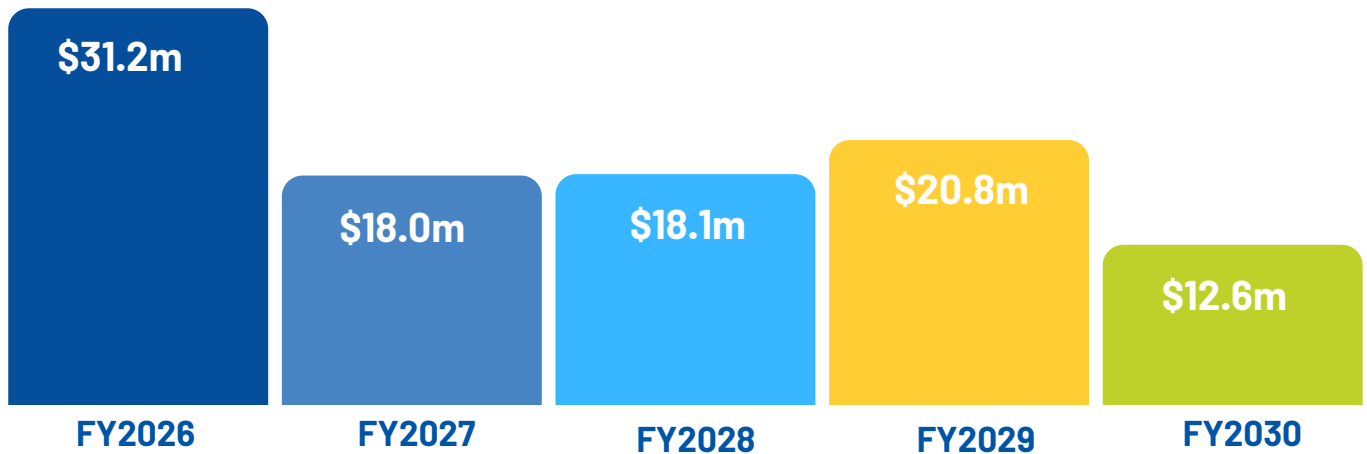
The works identified for the FY26-30 capital investment include all risk ranked issues as 'Extreme' and 'High', plus elements of works scopes that support delivery and efficiency of these.

Options, Assessment & Procurement

The forecast costs were based upon awarded contract rates (for Tranche 2), and unit rates benchmarked with actual costs from recent works (for tranches 4 and 5).

Delivery of this project will be completed within WaterNSW-approved procurement frameworks, policies and procedures and utilising the Asset Renewal and Replacement (ARR) model with the engagement of construction partner for delivery works and Asset Ready for technical oversight.

Project Cost Estimate FY26-FY30



Benefits

- Warragamba Pipelines and Corridor restoration works is a continuing program of works to rehabilitate and stabilise the 27km long corridor and twin pipelines that are the sole downstream transfer conduit from Warragamba Dam which accounts for 80% of water delivered to greater Sydney by WaterNSW
- Continuation of the works will allow avoidance of wider economic loss due to complete failure to supply water

Customer Outcomes

- ✓ This project aligns with WNSW Outcome 1: **WaterNSW will be efficient and keep its costs as low as practical**
- ✓ This project aligns with WNSW Outcome 2: **Provide secure and reliable water delivery**
- ✓ This project aligns with WNSW Outcome 4: **Sustainable water and land management**

DSU Offset Fishway Program Project Summary



Overview

WaterNSW's Dam Safety Upgrade (DSU) Offset Fishway Program will deliver new fish passages at eleven weirs in NSW. This will improve native fish migration while supplying reliable and sustainable water to our customers.

The Program aligns with WaterNSW's vision to play a key part in creating a more resilient water system and enabling thriving and healthy ecosystems, whilst reducing our environmental footprint.

The fishways are also a regulatory requirement under section 218 of the Fisheries Management Act 1994, which requires fish passage through or over a dam, weir or reservoir to be maintained following any construction, alteration or modification to the structure.



Tyreel Regulator

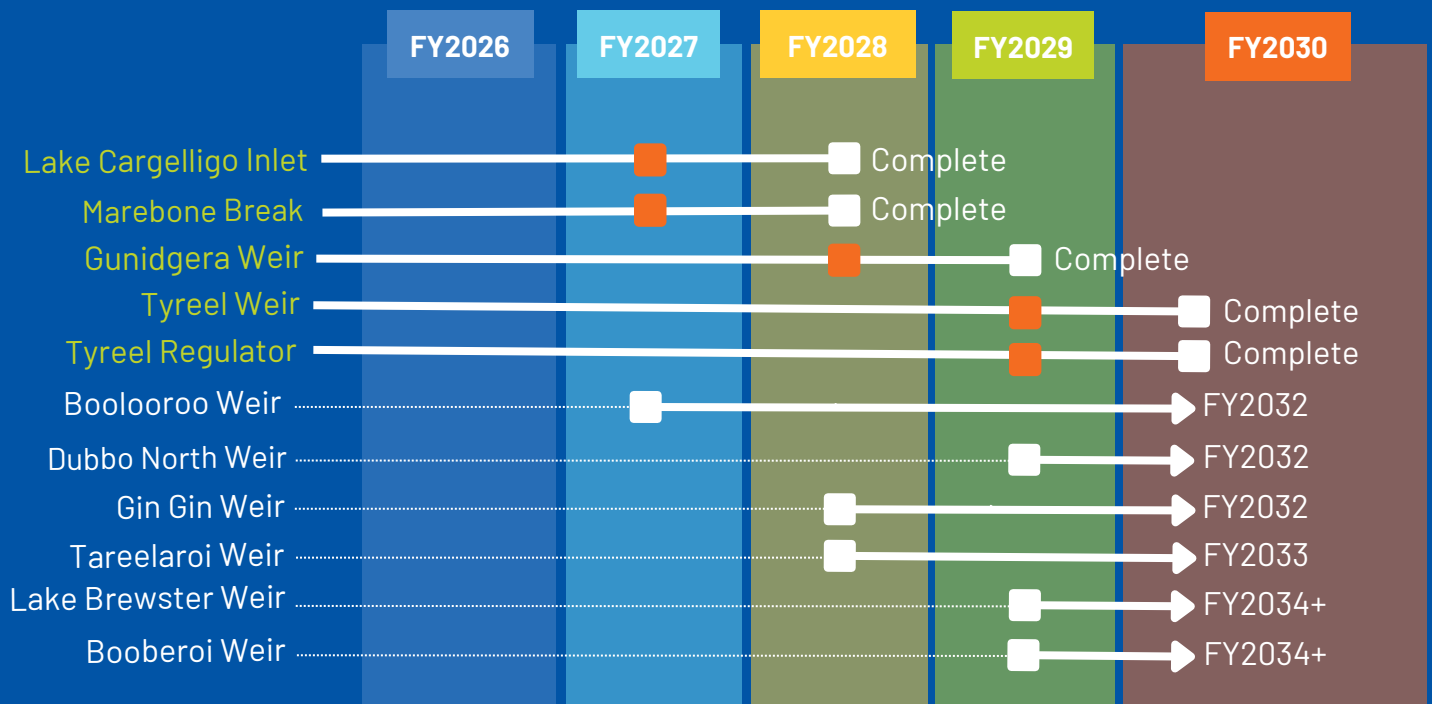
Scope for FY2026-FY2030

For the FY26-30 determination period, WaterNSW will deliver 5 and begin 6 new fishways on regulating structures throughout Namoi, Macquarie, Gwydir and Lachlan Valleys.

Project Timing & Delivery

- Set for completion in FY2026-FY2030
- Detailed design undertaken in FY2026-FY2030
- Anticipated practical completion

The Program is part of agreed environmental offsets following Dam Safety Upgrades at Copeton Dam (Gwydir Valley); Keepit Dam (Namoi Valley) Burrendong Dam (Macquarie Valley) and Wyangala Dam (Lachlan Valley).



Challenges

A major challenge is the construction of regulator and fishway structures that are reliable and safe to operate while still maintaining the intended level of service. They must reach the required fulfilment of operational obligations, at low effort and cost.

WaterNSW is currently exploring opportunities to further optimise costs in the delivery of the program, inclusive of exploring alternate sites that are more cost-effective compared to those proposed for Lachlan for FY31-35.

Compliance

Compliance with legislative and regulatory requirements & fulfilment of WaterNSW commitments include:

- **Ensure Legislative Adherence:** All fishway constructions must meet the obligations under *section 218 of the Fisheries Management Act 1994*.
- **Adherence to Biological and Operational Criteria:** Design and construct fishways that comply with DPI Fisheries Biological and operational criteria, ensuring that fishways are effective and sustainable in the long term.
- **Commitment to Installation:** WaterNSW has committed to the installation of a series of fishways as part of Dam Safety Upgrade offsets. This objective ensures that these commitments are met, enhancing fish passage and complying with the *Fisheries Management Act 1994*.
- **Integration with Major Works:** WaterNSW recognises that all major works on WaterNSW structures come with a requirement to construct fishways, integrating these installations into broader infrastructure projects to fulfil legal and ecological responsibilities effectively.

Options & Assessment

Project delivery and procurement considerations are currently underway to determine the best pathway forward for the Fishway Program, including the set up of a Fishway Consultancy Group.

The current Fishway Program has adopted the outcomes of the Strategic Fishway Implementation Program, where it was determined that the preferred types of fishways are: vertical slot, rock-ramp and lock fishways.

Procurement Considerations

WaterNSW has set up a specialist Fish Passage Design Procurement Panel in consultation with DPIRD Fisheries. The establishment of the Panel will allow WaterNSW to have multiple designs concurrently underway with multiple consultants while also ensuring value for money through a competitive tender process.

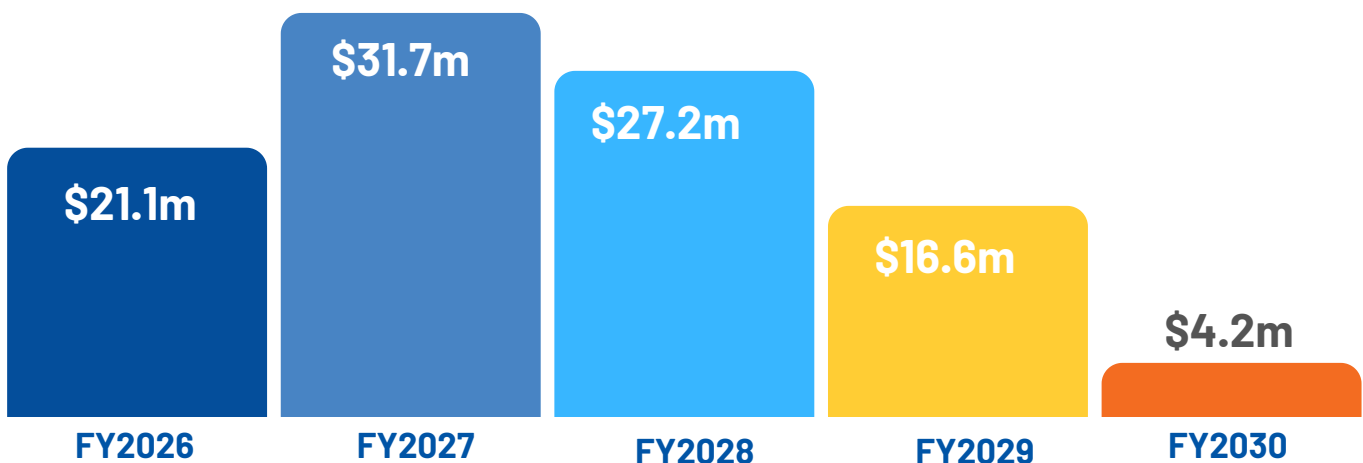
During construction, WaterNSW will use contractors with experience in fishway construction to deliver the projects.

Delivery Approach

The the Design Panel will prepare a detailed design for each project. During the design process, WaterNSW will regularly consult with DPI Fisheries to ensure the projects are addressing the fishway design criteria. The environmental assessment and preparation of a Review of Environmental Factors (REF) will be prepared simultaneously with the engineering design.

WaterNSW will stagger the construction of the fishway projects so that there is concurrent construction activities across two to three sites to carry forward lessons learnt whilst still ensuring delivery of the proposed program can be achieved by FY30.

Project Cost Estimate FY26-FY30





Lake Cargelligo Inlet



Marebone Break



Benefits

The proposed future state of the program involves the systematic removal of fish passage barriers across various weirs and regulators. This initiative aims to:

- **Discharge WaterNSW's Obligations:** Comply with s218 of the Fisheries Management Act (1994).
- **Maintain Weir Functionality:** Ensure the weirs and regulators continue to operate reliably, maintainable, and are available at the lowest lifecycle cost.
- **Enhance Fish Migration:** Facilitate the unimpeded migration of native fish species upstream and downstream.



Customer Benefits

This project aligns with WaterNSW corporate objective of **building a sustainable future**. The customer benefits are:

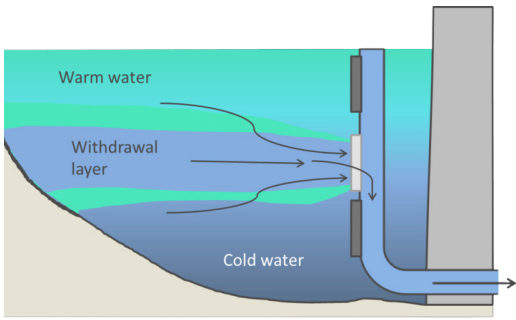
- **Sustainable Management:** Promoting sustainable water and land use practices.
- **Improved Fish Migration:** Ensuring native fish populations can migrate with minimal obstruction, supporting biodiversity.
- **Enhanced Service Reliability:** Maintaining the functionality of weirs, ensuring reliable water management services.
- **Cost Efficiency:** Achieving these improvements at the lowest Design and construction cost.



Customer Bill Impacts

The crucial factors that influence the decision-making process and implementation of fishway projects, ensuring their effectiveness, financial viability, operational efficiency, and environmental compliance include:

- **Assessment Focus:** Detailed assessments ensure fishway are selected based on specific site conditions and operational requirements.
- **Financial Implications:** Budgetary constraints and funding shortfalls necessitate careful planning to meet legislative obligations and minimise customer impact.
- **Operational Efficiency:** Prioritising low-maintenance designs reflects strategic planning to reduce ongoing operational costs.
- **Environmental Compliance:** Continuous monitoring and maintenance post-construction are critical to ensure ecological sustainability and regulatory adherence.



Overview

WaterNSW in accordance with the *Water Management Act 2000* must manage cold water impacts in order to eliminate the relative variance between the lower temperature water released from a dam and the natural water temperature upstream of the storage.

Where dam outlets withdraw water from deep parts of the storage, this cold water discharge into warmer receiving waters significantly impacts migration, breeding and growth of threatened and endangered native fish for many kilometres downstream of the storage.

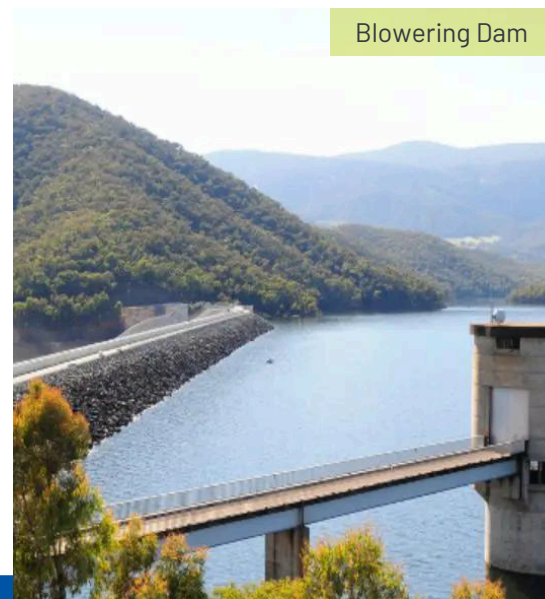
The NSW Government is seeking to address detrimental effects on native fish downstream of priority dams where cold water impacts are severe. The preferred strategy employed for many decades has been to supply warmer water from a position in the water column that is above the thermocline, to best mimic the natural conditions.

Challenges

WaterNSW must consider additional water quality outcomes such as preventing 'red alert level' release of toxic blue-green algae releases to downstream receptors in accordance with NSW Health protocols. This protects raw water quality for potable and recreational use, as well as impacts on other downstream users and the environment.

WaterNSW installed a world-first cold-water curtain around the offtake at Burrendong Dam in 2014. The infrastructure was damaged during operation and required redesign and remediation to improve its reliability. Operational robustness from this approach was not achieved.

This initial project demonstrates that designing engineering to reliably address cold water effects in large dam releases can be technically complex and costly, requiring significant investigation efforts.



Scope for FY2026-FY2030

For the FY26-30 determination period, WaterNSW plans to redesign and remediate the cold water pollution system at Burrendong Dam and complete planning, approvals and detailed design at Blowering, Copeton and Keepit Dams

Burrendong Dam
Cold Water Pollution - Execution

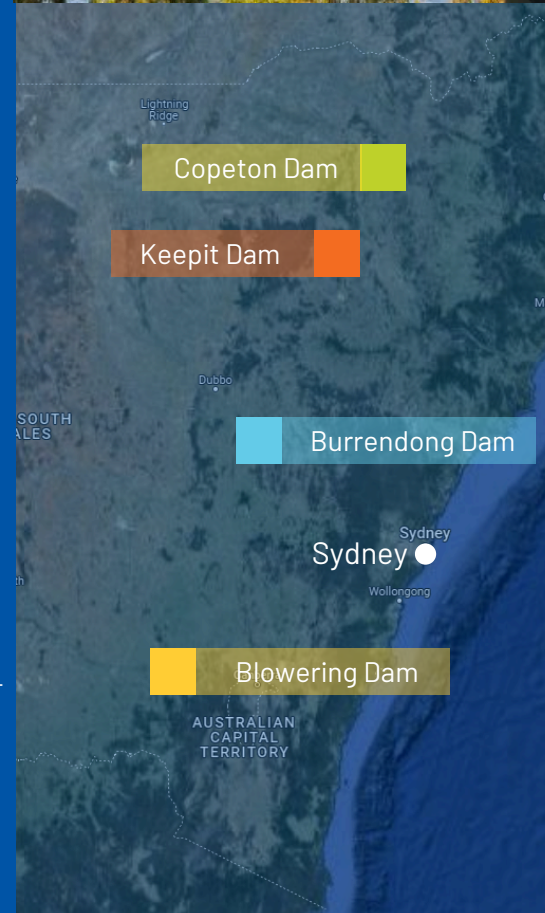
Redesign / remediation of existing cold water pollution infrastructure.

The current CWP mitigation option is an multi-level offtake – sliding plates. The option delivered within the funding envelope will likely be a Bubble Plume with or without renewable energy to offset the higher energy required, and associated opex cost.

Blowering, Keepit & Copeton Dam
Cold Water Pollution - Planning

Planning and design of cold water pollution mitigation solution.

The CWP mitigation options studies recommended delivery of detailed design and approvals works next period. Delivering these activities represents 8% to 10% of the estimated capital cost of the preferred option – Bubble Plume powered by renewable energy. The planning activities will inform the proposed implementation costs which will then be included as part of the FY31-35 regulatory period.



Approach

WaterNSW, with the support of the DPI Fisheries, will undertake the Cold Water Pollution Options Mitigation Project on three dams (Blowering, Copeton and Keepit Dams) while comparing mitigation against the precedence set by Pindari Dam, which has a multi-level offtake structure in place.

The proposed 3-Stage approach concludes with the implementation phase, that will then be included in the FY31-FY35 IPART submission reflecting the revised and more accurate cost. This approach aligns with the draft NSW Cold Water Pollution Strategy.

Options & Assessment

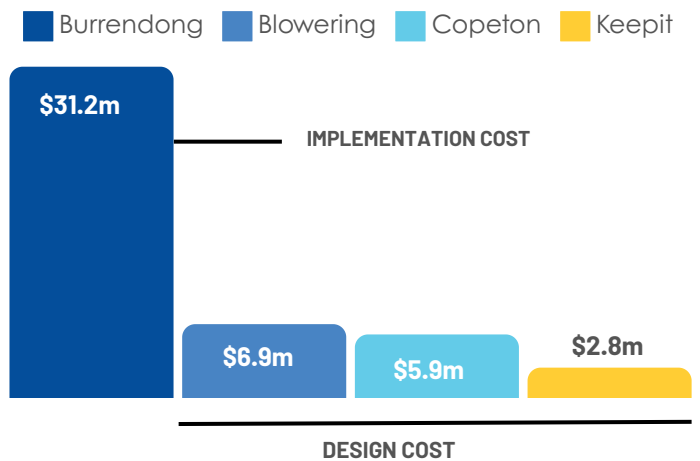
The design process was initiated following the development of an exhaustive long list of options to mitigate Cold Water Pollution. This long list was then subjected to a 'rapid' multi-criteria assessment to remove options that were not viable.

Opex Costs

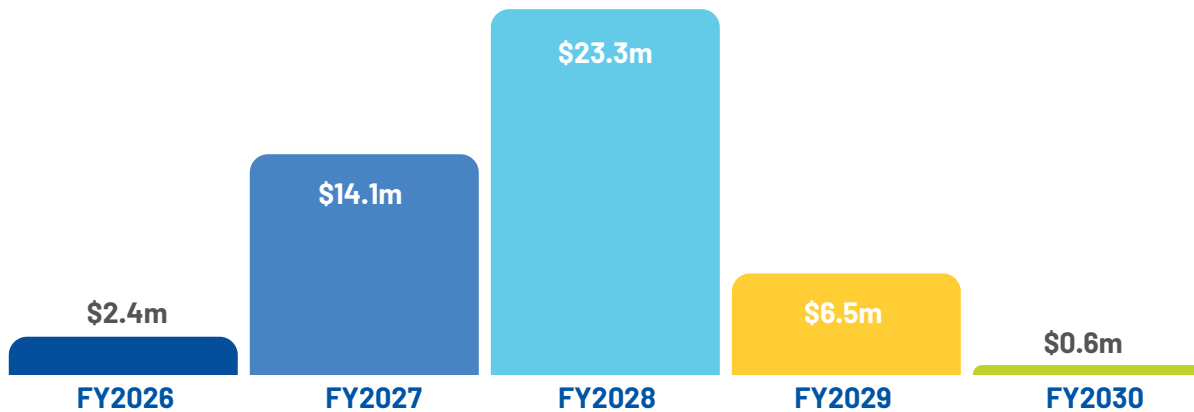
Operational expenditure costs scenarios have been considered when choosing the most prudent solution. These considerations include:

- **Energy Costs:** Energy required for operating gates, valves, and pumps.
- **Labor Costs:** Personnel to monitor and adjust flow rates.
- **Monitoring:** Continuous monitoring of downstream temperatures and flows.

Cost Estimate by Dam



Project Cost Estimate FY26-FY30



Benefits

- Controlling cold water impacts from priority dams would improve temperature conditions for the 2000 km of mainstream rivers affected by cold water pollution in NSW.
- These improvements in river health are expected to assist in the recovery of native fish populations and aquatic biodiversity.
- Significantly reduce ecological, social and cultural impacts of Cold Water Pollution to mainstream rivers in NSW.

Customer Outcomes

- ✓ This project aligns with WNSW Outcome 1: **WaterNSW will be efficient and keep its costs as low as practical**
- ✓ This project aligns with WNSW Outcome 4: **Sustainable water and land management**

Cataract Dam Safety and Upgrade Project Summary



Overview

Cataract Dam is one of the oldest and most picturesque dams in Sydney. At the time of its construction from 1902 to 1907, Cataract Dam was the biggest engineering project in Australia and the fourth biggest in the world.

The Upper Nepean Risk Review (UNRR) Project completed by WNSW, identified dam safety risks at Cataract Dam that plot above the 'Safety Threshold' as prescribed by the NSW Dam Safety Regulator. WaterNSW commissioned the Cataract Dam Safety Upgrade (CDSU) project to assess a range of dam safety upgrade options for the key Potential Failure Modes (PFMs) that were dominating the dam safety risks.

The complete list of risk control measures were subsequently assessed under the 'So Far As Is Reasonable Practicable' (SFAIRP) framework.

This project will see the implementation of the preferred options that have been selected, and preliminary concept designs and cost estimates developed.



Scope for FY2026-FY2030

For the FY26-30 determination period, WaterNSW will implement left abutment anchoring and spillway training wall buttress works.

The societal risk for Cataract Dam currently plots above the Dam Safety NSW Safety Threshold and ANCOLD limit of tolerability for existing dams. WaterNSW, as obligated under the regulation, has informed DSNSW and put forward a program to reduce the life safety risk of the dam.

The concept design recommends anchoring as a structural mitigation measure to address instability of the abutment during floods. The design also identified the need for concrete buttress on the spillway training wall to address the instability concerns.

The proposed works reduce the risk position for Cataract Dam to approximately half an order of magnitude below the Dam Safety NSW threshold and ANCOLD limit of tolerability for existing dams.

With the current state of knowledge and the available evidence, this is considered Reasonably Practicable and therefore is recommended for implementation to enable WaterNSW to fulfil its obligations as a dam owner.

Approach

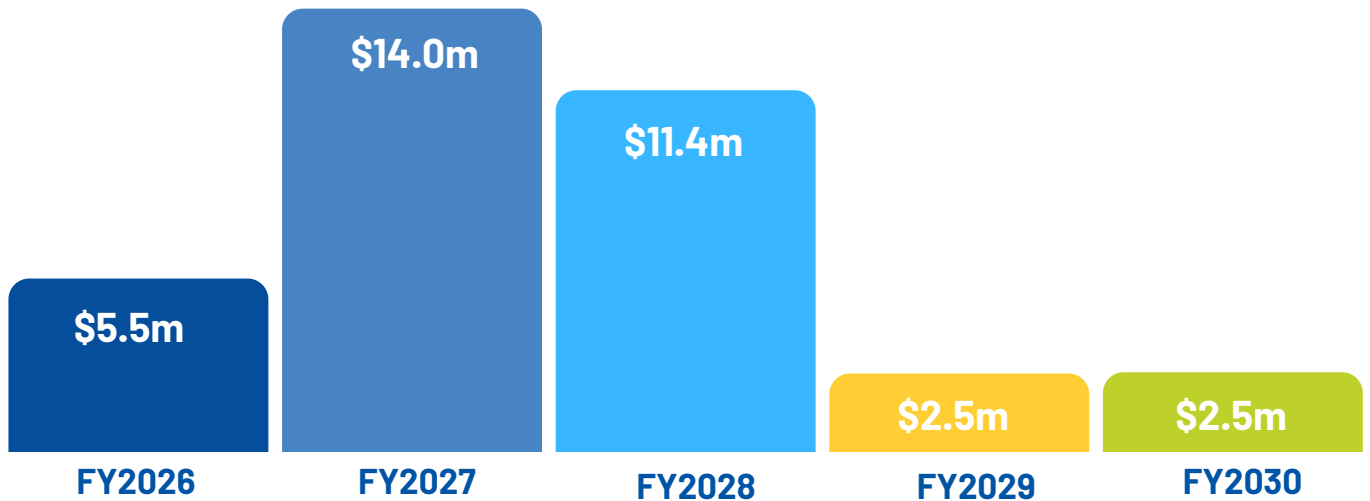
The Upper Nepean Risk Review was a comprehensive assessment of the Possible Failure Modes (PFM) of Cataract Dam. The assessment identified 5 PFM's which when assessed result in a risk that is above the safety threshold.

In order to identify potential solutions that would reduce the risk 'So Far As Is reasonably Practicable' a series of options were identified for further assessment.

Options & Assessment

WaterNSW identified five structural mitigation measures to progress to preliminary concept design. Following assessment it was identified that completion of two of the five measures would sufficiently reduce the assessed risk to an order of magnitude below the safety threshold.

Project Cost Estimate FY26-FY30



Procurement Considerations

A procurement strategy is currently being developed for the planning and detailed design phase of this project. WaterNSW will look to utilise capable and experienced consultants for this phase, including the consultants that were involved in the previous stage of this project

The nature of the works will require engagement of appropriately experienced contractors to deliver these key works packages. The project will require favourable climatic conditions (current and forecast) to minimise risk prior to the commencement of the construction phase.

Opex Costs

Operational costs have been considered when choosing the most prudent solution. The nature of the proposed works mean that there will be no change to the existing OpEx costs for Cataract Dam.

Benefits

The project will allow WaterNSW to implement control measures that reduce risk as far as is reasonably practicable in order to meet the dam safety requirements for Cataract Dam under the Dam Safety Regulation 2019.

Through the application of these structural mitigation measures, the societal risk, which currently exceeds the Dam Safety NSW Safety Threshold and the ANCOLD limit of tolerability for existing dams, will be reduced to below these thresholds.

Customer Outcomes



This project aligns with WNSW Outcome 1: **WaterNSW will be efficient and keep its costs as low as practical**



This project aligns with WNSW Outcome 2: **Provide secure and reliable water delivery**



This project aligns with WNSW Outcome 4: **Sustainable water and land management**

Torrigan Weir Upgrade & Fishway Project Summary



Overview

Commissioned in the 1960's, Torrigan Weir is an on-river structure located within Torrigan Creek, about 14km North of Booligal. The weir is currently in poor condition, and an operational and public WHS intolerable risk. One of the main purposes of the Torrigan weir is to deliver annual stock and domestic replenishment flows to landholders in Merrimajeel and Muggabah Creeks.

The Booligal Wetlands, one of the most valuable and nationally important wetland habitats in the Lachlan valley, are formed by the Merrimajeel and Muggabah Creek systems that flow away from the Torrigan Creek. Operationally, these two creeks are distributary channels of Torrigan Creek with the regulated flow by Torrigan Weir.

The Booligal Wetlands have been identified as one of the most important waterbird breeding sites in Australia, known for the large numbers of waterbirds that congregate to breed and forage in the area during and following floods. Environmental water over the last few years has contributed to priming and maintaining the wetlands.



Torrigan Weir Upstream



Torrigan Weir Downstream

Challenges

- During the translucent releases period from Wyangala Dam which occur during the period of 15 May to 15 November annually, the inflows to the storage and downstream tributary must meet the requirements specified in the Water Sharing Plan.
- Public access has been requested, and a bridge would be required to allow access to National Parks. This will need to be investigated.

Project Timing & Delivery

Scope for FY2026-FY2030

For the FY26-30 determination period, WaterNSW will replace Torrigan Weir; a major on-river structure. This will include:

Brief summary

The Torrigan Weir renewal project will include:

- Demolition of the existing weir
- Construction of a new concrete weir structure
- Provision of fish passage at the site

Flow monitoring and control

An options analysis for flow control and monitoring including:

- Electric actuated gates
- Mechanical with portable actuator
- Stop Boards

Gate configuration

- Options analysis to review optimum number of gates to save energy and provide better water level control
- Options to be considered based on flow requirements and hydraulic parameters, maintainability, and reliability

Initiation Phase Complete	Planning Phase In progress	Execution Phase FY26-30
<ul style="list-style-type: none"> • Identify and document User Requirements Specification • Undertake review • Undertake optioneering • Risk Workshop • Review performance criteria • Structural assessment • Options development • Resource schedule estimate • Consolidate prelim business case 	<ul style="list-style-type: none"> • Undertake review workshops • Concept design for preferred option • Develop project management plans • Detail design specifications • Liaise with DPIRD • Carry out environmental assessment • Issue for tender • Consolidate final business case 	<ul style="list-style-type: none"> • Award tender to construction partner • Develop Operating protocols • Disposal of decommissioned assets • Development of asset management lifecycle manualsil design specifications • Capitalisation of project costs • Updating asset information

Approach

WaterNSW will undertake the replacement of Torriganney Weir over 3 phases:

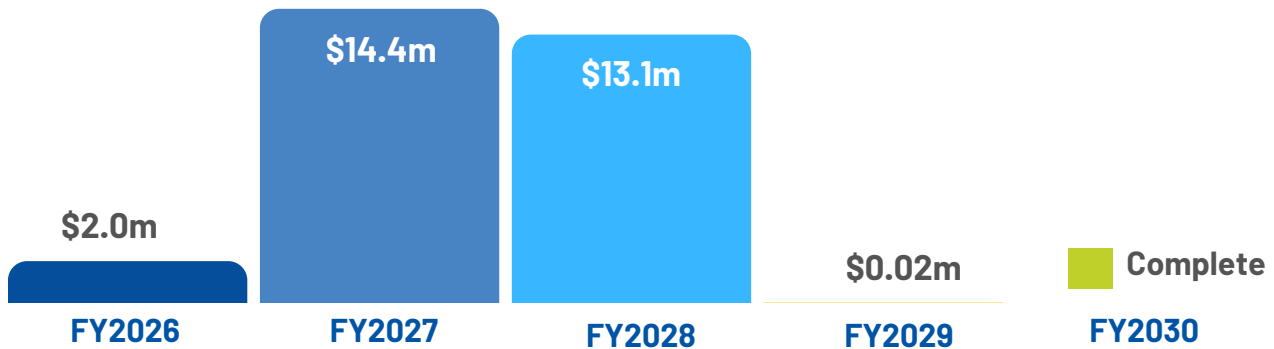
- Initiation Phase** - Commenced 2021
- Planning Phase** - FY22-FY25 Rural IPART submission
- Execution Phase** - FY26-FY30 combined IPART determination period

Procurement Considerations

Water NSW has set up a specialist fish passage design procurement group. The 3 consultants in the group were selected in consultation with DPI Fisheries. Its hoped that the establishment of the Fish Passage Design Group will ensure value for money through a competitive tender process.

For the construction of the fishways project, WNSW will use contracting partners and specialist fishway passage contractors to tender and deliver the projects.

Project Cost Estimate FY26-FY30



Options & Assessment

The concept design development during the initiation phase of the project considered the following 4 options:

Option 1: Offline construction of a new weir and bridge structure. Demolish the existing weir and excavation required to align the watercourse to suit the new location of the weir.

Option 2: Offline construction of a new weir with a separate bridge structure. Demolish the existing weir and excavation required to align the watercourse to suit the new location of the weir.

Option 3: Refurbishment of the existing weir. The refurbishment works included replacing the existing weir deck with a new concrete deck, replacing drop boards with 4 layflat gates, remediation of rock beaching up and downstream of the weir and undertake structure modification to stabilise abutment movement.

Option 4: Offline construction of a new weir, bridge and vertical slot fishway structure. Demolish the existing weir and excavation required to align the watercourse to suit the new location of the weir.

Following an option assessment process and considering the advice received from DPI Fisheries Option 4 was selected as the preferred option to take forward to detailed design.

Benefits

- Optimal delivery of environmental water to nationally important wetlands and environmental assets.
- Increased efficiency in water delivery operations due to increased re-regulating capacity.
- Reduced risk of structural & embankment failure and reduce potential WHS risk.
- Extend the life of structure and operational assets and at the same time reduce operational costs and maintenance time.
- Provision of fish passage to satisfy the Fisheries Management Act s218 requirements.
- Extended life for the weir structure and other operational assets.

Customer Outcomes

- ✓ This project aligns with WNSW Outcome 1: **WaterNSW will be efficient and keep its costs as low as practical**
- ✓ This project aligns with WNSW Outcome 2: **Provide secure and reliable water delivery**
- ✓ This project aligns with WNSW Outcome 4: **Sustainable water and land management**

Oberon to Duckmaloi Pipeline Renewals Project Summary



Overview

The Fish River Supply Scheme (FRWSS) was initially designed to help mitigate chronic water supply problems in the towns of Lithgow, Wallerawang, Portland, and Oberon, which occurred as early as 1937 and were exacerbated by the 1940s drought. World War II and the need for Australian-sourced fuel resulted in the FRWSS project commencing in 1943, with an expanded scope to include water supply to the Glen Davis shale oil works (Stage 1).

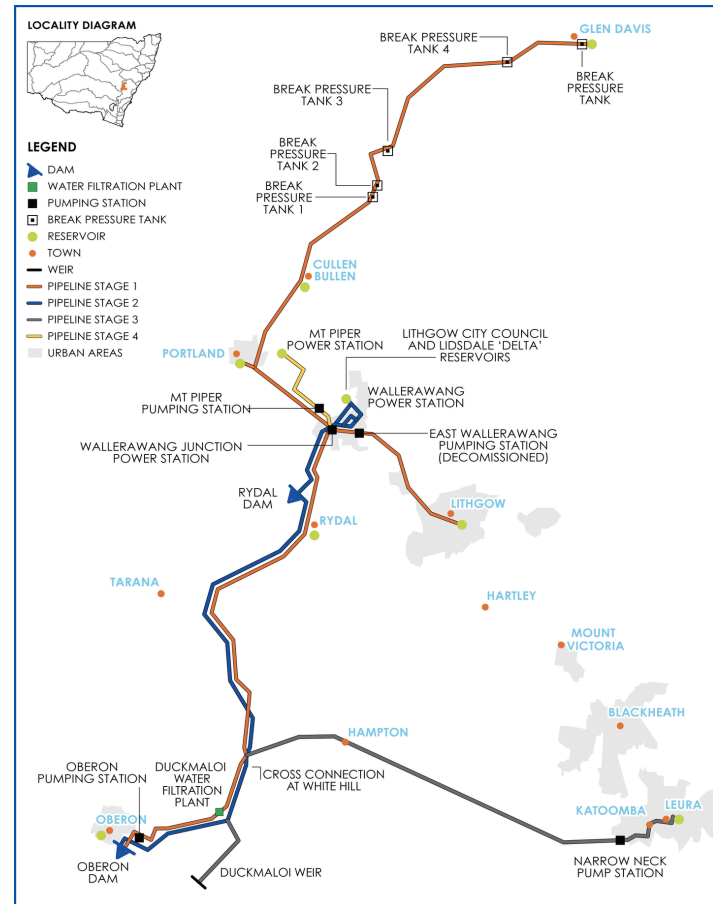
The early 1950's saw the closure of the shale oil works, and the creation of new power stations for electricity generation at Wallerawang. The power stations' need for cooling water and increasing domestic demand in the Upper Blue Mountains (where there were frequently water restrictions) became the catalyst for the scheme's expansion in the 1950's and 1960's (Stage 2 and Stage 3). An increasing need for water for Energy Australia's Mt Piper Power Station saw the development of the Stage 4 pipeline in 1991.

The scheme draws water from Oberon Dam and Duckmaloi Weir and includes 236km of pipelines and a tunnel under the Great Dividing Range.

Challenges

A significant proportion of the FRWSS pipelines were laid in the 1940's and 1950's. Many of these were constructed from reinforced concrete pipe, a material selected due to material shortages at the time. These pipes have arrived at the end of their useful life, and are now subject to very frequent leaks and breaks.

Repairing these pipe defects requires multiple pipeline outages per month, and can present health and safety risks to our personnel. The present failure rate (pipeline breaks) impacts on our ability to provide the expected levels of service to our Fish River customers. The service impacts include supply interruptions, whilst repairs are scheduled and completed and impacts on overall system reliability for our customers.



Scope for FY2026-FY2030

WaterNSW has undertaken a review of the pipelines in the scheme, and has developed a program of works to progressively improve the level of service to be in line with customer expectations and agreed service standards.

WaterNSW are conscious of the level of investment required to renew the ageing pipelines and the impact of this on customer prices. As a result we have proposed to phase the renewal program over multiple determination periods. This would see an investment of \$29m proposed in FY26-30 with a similar level of investment to occur in FY31-35.

This initial expenditure will be focused on replacing the worst performing pipelines between Oberon and Duckmaloi. The Stage 2 pipeline begins at the outlet works at Oberon Dam, with Section 3 of the pipeline between Whitehill and Rydal terminates at the inlet works at Rydal Dam, and Section 4 of the pipeline between Rydal and Wallerawang begins at the outlet works of the dam.

Following the preliminary options analysis the preferred option is pipeline renewal of the full 7.2km of the Stage 2 pre-stressed concrete section from Oberon Dam to Duckmaloi.



Approach

The recently completed Fish River Long-Term Strategy identifies a range of plausible service scenarios, some of which may involve changes to the services sought by some existing customers.

Whilst these scenarios are further considered by stakeholders, WaterNSW is proposing to invest in this section of the network which is not impacted by any potential longer-term changes to the supply arrangements. This provides customers confidence that the no-regrets investment is prudent and will support the Fish River scheme under multiple scenarios into the future.

Procurement Considerations

WaterNSW will use a variety of procurement methods, selecting the most appropriate approach to fit each individual scenario.

Options & Assessment

WaterNSW have considered multiple options for addressing levels of service reliability, including ongoing reactive repair strategies, pressure management, and varied approaches to pipeline renewals. Pipeline renewals have been phased in such a way to progressively deliver measurable benefits to service delivery performance over time.

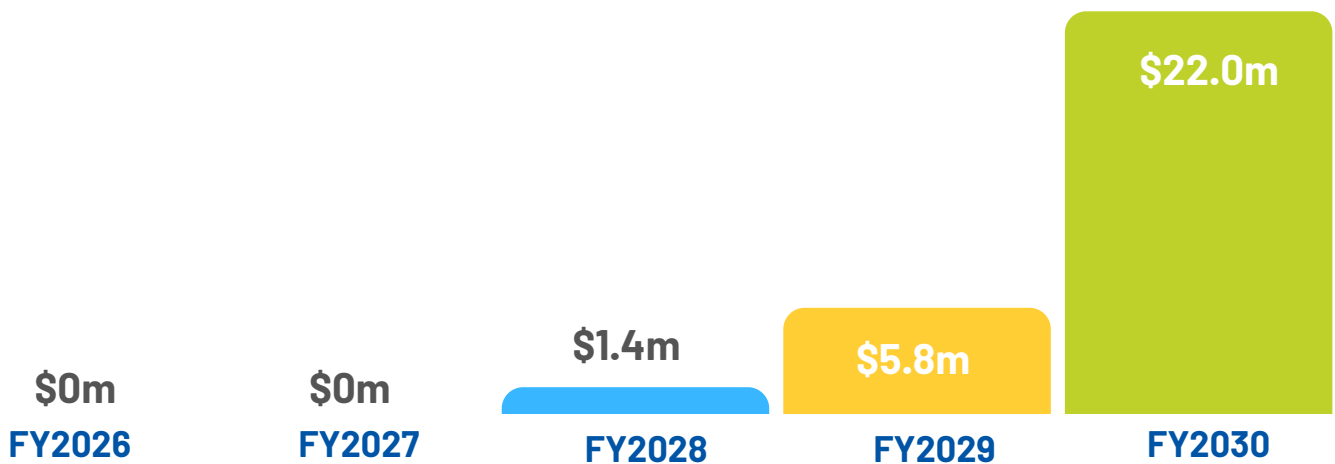
The options considered included Reactive Maintenance only, and other alternate renewal treatment options with the resulting Multi-Criteria Analysis supporting the selection of the preferred option.

Opex Costs

Opex costs from pipeline failures have escalated significantly over the last decade. The program of pipeline renewals is expected to recover some of this increase back over time.

As part of the options analysis undertaken a continuation of the current reactive approach to pipeline repair was considered. Notwithstanding the service impact that results, the NPV analysis also demonstrated that over the long-term investment in renewal of the pipeline provides a favourable financial outcome for customers.

Project Cost Estimate FY26-FY30



Benefits

- Increased reliability of water delivery services.
- Reduced reactive repairs will result in improved safety for our people.
- Reduced opex costs from frequent repairs.

Customer Outcomes



This project aligns with WNSW Outcome 1:
WaterNSW will be efficient and keep its costs as low as practical



This project aligns with WNSW Outcome 2:
Provide secure and reliable water delivery

Asset Lifecycle Management and Planning Project Summary



Overview

The Asset Lifecycle Management and Planning Program aims to enhance work management systems and processes to enable better planning, implementation and monitoring of physical infrastructure projects and activities.

Currently, there is a fundamental challenge of ensuring that information is readily accessible and reliable. The proposed solution is Data Driven Field Operations that represent a promising shift towards addressing the challenge of information availability and accuracy.

By leveraging the data and analytics platform introduced in the 2020 - 2025 price path, this solution is designed to consume large volumes of data from multiple sources including asset records and field-based observations.

Through the introduction and application of Advanced Analytics, AI and machine learning, this solution optimises asset maintenance schedules and drive towards predictive maintenance. This proactive approach is intended to minimise disruption, effectively turning the challenge of information availability and accuracy into a strength in field operations.

Scope for FY2026-FY2030

For the FY26-30 determination period, WaterNSW will enhance work management systems and processes to enable better planning, implementation and monitoring of physical infrastructure projects and activities. Including:

Field Mobility – this entails deploying tablets that are equipped with an integrated safety, field services and Customer Relationship Management (CRM) solution to enhance efficiency and safety in field operations and improve customer communication and relationships.

Integrated Operations Planning Solution – this will utilise asset maintenance and replacement scheduling analysis from the Optimised Field Service solution together with a detailed understanding of staff skills and availability to implement an optimised and automated asset maintenance program (i.e., which assets get maintained, when and by whom).

Asset Program Management – The Integrated Portfolio Controls Solution (IPCS) is intended to equip the planning team with a tool for defining program objectives, scoping, and budgeting that will flow through to the delivery team while being elaborated on at each stage gate. A planning and scheduling tool with capability enables the creation of robust schedule, allocation resources and setting up dependencies within the program.



Key Activities

Deliver

- Project governance & commercial risk management framework
- Solutions and implementation of target business processes

Improvement

- Of the field mobility solution to ensure that data can be captured on site online and offline and to validate asset information and execute work orders on the field
- Of the Graphical Planning Board (GPB) solution to capture work permits and Hazard and Operability Studies information and to support the Planner and Scheduler to plan work, resources and inventory

Enhancement

- Of Enterprise Asset Management System (EAMS), Field Mobility and GPB application to support additional modules within the core system and integration to GIS to have a Graphical User Interface to see assets on a layered map and the planning and capture of WaterNSW assets

Integrate

- EAMS to Supervisory Control and Data Acquisition (SCADA) systems to enable trigger fault and incident workorders
- EAMS to a time and attendance solution to ensure forecast and actual cost are captured on work orders and GBP

Update

- Update / configure EAMS and Field Mobility solution to capture Failure Mode, Effects & Criticality Analysis data.
- Update Asset Hierarchy to reflect Planned Maintenance and Corrective Maintenance tasks based on site-by-site assets

Other

- Water User engagement and digital program advocacy
- Quantify economic benefits assessment and associated customer research
- Detailed project delivery planning and costing for preferred option will be undertaken
- Joint agency executive sponsor approval
- Final Business Case for implementation submitted for Board approval
- External Project assurance review (Business Case and pre-execution stage)

Approach

The Asset Lifecycle Management and Planning program delivery methodology and approach will be determined as the funding and business case is approved.

Opex Costs

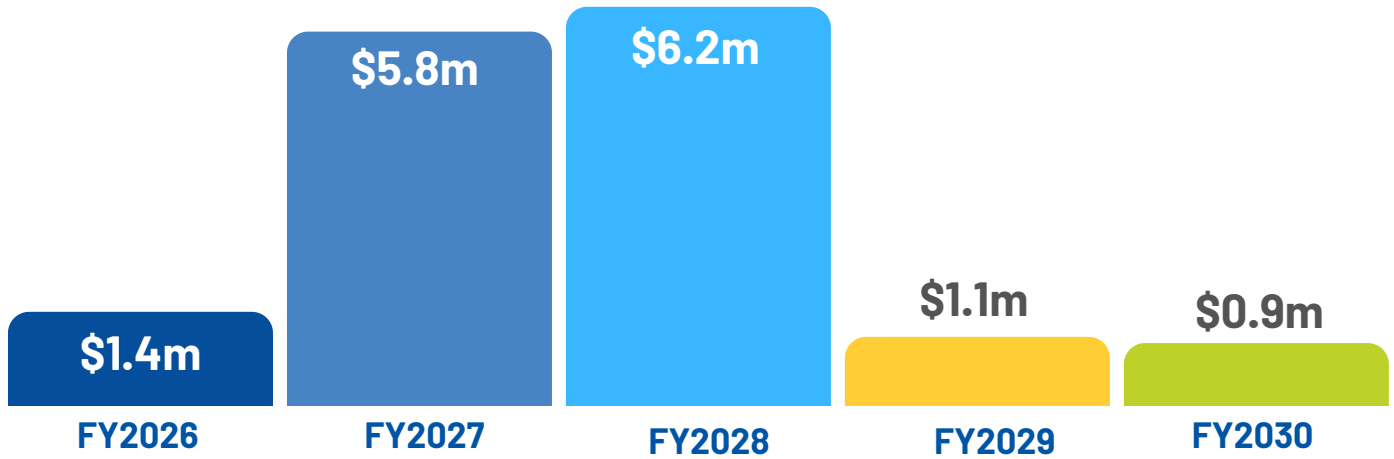
Investing in a robust Asset Lifecycle Management and Planning system for Water NSW can yield a range of financial and non-financial benefits.

Options & Assessment

The Asset Lifecycle Management & Planning analysed 3 options to achieve the “future state”. The options considered offered different levels of achievement with the preferred option being:

- Fully connected works management and optimised remote working in the field. Enabling a seamlessly integrated field mobility, operational and planning solution that optimises asset maintenance scheduling and ensures a smooth and efficient workflow.

Project Cost Estimate FY26-FY30



Benefits

- A fit-for-purpose Field Mobility solution would allow field information to be recorded in a structured way on a single platform, minimising duplicate efforts and improving data accuracy and consistency.
- Strong connectivity allows field staff to communicate accurate data and information and to have access to near real-time updates. This reduces the likelihood of errors, increases data quality and streamlines decision-making.
- Ability to forecast, plan and schedule resources including human and non-human, parts and contractors.
- An automated asset maintenance program will reduce downtime, improve operational safety, and optimise field resource allocation. In-day changes to schedules will be automatically updated to maintain efficiency and productivity.

Customer Outcomes



This project aligns with WNSW Outcome 1:
WaterNSW will be efficient and keep its costs as low as practical



This project aligns with WNSW Outcome 3:
WaterNSW will be open and transparent about customer charges and WNSW expenditure

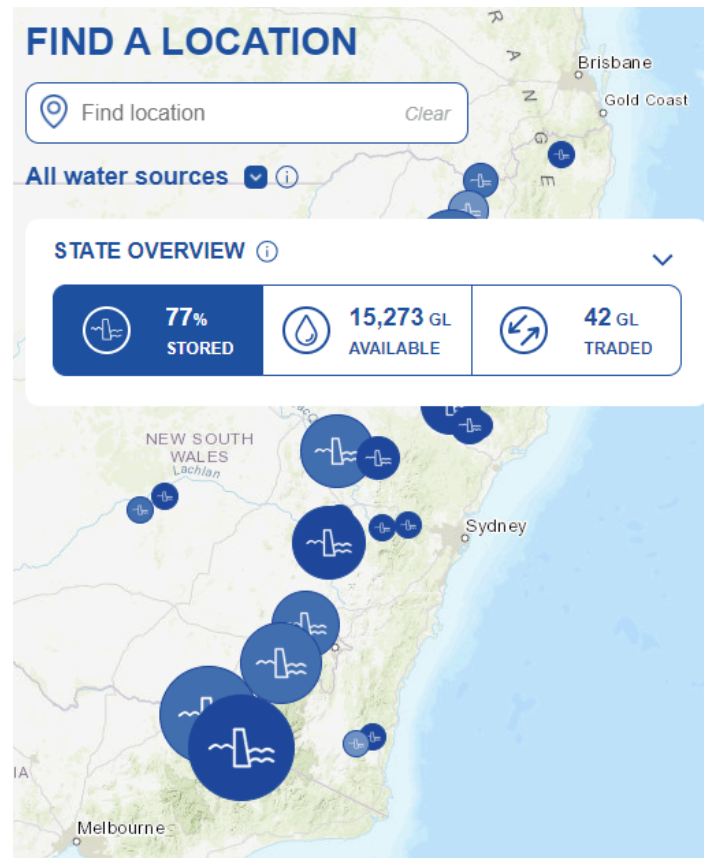
Overview

WaterInsights is a strategic WaterNSW digital product designed to enhance water transparency and data accessibility. It underscores our commitment to empowering communities with crucial information and education on managing this finite resource.

The portal has successfully fulfilled its original objective of offering a straightforward, community-focused platform for water regulation and access information relevant to the community and customer.

Features such as access to data sets have garnered significantly more interest than initially anticipated, highlighting the portal's strategic value in continuing to meet and exceed the users needs.

WaterInsights serves as a user-centric portal aimed at empowering communities with relevant information and educational resources on water resource management. The platform offers easy access to comprehensive data sets, supporting informed decision-making for individuals, policymakers, and researchers. By fostering greater community engagement and trust, the portal plays a vital role in promoting sustainable management of water resources.



Scope for FY2026-FY2030

For the FY26-30 determination period, WaterNSW will focus on improving delivery of information to continue to better serve the needs of our Customers and the Community. These includes the following:

User-Centric Design: Implementing a user-friendly interface that simplifies navigation and enhances the discovery and use of contextual information & data. Through the design of intuitive visuals to communicate the interconnectedness of water resources and their impacts, alongside continuous data & information integration WaterInsights will continue to provide relevant information to our customers and community for their use in decision making and understanding the complexities within water management. This also encompasses a native mobile app to ensure the best possible experience for our customer and community on the move, in the field or in areas of low connectivity.

Continuous Data Integration: Integrating data into WaterInsights from multiple sources will enable a more complete & holistic view of water resources including:

- Water quality, environmental impacts and localised information
- Provision of water information from river reach to regional scale.
- Links to information to aid further information and add value to customers and the community
- Improve the ecosystem health including improving asset information, maintenance, outages and reduced capability

FY26 Goals

- Increase access to historical data and complete integration for water quality across Greater Sydney
- Update navigation to make it easier for all our customers

FY27 Goals

- Native app development
- All WaterNSW data is sourced from our central repository single source of truth
- Selected external data shared from across states

FY28 Goals

- Water balances, flow and quality at farm through to regional scale
- Education - links to information, research, further reading

FY29 - FY30 Goals

- Ecosystem health including asset information, maintenance, outages, reduced capability

Approach

WaterNSW has clear goals to achieve in each year of the 2026-2030 financial years for WaterInsights. The focus will be on meeting these goals in order to improve delivery of information and to continue to better serve the needs of our customers and the community.

Procurement Considerations

Development activities on WaterInsights will be delivered using a combination of contract resources led by WaterNSW staff. This arrangement puts more control to WaterNSW in managing and prioritising activities. Contract personnel will be sourced through the WaterNSW vendor panel.

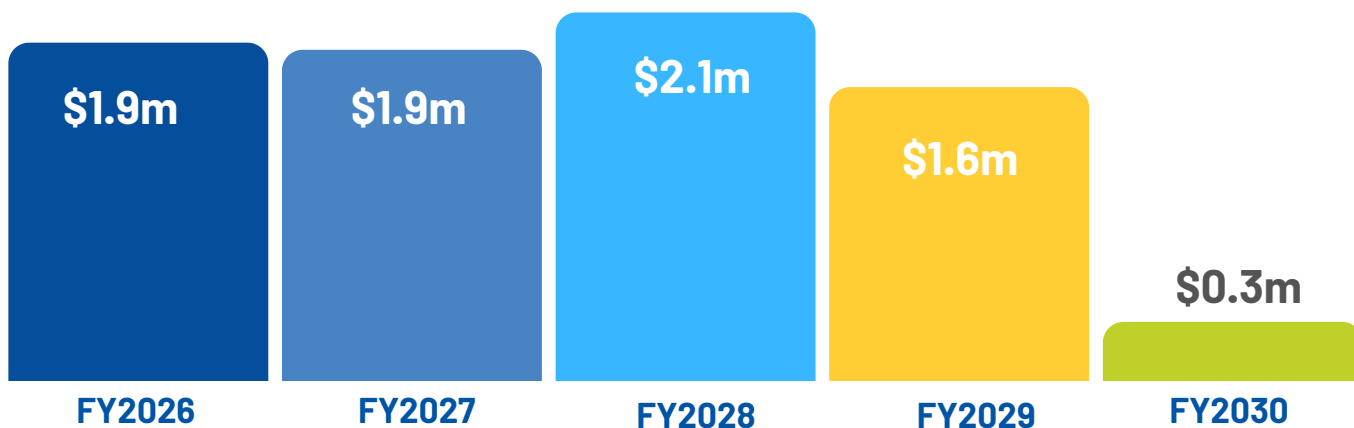
Options & Assessment

Three options have been considered for the proposal, including a minimum cost (maintenance only approach), mid-tier investment and fully featured investment. These options were submitted to community group consultation, with the result being community agreement on the mid-tier option.

Opex Costs

Potential cost benefits will be identified as part of the business case that is yet to be completed.

Project Cost Estimate FY26-FY30



Benefits

Transparency: promotes openness by providing public access to information & data, fostering trust and accountability in the communities we serve

Empowerment: WaterInsights empowers communities with valuable information to enable informed decisions

Data-Driven Decisions: Supports all stakeholders and users of the data through contextual and accessible data sets

Community Engagement: WaterInsights enhances community engagement by making water information relevant and accessible to users, driving greater interest and participation in water management

Customer Outcomes



This project aligns with WNSW Outcome 1:
WaterNSW will be efficient and keep its costs as low as practical



This project aligns with WNSW Outcome 3:
WaterNSW will be open and transparent about customer charges and WNSW expenditure