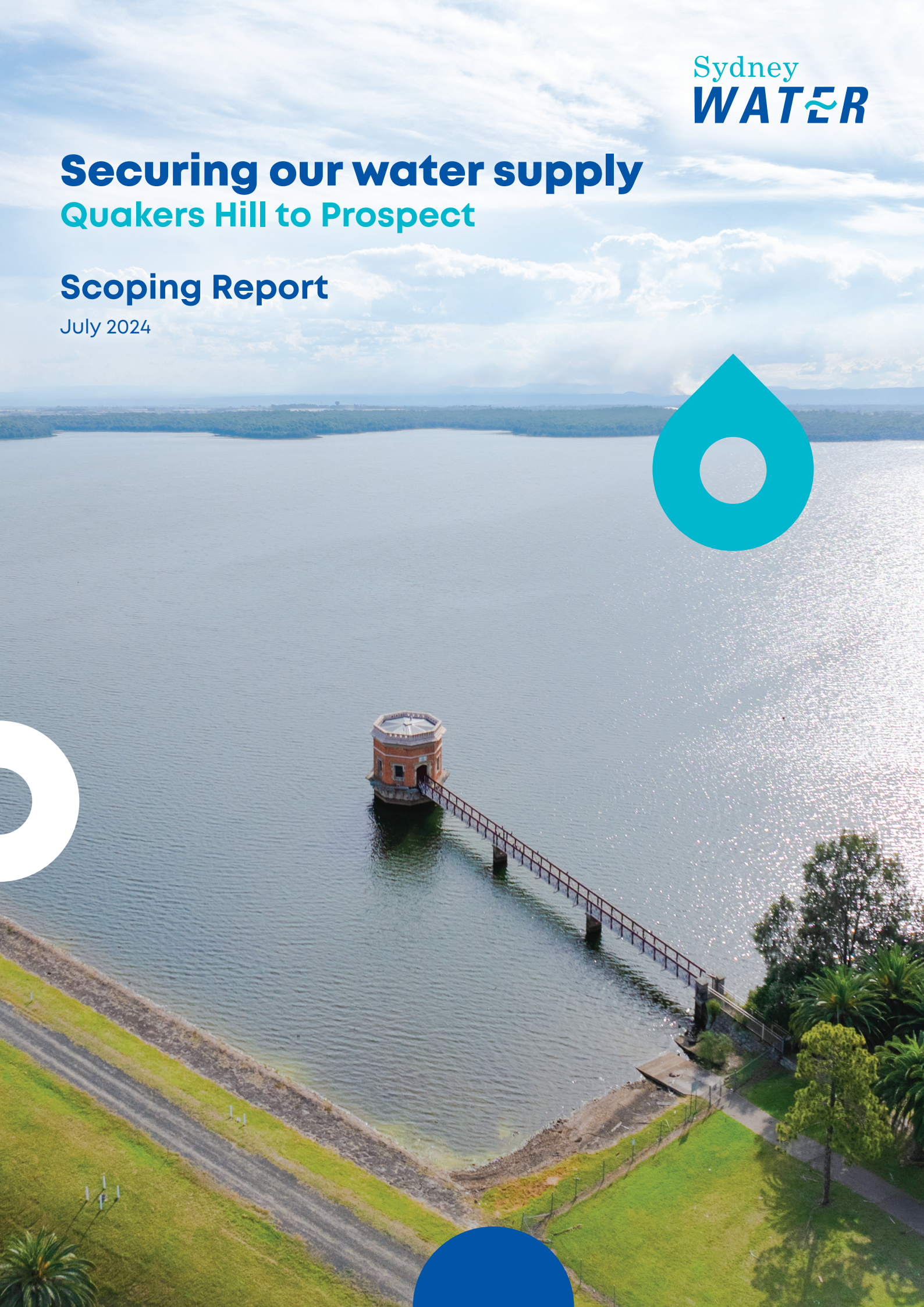
Sydney WATER

Securing our water supply

Quakers Hill to Prospect

Scoping Report

July 2024



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Sydney Water respectfully acknowledges the traditional custodians of the lands and waters across Greater Sydney that will be influenced by this project – the Dharawal, Dharug and Eora nations. We also pay our respect to Elders, past and present.

Their lore, traditions and customs nurtured and continue to nurture the waters, saltwater and sweetwater (freshwater) in Sydney Water's operating area, creating wellbeing for all.

Publication number SW 61 04/24

Executive Summary

Greater Sydney's water supply – a resilient and reliable future

For 136 years, Sydney Water has invested in water infrastructure across Greater Sydney, the Blue Mountains and Illawarra to help secure the lifestyle we live today. While we have historically relied mainly on rainfall for water supply (from dams and waterways), we need to think about water differently as our climate changes, our population expands, and our demand grows.

The NSW Government's Greater Sydney Water Strategy establishes the direction for urban water management in Greater Sydney and supports an approach to build a resilient and reliable water supply. Dams, water conservation and water recycling for non-drinking purposes will continue to be important. However, we also need to incorporate a variety of rainfall-independent sources to provide resilience and reliability in all climate scenarios. Prolonged dry weather, drought conditions and intense rainfall have shown us how quickly our water storages can deplete and replenish when we rely on rainfall alone (Figure ES-1).

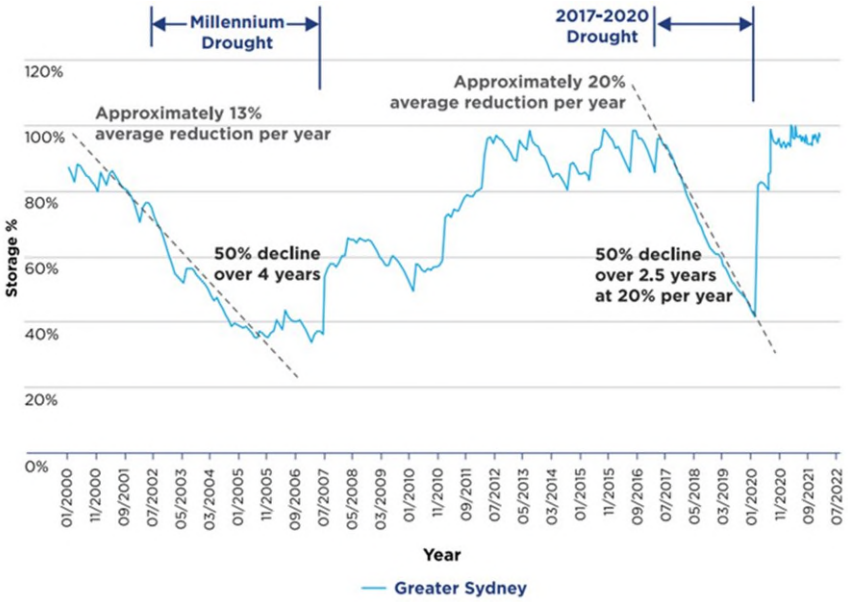

Figure ES-1 – Changes in Greater Sydney's water storage levels between 2000 and 2022 (DPE 2022a, p.36)

In 2007, Sydney invested in its first desalination plant that can supply up to 15 per cent of our drinking water needs. As part of the Greater Sydney Water Strategy, investigations are progressing to expand this plant to supply up to 30 per cent of our needs. Additional desalination plant capacity is being considered in the Northern Beaches and Illawarra regions.

Water conservation continues to play an important role. Our customers have helped us make the most of our existing water assets and supply by changing their behaviours and attitudes towards water.

While we've seen positive changes over the years, dams, desalination and water conservation are not enough to secure our water future. We also need to consider the most cost-effective ways to secure the water our city needs. Sydney Water's long-term investment planning acknowledges a gap in our water demand and supply, along with the costs of upgrading our wastewater systems to meet the challenge of population growth and environmental performance expectations.

Investigating Purified Recycled Water

One way we are addressing this challenge is further investigating the opportunity to include Purified Recycled Water (PRW) as a water supply option for Sydney. PRW is a safe, high-quality, and cost-effective water supply option that is sustainable and drought-proof. It would be treated to the same quality as our other sources of water. PRW has already been adopted in more than 35 cities around the world as a safe and resilient component of their drinking water supply, including in California, South Africa, the United Kingdom, Singapore and locally in Perth in Western Australia.

PRW is defined as water recycled from industry and homes (including from kitchens, showers and toilets) that has been purified to meet strict Australian Guidelines for Water Recycling (Phase 2) to supplement drinking water sources (like rivers and dams). PRW is highly treated before being added to existing raw water supplies such as dams, reservoirs and rivers. It is not proposed to be transferred directly into our drinking water network.

Sydney Water has built a PRW Discovery Centre at Quakers Hill to demonstrate the performance and reliability of the treatment technology, and give the community an opportunity to learn about PRW. We've had over 1,500 visitors since opening in October 2023. Sydney Water is doing comprehensive testing to show that the water meets the Australian Guidelines for Water Recycling (Phase 2). Water produced at the Discovery Centre is not included in Greater Sydney's water supply.

Sydney Water's Long Term Capital and Operational Plan is Sydney Water's strategic response to key challenges such as population growth, climate change, evolving technology and our ageing infrastructure. It focuses on the investments that we have determined will provide the most value. However, it is adaptive to a range of scenarios given the future is uncertain. Aligning with this plan, we are starting planning for potential investments in PRW, initially for a scheme from Quakers Hill to Prospect Reservoir, as outlined in this Scoping Report. This scheme is more cost effective than other sources of new water supply because it builds on existing infrastructure at the Quakers Hill Water Resource Recovery Facility (WRRF). Pending environmental and other approvals, over the next 30 years, we also envisage future investments in PRW schemes, including at Camellia, Liverpool and Glenfield WRRFs to ensure that we continue to provide world-class reliable and resilient water services for our city, while maintaining affordable bills for our customers.

Securing our water supply – Quakers Hill to Prospect

The Securing our water supply – Quakers Hill to Prospect project includes a new PRW Treatment Plant at Quakers Hill WRRF which would treat wastewater to produce PRW. It also includes a new pipeline to transfer PRW from the Treatment Plant to Prospect Reservoir and infrastructure such as holding tanks. The PRW would be mixed with dam or river water in Prospect Reservoir. The storage time in the reservoir helps provide a conditioning and checking period with this dam and river water. If required, we will build assets in the reservoir to ensure appropriate mixing. Finally, as happens today with other water sources, this blended water from the reservoir would be further treated at the Prospect Water Filtration Plant and transferred into drinking water systems that supply drinking water to about 80 per cent of Greater Sydney. Another part of the project is a pipeline to transfer the brine produced as a by-product of the purification process from the PRW Treatment Plant to Sydney Water's existing wastewater network at Seven Hills.

To build a foundation for future PRW schemes, environmental assessment of the project will assess the impacts of flows (from this and future schemes) on Prospect Reservoir, and potentially make some allowance for them in infrastructure design.

A pathway to PRW – the first of many steps

This Scoping Report is the first step in a planning approval process to assess the environmental and social impacts of the Securing our water supply – Quakers Hill to Prospect project.

This report describes the project, demonstrates alignment with government plans and strategies and summarises the expected impacts. The next steps are for Sydney Water to prepare an Environmental Impact Statement (EIS) and continue to provide a range of opportunities for community education, engagement and feedback on the project. The community and stakeholders will have the opportunity to make submissions to the NSW Department of Planning, Housing and Infrastructure through public exhibition of the EIS in late 2025.

A planning approval from the Minister for Planning and Public Spaces is only one approval needed before investing in transferring PRW to Prospect Reservoir. Other key activities and approvals include continuing community and stakeholder engagement (which started in 2021), funding approvals to build and operate the project, and approvals from NSW Health. Figure ES-2 shows an indicative project timeline.

Provided the necessary community support and government approvals are received, transfers of PRW to Prospect Reservoir could start by mid-2032.

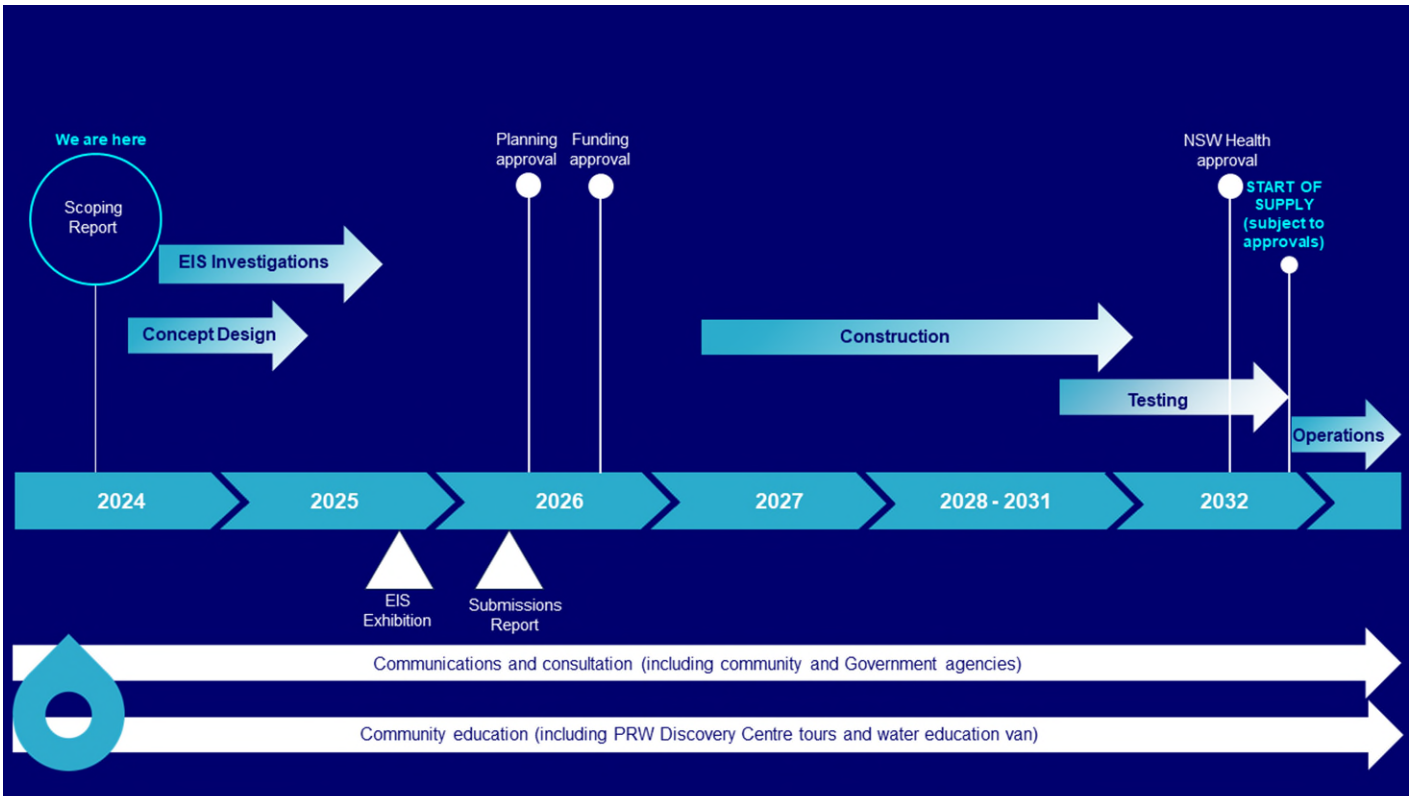

Figure ES-2 – Indicative project timeline

Where to find out more

If you are interested in knowing more about the project, you can visit our website, book a tour of our Quakers Hill PRW Discovery Centre, or contact us at prw@sydneywater.com.au.

1. Introduction

1.1 Project overview

Sydney Water is investigating rainfall-independent water supplies (RFIS) through our Resilient and Reliable Water Supply (RRWS) program. This program is part of our role in implementing the NSW Government's Greater Sydney Water Strategy (DPE 2022a). The RRWS program aims to ensure we meet both current and future drinking water demand, in all climate scenarios, without relying on one approach or infrastructure solution. One of these approaches is purified recycled water (PRW). PRW is water recycled from industry and homes (including from kitchens, showers and toilets) that has been purified to meet strict Australian Guidelines for Water Recycling (AGWR Phase 2) to supplement drinking water sources.

The Securing our water supply – Quakers Hill to Prospect project described in this scoping report ('the project') is a PRW scheme that would potentially provide a new source of water for Greater Sydney. The project includes a new PRW Treatment Plant at Sydney Water's existing Quakers Hill Water Resource Recovery Facility (WRRF) in north-western Sydney which would treat wastewater to produce PRW. It also includes a new pipeline to transfer the PRW from the Treatment Plant to Prospect Reservoir and infrastructure such as holding tanks. The PRW would be mixed with dam or river water (from Warragamba Dam and Upper Canal) in Prospect Reservoir. The storage time in the reservoir helps provide a conditioning and checking period with this dam and river water. If required, we will build assets in the reservoir to ensure appropriate mixing. Finally, as happens today with other water sources, this blended water from the reservoir would be further treated at the Prospect Water Filtration Plant (WFP) and transferred into drinking water systems that supply drinking water to about 80% of Greater Sydney. Another part of the project is a pipeline to transfer the brine produced as a by-product of the purification process from the PRW Treatment Plant to Sydney Water's existing wastewater network in Seven Hills.

Figure 1-1 shows indicative locations of these project components in their regional setting. Infrastructure locations are still being refined and will be confirmed in the EIS. Section 3 describes the project in more detail, including related and excluded development.

This project is State significant infrastructure (SSI) and approval for the project is required under section 5.14 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act), as discussed in more detail in section 4. Sydney Water has prepared this scoping report as part of an application to request Secretary's Environmental Assessment Requirements (SEARs) from the Department of Planning, Housing and Infrastructure (DPHI). The SEARs will guide the preparation of an Environmental Impact Statement (EIS), which is required for an SSI application.

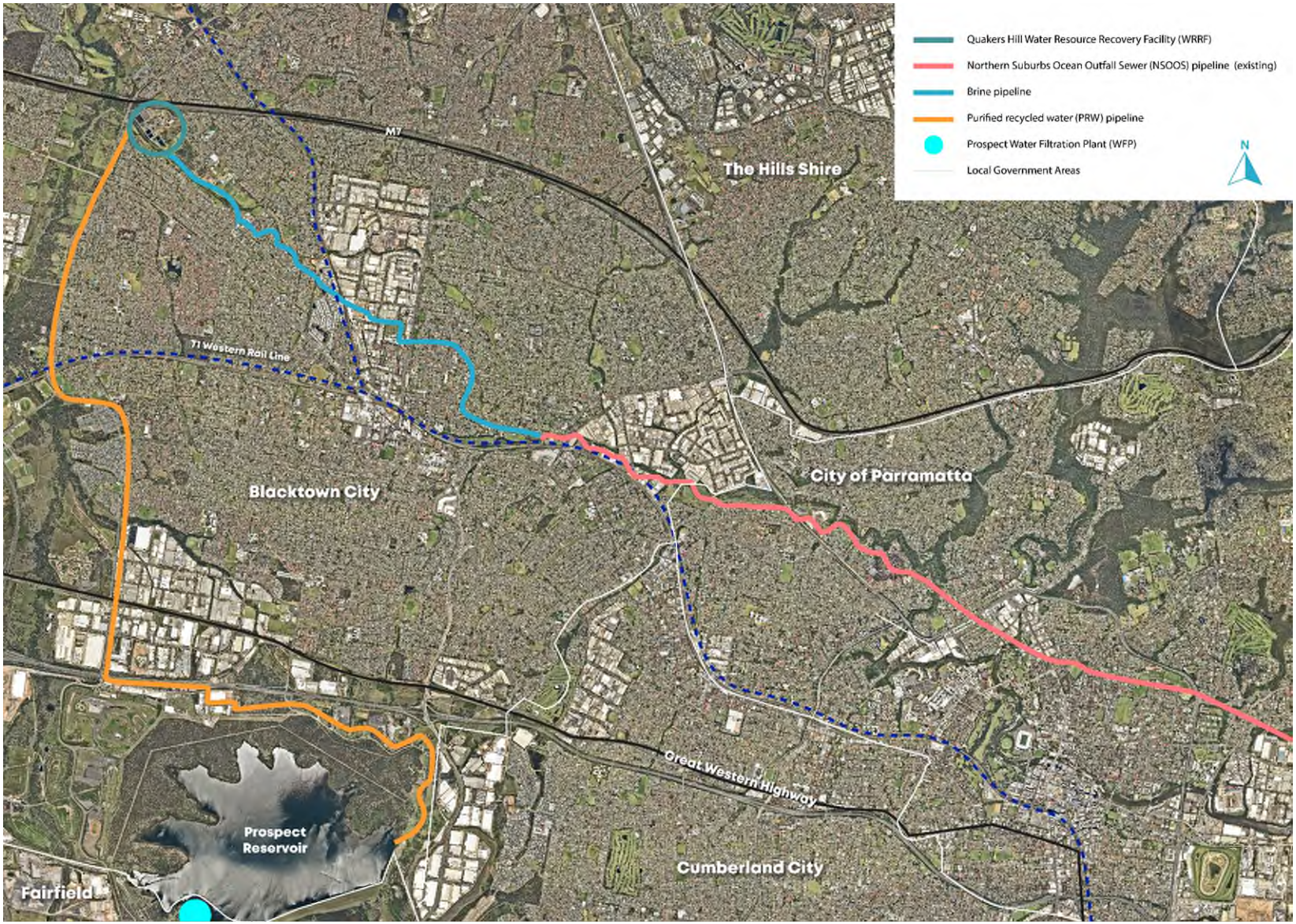

Figure 1-1 Indicative project location and regional context

1.2 The proponent

Sydney Water Corporation (Sydney Water) is the proponent for this project. Sydney Water's ABN is 49 776 225 038 and our address is 2 Parramatta Square, Parramatta NSW 2150.

Sydney Water is a statutory state-owned corporation, wholly owned by the New South Wales Government. We are Australia's largest water utility, supplying water, wastewater, recycled water and stormwater services to more than 5.3 million people in Greater Sydney. Our area of operations covers about 12,700 km^2.

Sydney Water operates under an Operating Licence that sets out our operating standards and requirements and is subject to regular review. These requirements are underpinned by Sydney Water's vision of 'creating a better life with world-class water services'.

For this project, Sydney Water would work with partners from the private sector to deliver a leading-edge PRW Treatment Plant, ensuring environmental protection and the best outcomes for customers through the delivery of quality infrastructure that will play a vital role in securing our water supply for generations to come.

1.3 Project background

1.3.1 Greater Sydney water supply challenges

Sydney Water will service about one million more people over the next 10 years and more than 2 million more by 2050, creating an increase in the demand for drinking water. Sydney currently relies on rainfall for over 85% of its water supply, with water sourced primarily from dams managed by WaterNSW. The remainder comes from the Sydney Desalination Plant at Kurnell.

Our current sustainable water supply is insufficient to meet the average demand for drinking water now, and without new RFIS this supply shortfall is predicted to increase over time with population growth. Our city's demand for water in 2056 is expected to exceed sustainable supply by about 180 gigalitres per year (GL/year) or 500 megalitres per day (ML/day). This means we are at increasing risk of extended and stringent water restrictions and are vulnerable to running out of water during a severe drought. The rapid changes in climate and the increase in the frequency of extreme events (like prolonged drought, bushfires, and shorter and heavier rainfall periods resulting in flooding) exacerbate this risk and mean that we need to secure and diversify our water supply, and make sure it is reliable, robust, and resilient. The Greater Sydney Water Strategy provides more detail about the current challenges facing our drinking water supply.

To ensure a more resilient and reliable drinking water supply, investment in RFIS is required to increase the sustainable supply and add redundancy to the system. Sydney Water has developed its RRWS program to implement the Greater Sydney Water Strategy as it relates to drinking water supply services and to address the above challenges. Our approach to integrated water management planning means having all options on the table for consideration to supplement raw water or drinking water supplies. This includes PRW alongside more familiar approaches in Sydney like desalination, dams, and recycling for non-drinking purposes. Water conservation also continues to play an important role.

The project described in this scoping report is one of several projects in Sydney Water's RRWS program, alongside creating capacity to accept more desalination and building redundancy in the drinking water network. PRW can provide a new climate resilient and cost competitive supply source for Greater Sydney's growing drinking water needs.

1.3.2 Purified recycled water (PRW)

One of Sydney Water's actions under Priority 2 of the Greater Sydney Water Strategy was to construct and commence the operation of a small-scale PRW demonstration plant. Sydney Water built this plant, called the PRW Discovery Centre, at Quakers Hill. It was launched as part of National Water Week celebrations in October 2023 and opened to stakeholders in early 2024. This centre demonstrates the performance and reliability of the treatment technology and helps to build community understanding and acceptance. Water produced at the Discovery Centre is not included in Greater Sydney's water supply. Working closely with NSW Health, we will also demonstrate how we can produce water that complies with the AGWR Phase 2 (Environment Protection and Heritage Council, National Health and Medical Research Council and Natural Resource Management Ministerial Council 2008) and how this water could safely be added to our existing raw water supply (such as dams and rivers).

PRW has already been adopted in more than 35 cities around the world as a safe and resilient component of their drinking water supply, including in Singapore, Orange County in California, and Perth in Western Australia. Sydney Water's intent is that drinking water sourced from PRW is triple treated, passing through 3 different treatment plants, each with multiple treatment steps, before reaching the customer. In this process, water from a PRW Treatment Plant will mix with water from dams or rivers before being extracted for drinking water filtration.

Sydney Water recognises that PRW is a new approach to water supply in Greater Sydney and that it is important we educate and engage with the community and stakeholders and demonstrate the outcomes of rigorous technical assessments. These will be a key focus of the project's EIS. Section 5 of this report describes the community engagement proposed and section 6 the technical assessments proposed for inclusion in the EIS.

Figure 1-2 shows conceptually how the PRW Treatment Plant would integrate with Sydney Water's existing water supply and wastewater treatment networks. Sydney Water has 13 water delivery systems that supply about 1.5 billion litres of water each day. These systems include about 23,000 km of pipes, 251 reservoirs, 153 drinking water pumping stations, 9 water filtration plants and the Sydney Desalination Plant. Many of these systems are interconnected which means we can divert water between them to meet demand in different areas or shut down areas for maintenance or repairs. PRW produced by the project would be treated at Prospect WFP, which can supply most of Greater Sydney, as shown in Figure 1-3.

The planning approval process initiated by this Scoping Report is just one of several approvals required before a decision is made to include PRW in Greater Sydney's water supply, including funding approvals and approvals from NSW Health. It would also include the continuation of the comprehensive community and stakeholder education and engagement program that is underway.

Figure 1-2 Integrating PRW with Sydney Water's existing systems

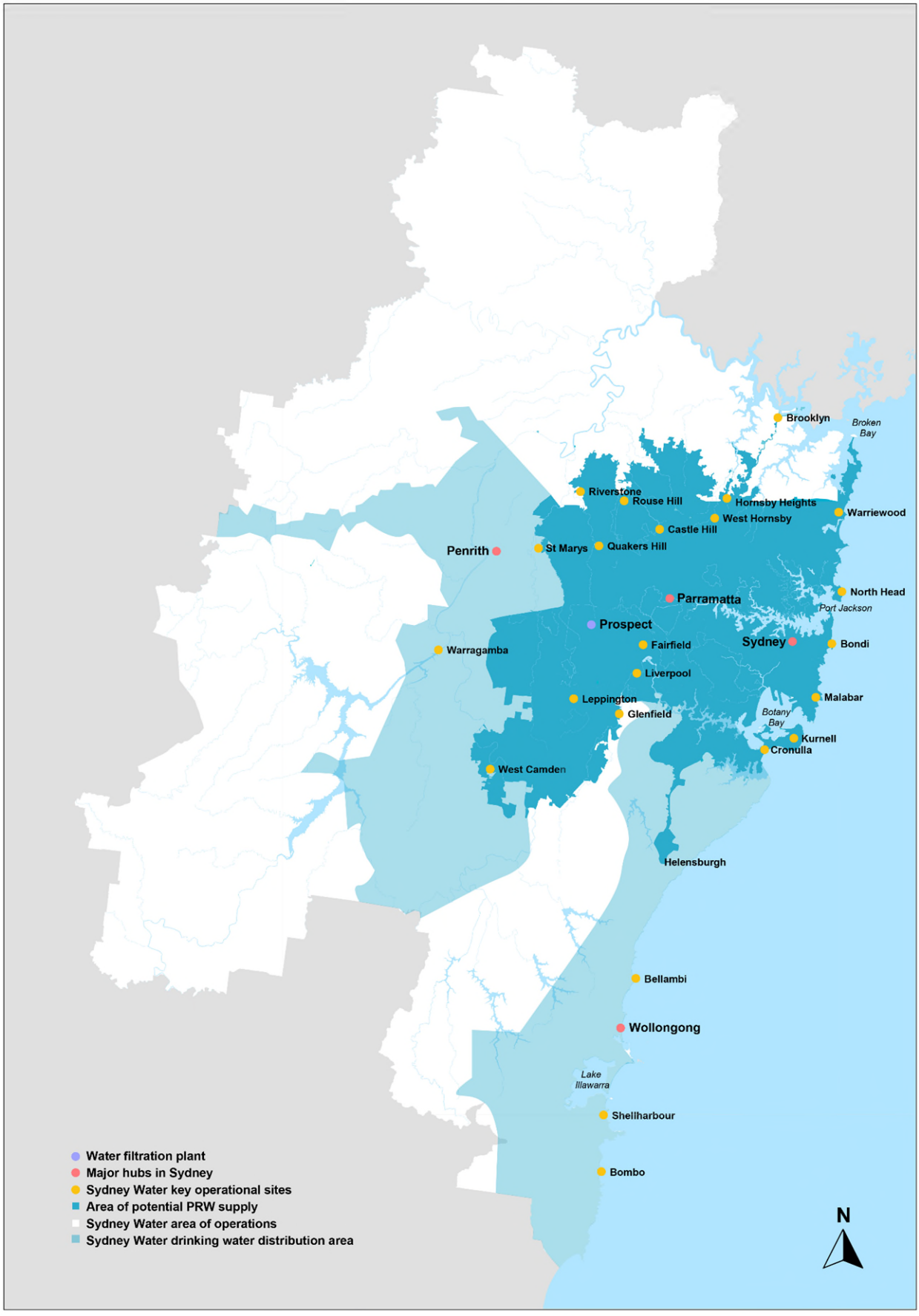

Figure 1-3 Areas supplied by Prospect Water Filtration Plant

1.4 Project objectives

The project would contribute to the objectives of Sydney Water's RRWS program as outlined in Table 1-1. This table also shows how these objectives align to the Greater Sydney Water Strategy.

Table 1-1 RRWS program objectives

Objective	Description	Alignment to Greater Sydney Water Strategy priorities
Safe, secure, and adequate water supply	Provide a safe and reliable drinking water supply that meets the appropriate level of service and reduce location-specific and asset - specific risks by providing redundancy in the system.	Priority 1.1 and 1.2 Priority 2.2, 2.3, and 2.4
Respond to growth	Provide essential drinking water services to support continuing development in Greater Sydney, in line with the NSW Government's long-term population forecasts and Sydney Water's licence obligations.	Priority 1.1 and 1.2
Provide efficient services to the community	Provide value-for-money drinking water services that are financially sustainable for Sydney Water whilst managing impacts on customer bills.	Priority 5.2 and 5.3
Adaptable solution	Incorporate flexibility, so the solution can be adapted to alternative futures, address a range of demand scenarios (including before 2025), and meet customers' changing aspirations.	Priority 3.1 and 3.2 Priority 5.2 and 5.3
Sustainable solution	Demonstrate leadership in integrated and sustainable water management to provide resilient and reliable water supply services that can withstand climate uncertainty by building capacity of purified recycled water and RFIS.	Priority 2.1, 2.2, 2.3, and 2.4 Priority 3.1, 3.2, and 3.4

The specific project objectives are to:

- introduce PRW into Sydney's water supply network as a safe, viable and reliable rainfall-independent water supply source to help secure Greater Sydney's water future
- protect waterway health through continued environment protection licence compliance within Breakfast Creek and Sackville 2 zone of the Hawkesbury Nepean River catchment
- ensure that wastewater treatment servicing and water delivery services are affordable to customers
- deliver and operate wastewater treatment and water delivery services sustainably.

2. Strategic context

This section summarises strategic issues relevant to the project and how the project aligns with and supports delivery of key government strategies. It also describes key features of the area and potential cumulative impacts.

2.1 Key features of the surrounds

The project is proposed in the City of Blacktown local government area (LGA) across highly urbanised areas that are dominated by residential development with pockets of industrial and commercial areas. The area is well connected to major transport links including the M7 and M4 motorways, Great Western Highway and the T1 Western rail line.

Key water supply infrastructure in the area includes Prospect Reservoir, which is a critical part of supplying 80% of Greater Sydney's water supply and includes infrastructure managed by WaterNSW and Sydney Water. The reservoir and surrounding areas have heritage value, having been a part of our drinking water supply since the 1880s and through various other connections including to the explorer William Lawson.

The area has interconnected green space links, including Western Sydney Parklands, Prospect Nature Reserve, and parkland along Breakfast Creek. Risks and hazards in the area include contamination typical of urban areas and some areas of bushfire-prone and flood-prone land.

2.2 Alignment with strategies, policies and plans

The project contributes to actions and recommendations in several government water and infrastructure strategies and policies that directly reference PRW as a key option in ensuring a resilient water supply. The following sections describe this in more detail, along with how the project aligns with local and regional strategic planning.

2.2.1 Water strategies

2.2.1.1 NSW Water Strategy: Towards 2050

The NSW Water Strategy (DPIE 2021) provides an umbrella strategy over twelve regional water strategies and two metropolitan water strategies. It identifies a range of stressors where adaptation is required to meet the State's needs. These include more variable and changing climate, population growth, community expectation, industry needs, economic conditions and budget constraints. As a result, the overarching objectives of the Strategy are focused on developing resilience, security, reliability and quality in NSW's water resources. Table 2-1 outlines the 7 priorities, relevant actions and how the project aligns with them.

Table 2-1 Project alignment with NSW Water Strategy priorities

Priority	Relevant actions	Project alignment
Priority 1: Build community confidence and capacity through engagement, transparency and accountability	1.1 Improve engagement, collaboration and understanding 1.2 Increase the amount and quality of publicly available	Sydney Water has been undertaking water literacy tracking and community sentiment monitoring since 2021 to be clear on what the community understands about desalination and purified recycled water. This has provided insights to help tailor and target project-specific

Priority	Relevant actions	Project alignment
	information about water in NSW	community engagement activities and will increase quality information available to the community. The PRW Discovery Centre, launched in October 2023, is providing a unique platform to continue these conversations across all sections of the community.
Priority 2: Recognise First Nations/Aboriginal People's rights and values and increase access to and ownership of water for cultural and economic purposes	2.5 Work with First Nations/Aboriginal People to maintain and preserve water-related cultural sites and landscapes	The EIS for this project will include an Aboriginal Cultural Heritage Assessment which includes engagement with First Nations people. Sydney Water will also consult more broadly with First Nations people about the project as outlined in section 5.
Priority 3: Improve river, floodplain and aquifer ecosystem health, and system connectivity	Not applicable	None of the actions for this priority are relevant to the project as they relate to regional water strategies, land management to improve river health, threats to native fish in priority dams and long-term monitoring. However, the EIS will assess impacts on water quality and health of Prospect Reservoir and Breakfast Creek.
Priority 4: Increase resilience to changes in water availability (variability and climate change)	4.3 Improve drought planning, preparation and resilience	This action includes the requirement to ensure that metropolitan water strategies identify options for the diversification of water sources to provide more resilience. This project responds directly to this objective by proposing a new water supply for Greater Sydney.
Priority 5: Support economic growth and resilient industries within a capped system	Not applicable	None of the actions for this priority are relevant to the project as they relate to access to water in the regions, lifting of productivity in NSW industries and water trading. However, the strategy notes that confidence in Greater Sydney's water supply security is essential for economic growth. The project would increase the security of Greater Sydney's water supply and therefore contribute to achieving this priority.
Priority 6: Support resilient, prosperous and liveable cities and towns	6.1 Increase resilience to changes in climate and water availability in Greater Sydney and the Lower Hunter	The Greater Sydney Water Strategy was prepared in response to this priority and specifically requests consideration of rainfall-independent supplies like PRW.
Priority 7: Enable a future focused, capable and innovative water sector	Not applicable	None of the actions for this priority are relevant to the project as they relate to smaller scale technologies (like metering, telemetry and onsite household grey water reuse technologies). However, Sydney Water aligns with the priority more generally, through development and operation of our PRW Discovery Centre at Quakers Hill to demonstrate and educate the community about this technology.

2.2.1.2 Greater Sydney Water Strategy

The Greater Sydney Water Strategy (DPE 2022a) was developed in parallel with the NSW Water Strategy and provides a long-term vision and direction for resilient and sustainable water services in Greater Sydney. It identifies that, based on our current drinking water supply providing 515-540 GL/year, a 'mid-case' population growth scenario would still require an additional 120 GL/year by 2060 to meet the demand. In looking at a range of options to respond to this need, the strategy sets out several possibilities, including PRW.

The Draft Greater Sydney Water Strategy was on public exhibition in September 2021 and included a public consultation process involving mail outs, social media and newspaper ads, online information sessions and website information. Among the many responses, there was strong support for PRW.

The strategy contains 5 priorities accompanied by actions. Table 2-2 outlines relevant priorities and how the project aligns with them.

Table 2-2 Project alignment with Greater Sydney Water Strategy priorities and actions

Priority	Relevant actions	Project alignment
Priority 1: We understand how much water we need and when	Not applicable	The project does not contribute to these actions, which relate to forecasting and assessing future water needs. However, by providing a reliable water supply that is less reliant on rainfall, it responds to the results of those actions which have identified the need for additional water supply.
Priority 2: Our water systems are sustainable for the long term and resilient to extreme events	2.3 Plan for new infrastructure with a focus on rainfall-independent supply	This action identifies a portfolio of infrastructure options to increase rainfall-independent supply, including PRW, groundwater, desalination and transfer options. It notes that PRW can be staged and can support growth. Other PRW benefits it notes include a lower carbon footprint than other options, and lower capital costs.
	2.4 Managing drought	The Greater Sydney Drought Response Plan considers new rainfall-independent water supplies. These new supplies, including PRW, would increase the level of enduring supply, reducing Sydney's exposure to future droughts, and reducing dependence on drought response actions.
Priority 3: Our city is green and liveable	3.4 Progress a circular economy approach for water services	The strategy notes that working with the community and customers to build confidence in and acceptance of PRW will progress over the life of the strategy. Although the strategy did not detail plans to introduce PRW into the drinking water system at time of publication, Sydney Water has since progressed planning for the project. This is inherently circular in recovering and reusing water rather than discharging it to the environment.
Priority 4: Our waterways and landscapes are healthy	4.1 Maintain and improve ecosystem health	The focus of this action is developing waterway objectives, values, reporting, and providing environmental flows. Although the project does not contribute to delivering these actions, the EIS will

Priority	Relevant actions	Project alignment
		include an assessment of impacts on waterway health.
	4.4 Protect water for recreation	This action relates to the provision of fit-for-purpose water to support recreational activities in urban areas, including supporting local councils to increase recreational use of waterways. Although Prospect Reservoir is not mentioned, since then Department of Climate Change, Energy, the Environment and Water (DCCEEW) has commenced a feasibility study into recreation opportunities at the reservoir. As project planning and assessment progresses, Sydney Water will work closely with DCCEEW on this matter.
Priority 5: Water management and services meet community needs	5.1 Recognise and protect Aboriginal rights, interests and access to water	The EIS for this project will include an Aboriginal Cultural Heritage Assessment which includes engagement processes with First Nations people. Sydney Water will also consult more broadly with First Nations people about the project as outlined in section 5.
	5.2 Enhance community confidence through engagement and transparency	Sydney Water has undertaken water literacy tracking and community sentiment monitoring since 2021. This forms the basis for the project specific engagement that will occur as part of this project. The PRW Discovery Centre was launched in October 2023.
	5.3 Manage price impacts for customers	Investment in new rainfall-independent sources of supply is needed to secure Greater Sydney's water supply and maintain the high level of service and water quality. Although this is expected to lead to higher water bills in the future, Sydney Water is working with the NSW Government and IPART to smooth price increases. In addition, as outlined in section 3.6, the project is a cost-effective option for providing additional water supply, compared with other options. Running out of water would impose substantial financial costs on households, businesses, and the broader economy.

The Greater Sydney Water Strategy also has an implementation plan for 2022-2025. Actions relevant to this project include:

- Priority 2, Action 2.5(b) – Construct and commence operation of a purified recycled water demonstration plant in the Sydney Basin by July 2023. The plant does not form part of Sydney's drinking water supply and any future decision to include purified recycled water would be subject to community consultation and require stringent Government approvals.

  Sydney Water has built a PRW demonstration plant at Quakers Hill WRRF (the PRW Discovery Centre as outlined in section 1.3.2).

- Priority 2, Action 2.5(c) – Engage with the community to understand preferences for additional water supplies—including the use of purified recycled water—and demand management measures to

secure water supplies and to help make Sydney a more liveable city within 3 years. Any new water supply option, including desalination and purified recycled water, would only be introduced to Sydney's water supply system following community consultation and stringent Government approvals.

Sydney Water has been undertaking water literacy tracking and community sentiment monitoring since 2021 and continues to do so. That data is being used as a foundation for the engagement planning for the project. The project will also be subject to detailed technical assessment and government approval, including as part of the EIS.

2.2.1.3 Lower Hawkesbury Nepean nutrient framework

The EPA has developed a regulatory framework to manage nutrient load inputs to the Hawkesbury Nepean River from wastewater treatment plants (Environment Protection Authority 2019). The objective is to meet the community's environmental values for the river and provide WRRF operators with alternatives to meet those nutrient loads. The framework includes limits on nutrient concentrations, interim caps on nutrient loads and a framework for nutrient trading and offsets. The project would produce PRW from water that is currently released to Breakfast Creek from Quakers Hill WRRF. This means the project would reduce nutrient loads in the Hawkesbury Nepean catchment, contributing to Sydney Water's compliance with the framework.

2.2.1.4 Sydney Water strategies

Sydney Water's strategy (Sydney Water 2020) centres around the vision 'Creating a better life with world-class water services'. One of the strategic outcomes is 'thriving, liveable and sustainable cities' which includes an increasing portfolio of circular economy products and services, and having a system that is resilient to shocks and disruptions. The project would contribute to this outcome by recycling water (which aligns with circular economy principles) and providing an additional source of rainfall-independent supply (which supports a resilient system).

Sydney Water's Long Term Capital and Operational Plan (LTCOP) (Sydney Water 2023) outlines Sydney Water's key infrastructure and operational decisions to 2050. The LTCOP is aligned to the Greater Sydney Water Strategy and outlines forward plans for water management, adaptability and capital investment. It highlights PRW as a future direction to reduce dependence on rainfall, reduce dependence on single assets, and avoid costly wastewater augmentations. The project is included in the planned $34 billion investment to 2033 to support population growth and continue to service Greater Sydney. It notes that PRW schemes could generate up to 163 GL/year by 2050, replacing up to 23% of Greater Sydney's water use.

2.2.2 Infrastructure strategies

2.2.2.1 Australian Infrastructure Plan

The 2021 Australian Infrastructure Plan (Infrastructure Australia 2021) was prepared by the Commonwealth government as an actionable roadmap for infrastructure reform. The plan notes that 82% of Australia's urban water supply is from surface water which is highly dependent on rainfall and so a more diversified water supply is important. This includes alternative water sources such as recycled water for drinking.

Reform 6.1 of the plan relates to securing our water future, focused on what Australia needs to do to ensure that our water resources meet the nation's future needs. It also includes action 6.1.3 to meet users' long-

term water needs by ensuring that all options are fully evaluated in infrastructure planning. This action emphasises the importance of considering all options for expanding water supplies fully and transparently. It also discusses strategies to remove perception barriers to the use of alternative water sources, particularly PRW. These reforms are to be led by the Commonwealth, supported by state and territory water departments and water utilities.

Sydney Water's RRWS program is considering the full suite of options to diversify water supply and this project is progressing PRW as one of these options. Sydney Water has a range of activities to support removing perception barriers around alternative water sources, including the PRW Discovery Centre at Quakers Hill WRRF, ongoing water literacy tracking, sentiment monitoring and project-specific engagement activities.

2.2.2.2 Staying Ahead: State Infrastructure Strategy 2022-2042

One of the 9 key objectives of the NSW State Infrastructure Strategy (Infrastructure NSW 2022) is to enhance long-term water security. Section 7.3 of the Strategy notes that securing Greater Sydney's future water supply requires investment in rainfall-independent sources, along with water conservation and demand management. This includes water recycling and the opportunity to progress PRW. The project would directly contribute to the following recommendations of the State Infrastructure Strategy, which are identified as having immediate priority:

- Recommendation 28 – increase the resilience of Greater Sydney's water supply through a full range of options, including better conservation and more diverse sources. The project particularly contributes to item b which is to progress planning and development for rainfall-independent water supply projects, including desalination, recycled water and interconnections.
- Recommendation 29 – develop a roadmap for the adoption of purified recycled drinking water, including measures to build community support and demonstrate the efficacy of the technology. As noted in previous sections, Sydney Water has a range of activities in place to do this.

2.2.2.3 Productivity Commission White Paper 2021 – Rebooting the economy

This White Paper was prepared by NSW Treasury in efforts to avoid weak productivity growth (NSW Treasury 2021). The Paper identifies 60 opportunities to support a growth in productivity, including Recommendation 5.4: Engage on Water Recycling. The actions involved in this recommendation include liaison with Sydney Water to develop a public engagement program for PRW, and the investment in demonstration plants to build community trust and confidence in the technology. The report notes that Greater Sydney needs new water sources and highlights that PRW has many benefits, including lower costs of distribution, lower energy use and carbon emissions and reduced wastewater discharge compared with desalination. The efficiency gained in a PRW scheme is the ability to distribute the water through existing infrastructure, rather than needing a new reticulation system. The project makes a direct contribution to Recommendation 5.4.

2.2.3 Regional strategies

2.2.3.1 Greater Sydney Region Plan and Central City District Plan

Greater Sydney has a population of 5.3 million and stretches from Bargo in the south, Mount Victoria in the west, and Doyalson in the north. The population is projected to grow to 6.1 million by 2041 (DPE 2021). The

historic and future growth is changing how the area needs to function. This includes an imbalance between where people live, where people work, and how people move around the region. These combined factors mean that various government strategies are focused on supporting Greater Sydney's sustainable growth, resilience and connection of people to jobs, utilities and facilities.

The main strategic plan is the *Greater Sydney Region Plan 2018: A Metropolis of Three Cities – connecting people* (State of NSW 2018a). The three cities identified in this plan are the Western Parkland City, the Central River City and the Eastern Harbour City. The project sits within the Central River City which is centred around Greater Parramatta and extends west to around Blacktown. The plan outlines 10 directions, with many related to the provision of transport, housing and urban spaces. The Central City District Plan (State of NSW 2018b) builds on these objectives by identifying planning priorities for the Central River City.

Table 2-3 summarises the objectives and planning priorities that the project could directly contribute to, or that would be relevant considerations in the EIS.

Table 2-3 Greater Sydney Region Plan and Central City District Plan planning priorities relevant to the project

Direction	Objective/planning priority	Comment
A city supported by infrastructure	Objective 3: Infrastructure adapts to meet future needs Objective 4: Infrastructure use is optimised Planning priority C1: Planning for a city supported by infrastructure	A key objective of the project is to contribute to Greater Sydney's future water needs, and to be the first of several stages of future PRW schemes that can be adaptable to future needs. The project proposes to locate key project components with existing water assets such as Quakers Hill WRRF and Prospect Reservoir and connect to the existing water and wastewater networks. This optimises use of existing land and infrastructure.
A city of great places	Objective 13: Environmental heritage is identified, conserved and enhanced Planning priority C6: Creating and renewing great places and local centres, and respecting the District's heritage	This objective includes early consultation on heritage values and managing the impacts of development on heritage. The District Plan specifically mentions Prospect Reservoir. Heritage will be an important consideration for the project, including impacts at Prospect Reservoir.
A city in its landscape	Objective 25: The coast and waterways are protected and healthier Planning priority C13: Protecting and improving the health and enjoyment of the District's waterways	This objective includes elements related to: • protecting environmentally sensitive areas of waterways • enhancing sustainability and liveability by improving and managing access to waterways, including for recreation • reinstating more natural conditions in highly modified urban waterways. The security of Sydney's water supply and the potential for Prospect Reservoir as a nature-based recreation destination are both called out in this objective. The project would reduce flows in Breakfast Creek, resulting in a more natural condition. However, Sydney Water will consider the

Direction	Objective/planning priority	Comment
		amount of ongoing flow from Quakers Hill WRRF that would be beneficial to protect waterway health. As noted in previous sections, Sydney Water will work closely with DCCEEW as options for recreation in Prospect Reservoir are explored.
	Objective 27: Biodiversity is protected, urban bushland and remnant vegetation is enhanced Planning priority C15: Protecting and enhancing bushland, biodiversity and scenic and cultural landscapes	This objective relates to protecting and enhancing biodiversity through landscape-scale biodiversity conservation, managing urban bushland and green infrastructure and reducing edge effects. The District Plan notes Prospect Nature Reserve is one of several areas that preserves important ecological communities. The project's indicative infrastructure locations have been designed to minimise impacts on urban bushland (including Prospect Nature Reserve), which reduces potential negative impacts on these objectives. The EIS will assess biodiversity impacts of the project.
	Objective 31: Public open space is accessible, protected and enhanced Planning priority C17: Delivering high quality open space	The project would primarily be built on Sydney Water land at Quakers Hill WRRF and Prospect Reservoir, with the pipelines having temporary impacts during construction. The EIS will consider how the project impacts on public open space along pipeline alignments, and existing and future recreation opportunities at Prospect Reservoir.
	Objective 32: The Green Grid links parks, open spaces, bushland and walking and cycling paths Planning priority C16: Increasing urban tree canopy cover and delivering Green Grid connections	Prospect Reservoir is an existing open space that is part of the Green Grid corridor. The EIS will consider the project's potential impact on open space linkages in this area.
A resilient city	Objective 36: People and places adapt to climate change and future shocks and stresses Planning priority C20: Adapting to the impacts of urban and natural hazards and climate change	This objective contemplates the future of Greater Sydney in the face of changing temperatures which will place pressure on resources. This includes supporting initiatives that respond to the impacts of climate change. The project directly contributes to this objective by reducing reliance on rainfall and building resilience into the drinking water system. Climate change and natural hazards such as flooding and bushfire will be considered in the EIS, along with contributions to noise and air quality in the area.

2.2.3.2 Feasibility study for recreation in Prospect Reservoir

The former NSW Department of Planning and Environment (now DCCEEW) released a public discussion paper about recreation opportunities at Prospect Reservoir (DPE 2023). This sought comment from the community to inform a feasibility study 'to identify the best way to increase recreation opportunities at the site, while protecting drinking water quality, cultural values, and the environment'.

The discussion paper included a variety of findings from various surveys and consultation since 2018, including that:

- Sydneysiders would like to see more opportunities for swimming and water-based activity less than 30 minutes from their home
- there is an increased demand for access points to water for activities such as kayaking and paddle boarding
- there is high demand for recreational fishing in water supply bodies like dams and reservoirs.

A pop-up swim site was established at Prospect for 40 days over the 2022-23 summer. During that time, more than 2,300 people visited and 756 surveys were completed, finding that:

- 98% of people surveyed were interested in more swimming and recreation opportunities in local waterways
- there was a low level of awareness in the community about Prospect Reservoir.

The feasibility study is yet to be completed. However, Sydney Water will consult with DCCEEW during EIS preparation about interactions between the project any potential future recreational opportunities at Prospect Reservoir.

2.2.3.3 Western Sydney Parklands Management Plan

The Western Sydney Parklands Plan of Management 2030 (Western Sydney Parklands Trust 2018) aims to safeguard and enhance the 5,280 ha of parklands that stretch from Quakers Hill in the north to Leppington in the south. Although not owned by Greater Sydney Parklands, Prospect Reservoir and its environs are within precincts 7 and 8 of Western Sydney Parklands. The current alignment of the PRW pipeline is also adjacent to precincts 1, 2, 4 and 5. The EIS will consider alignment with the objectives and associated key management priorities for relevant precincts. This includes the objectives for precincts 7 and 8 outlined in Table 2-4.

Table 2-4 Western Sydney Parklands precinct objectives

Precinct 7 – Prospect Recreation	Precinct 8 – Prospect Reservoir and Nature Reserve
Protect the integrity of Prospect Reservoir, its infrastructure and cultural heritage values	Support WaterNSW, Sydney Water and the National Parks and Wildlife Service to protect water supply quality, maintain water, dam infrastructure and bushland resources and protect their cultural heritage values
Create a major destination precinct for recreation, leisure and tourism	Conserve and maintain links to the Bushland Corridor within the Parklands and surrounding areas
Retain and enhance the walking and cycling track network, including the Prospect Cycling Track	

2.2.4 Local strategies

2.2.4.1 Local planning strategies in Greater Sydney

While the project would be physically located in the Blacktown LGA, most LGAs in Greater Sydney receive water from Prospect Reservoir and would benefit from a more resilient water resource to support their long-term strategic goals. For example, the Fairfield Local Strategic Planning Statement (LSPS) includes a provision in its theme of Infrastructure and Places – Supporting Growth and Change, for collaboration with State and Federal bodies regarding delivery of a range of essential services, including water, that are needed to support the growing population of the area (Fairfield City Council 2020).

2.2.4.2 Blacktown Local Strategic Planning Statement

The Blacktown City Council Local Strategic Planning Statement 2020 (LSPS) (Blacktown City Council 2020) and the Blacktown 2041 Community Strategic Plan (Blacktown City Council 2022) build on the aspirations of the Greater Sydney plans and incorporate the specific needs of the local area. The LSPS identifies that Blacktown City is one of the fastest growing LGAs in the country and within ten years is expected to be home to more than half a million people. Council's strategy is focused on planning for an area supported by infrastructure and supporting a growing and resilient city. This requires collaboration with the NSW Government and various stakeholders to achieve regional approaches to many issues, including water. The project would support this by contributing to a more secure and resilient water supply.

The LSPS divides the LGA into 4 precincts. The project would be in the Blacktown Precinct.

The LSPS includes using Prospect Reservoir area for community events under Local Planning Priority (LPP) 6, enhancing the local scenic and cultural landscape under LPP 13 and supporting sports and recreation with walking tracks, trails and bicycle paths under LPP 15. This results in Action 52–- Collaborate to explore new recreational opportunities, including at Prospect Reservoir.

Sydney Water has started engaging with Blacktown City Council and will continue to consult with them during the EIS phase to discuss how the project can align with Council's strategic plans.

2.3 Cumulative impacts

Sydney Water reviewed DPHI's Major Projects Portal in March 2024 to identify nearby projects, which were either active (e.g. preparing EIS, response to submissions stage) or had been determined in the last 10 years. The project is mostly within and adjacent to previously disturbed, modified, and urbanised areas. Major projects in the vicinity largely relate to new or upgraded industrial and warehousing facilities around Prospect Reservoir, including Wetherill Park to the south, Pemulwuy to the east and Arndell Park and Huntingwood to the north. The project's brine pipeline from the PRW Treatment Plant to Sydney Water's existing wastewater network in Seven Hills is also proposed to cross through an existing industrial area in Kings Park/Blacktown, where some major projects are also proposed.

These nearby industrial and warehousing projects may have cumulative construction impacts with this project. Some of these projects are shown in Table 2-5.

Table 2-5 Nearby major projects

Type of work	Project name	Status	Location	Address
Expansion or modification	Huntingwood Processing Facility Expansion	Determined July 2022	Adjacent to proposed PRW pipeline	65 Huntingwood Drive, Huntingwood
Expansion or modification	Kings Park Metal Recovery and Recycling Facility Expansion	Determined November 2023	About 800 m north of the proposed brine pipeline	23-43 and 45 Tattersall Road, Kings Park
Expansion or modification	Eastern Creek Data Centre expansion project	Determined September 2023	About 200 m south of the proposed PRW pipeline	90 Peter Brock Drive, Eastern Creek
Expansion or modification	Widemere Waste Facility modification	Determined December 2023	About 200 m south and east of Sydney Water-owned land at Prospect Reservoir	Widemere Road, Wetherill Park
Expansion or modification	Horsley Park Brickworks Plant 2 – Mod 1	Determined August 2022	Near Sydney Water-owned land at Prospect Reservoir (opposite sides of Ferrers Road)	780 Wallgrove Road, Horsley Park
Expansion or modification	Americold Prospect Expansion	Determined October 2023	About 200 m east of the proposed PRW pipeline	554-562 Reservoir Road, Prospect
Expansion or modification	Halgan Liquid Waste Treatment Facility	Prepare EIS	About 250 m south of Sydney Water-owned land at Prospect Reservoir	10 Davis Road, Wetherill Park
New project	51 Huntingwood Drive Data Centre	Determined September 2023. Some new structures are in construction as of March 2024	Adjacent to proposed PRW pipeline	51 Huntingwood Drive, Huntingwood
New project	Huntingwood Data Centre	Prepare EIS stage	About 300 m north of proposed PRW pipeline	6 Honeman Close, Huntingwood
New project	Various construction within the Light Horse interchange warehouse	Determinations in 2023 and 2024 and others in progress. Some construction underway at 165 Wallgrove Road in March 2024	Lot boundary is within 100 m of proposed PRW pipeline	165 Wallgrove Road and 475 Ferrers Road, Eastern Creek
New project	Augusta Street Waterhouse and Distribution Centre	Response to submissions	About 500 m north of the proposed PRW pipeline	Multiple lot/DPs along Augusta Street, Blacktown
New project	Horsley Park Bioenergy Facility	Prepare EIS	Near Sydney Water-owned land at Prospect Reservoir	780 Wallgrove Road, Horsley Park

Type of work	Project name	Status	Location	Address
New project	Davis Road Data Centre (Cundall)	Exhibition	About 250 m south of Sydney Water-owned land at Prospect Reservoir	3 Davis Road, Wetherill Park

Other potential projects which may have cumulative impacts with this project include:

- Prospect Reservoir recreation opportunities – currently at feasibility study stage
- Western Sydney Freight Line – Stages 1 and 2 – corridor under investigation includes land south of Prospect Reservoir, within Wetherill Park
- other Sydney Water and WaterNSW projects around Prospect Reservoir.

The EIS for the project will consider cumulative construction impacts. Cumulative construction impacts are expected to be related to amenity issues including noise, vibration, traffic, access, and air quality. Mitigation measures will be incorporated in the EIS to minimise and mitigate these potential impacts.

During operation, cumulative impacts are unlikely, but this will be revisited in the EIS based on the status of nearby projects at the time.

Sydney Water has not entered into any agreements with other parties to mitigate or offset the impacts of the project.

2.4 Justification for the project

Greater Sydney is facing several key water supply challenges:

- We are at increasing risk of extended and stringent water restrictions and are vulnerable to running out of water during a severe drought.
- Our current sustainable supply is insufficient to meet the average demand for drinking water now and the supply shortfall increases to 2056 due to population growth and climate change.
- Our water supply system has an unsustainable reliance on single assets and single supply sources.

Sydney Water's approach to integrated water management planning means having all options on the table for consideration to supplement raw water or drinking water supplies. This includes PRW alongside approaches more familiar in Sydney like desalination, dams, and recycling for non-drinking purposes.

Sydney Water has developed its RRWS program to address drinking water supply aspects of the Greater Sydney Water Strategy and address the above challenges. The project described in this scoping report is one of several projects in Sydney Water's RRWS program as a range of options that need to be considered to secure Sydney's water future. PRW can provide a new climate resilient and cost competitive supply source for Greater Sydney's growing drinking water needs. In 2023 Sydney Water submitted a Strategic Business Case (SBC) to Infrastructure NSW (INSW) for investment review assurance which received a high confidence rating.

There are several strategic plans and policy papers prepared by various arms of the Commonwealth and NSW Governments that acknowledge the need for less rainfall-dependent water sources to support population growth and economic and industrial growth including:

- NSW Water Strategy which seeks to increase resilience to changes in water availability and improve drought planning, preparation and resilience
- Greater Sydney Water Strategy which contemplates planning for new infrastructure with a focus on rainfall-independent supply
- Australian Infrastructure Strategy which includes recommended reforms to support a more resilient and secure water supply including options for recycled water
- State Infrastructure Strategy which seeks to increase the resilience of Greater Sydney's water supply through a full range of options and specifically cites PRW as one of those options
- Productivity Commission White Paper on rebooting the economy which identifies water security and recycled water options to avoid weak productivity growth
- Greater Sydney Region Plan which identifies objectives to support Sydney as a resilient city into the future, including responding to climate change with water resource options.

Sydney Water's internal plans, polices and strategies, including the project, contribute to delivering water-related objectives of these strategic plans.

The project is also consistent with a range of other strategic plans for the region, including the Central City District Plan (State of NSW 2018b), the Hawkesbury Nepean nutrient framework (EPA 2019), the Blacktown Local Strategic Planning Statement (Blacktown City Council 2022), Blacktown Community Strategic Plan (Blacktown City Council 2022) and Western Sydney Parklands Plan of Management (Western Sydney Parklands Trust 2018).

The main project components are proposed on Sydney Water land at the Quakers Hill WRRF and Prospect Reservoir, consistent with existing land uses.

The PRW and brine pipelines would traverse main roads and some suburban streets, with the brine pipeline connecting to the existing Northern Suburbs Ocean Outfall Sewer (NSOOS) network. Impacts on roads and residential areas would be temporary and related to construction only. Once operational, there would be minimal impacts to those areas given the pipelines would be underground with surface features accessed only rarely for maintenance purposes.

3. Project

The project involves:

- a new PRW Treatment Plant at Sydney Water's existing Quakers Hill Water Resource Recovery Facility (WRRF), producing up to 36 ML/day of PRW
- a new PRW pipeline from the PRW Treatment Plant to Prospect Reservoir
- a new brine pipeline from the PRW Treatment Plant to Sydney Water's existing Northern Suburbs Ocean Outfall Sewer (NSOOS) at Seven Hills
- a range of works at the Prospect Reservoir site to accommodate PRW, such as receival tanks adjacent to the reservoir, modifications within the reservoir to enable release of water and ensure appropriate mixing and retention times, and upgrades to the raw water pumping station
- a range of ancillary infrastructure associated with the above components.

The following sections describe each of these components in more detail. Locations and details are indicative at this stage and will be refined as design progresses and be included in the EIS.

As noted in earlier sections, after PRW is transferred and mixed into Prospect Reservoir, it would be treated at the Prospect WFP and distributed through the existing drinking water system. No changes to Prospect WFP or the drinking water system would be required to facilitate the project, so they are not discussed further in this section.

3.1 Staging

This project is the first of several PRW schemes proposed for Greater Sydney. This section describes the proposed staging of the Quakers Hill PRW scheme (of which the project is the first stage) and its relationship with other potential PRW schemes. Sydney Water currently expects that future approvals described in this section would be assessed under Division 5.1 of the EP&A Act unless there is potential for a significant environmental impact.

3.1.1 Quakers Hill PRW scheme

This project is seeking approval for the first stage of a PRW Treatment Plant at Quakers Hill WRRF to produce up to 36 ML/day of PRW from the Quakers Hill WRRF catchment only. Sydney Water currently proposes to build to this capacity in one stage by 2030. Assuming the earlier phases of the project progress, Sydney Water ultimately intends to expand the Quakers Hill PRW Treatment Plant in future stage(s) to produce up to 86 ML/day, by transferring and treating wastewater from nearby WRRFs. This expansion to 86 ML/day is not in scope for this project and would be subject to separate planning approvals in the future. Expansion of Quakers Hill PRW Treatment Plant would provide a low cost of water asset solution servicing a significant proportion of Greater Sydney.

Project design will investigate the possibility of building the PRW and brine pipelines to align with the proposed ultimate capacity of the Quakers Hill PRW Treatment Plant (i.e. up to 86 ML/day). This would avoid building more pipelines should the Quakers Hill PRW Treatment Plant expand, to minimise community and environmental impacts. However, efficient operation of the pipelines and implications for future

investment decisions will need to be considered. If pipelines were built to an ultimate capacity, they would only be operated to align with the first stage of the Quakers Hill PRW Treatment Plant (i.e. up to 36 ML/day) with operation for future stages subject to separate planning approvals. Any pipelines required to transfer wastewater from nearby WRRFs to Quakers Hill WRRF are also out of scope and would be subject to separate planning approvals.

3.1.2 Other potential PRW schemes

Sydney Water could ultimately produce about 250 ML/day of PRW from a range of PRW schemes, including the future staged expansion(s) at Quakers Hill WRRF described above, new schemes at Camellia and Liverpool-Glenfield, and other potential future schemes shown in Figure 3-1. Subject to further approvals, these future schemes are expected to be delivered between around 2032-2056. Figure 3-1 also shows locations being considered for new desalination plants or upgrades, which are outside the scope of this project.

The project is seeking approval to build and operate the ancillary works at Prospect Reservoir to accommodate the transfer of up to 250 ML/day of PRW from these schemes (or other PRW schemes identified in the future) and distribute it into the reservoir and then the drinking water system. Transfers of PRW would be staged as each project comes online and be informed by ongoing monitoring of the impacts of PRW in Prospect Reservoir.

The EIS will further explore the suitability of transferring volumes up to 250 ML/day into Prospect Reservoir in terms of water quality and health risk management. Depending on the outcomes of these studies, the EIS may seek initial approval for a smaller volume (e.g. 100 ML/day), with establishment of monitoring and testing regimes to determine the suitability of expansion to larger volumes.

Approval is also being sought for construction of works at Prospect Reservoir to cater for additional PRW schemes but construction of these works may also be staged. Assets for the Camellia and Liverpool-Glenfield projects, or any other future projects (e.g. PRW Treatment Plants, PRW pipelines and brine pipelines) are not in scope for this project and would be subject to separate planning approvals in the future.

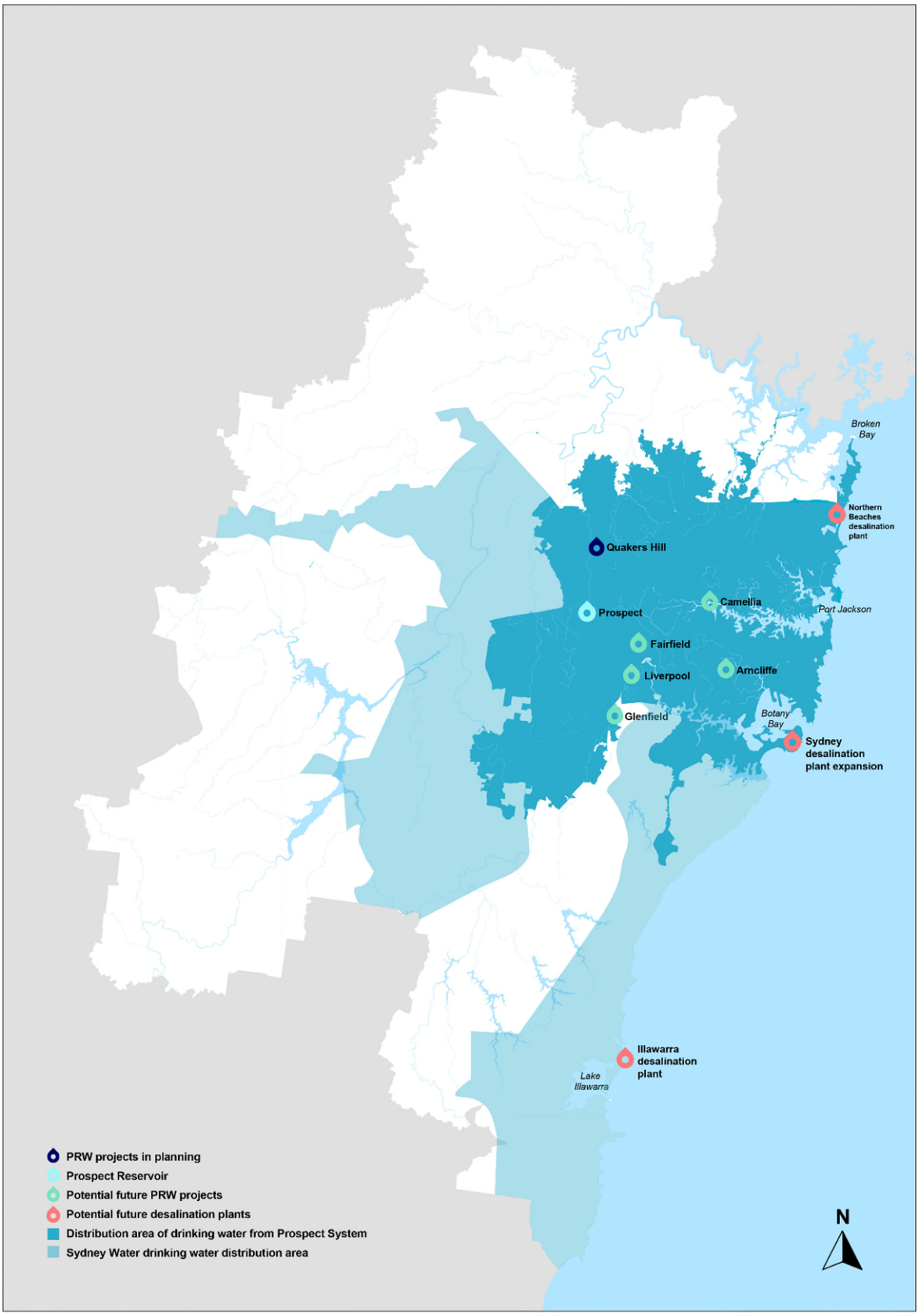

Figure 3-1 Potential future rainfall-independent water supplies

3.2 Project scope

This section describes each key component of the project in more detail. The description is indicative and will likely be refined and changed as the design progresses. The final project scope will be included in the EIS.

3.2.1 PRW Treatment Plant

Table 3-1 summarises key features of the proposed PRW Treatment Plant.

Table 3-1 PRW Treatment Plant description

Feature	Detail
Location	On Sydney Water's existing Quakers Hill WRRF site. The exact location on this site is subject to further design but Figure 3-2 shows an indicative area of the existing site being considered for the PRW Treatment Plant and its associated construction area based on preliminary investigations. There would likely also be some works on other parts of the Quakers Hill WRRF site, for activities such as connecting the PRW Treatment Plant to existing assets.
Land ownership	The PRW Treatment Plant would be built on land owned by Sydney Water.
LGA	City of Blacktown
Suburb	Quakers Hill
Capacity	Up to 36 ML/day
Treatment processes	Aligned with the Australian Guidelines for Water Recycling (AGWR), the PRW Treatment Plant treatment process would consist of multiple barriers to ensure protection of public health. The PRW Treatment Plant would produce high quality recycled water from the Quakers Hill WRRF. The additional treatment processes will be further refined as design progresses but are likely to include: • ultrafiltration – to provide a physical barrier reducing pathogen risks and as pre-treatment for the reverse osmosis system • reverse osmosis – to provide a robust physical barrier reducing salts and further reducing pathogen and chemical risks • ultra violet (UV) advanced oxidation process – to provide disinfection by high intensity UV light combined with an oxidant such as hydrogen peroxide • chlorine disinfection – to provide disinfection targeted towards bacteria and viruses • stabilisation – to stabilise the water via raising pH and increasing alkalinity. It is anticipated that this would be undertaken using lime & carbon dioxide.
Pathways for treated water	Most dry weather flows into Quakers Hill WRRF are currently treated and released to Breakfast Creek. The PRW Treatment Plant would treat most dry weather flows into Quakers Hill WRRF and transfer them to Prospect Reservoir. There may be occasions where releases to Breakfast Creek are still required (for example if there is an issue with the pipeline or reservoir that means it cannot be transferred, if the water quality is not suitable for transfer or the plant requires maintenance). There may also be times when extended outages are needed (with durations to be defined as project design progresses), and a pathway for dry weather discharge will therefore be retained. As a minimum, the current supply of recycled water to Stonecutters golf course will be retained. In addition, some water may also be provided directly to additional recycled water customers from the Quakers Hill WRRF at a fit-for-purpose quality.

Feature	Detail
	Sydney Water will also consider as part of EIS whether some dry weather flows should be maintained in Breakfast Creek to maintain waterway health. The project would not significantly change wet weather flows to Breakfast Creek. Flows to Quakers Hill WRRF can be higher in wet weather and most of these flows (in heavy rain, over 75% of the flows), would not be treated through the PRW Treatment Plant. The brine produced as a by-product of the reverse osmosis process would be transferred to the NSOOS. The EIS will discuss flow paths under the various scenarios in more detail.
Proposed infrastructure	The PRW Treatment Plant would comprise a range of tanks, mechanical and electrical equipment in a new building(s) which may be two to three storeys high. There would also be a range of ancillary infrastructure such as brine storage tanks, chemical storage, electrical and pipeline connections. The details of the infrastructure required will be refined as design progresses.
Key activities	The main construction activities on the site would be civil works and installation of buildings, equipment and ancillary infrastructure. Temporary construction compounds and storage would also be required on site. Once the PRW Treatment Plant is tested and commissioned, it would operate as part of the existing Quakers Hill WRRF.

Figure 3-2 Indicative areas of Quakers Hill WRRF being considered for PRW Treatment Plant siting

3.2.2 PRW pipeline

Table 3-2 summarises key features of the proposed PRW pipeline.

Table 3-2 PRW pipeline description

Feature	Detail
Location	Pipeline between Quakers Hill WRRF and Prospect Reservoir. The route is still to be refined. Figure 1-1 shows an indicative alignment, which may change as design progresses.
Land ownership	The pipeline would be built in road reserves where possible, adjacent to private residential, commercial and industrial properties. It would also cross roads, rail lines and waterways. At Prospect Reservoir, the pipeline would be built on land owned by Sydney Water.
LGA	City of Blacktown. The western edge of Cumberland LGA is close to the preliminary alignment. Depending on final design a small amount of works may be needed in Pemulwuy in the Cumberland LGA.
Suburbs	Quakers Hill, Doonside, Bungarribee, Arndell Park, Eastern Creek, Prospect
Capacity	About 80 ML/day. This is an average flow, and the pipeline would also need to cater for peak flows above this. Flows through the pipeline would be lower than this for the first stage of the Quakers Hill PRW Treatment Plant and increase to these volumes if it is expanded in the future.
Proposed infrastructure	The pipeline would be installed below ground. There may be some above-ground ancillary infrastructure associated with the pipeline such as scour valves and maintenance holes. The pipeline size and material will be determined during detailed design but is expected to be about 600-900 mm diameter.
Key activities	The key construction activity is installation of the pipeline. Construction is expected to primarily use open trenching methods, with tunnelling and drilling methods in some locations to avoid constraints (for example for major road and rail crossings). Construction corridors are expected to typically be 9-12 m wide, and wider in some areas to accommodate certain construction activities (e.g. tunnelling launch and receival pits). Some works may also be required outside this corridor to facilitate safe working and traffic flow. Temporary construction compounds, laydown areas and access roads would also be required. Once the pipeline is tested and commissioned, it would operate as part of the existing Sydney Water network.

3.2.3 Brine pipeline

Table 3-3 summarises key features of the proposed brine pipeline.

Table 3-3 Brine pipeline description

Feature	Detail
Location	Pipeline between Quakers Hill WRRF and the connection point to the NSOOS at Seven Hills. The route and connection point are still to be refined. Figure 1-1 shows an indicative alignment, which may change as design progresses.

Feature	Detail
Land ownership	The pipeline would be built in road reserves where possible, adjacent to private residential, commercial and industrial properties. Along Breakfast Creek, it would likely be built in public open space. It would also cross roads, rail lines and waterways.
LGA	City of Blacktown
Suburbs	Quakers Hill, Marayong, Blacktown, Seven Hills
Capacity	Up to about 20 ML/day. As for the PRW pipeline, this is an ultimate capacity accounting for future stages of the Quakers Hill PRW Treatment Plant.
Proposed infrastructure	The pipeline would be installed below ground. There may be some above-ground ancillary infrastructure associated with the pipeline such as scour valves and maintenance holes. The pipeline size and material will be determined during detailed design but is expected to be about 300 mm diameter. While a new pipeline is proposed, design will consider whether it is feasible to use an existing pipeline between Quakers Hill WRRF and the NSOOS, at least for Stage 1.
Key activities	The key construction activity is installation of the pipeline, including connection into the NSOOS. Construction is expected to primarily use open trenching methods, with tunnelling and drilling methods in some locations to avoid constraints (for example for major road and rail crossings). Construction corridors are expected to typically be 9-12 m wide, and wider in some areas to accommodate certain construction activities (e.g. tunnelling launch and receival pits). Some works may also be required outside this corridor to facilitate safe working and traffic flow. Temporary construction compounds, laydown areas and access roads would also be required. Once the pipeline is tested and commissioned, it would operate as part of the existing Sydney Water network.

3.2.4 Prospect Reservoir infrastructure

Table 3-4 summarises the infrastructure needed at Prospect Reservoir, within the reservoir and in the surrounding area.

Table 3-4 Prospect Reservoir infrastructure description

Feature	Detail
Location	Prospect Reservoir and its surrounds. The exact connection point into Prospect Reservoir is still to be determined. However, Figure 3-3 shows an indicative location of the most likely location for land-based assets adjacent to the reservoir.
Land ownership	The infrastructure would primarily be built on land owned by Sydney Water, with the release structures, baffles and aeration system located in Prospect Reservoir which is managed by WaterNSW.
LGA	City of Blacktown
Suburb	Prospect
Capacity	Up to 250 ML/day. As noted in earlier sections of this report, these flows would be staged as additional PRW schemes come online.

Feature	Detail
Proposed infrastructure	**Adjacent to reservoir** The main infrastructure required adjacent to the reservoir would be above-ground receival tanks to store PRW transferred from the PRW Treatment Plant. This may include systems such as carbon dioxide dosing to ensure appropriate pH levels before release to the reservoir, depending on the overall pH management strategy between the PRW Treatment Plant and discharge point. The most likely location of receival tanks is on the eastern side of the Prospect Reservoir site in the area shown in Figure 3-3. However, as noted above, further investigations are required during design to confirm feasibility of this location. **Within reservoir** A range of infrastructure would be required in the reservoir including: • a release structure to transfer PRW from the receival tanks into the reservoir • systems to ensure appropriate retention times, mixing and aeration with the reservoir. These are subject to further design but preliminary investigations indicate they could include long baffle curtains (in the order of 1.3 km) to the full depth of the reservoir. These would be weighted to the reservoir floor and have floats at the surface. WaterNSW has an existing aeration system in the reservoir that may require expansion or construction of a supplementary system if complete reservoir aeration and mixing is desirable. A range of ancillary infrastructure would also be required such as chemical storage and pipeline connections. PRW would be mixed with other raw water sources (from Warragamba Dam and Upper Canal) in Prospect Reservoir. This blended water would be transferred from Prospect Reservoir to the existing Prospect WFP via the existing Prospect Raw Water Pumping Station. In the inlet channel to the Prospect WFP, this blended water would be further mixed with other raw water sources. After being further treated at Prospect WFP, the blended water would be distributed to Sydney Water's existing water distribution network. Some upgrades may be required at the Prospect Raw Water Pumping Station. No new or modified infrastructure is required for the Prospect WFP or water delivery network to accommodate the PRW. It is likely that optionality would be provided to pump PRW through the proposed Prospect Pretreatment Plant (PPTP). Although it is not a requirement to treat water through the PPTP, this may be a mitigation against any risks of algae growth in the reservoir.
Key activities	**Adjacent to reservoir** The main construction activities on the site would be civil works and installation of buildings, equipment and ancillary infrastructure. Temporary construction compounds and storage would also be required on site. Once built, the above ground works would be operated by Sydney Water (or contracted entities). **Within reservoir** The key activities would be civil works to build release infrastructure, baffles and aeration systems. Sydney Water will work closely with WaterNSW to design this infrastructure and establish appropriate construction and operational arrangements.

Figure 3-3 Indicative location of land-based assets at Prospect Reservoir

3.3 Timing

Figure 3-4 summarises the indicative timing for the project and notes key approval steps required before a decision is made to incorporate PRW into our drinking water supply.

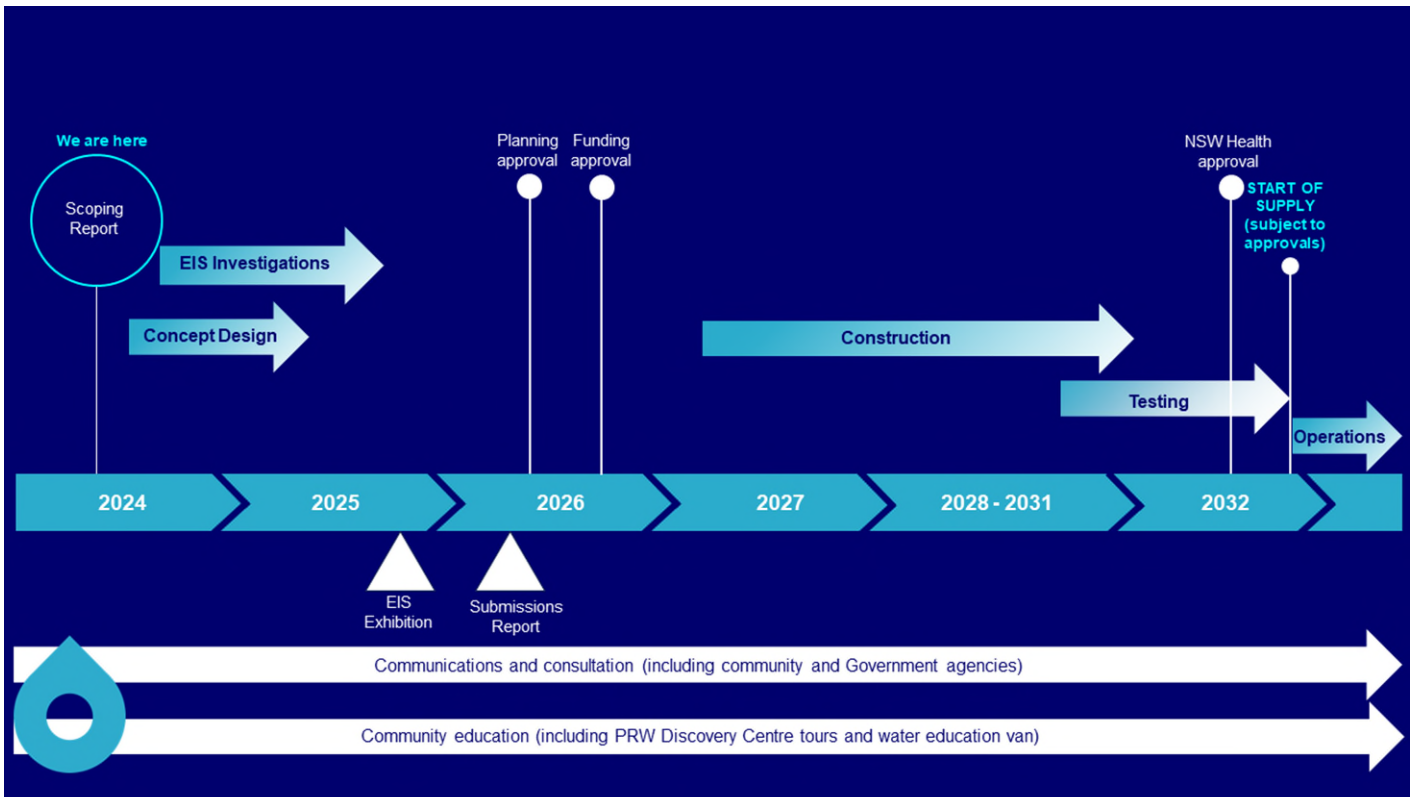

Figure 3-4 Indicative project timing

3.4 Project phases

3.4.1 Design

Sydney Water is currently initiating a reference design for the project, which is a high-level concept to demonstrate feasibility of building the project to meet its objectives. We are working closely with other utility and infrastructure providers to ensure we factor in potential interactions with their existing or future assets. This reference design will inform the EIS. Sydney Water will engage a contractor to progress further design and construction of the project. The contractor's design may differ from the reference design. The EIS will seek flexibility for this, provided the contractors' design meets specified performance and impact outcomes. If the project is approved, we will require the contractor to demonstrate consistency of their design with the EIS and conditions of approval, or otherwise seek an approval modification.

3.4.2 Early works

Sydney Water may seek exclusion of some early works from the definition of construction so they could start once approval is granted but before a Construction Environmental Management Plan is approved. We will define these in the EIS however they are likely to include activities such as investigations, surveys, installing environmental controls and establishing site compounds.

3.4.3 Construction

Construction is expected to take about 3 years. The detailed construction program would be developed by the delivery contractor, but it is expected the PRW Treatment Plant, pipelines, and other infrastructure would be built simultaneously. Typically, the key construction phases include site establishment, earthworks, civil works, mechanical and electrical installation and landscaping and restoration. Works and deliveries would be scheduled during standard hours but works outside these hours may be needed to minimise traffic impacts or undertake complex tunnelling.

Temporary ancillary facilities such as construction compounds and laydown areas would be required at Quakers Hill WRRF, Prospect Reservoir and at various locations along the pipeline alignment. The exact locations of these facilities are not yet known. Sydney Water will seek some flexibility in the location of the impact area and temporary ancillary facilities to account for changes required as design and construction planning progress. Most project components have existing access (e.g. Quakers Hill WRRF, Prospect Reservoir and most of the pipeline alignments). However, additional temporary access roads may be required in some locations if there is no existing access via the road network (e.g. for sections of the brine pipeline along Breakfast Creek).

3.4.4 Commissioning and proving

Before the new infrastructure is used, Sydney Water would thoroughly test it through a commissioning period. Commissioning would be in accordance with manufacturers' commissioning recommendations and Sydney Water's standard operating procedures and is expected to take about a year.

3.4.5 Operation

The PRW Treatment Plant and pipelines would typically operate 24 hours a day, 7 days per week and in accordance with Sydney Water's standard operating protocols. Some functions would be performed by on-site operators and others would be managed remotely. Sydney Water would carry out a range of monitoring at the PRW Treatment Plant and Prospect Reservoir, such as water quality monitoring, to ensure the plant is operating as predicted.

The project would operate in accordance with Sydney Water's operational management systems. This is the same approach taken for other Sydney Water projects approved by the Minister for Planning and Public Spaces. This means that after initial operational verification of performance, the project largely operates under its standard operating systems, rather than having an additional operational plan regulated by DPHI.

3.5 Related development

Aside from the connections to existing infrastructure described above, there is no existing or approved development or infrastructure that would be incorporated into the project. Sydney Water will continue to undertake separate projects and activities on some of the existing sites on which the project is located. For example, the PRW Discovery Centre on the Quakers Hill WRRF site, upgrade of the secondary treatment process at the Quakers Hill WRRF, and upgrades at Prospect WFP or other Sydney Water assets at Prospect Reservoir.

The secondary treatment process upgrade at the Quakers Hill WRRF is needed regardless of whether PRW proceeds, to maintain licence compliance and service growth. Sydney Water is planning to assess this

project in a Review of Environmental Factors under Division 5.1 of the EP&A Act. This secondary treatment process upgrade is also an important part of ensuring high quality feedwater for the PRW Treatment Plant and ensuring health and environment requirements can be met.

As noted above, related development excluded from project scope includes:

- expansion of PRW Treatment Plant beyond 36 ML/day and transfer pipelines from other WRRFs
- infrastructure for future PRW schemes, with the exception of infrastructure at Prospect Reservoir outlined in Table 3-4.

In addition, it is expected that any utility upgrades (e.g. power supply) needed for the project would be delivered under separate planning approvals. The following sections describe other related activities that are out of project scope.

3.5.1 Site investigations

Site investigations will be required before a determination is made on this project by the Minister for Planning and Public Spaces. These would be subject to separate planning approvals if required. The types of investigations include environmental and heritage studies, monitoring and testing, geotechnical and contamination investigations.

3.5.2 Property management

Sydney Water may need to carry out a range of property management activities on the Quakers Hill WRRF site and at Prospect Reservoir before the project is approved and during operation. These are excluded from the project scope and would be subject to separate planning approvals if needed. The types of property management activities include:

- land management activities such as removing spoil stockpiles adjacent to PRW Discovery Centre
- relocating/adjusting utility connections
- vegetation management
- site drainage management
- establishing site security
- demolition works
- land remediation activities.

3.5.3 Minor works and maintenance

Sydney Water proposes that once the project is operational, any maintenance, replacement and repair of that infrastructure or any minor works or upgrades would be out of scope of the project and assessed in separate planning approvals if needed. Similarly, any activities or works that improve environmental performance or have neutral environmental impact would be excluded from the project scope.

3.6 Alternatives considered

3.6.1 Do nothing option

If the proposed RRWS program does not proceed, Greater Sydney's total water demand and supply gap will increase over the coming decades and Greater Sydney would be exposed to complete supply failure in severe drought. Sydney is Australia's largest city and is responsible for 25% of national GDP. Failure of a critical utility such as water would have enormous economic impact.

The consequences of failing to proceed with the RRWS program are:

- inability to meet demand
- increasingly stringent and potentially continuous water restrictions
- potential boiled water alerts and higher public health risks at low surface storage levels
- restrictions on land development and housing supply
- constrained economic activity and growth
- high risk of inadequate water supply during drought
- extended water supply interruptions due to asset failures
- reduced ability to support a liveable, sustainable, and productive global city.

This project is a fundamental component of the RRWS program and therefore not proceeding contributes to the above risks. Not proceeding with the project would mean not supplying up to 36 ML/day initially (and ultimately up to 250 ML/day) of the projected additional 500 ML/day of water required by 2056 to ensure a sustainable supply. Not proceeding with this project also means an opportunity is lost to deliver the least cost option of RFIS. Alternative supply sources are more expensive and would increase the impact on customer bills. Further, several of the potential PRW schemes, including at Camellia and Liverpool/Glenfield WRRFs, contribute to Sydney Water's overall aim to reduce ocean discharges. Failing to implement PRW will result in continuous augmentation of ocean discharge of treated wastewater and does not align with this strategic aim to reduce ocean discharges.

3.6.2 Strategic options

There are a range of ways to augment Greater Sydney's water supply, including water recycling for drinking purposes (PRW), more traditional supply options such as desalination, dams, stormwater harvesting, and water recycling for non-drinking purposes. There are also non-asset measures, such as water conservation and strict water restrictions, that can reduce demand and address supply shortfalls. Any solution also needs to provide system resilience by addressing single points of failure and improving the level of interconnectivity between Sydney's water systems.

No single option will address the future demand and drought service needs, or the risks associated with asset failure and diversification of supply is required to achieve this. This means a suite of solutions is required to be delivered or planned for drought readiness over the next 40 years.

The RRWS program SBC identified several options within each of the above categories (for example 6 potential PRW schemes were identified). These options were assessed against criteria such as amount of

water produced, ability to address drought risks, adaptability and ability to address other system risks, cost impact to customers, and cost per ML of water produced. The shortlisted options within these categories were then developed into adaptable portfolios of options to address water supply demand over the coming decades. As a result, Sydney Water is currently progressing planning for network changes required to accept flows from an expanded Sydney Desalination Plant, PRW schemes (with the Quakers Hill PRW scheme as the priority), addressing single points of failure and contingency planning for additional desalination plants.

Of the 6 PRW scheme options identified, a PRW Treatment Plant at Quakers Hill WRRF was the most cost effective and straightforward to implement. At ultimate capacity of 86 ML/d it was also the most cost-effective source of RFIS compared to all other options in the RRWS Program. A PRW Treatment Plant at Quakers Hill WRRF also has the following advantages:

- Data obtained during operation of the PRW Discovery Centre at Quakers Hill WRRF will provide valuable design data for a development of a PRW Treatment Plant at Quakers Hill and build on the work that will be completed with NSW Health through the first year of operation of the plant.
- Quakers Hill WRRF already has approval to release treated wastewater into local waterways. All other PRW schemes that have been assessed as part of the RRWS SBC would require specific approval for local river releases to permit discharge of out of specification PRW and PRW in excess of demand. This simplifies the planning approvals and environmental protection licensing required for this project over others.
- There is additional value associated with reducing nutrients discharged at Quakers Hill WRRF (i.e. total nitrogen and total phosphorus) and providing greater flexibility in managing performance against new load limits.
- Introducing advanced treatment at Quakers Hill WRRF is preferred over St Marys and Riverstone to meet environment protection licence compliance obligations within the Hawkesbury Nepean River Sackville subzone. Advanced treatment would be needed to meet these obligations regardless of whether PRW is implemented. This means the additional treatment to meet PRW standards is a small incremental investment beyond that.
- Quakers Hill WRRF is the closest WRRF to Prospect Reservoir, which results in lower construction costs due to a shorter length of pipeline required.
- There is land available at the Quakers Hill WRRF to accommodate the new facilities.

The PRW schemes considered are ‘indirect augmentation schemes’ as defined in AGWR Phase 2. In indirect schemes, the PRW produced by a PRW Treatment Plant is transferred to an environmental buffer such as a reservoir or dam, where it is stored to remove risk of spikes in contaminants impacting quality of supply, before undergoing further treatment at a WFP and entering the distribution network. Three buffers were considered:

- Prospect Reservoir
- A new reservoir
- Warragamba Dam

Transferring PRW to Warragamba Dam or a new reservoir between Prospect and Warragamba, instead of delivering it to Prospect Reservoir was evaluated but not shortlisted due to the significant amount of infrastructure and energy that would be required to transfer PRW to these locations. Further, construction of the pipeline to enter Warragamba Dam would require substantial works within National Park land (e.g. Blue Mountains National Park, Burragorang State Conservation Area). A new reservoir would need to be located on relatively high value land, most likely in proximity to the new Western Sydney Airport. These options have limited or no tangible quality control benefit over Prospect Reservoir, and are very high cost, and were therefore not progressed.

Adding PRW directly into the water network was also considered but not shortlisted. This approach is not currently considered suitably advanced internationally for adoption. Also, due to the additional treatment required, and cost associated with addressing network water balance, it was not expected to provide cost savings in the Sydney application. This approach would also have additional challenges in obtaining community acceptance in Sydney. Where direct schemes are supported overseas, this is generally based on initial establishment of an indirect augmentation scheme nearby.

3.6.3 Project options

Table 3-5 outlines key options considerations for each project component to date. The EIS will include the outcomes of the additional options analysis currently underway.

Table 3-5 Project option considerations

Project component	Options considerations
PRW Treatment Plant at Quakers Hill	Given the PRW Treatment Plant would treat water from Quakers Hill WRRF and Sydney Water owns this land, no other sites were considered. The exact location will be refined as design progresses but is likely to be in the south-east corner where there is available land and it can effectively take feed water from the WRRF.
Prospect Reservoir infrastructure	Options avoided locating receival tanks and release structures in Prospect Nature Reserve on the northern side of the reservoir. One option considered was having this infrastructure on the western side of Prospect Reservoir. However, the most likely option is on the eastern side of Prospect Reservoir to provide longer retention and mixing times in the reservoir before extraction for treatment in the Prospect WFP. Sydney Water also owns land on this side of the reservoir. Various baffle configurations and aeration approaches are possible in the reservoir. These will be determined as design progresses with the intent of achieving appropriate mixing and retention times.
PRW pipeline	This pipeline would need to connect the PRW Treatment Plant and receival tanks at Prospect Reservoir. Figure 1-1 shows an indicative alignment but limited options assessment has been completed to date.
Brine pipeline	This pipeline would need to connect the PRW Treatment Plant and NSOOS. Figure 1-1 shows an indicative alignment but limited options assessment has been completed to date. Sydney Water considers that releasing brine to inland waterways is not an acceptable environmental outcome and that release to a wastewater system with an ocean outfall is appropriate. This is consistent with the recently approved approach for brine management for Sydney Water's Upper South Creek Advanced Water Recycling Centre.

Project component	Options considerations
	The location of release into the NSOOS will be subject to further design. The indicative location has been chosen as it is the closest wastewater system with an ocean outfall with a suitable connection point and capacity to take the brine.

4. Statutory context

Table 4-1 summarises the project's statutory context, including the power to grant planning approval, project permissibility and other approvals relevant to the project. Table 4-2 summarises other statutory matters for consideration, including environmental planning instruments.

Table 4-1 Project statutory context

Matter	Application to project
Power to grant planning approval	Sydney Water is seeking approval for the project as State significant infrastructure (SSI) under Division 5.2 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The project is SSI due to clause 1(1) in Schedule 3 of State Environmental Planning Policy (Planning Systems) 2021 (Planning Systems SEPP). In addition, the specific works at Prospect Reservoir as part of this project are expected to exceed $30m. This is another trigger for SSI through Schedule 3, clause 4(1) of the Planning Systems SEPP. SSI is the appropriate pathway given all project components are permissible without development consent as outlined below. Sydney Water will also request the Minister for Planning and Public Spaces declare the project critical State significant infrastructure under section 5.13 of the EP&A Act. The approval authority is the Minister for Planning and Public Spaces.
Permissibility	Under Divisions 18 and 24 of State Environmental Planning Policy (Transport and Infrastructure) 2021 (TISEPP): • the PRW Treatment Plant would be defined as a 'water recycling facility' • the brine pipeline and associated infrastructure would be defined as a 'sewage reticulation system' • the PRW pipeline and associated infrastructure (including storage tanks and discharge infrastructure at Prospect Reservoir) would be defined as a 'water reticulation system' • the works in Prospect Reservoir (e.g. aerators and baffles) are part of a 'water storage facility'. The PRW Treatment Plant would be on land zoned SP2 (Infrastructure) under Blacktown Local Environmental Plan 2015. The PRW Treatment Plant would be permitted without development consent under clause 2.126(4) of the TISEPP, given SP2 is a prescribed zone and Sydney Water is a public authority. The PRW pipeline, brine pipeline and associated infrastructure would be located in a range of land use zones. Under clauses 2.159(1) and 2.126(6) of the TISEPP, these pipelines and associated infrastructure would be permissible without development consent because permissibility is not limited to certain land use zones and Sydney Water is a public authority. Work associated with this infrastructure can only be carried out on land reserved under the *National Parks and Wildlife Act 1974* if the development is authorised by or under that Act. Sydney Water's current design does not impact any land reserved under this Act so this provision is not relevant. Clause 2.159(2) of the TISEPP provides that water storage facilities are permissible without development consent in certain land use zonings (which are all listed as prescribed zones in clause 2.158). As part of the Western Sydney Parklands, Prospect Reservoir does not have a land use zoning under State Environmental Planning Policy (Precincts – Western Parkland City) 2021, but clause 7.5A(2) notes that the Western Sydney Parklands is taken to be a prescribed zone for the purposes of Chapter 2 of the TISEPP. Sydney Water considers this means the works in Prospect Reservoir would be in a land use zone equivalent to a prescribed zone and are therefore permissible without development consent.
Other approvals	This row considers approvals that are likely to be relevant for the project. This will be revisited as design and environmental investigations progress and will be updated in the EIS if needed.

Matter	Application to project
	Approvals that should be consistent with approved SSI (section 5.24 of the EP&A Act) • Environment protection licence under Chapter 3 of the *Protection of the Environment Operations Act 1997* (POEO Act). Sydney Water expects that the brine pipeline would form part of Sydney Water's existing Quakers Hill sewerage system EPL (licence number 1724) or the North Head sewerage scheme (licence number 378) (of which the Northern Suburbs Ocean Outfall Sewer (NSOOS) is a part). As design progresses, we will consider further whether the PRW Treatment Plant would be included in the Quakers Hill EPL. Sydney Water considers that the PRW pipeline and associated infrastructure in Prospect Reservoir are not 'sewerage treatment' under clause 36 of Schedule 1 of the POEO Act, and therefore do not require a scheduled activity EPL under section 43(b) of the POEO Act. These project components would transport high-quality water into Prospect Reservoir. This is similar to the existing transfers of water from Warragamba Dam and other dams, and PRW would be subject to higher treatment levels than this dam water before entering Prospect Reservoir. Sydney Water will further consider whether to obtain an EPL under section 43(d) of the POEO Act given the high quality of water that would be released into Prospect Reservoir. • Consent under section 138 of the *Roads Act 1993*. This consent would be required given pipelines are expected to be constructed in and across roads. **Approvals not required for approved SSI (section 5.23 of the EP&A Act)** • An approval under Part 4, or an excavation permit under section 139, of the *Heritage Act 1977*. Given the project would include infrastructure at Prospect Reservoir, which is on the State heritage list, if the project was not SSI it would require approvals under the *Heritage Act 1977*. • An Aboriginal heritage impact permit under section 90 of the *National Parks and Wildlife Act 1974*. It is possible that the project would impact on Aboriginal heritage items. This will be determined through an Aboriginal cultural heritage assessment as part of the EIS. If Aboriginal heritage items are impacted, if the project was not SSI it would require a permit under section 90 of the *National Parks and Wildlife Act 1974*. • A water use approval under section 89, a water management work approval under section 90 or an activity approval (other than an aquifer interference approval) under section 91 of the *Water Management Act 2000*. It is possible that the project would require certain approvals under the *Water Management Act 2000* if extractions are of a depth that interferes with groundwater. This will be established as design progresses. ***Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) approval** Initial desktop assessment suggests the project is unlikely to have a significant impact on Matters of National Environmental Significance listed under this Act. Sydney Water will revisit this as project design and assessment progresses, and if needed would submit a referral to the Commonwealth Department of Climate Change, Energy, the Environment and Water. **Other approvals not integrated into SSI assessment** No additional approvals have been identified at this stage.

Matter	Application to project
Pre-conditions to exercising the power to grant approval	Sydney Water is not aware of any specific pre-conditions to exercising the power to grant approval.
Mandatory matters for consideration	Sydney Water is not aware of any mandatory matters for consideration. However, Table 4-2 summarises relevant considerations from other legislation and environmental planning instruments relevant to the proposal.

Table 4-2 Summary of other matters for consideration

Instrument	Relevance to project
SEPP (Precincts – Central River City) 2021	This SEPP aims to 'facilitate the development, redevelopment or protection of important urban, coastal and regional sites of economic, environmental or social significance to the State so as to facilitate the orderly use, development or conservation of those State significant precincts for the benefit of the State'. Two precincts in this SEPP are close to the current proposed alignment of the PRW pipeline: • Huntingwood West Precinct which is bounded by the M4 to the south, Great Western Highway to the north and Brabham Drive to the east. Based on current design, the PRW pipeline would be located along Brabham Drive. • Greystanes Southern Employment Lands which is located on the eastern boundary of Prospect Reservoir. Although the current proposed alignment of the PRW pipeline would not directly impact these precincts, any impacts will be revisited in the EIS.
SEPP (Precincts—Western Parkland City) 2021	The aims of this SEPP are the same as the Central River City SEPP. One of the State significant precincts is the Western Sydney Parklands which includes Prospect Reservoir and its surrounds. The EIS will consider any relevant provisions from this SEPP.
SEPP (Biodiversity and Conservation) 2021	An objective of Part 6.5 of this SEPP is for developments to have a Neutral or Beneficial Effect (NorBE) on the Sydney Drinking Water Catchment. WaterNSW's Neutral or Beneficial Effect on Water Quality Assessment Guideline (WaterNSW, 2022) will be used in the water quality assessments for the EIS.
SEPP (Resilience and Hazards) 2021	As project design progresses, we will consider whether it is classified as potentially hazardous industry under section 3.2 of this SEPP. Water/sewage treatment is identified as an industry to which this SEPP might apply (under Appendix 3 of Applying SEPP 33). If it did apply, a risk screening, and potentially a Preliminary Hazard Analysis would need to be undertaken.
	Under section 4.6 of the SEPP, a consent authority must not consent to a development unless it has considered whether the land is contaminated. If the land is contaminated, it also needs to consider if the land is suitable (or would be suitable, after remediation) for the proposed purpose. Contamination studies are proposed as part of the EIS to determinate if land impacted by the project is contaminated.
Dam Safety Act 2015	Prospect Dam at Prospect Reservoir is listed as a declared dam and is managed by WaterNSW. Declared dams are regulated by an independent regulator, Dams Safety. Sydney Water will work with WaterNSW to consider any impacts of the project on Prospect Dam and consistency with its dam safety management system.

Instrument	Relevance to project
Biodiversity Conservation Act 2016	Under Section 7.14 of this Act the Minister must take into account the impacts to biodiversity. In accordance with section 7.14(1), the EIS would be accompanied by a Biodiversity Development Assessment Report (BDAR).
Crown Land Management Act 2016	The current alignment would not impact any Crown Land reserves. However, there are some reserves nearby and this will be revisited in the EIS.

5. Community engagement

5.1 Engagement to date

Sydney Water's objective for early engagement was to enhance water literacy across Greater Sydney. This supports a more informed community to better engage on options for their future water supply.

Table 5-1 summarises early engagement Sydney Water has undertaken to date.

Table 5-1 Summary of early engagement

Item	Details of engagement
What We Heard **September 2021**	The NSW Government's Greater Sydney Water Strategy sought community views on PRW in late 2021. The consultation outcomes report reported the following: • There was significant support for more rainfall-independent water supplies including strong support for PRW and moderate support for desalination (p16). • While there was significant support for PRW for drinking, there were moderate levels of concern from a minority of respondents over the appropriateness of this source (p21). • Seventy-five per cent of survey respondents agreed or strongly agreed that PRW should be a water supply option for Greater Sydney (p21). • Many local water utilities and local governments want to progress options for PRW and identified the need to work with the community closely and effectively to increase understanding and acceptance of the concept before it can be applied. The idea of a demonstration plant for PRW to increase understanding and acceptance from the community was well received at the community information sessions, in survey responses and in written submissions (p22).
Our Water Our Voice **From July 2022**	Through the Our Water, Our Voice customer engagement program, Sydney Water customers established their priorities, shown below. • Maintaining safe and clean drinking water • Ensuring water/wastewater bills remain affordable • Ensuring waterways/water recreation areas remain clean and safe to use • Enhancing the water network's resilience to drought through water recycling and/or desalination • Reducing water loss by minimising leaks and breaks in Greater Sydney's pipe networks The program was carried out over 21 months, involving more than 13,000 customers and stakeholders through 12 customer forums, 5 online surveys, 120 interviews, 58 focus groups and 10 workshops. Insights from this engagement program have informed Sydney Water's price submission, but also ongoing education and engagement on implementation of PRW.
Wonders of Water van **From Mid-2022**	Sydney Water's Wonders of Water Discovery Van is a mobile education vehicle that has been built to help engage the community about where their drinking water comes from, how it is treated, and to start a conversation about the importance of a resilient and reliable water supply. It features activities specifically designed to build awareness and understanding of PRW as a future water supply option. Through a range of events, the van has accumulated more than 110,000 direct community member engagements.

Item	Details of engagement
Digital **From September 2023**	As a key source of information for Sydney Water customers, Sydney Water's website contains information about the role for PRW in a resilient and reliable water future. The website includes information on the environmental and cost benefits of PRW, noting that it could provide up to 25% of water needs across our city by 2056. There is also a range of resources about PRW including: • examples of PRW around the world • fact sheets on PRW and its future role in water supply • information about treatment processes • PRW Discovery Centre animation • videos on the future of water, and deep dives on the technology • a virtual tour of PRW Discovery Centre (Produced and hosted by the University of New South Wales Chemical Engineering Department) • a link to book a tour at the PRW Discovery Centre. The web page (https://www.sydneywater.com.au/education/drinking-water/purified-recycled-water.html) has been viewed almost 90,000 times.
Social media **From Mid 2023**	Sydney Water's 'Did you know' campaign to build water literacy and promote awareness of PRW reached over 1,000,000 social media users with a 5.73% engagement rate. This series of short explainer videos (shown as ads) was viewed over 29 million times.
Traditional media **From November 2023**	The media launch of Sydney Water's PRW Discovery Centre on 19 November reached a TV audience of 1.9 million. Overall media coverage across TV, videos, radio, online articles and podcasts is 3.6 million.
PRW Discovery Centre **From October 2023**	Open less than 6 months, the PRW Discovery Centre has had more than 1,100 visitors comprised mostly of employees, key stakeholders and community members. The centre opened to community tours in early April 2024. People who tour the centre are asked to provide their views on PRW at the end of the session. Of about 200 people who have completed the survey, 88% strongly agreed that they understood why PRW was being considered after the tour. Survey results also show an increase support for PRW after the tour with an average comfort level of 8.8 on a 10 point scale (1 Not comfortable, 10 Very comfortable) for PRW being used in Greater Sydney's water supply. More than 500 employees have toured the centre, as a key part of Sydney Water's internal employee education campaign for more than 3,000 employees.
Waterwrap newsletter **February 2024**	The February to April edition of the Waterwrap, the customer newsletter that accompanies all bills (print and online) explained what PRW is and its potential use as a part of Greater Sydney's water supply. It also had a link to the website with information about PRW and invited members of the public to take a tour of the PRW Discovery Centre.

Item	Details of engagement
	
Infrastructure Pipeline and Supply Chain expo **13 March 2024**	Sydney Water's exhibition and conference with keynote presentations and panel discussions on the capital delivery pipeline included details about a future PRW scheme. Attendees included representatives of tier one contractors and supply chain partners, with 37 of those having detailed conversations about PRW.
Parliamentary Showcase **21 March 2024**	This project was promoted at an event in Parliament House as a part of Sydney Water's showcase of capital investment in Major Projects. MPs and their advisors were able to speak directly with project teams and had the opportunity to taste PRW samples from Singapore.
Waterwrap newsletter **May 2024**	The May to July edition of the Waterwrap featured the PRW Discovery Centre, again promoting the tours to help the community learn more about the technology used in countries around the world. 

5.1.1 Stakeholder and regulator engagement

Sydney Water has engaged with a range of government and agency stakeholders as part of developing the project. This has included engaging on PRW through tours of the PRW Discovery Centre or individual briefings.

Members of Parliament (including the Members for Badgerys Creek, Balmain, Castle Hill, Cronulla, Davidson, Drummoyne, East Hills, Mount Druitt, Oatley, Parramatta and Winston Hills) and their representatives (for the Member for Granville) have toured the facility. Elected representatives and/or

executives from Blacktown and Wollondilly councils have also attended a tour of the PRW Discovery Centre. These tours will continue as the project progresses. Sydney Water has also provided ongoing briefings to the offices of the Premier, Minister for Health, Minister for Planning and Minister for Energy and Climate Change.

Sydney Water is also working closely with NSW Health as we develop our approach to aligning with the (AGWR) Phase 2 for the PRW Discovery Centre.

In March 2024 Sydney Water held a briefing for a range of government agency stakeholders, further detailing the specifics of the proposed project. This provided more detail about the project and its potential impacts and included a PRW Discovery Centre tour and site visit to Prospect Reservoir. Representatives from the following agencies attended:

- NSW Department of Climate Change, Energy, the Environment and Water (DCCEEW) – Water Policy teams
- NSW Department of Planning, Housing and Infrastructure (DPHI)
- NSW Environment Protection Authority (EPA)
- Greater Sydney Parklands
- NSW Health
- WaterNSW

Sydney Water also offered individual briefings to government agencies who were unable to attend this session and has since met with DCCEEW (on Aboriginal heritage and recreation at Prospect Reservoir) and Department of Primary Industries – Fisheries.

Sydney Water has also provided PRW briefings to the Committee for Sydney (who have also completed a tour of the PRW Discovery Centre), Western Sydney Leadership Dialogue, Urban Development Institute of Australia, NSW Property Council, Business Western Sydney and Infrastructure Partnerships Australia.

In taking guidance from consultation supporting development of the NSW Aboriginal Water Strategy, Sydney Water has begun engaging with First Nations representatives to seek out and listen to indigenous perspectives. Sydney Water will continue to align itself with the NSW Government's engagement approach addressing the six important principles for Aboriginal people regarding water, specifically culture, health and wellbeing, caring for country, meaningful engagement, economic benefit and shared cultural and environmental benefits.

5.2 Community views

Since early 2022, Sydney Water has been tracking water literacy and sentiment toward PRW. Recent quantitative results[1] (March 2024) show 2 in 3 customers (64%) are comfortable with the idea of PRW being used for drinking water, as a new source of water. Comparatively, comfort with existing water sources, being desalination and dams, is 78% and 89% respectively. While this single metric has limited value in capturing the complexity of social licence from the community to operate a PRW scheme, it does indicate a strong base for community engagement on the specifics of the project.

Independently, Aurecon recently carried out a national survey of more than 1,400 people in January 2024 which showed eight out of ten Australians believe it is important to consider alternative water sources, such as PRW, to improve water security[2]. The report also highlighted that experience with PRW is linked to acceptance, as well as trust in water authorities. Sydney Water's own research found a high proportion of people trust Sydney Water to provide tap water that is safe to drink (89%), and to plan and manage the water supply (87%).

Some of the key considerations for customers who are less comfortable with PRW include unfamiliarity with PRW as a new source of water, understanding of costs and value, legitimacy of the need, and perceived health impacts.

5.2.1 Water literacy

There is a higher correlation between those highly comfortable with PRW (and also desalination) and those who have higher water literacy (as measured by Sydney Water's Water Literacy Index). Inner Sydney and Western Sydney have lower water literacy rates than Northern Sydney, Southern Sydney and the Illawarra.

Ongoing engagement for the project will address this, drawing insights from quarterly research to make continuous improvements to the communication and engagement approach. Sydney Water will also continue to lift water literacy through education, enabling the community to provide informed feedback throughout the project.

Based on existing customer research, the below demographics are key targets where water literacy is lower:

- Men 18-39
- Women 18-49
- Inner Sydney and West
- Renters
- First Nations People
- CALD communities (Arabic, Greek, Hindi, and Vietnamese)

[1] Question: How comfortable do you feel about the following sources of water being used as part of Greater Sydney's drinking water supply? Sample size 1,506. October to December 2023 survey results.

[2] Details are available at https://www.aurecongroup.com/insights/australian-attitudes-alternative-water-sources.

5.2.2 Engagement approaches to build awareness and understanding

While communications about the project will seek to address potential concerns outlined below, it is broadly understood that it takes ten or more years to build acceptance for the implementation of a PRW scheme. Water Corporation in Perth took 13 years to plan and deliver their groundwater replenishment scheme, while San Diego's water reuse scheme will go live almost 2 decades after engagement began (Water Services Association of Australia, 2019). Sydney Water began the conversation with the community about water supply options for the future in 2021. Sydney Water will continue these efforts to 2032 and beyond to build acceptance for PRW through a mix of mass media and grass roots engagement, community events, education and media campaigns.

Engagement to date has not referenced the project, instead focusing on building awareness of PRW. For this reason, community views on the project specifics, including construction impacts, are limited. A series of anticipated community concerns are outlined in Table 5-2. These are based on existing global research on PRW, a small number of discussions with community members, and other anecdotal evidence.

Table 5-2 Anticipated community concerns

Issue raised	Issue category	Engagement approach
Varying perceptions of PRW • It is unnatural • It is contaminated • It is unsafe	Issues beyond scope of project	Initiatives will continue to address these concerns by providing information on the urban water cycle, the methods to ensure safety of PRW and the long-term benefits. Community tours at the PRW Discovery Centre will also help build comfort with the technology through demonstration of a working facility.
Legitimacy of the option and the need for PRW	Community engagement	Section 5.3
Property impacts	Community engagement	Section 5.3
PRW will contaminate natural water sources and result in the potential loss of recreational activities	Community engagement	Section 5.3

Table 5-3 summarises the issues raised through government agency consultation at the March 2024 briefing session and subsequent meetings, and where they are addressed in the scoping report.

Table 5-3 Issues raised in government agency consultation

Issue raised	Issue category	Relevant section of Scoping Report
Clarifying various elements of scope such as which components will be included in EIS, size and location of assets, upgrades to existing assets, planning approval pathways for future schemes	The project	Section 3
Project costs	The project	Indicative capital investment value will be provided separately to DPHI and change to customer bills is briefly noted in section 3.6.2. However, project costs and any changes to

Issue raised	Issue category	Relevant section of Scoping Report
		customer bills are regulated outside the EIS process. This is through internal business cases and Infrastructure NSW assurance in terms of project costs, and through our price submissions to the Independent Pricing and Regulatory Tribunal for changes to customer bills.
Approach to communications, key messaging to the community and ensuring appropriate communication with a range of demographics. Includes communicating environmental benefits.	Community engagement	Section 5
Details about treatment process steps and operations	The project	Section 3
Other options considered	Alternatives considered	Section 3.6
Interactions with Prospect Reservoir (for example, temperature, water quality, aquatic ecology, potential future recreation)	Key matters for assessment in EIS	Section 6
Potential changes to flows in Hawkesbury-Nepean and downstream impacts (for example, to irrigators)	Key matters for assessment in EIS	Section 6
Timing of delivery contractor involvement	Issues beyond scope of project	N/A. Sydney Water will investigate the timing of delivery contractor involvement in later stages of the project as we determine our procurement approach for delivery.
Whether a referral under EPBC Act is needed	Statutory issues	Section 4
Works in Western Sydney Parklands	The project	Section 2.2.3
Heritage at Prospect Reservoir	Key matters for assessment in EIS	Section 6.7
Cumulative waterway impacts with future PRW schemes	Key matters for assessment in EIS	Section 6.2
Impacts of brine on North Head system and potential for concentration of contaminants and spills	Key matters for assessment in EIS	Section 6.2
Impacts to aquatic ecology associated with changes to water quality, volumes and temperature, including any potential for scouring	Key matters for assessment in EIS	Section 6.4

5.3 Proposed engagement

Sydney Water is committed to providing a range of opportunities for community education, engagement and feedback on the project. In addition to meeting the requirements of *Undertaking Engagement Guidelines for State Significant Projects* (DPHI 2024), the objectives for the proposed engagement are to:

- be inclusive, transparent and easy to engage for all customers including First Nations and culturally and linguistically diverse groups
- build awareness and understanding of PRW and the project
- gather feedback from the community on the project and consider options to address that feedback
- refine the approach as the EIS progresses, in response to feedback or new issues.

5.3.1 Stakeholders

Stakeholders and community to be engaged throughout the project are outlined below.

- Elected representatives
  - Federal and State Government Ministers
  - State Government Members of Parliament
  - Local Government Mayors and Councillors
- Government departments and agencies
  - Department of Climate Change, Energy, the Environment and Water (Federal)
  - DCCEEW (NSW)
  - DPHI
  - Department of Premier and Cabinet
  - Water NSW
  - National Parks and Wildlife Service
  - National Parks and Wildlife Advisory Council
  - Heritage Council of NSW
  - NSW Health
  - Transport for NSW
  - NSW EPA
  - DPI – Fisheries
  - Greater Sydney Parklands Trust
  - Emergency Services
  - Department of Education
  - Local Councils (CEOs and professional staff)
- First Nations representatives
  - Deerubbin Local Aboriginal Land Council (LALC)
  - Metropolitan LALC
  - First Nations people

- Members of the community
  - Sydney Water Customer and Community Reference Group
  - Adjacent and nearby landowners
  - Sydney Water customers
  - Community interest groups
  - Local sporting groups
  - Local businesses
  - Language and cultural groups
  - Religious groups
- Local and national environmental groups
  - Parramatta River Catchment Group
  - Other groups with interest in the Hawkesbury-Nepean River system and the Parramatta River
- Local tourism operators
- Energy, gas and telecommunications providers

The next steps for stakeholder and community engagement for the project are summarised in Table 5-4.

Sydney Water will also continue to consult with the government agency stakeholders outlined in section 5.1.1 through emails and meetings, to discuss relevant impacts and issues as they arise. We will also consult with a range of other government agency stakeholders using the same approach, including utilities, transport agencies, DCCEEW (biodiversity, National Parks and heritage teams), emergency services and Crown lands.

Table 5-4 Next steps for stakeholder and community engagement

Timing	Activities	Collateral
EIS preparation	Project website (Sydney Water Talk), email and hotline Establish online project feedback form Project introduction and update letters Newsletters Stakeholder briefings Community briefings NAIDOC week PRW stall CALD events (religious and language groups) Pop-up displays Forums Focus groups Tours Project and information line enquiries Door knocking	Website Community newsletter Stakeholder letters Fact sheet Frequently Asked Questions Project map Survey Presentations Static displays Digital advertising Media campaigns (need to check with media team) Sydney Water's Quarterly Stakeholder Newsletter

Timing	Activities	Collateral
	Social media Promotion through Sydney Water's corporate membership partners	
EIS exhibition	Project update letters and newsletters Stakeholder briefings Community briefings CALD events (religious and language groups) Pop-up displays Tours Project and information line enquiries Newspaper advertisements Social media	Website Community newsletter Stakeholder letters Fact sheet Frequently Asked Questions Project map Presentations Static displays Advertising Sydney Water's Quarterly Stakeholder Newsletter
Post-EIS	Project update letters and newsletters Stakeholder briefings Community briefings Project and information line enquiries Social media	Summary report Website update Community newsletter Stakeholder briefings Sydney Water's Quarterly Stakeholder Newsletter

5.3.2 Best practice engagement

In developing the engagement approach, Sydney Water has met with Water Services Association of Australia (WSAA) as well as other utilities who have successfully implemented PRW schemes. This includes Water Corporation (Perth, Australia), Southern Water (United Kingdom), San Diego (United States of America) and Cape Town (South Africa).

WSAA has a range of PRW resources available on its website which have also been referenced in developing the engagement plan and collateral (https://www.wsaa.asn.au/all-options-table-toolkit-purified-recycled-water-drinking).

Sydney Water will seek third party endorsement of the Community and Stakeholder Engagement Plan from a suitably qualified third-party engagement practitioner. Efforts to ensure best practice engagement will also include the use of the Infrastructure Engagement Excellence (IEE) Framework and Toolkit developed by the Next Generation Engagement Program (I2S) for the Australian National University's Crawford School of Public Policy.

5.3.2.1 First Nations

Sydney Water will engage with First Nations peoples and organisations including Traditional Custodians, knowledge-holders, community members and Local Aboriginal Land Councils. Consultation will be

undertaken in line with Sydney Water's Reconciliation Action Plan, internal consultation guidelines, and the NSW Government's Connecting with Country Framework.

To deliver best practice engagement for First Nations stakeholders, Sydney Water has appointed an identified First Nations Engagement Advisor within the Major Projects Office. This important role will help to guide approaches to listening, developing relationships and developing opportunities for more culturally aligned project planning. As noted earlier, engagement for this project will also take guidance from principles identified through consultation in development of the NSW Aboriginal Water Strategy.

5.3.2.2 Culturally and Linguistically Diverse Communities

Across Sydney Water's area of operations, 37% of people speak a language other than English at home. Using existing customer segmentation data, the project engagement approach has targeted the following for in-language communications for the project:

- Mandarin
- Arabic
- Cantonese
- Vietnamese
- Korean
- Greek
- Hindi

The project will leverage existing CALD engagement approaches through the Love Water, Don't Waste it campaigns, shown in Figure 5-1.

In addition to in-language communication materials, Sydney Water will also deliver a targeted outreach engagement program to support local cultural leaders to inform their communities. This will include community grants for delivering information about PRW, CALD influencers, and also involve Sydney Water's own employees with skills in languages other than English.

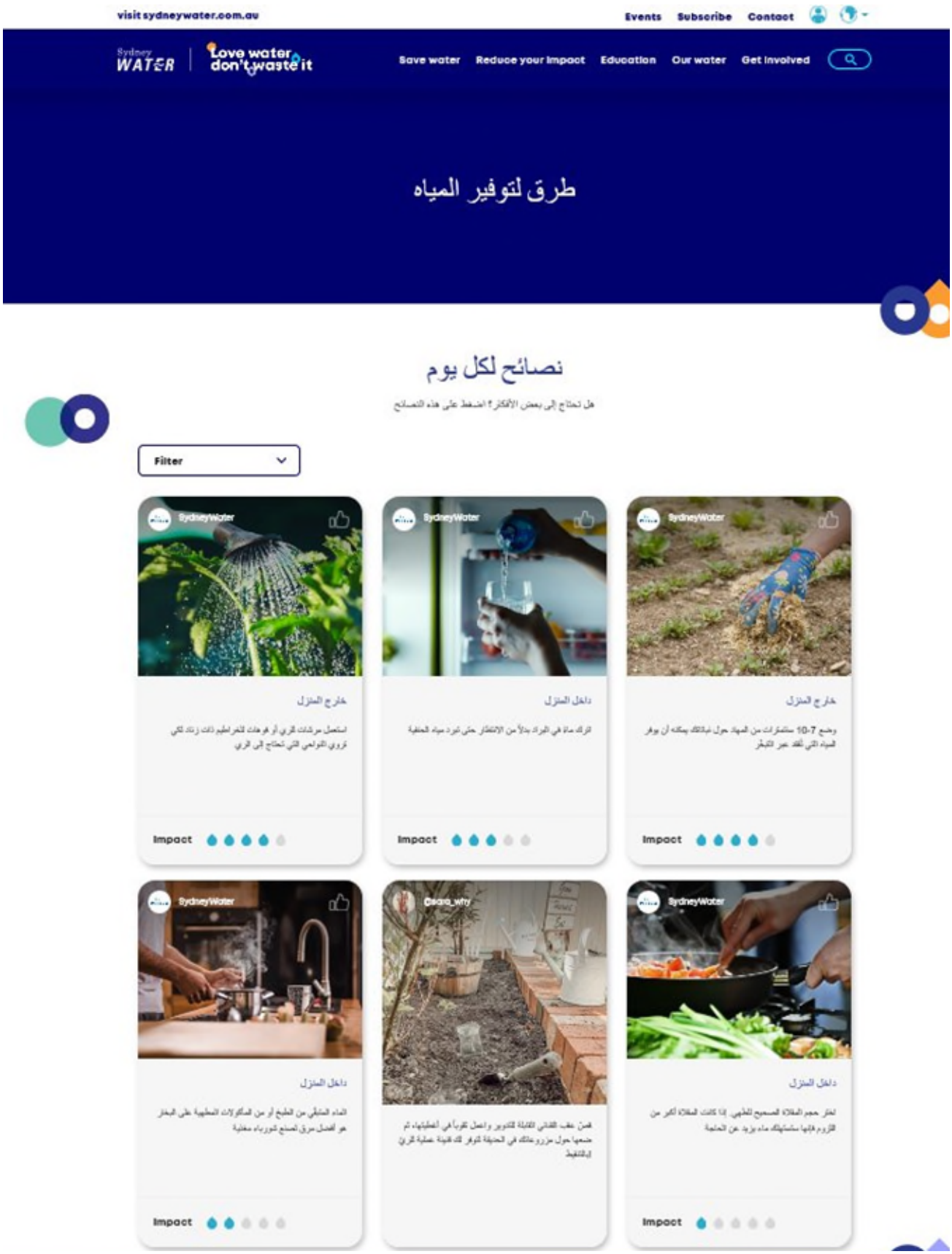

Figure 5-1 Example of in-language material

6. Proposed assessment of impacts

6.1 Approach to assessing impacts

This section describes the project's likely impacts on key environmental matters that will require further assessment in the EIS.

Sydney Water has identified key environmental matters as those where:

- the project may have high or moderate impacts (actual or perceived) and/or
- assessment is necessary to determine the level of potential impact and to develop appropriate measures to mitigate and manage the impacts.

This approach is consistent with *Preparing a Scoping Report – Appendix A to the SSI Guidelines* (DPE 2022b). The purpose of considering these matters at this stage is to inform the preparation of the SEARs, which will guide assessment in the EIS.

The information in this section is based on desktop reviews and initial site visits and considers the environment surrounding the project location in Figure 1-1. It is also based on indicative project locations and information that may change as design progresses.

Appendix A includes a scoping summary table in DPHI's template that:

- summarises the impacts and assessment level for a range of matters
- includes a list of the relevant plans, polices and guidelines that will be considered for each matter
- identifies matters requiring no further assessment in the EIS.

6.2 Water

6.2.1 Existing environment

Figure 6-1 shows waterways surrounding the project.

Currently, treated water from the Quakers Hill WRRF is released into Breakfast Creek, which is a highly modified waterway. The riparian corridor is well-vegetated with remnant native vegetation and higher ecological values downstream from the Quakers Hill WRRF compared with upstream. Breakfast Creek flows in a westerly direction into Eastern Creek. The reaches of Eastern Creek near the project are within the Western Sydney Parklands. Eastern Creek also has a well vegetated riparian corridor consisting of remnant native vegetation.

Bungarribee Creek runs northwest through the Western Sydney Parklands into Eastern Creek. The PRW pipeline is proposed to cross Bungarribee Creek at Doonside Road. The brine pipeline is proposed to connect into the NSOOS network on the north side of Blacktown Creek at Seven Hills. Like Breakfast Creek, these two waterways are modified and the riparian corridors, well vegetated with patches of remnant native vegetation.

Low to medium priority groundwater dependent ecosystems (GDEs) occur near the project along Breakfast Creek, Eastern Creek and Bungarribee Creek. These are also discussed in section 6.4.2. The high priority GDEs closest to the project are on the southern side of the dam wall at Prospect Reservoir.

Prospect Reservoir is a constructed and artificially managed water body in an urban setting, with no downstream connections. Raw water is supplied to Prospect Reservoir from either Warragamba Dam or the Upper Canal system. Some raw water is also received from rainfall in the local catchment. While the aquatic environment has developed some biodiversity value over time, the reservoir's primary purpose is as a bulk water storage as part of Sydney's drinking water supply. The reservoir is artificially de-stratified using an aerator to maintain good water quality, with WaterNSW responsible for managing the water level. Alum dosing periodically occurred at Prospect Reservoir up until the 1990s, before construction of Prospect WFP. This was to promote flocculation, reduce turbidity and remove colour. This resulted in an alum sludge layer of varying depths, covered with a layer of algae.

6.2.2 Potential impacts

6.2.2.1 Water quality – environment

Construction

During construction, water quality impacts may occur from pipeline waterway crossings, instream work in Prospect Reservoir, and excavation activities near waterways.

Potential impacts to water quality during construction include:

- potential off-site migration of contaminants in groundwater that may affect adjacent waterways
- potential for frac-outs from tunnelling and drilling activities that may lead to a pollution incident in the waterways
- potential for water quality impacts in Prospect Reservoir through disturbing sediments that may contain high concentrations of certain chemicals (for example alum)
- erosion and sedimentation run-off into the waterways
- contamination from spillage or inappropriate storage of chemicals and fuels.

Operation – Prospect Reservoir

Given its high level of treatment, PRW quality would be different from the raw water within Prospect Reservoir. The raw water from dams is transferred either directly to Prospect WFP or into Prospect Reservoir. The raw water typically does not have any water quality treatment, except for some screening. As a result, the PRW may change water quality in Prospect Reservoir over time, depending on the relative volumes of PRW compared with raw water from dams.

Further analysis of water quality is required but potential impacts could be positive or negative. The key parameters identified during high level assessment that would be considered include:

- pH
- Total Nitrogen (TN)
- Total Phosphorus (TP)

- temperature
- Total Organic Carbon
- turbidity
- heavy metals.

For example, changes in these parameters have the potential for impacts including increased risk of algal growth and subsequent ecology impacts resulting from a change in the food chain. There is also the potential for a shift of dominant biological or algae strains. The clarity of PRW water may be of benefit to water treatment in Prospect WFP.

Operation – other waterways

Water quality in Breakfast Creek may change downstream of Quakers Hill WRRF, due to reduced flows of treated wastewater during dry weather. Flows would be reduced because the water that is currently released would instead be treated to produce PRW. This change is expected to have a positive water quality impact, as it would reduce the volume of treated wastewater and associated nutrient loads to Breakfast Creek. However, the current treated wastewater flows represent most of the flow in Breakfast Creek so reducing the flow may also impact some water quality benefits currently provided. For example, the current flows can dilute poorer water quality from upstream sources and minimise the potential for low flow or stagnant conditions.

Similar impacts are also possible further downstream in Eastern Creek, around the confluence with Breakfast Creek. However, Eastern Creek also receives flows from a range of other sources, so any changes would likely be less pronounced.

Brine would be transferred to the North Head WRRF and would be a very small proportion of the total flows to that plant. Sydney Water already transfers brine to the North Head WRRF from the St Marys Advanced Water Treatment Plant. It is unlikely that the addition of brine to the system would affect our ability to comply with North Head system EPL requirements for releases from the North Head WRRF. However, if brine is not appropriately managed, particularly during wet weather, there is potential for it to affect capacity in the wastewater network and increase the risk of wastewater overflows.

No operational impacts are expected at Bungarribee Creek or Blacktown Creek.

6.2.2.2 Water quality – human health

Construction

During construction, water quality impacts to human health are considered unlikely.

Operation – Prospect Reservoir

Wastewater contains pathogens and chemicals such as heavy metals, organic chemicals, antibiotics and other pharmaceuticals. The Quakers Hill WRRF and PRW Treatment Plant would remove these to safe levels. Additional reduction would occur through storage in Prospect Reservoir and subsequent treatment through the Prospect WFP. Sydney Water intends to ensure these processes are operated effectively. Public health impacts from inadequately treated PRW and the associated risk management approaches are primarily regulated by NSW Health, outside of the scope of this EIS.

The NSW Government is exploring potential future recreation opportunities at Prospect Reservoir, including swimming, fishing and kayaking, with a feasibility study being prepared this year. Depending on the options that are presented, there is the potential for some cumulative impacts including dilution and retention of water in Prospect Reservoir.

6.2.2.3 Hydrology and groundwater

Construction

The main potential for hydrological impacts during construction is the risk of erosion and sedimentation if surface flows are not effectively managed around excavated areas.

There is potential for groundwater to be encountered and possibly require extraction during pipeline construction, including any work for waterway crossings.

Potential impacts to groundwater include changes to:

- groundwater flows and groundwater drawdown during excavation
- groundwater quality from spills or the disturbance of the existing contaminated land
- surface watercourses with groundwater connectivity
- groundwater dependent ecosystems.

Operation

There would be ongoing changes to the hydrological regime of Breakfast Creek due to the reduction in discharge from the Quakers Hill WRRF. This would also reduce flows to Eastern Creek from Breakfast Creek. Changes to the surface water regime are expected to be minor during operation given pipelines would be below ground, the PRW Treatment Plant would be built on an existing Sydney Water site and the relatively small scale of infrastructure at Prospect Reservoir.

No groundwater extraction is expected during operation.

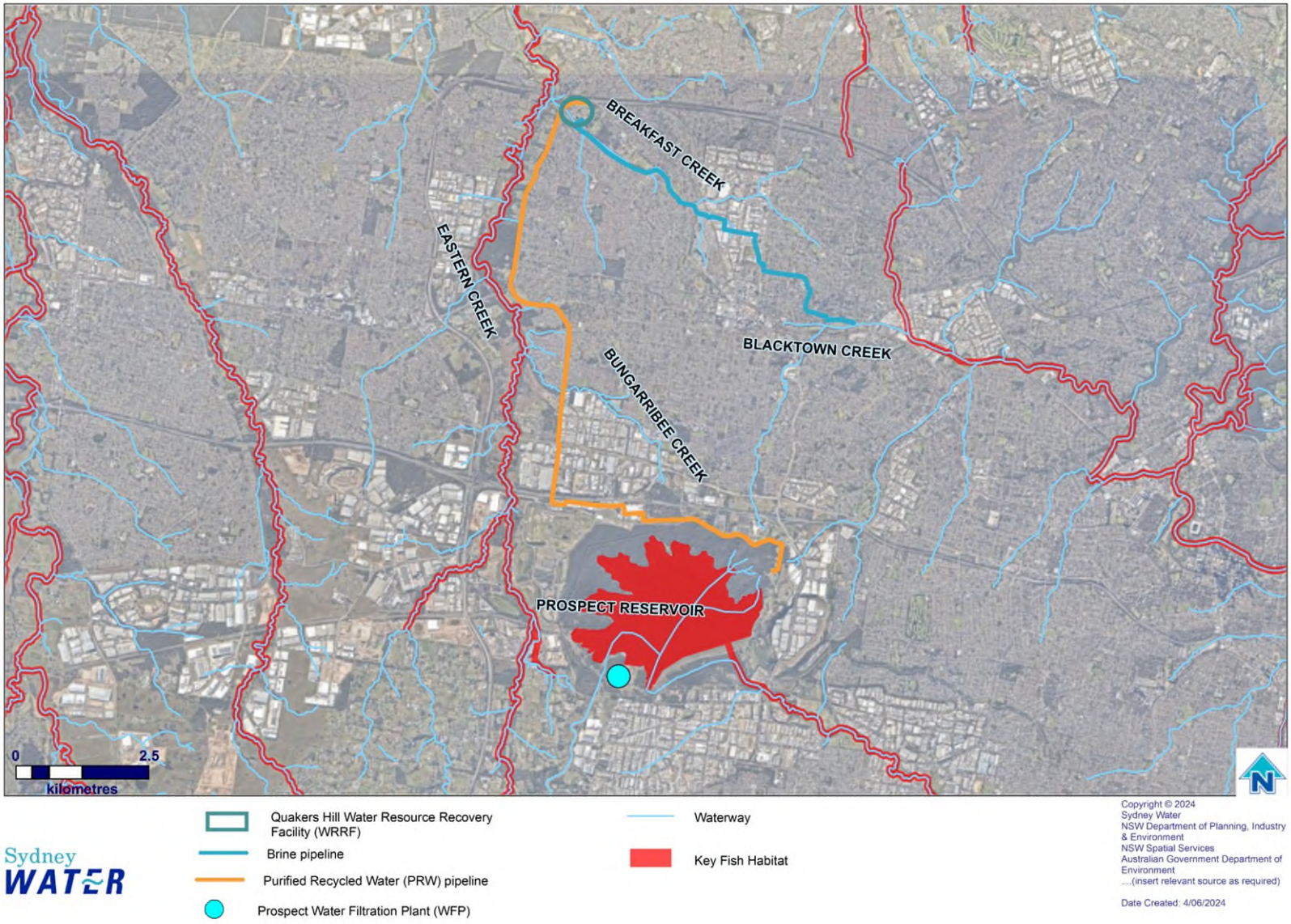

Figure 6-1 Waterways near the project

6.2.3 Assessment approach

6.2.3.1 Water quality – environment

The assessment will focus on operational impacts, with construction impacts assessed qualitatively given their temporary and short-term nature.

Prospect Reservoir

Further investigation and assessment of releasing PRW into Prospect Reservoir will include developing key operating flow scenarios and undertaking hydrodynamic water quality modelling with WaterNSW. The operational scenarios will consider releases from the first stage of the PRW scheme at Quakers Hill WRRF (i.e. at 36 ML/day) through to the ultimate release of up to 250 ML/day. The modelling will also include consideration of design measures to protect water quality. This will be captured in a hydrodynamics and water quality impact assessment that will also include:

- a review of available water quality data
- additional baseline water quality monitoring to address any gaps in existing data
- assessment of changes to existing conditions in Prospect Reservoir
- potential interactions with any proposed in-reservoir recreation activities in Prospect Reservoir if these are identified in DCCEEW's feasibility study
- identification of appropriate measures to avoid, minimise and/or mitigate potential impacts.

Other waterways

Further investigations and assessment at Breakfast Creek will include:

- bathymetric survey of the channel and refined hydraulic modelling to confirm the minimum flow requirements and need for any waterway rehabilitation works
- further analysis to determine potential water quality impacts from reduced flows
- identification of any downstream irrigators who may experience impacts from reduced flows
- identification of appropriate measures to avoid, minimise and/or mitigate potential impacts.

Sydney Water will model flows in the North Head wastewater system to ensure brine management for the project is designed to reduce the risk of wastewater overflows and consider the potential for any impacts on the North Head system EPL. The analysis will focus on impacts from the project and any cumulative impacts with the new WRRF proposed as part of Sydney Water's Greater Parramatta and Olympic Peninsula Water Cycle Management project. Potential brine impacts from other PRW schemes would be assessed in future environmental impact assessment of those projects, if they progress in the future.

6.2.3.2 Water quality – human health

The assessment will focus on operational impacts from releasing PRW into Prospect Reservoir as part of Sydney's drinking water supply, including summarising key design measures to protect human health and

any key findings from the work Sydney Water is progressing with NSW Health for the PRW Discovery Centre. Key elements include:

- source water assessment
- product water monitoring
- verification monitoring.

Given NSW Health regulates the human health impacts associated with water quality, the EIS would summarise this work, rather than complete separate studies.

6.2.3.3 Hydrology and groundwater

A groundwater assessment will be prepared and will include:

- baseline hydrogeological assessment
- estimates of groundwater inflows and groundwater levels where relevant
- assessment of potential hydrogeological impacts to receptors such as groundwater users, infrastructure, groundwater dependent ecosystems and groundwater quality
- identification of appropriate measures to avoid, minimise and/or mitigate potential impacts.

6.3 Social

6.3.1 Existing environment

6.3.1.1 Social localities

There are several local or regional communities that could be affected by the project that can be categorised into:

- **Local: Limited** – meaning the sphere of influence is limited to the geographic context of the impact, for example, those adjacent or near to a pipeline construction
- **Local: Extended** – where the activity has the potential to impact a broader local area, for example, if impacts at a major intersection could result in ripple effects through the traffic network within one or more suburbs
- **Regional** – where broader impacts may be experienced across the LGA or further.

Table 6-1 identifies the relevant social locality for each project component.

Table 6-1 Overview of social localities

Project activity	Relevant social locality
Construction at Quakers Hill WRRF	Local: Limited – Quakers Hill in the vicinity of the WRRF
Construction of the PRW pipeline	Local: Primarily Limited but with some Extended – Quakers Hill to Prospect
Construction of the brine pipeline	Local: Primarily Limited but with some Extended – Quakers Hill to Blacktown

Project activity	Relevant social locality
Construction of the holding tanks and baffles in Prospect Reservoir	Local: Limited – Prospect Reservoir
Operational regime at Breakfast Creek	Local/regional – Breakfast Creek and environs
Operational regime at Prospect Reservoir	Regional – drinking water customers across Sydney Regional – Blacktown LGA, Western Sydney Parklands and recreational users near Prospect Reservoir Local: Limited – Prospect Reservoir

6.3.1.2 Local context

Quakers Hill WRRF

The Quakers Hill WRRF is on land owned by Sydney Water and bound by the M7 Motorway to the north, Breakfast Creek and its vegetated riparian zone to the south, and residential development in the east. To the west is Quakers Hill Parkway, Eastern Creek and the Western Sydney Parklands. The broader waterway corridor of Breakfast Creek includes continuous public open space such as parklands, walking/cycling paths and amenities which provide community benefits to residents and commuters.

Trees, topography of the landscape and surrounding roads provide a visual buffer around the site.

PRW pipeline

From the Quakers Hill WRRF, the PRW pipeline would traverse residential areas through Quakers Hill, Doonside and Bungarribee, along main roads where practical, to reduce impacts on residential areas. It would run adjacent to Western Sydney Parklands. It would cross sparsely populated and industrial areas of Arndell Park, Eastern Creek and Prospect, to Prospect Reservoir. It would also cross a rail line and major roads including the M4 Motorway and Great Western Highway. The pipeline would typically be adjacent to private properties rather than directly affecting them.

Along this pipeline there are some areas with higher sensitivity including medical centres, open space (including Nurragingy Reserve), sporting facilities (including Doonside Cricket Club), churches (including along Doonside Road) and a range of businesses, particularly around Arndell Park, Eastern Creek and Prospect. These receivers may be particularly sensitive to amenity and access impacts during construction.

There are no schools or childcare facilities directly along the current proposed pipeline alignment but there are some nearby including Crawford Public School.

Brine pipeline

From Quakers Hill WRRF, the brine pipeline would follow open space areas along Breakfast Creek which include sportsfields, playgrounds, walking paths and parkland that are easily accessible to pedestrians. It would then cross a business and warehouse area in Marayong and residential areas in Blacktown to connect to the NSOOS in Seven Hills. It would also cross a rail line. The pipeline would typically be adjacent to private properties rather than directly affecting them.

Along this pipeline some areas have a higher sensitivity, including open spaces and recreational facilities along Breakfast Creek, nearby schools and churches, sports fields, warehouses, businesses and medical centres. Similar to the PRW pipeline, these receivers may be sensitive to amenity and access impacts during construction.

Prospect Reservoir

Prospect Reservoir is located in the Western Sydney Parklands and is surrounded by businesses including recreational facilities such as Raging Waters water park. Sydney Water owns the land directly to the east and south of the reservoir. Some of this land is publicly accessible, with picnic tables, playground, public parking and toilet facilities in Andrew Campbell Reserve and at George Maunder lookout. Prospect Nature Reserve also forms part of Western Sydney Parklands but is not accessible to the public because it is part of a special water catchment area.

As noted in section 2.2.3.2, DCCEEW is also investigating the feasibility of future recreation opportunities at Prospect Reservoir.

6.3.1.3 Regional context

While the local context described above is most relevant during project construction, once the project is operational it has a broader regional context across Greater Sydney. As shown in Figure 1-3, the water produced by the project can be distributed more broadly across Greater Sydney.

6.3.2 Potential impacts

Appendix B provides a preliminary assessment of the project's social impacts which will inform the Social Impact Assessment (SIA) in the EIS.

Social impacts during construction would be typical of major infrastructure projects and are outlined in more detail in Appendix B. These relate to potential impacts on way of life, surroundings, access, community and culture associated with generation of noise or dust, additional traffic movements and work in roads, visual impacts, work on heritage items and disruption to public open space and community events.

The project has a strong social benefit by providing a secure rainfall-independent water supply to address a predicted supply shortfall in Greater Sydney's water supply to 2056. Although PRW is a known technology implemented in other parts of Australia and across the world, this is the first time it is proposed for Sydney. This means there may be a perception in parts of the community about risks to the safety of drinking water or suitability of use for a range of purposes. Accordingly, Sydney Water considers that the primary social consideration for this project is this use of PRW as a source for the drinking water network and any associated barriers or concerns across the broader community of Greater Sydney.

6.3.3 Assessment approach

Sydney Water will prepare a social impact assessment (SIA) that includes:

- a detailed investigation into the social locality to establish the social baseline. This will consider local context as outlined in Appendix B but also draw on Sydney Water's extensive education and engagement work about water literacy and PRW in a regional context, as outlined in section 5

- a program of targeted consultation with key stakeholders and the community to supplement education and engagement work already being undertaken by Sydney Water. This is intended to take a qualitative approach, further investigating project-specific matters in the local context and to gain better understanding of relevant barriers, fears or concerns related to PRW that may exist for different demographics in a regional context
- assessment of social impacts during construction and operation
- identification of appropriate measures to avoid, minimise and/or mitigate potential impacts.

6.4 Aquatic flora and fauna

6.4.1 Existing environment

Aquatic habitats in the project area include Breakfast Creek, Eastern Creek, Blacktown Creek, Bungarribee Creek and Prospect Reservoir. Eastern Creek and Prospect Reservoir are mapped as Key Fish Habitat (KFH) as shown on Figure 6-1. Given the main direct impacts would be on Breakfast Creek and Prospect Reservoir, these are the focus of aquatic ecology considerations below.

6.4.1.1 Breakfast Creek

Although the riparian corridor of Breakfast Creek is heavily modified, permanent flows and current channel conditions support remnant native vegetation patches. These provide habitat for riparian and aquatic plant and animal species such as macrophytes, fish, and macroinvertebrates. As noted by Streamology (2024), the ecological condition of Breakfast Creek upstream of the Quakers Hill WRRF is poor, disturbed by urban runoff and fragmentation. There are several road crossings and culverts, sedimentation, and stagnant conditions from weeds and green algae. The Quakers Hill WRRF treated water flows and wet weather flows are discharged into Breakfast Creek, contributing significantly to frequent flows in the creek. Downstream of the Quakers Hill WRRF the creek is in moderate condition, with increased flow from Quakers Hill WRRF, more suitable instream habitat and a well vegetated riparian corridor. Breakfast Creek flows into Eastern Creek which also has a well vegetated riparian corridor at this confluence.

6.4.1.2 Prospect Reservoir

As discussed in section 6.2.1, Prospect Reservoir is a constructed and artificially managed water body. It is a closed system with no fish passage upstream or downstream of the reservoir, except in very rare circumstances.

A protected matters search conducted on 25 March 2024 identified that the following threatened species protected under the EPBC Act, or their habitats, have the potential to occur near the project:

- Australian grayling (*Prototroctes maraena*), listed as Vulnerable
- Macquarie perch (*Macquaria australasica*), listed as Endangered.

The closest known population of Australian grayling is in Nowra and this is considered unlikely to occur in Prospect Reservoir. Although Macquarie Perch is known to occur in parts of the Hawkesbury-Nepean river system, Prospect Reservoir does not have a hydrological connection to this river system and it is also considered unlikely to occur. Based on fish survey information from studies in 2004, 2020 and 2022, neither species has previously been recorded in Prospect Reservoir.

Although three individual Murray cod (*Maccullochella peelii*), listed as vulnerable under the EPBC Act, have been observed in Prospect Reservoir, it is outside of their natural range, and the population is not expected to be self-sustaining. They are thought to be a translocated population from Lake Burragorang. Sydney Water has discussed with DPI Fisheries the potential for occurrence of Australian grayling, Macquarie perch and Murray cod and confirmed that these are unlikely to be a concern in Prospect Reservoir.

A total of nine native and three invasive fish species have been recorded during fish surveys conducted in 2004, 2020 and 2022.

A macrophyte survey identified extensive macrophyte and Chara beds across the areas of Prospect Reservoir where there was sufficient light penetration for photosynthesis and plant growth (i.e. the littoral zone). Chara is a genus of Charophytes (family Characeae) a benthic, submerged, multicellular macroalga, which has a plant-like appearance. Nitella, which is another Charophytes genus, was also observed. The species of macrophyte identified across during the survey included:

- Ribbon weed (*Vallisineria americana*)
- Clasp pondweed (*Potamogeton perfoliatus*)
- Hydrilla (*Hydrilla verticillata*)
- Waternymph (*Najas tenuifolia*).

6.4.2 Potential impacts

6.4.2.1 Construction

Potential impacts to aquatic flora and fauna include:

- impacts on aquatic habitats from the construction of infrastructure in Prospect Reservoir (e.g. release pipelines, baffles, aeration system). This may include disturbance of any aquatic vegetation where baffles are installed, or disturbance of bottom sediments increasing turbidity in the reservoir.
- impacts on aquatic habitats from any trenched construction across waterways
- potential for frac-outs, which is the temporary loss of drilling fluids into the nearby waterways during trenchless construction, which may harm aquatic ecology
- sedimentation and erosion impacts on the aquatic environments of Breakfast Creek, Eastern Creek, Bungarribee Creek, Blacktown Creek and Prospect Reservoir from adjacent construction activities.

6.4.2.2 Operation

Potential impacts to aquatic flora and fauna include:

- changes to the quality or type of aquatic habitats available downstream of Quakers Hill WRRF due to reduced flows in Breakfast Creek
- highly treated PRW releases to Prospect Reservoir are likely to be different quality to existing water in Prospect Reservoir which has been transferred directly from dams. For example, PRW releases would likely have lower turbidity. This may change conditions in the reservoir over time (for example increase in light penetration in relation to turbidity) that may have positive or negative impacts on different species.

Baffle or aeration arrangements in Prospect Reservoir may indirectly impact aquatic ecology during operation. For example, there may be changes to flow and stratification of water in the reservoir from these arrangements. Any other potential flow-on impacts to aquatic ecology would also be considered.

As noted in section 6.2.2, water quality impacts from brine releases are considered unlikely. However, if any impacts are identified from further investigations, flow on impacts to aquatic ecology would be considered.

6.4.3 Assessment approach

An aquatic ecology impact assessment will be prepared and will include:

- desktop and literature review of the aquatic and riparian ecosystems
- site inspections of the relevant waterways and habitats
- assessment of direct and indirect impacts on aquatic ecology, population, habitat and ecological communities. This would include a range of aspects including changes to water quality, volume, temperature and potential for scouring
- identification of appropriate measures to avoid, minimise and/or mitigate potential impacts.

The aquatic ecology assessment will also be informed by the assessments described in section 6.2.3 that will consider how water quality and flow conditions in Prospect Reservoir and Breakfast Creek would change under different scenarios.

6.5 Terrestrial flora and fauna

6.5.1 Existing environment

6.5.1.1 Vegetation communities

The areas surrounding the project are highly modified, as a result of extensive urban development. However, small, scattered patches of native remnant vegetation remain throughout the project area, with larger patches in Western Sydney Parklands, Prospect Nature Reserve and along riparian areas. These larger patches also retain connectivity to other vegetation in the locality. Parts of the Quakers Hill WRRF and Prospect Reservoir sites (outside the nature reserve) also contain native vegetation.

A range of Plant Community Types (PCTs) are mapped in the locality, including several Threatened Ecological Communities (TECs) as shown on Figure 6-2. Two TECs that are both listed as critically endangered under the BC Act and EPBC Act are mapped adjacent to project infrastructure:

- Cumberland Shale Plains Woodland (PCT 3320)
- Cumberland Red Gum Riverflat Forest (PCT 4025)

Small patches of the following TECs have also been mapped nearby:

- Castlereagh Ironbark Forest (PCT 3448) about 2 km north-east of the Quakers Hill WRRF
- Coastal Valleys Riparian Forest (PCT 4023) about 750 m north of the brine pipeline
- Southern Lower Floodplain Freshwater Wetland (PCT 3975) about 500 m west of the PRW pipeline

There is no mapped coastal wetland or littoral rainforest within the project area. The closest mapped coastal wetland is about 600 m northeast of Prospect Reservoir. Low to medium priority groundwater dependent ecosystems (GDEs) exist primarily along Breakfast Creek, Eastern Creek and Bungarribee Creek as shown on Figure 6-3. The closest high priority GDEs in the vicinity of the project are located on the southern side of the dam wall at Prospect Reservoir.

6.5.1.2 Threatened flora

A range of threatened flora species have been mapped near the project area, including:

- Austral Pillwort – *Pilularia novaehollandiae*
- Downy Wattle – *Acacia pubescens*
- Juniper-leaved Grevillea – *Grevillea juniperina*
- Macadamia Nut – *Macadamia integrifolia*
- Magenta Lilly Pilly – *Syzygium paniculatum*
- Narrow-leaved Black Peppermint – *Eucalyptus nicholii*
- Native Pear – *Xylomelum pyriforme*
- Plum-leaf Pomaderris – *Pomaderris prunifolia*
- Spiked Rice-flower – *Pimelea spicata*
- Sydney Plains Greenhood – *Pterostylis axicola.*

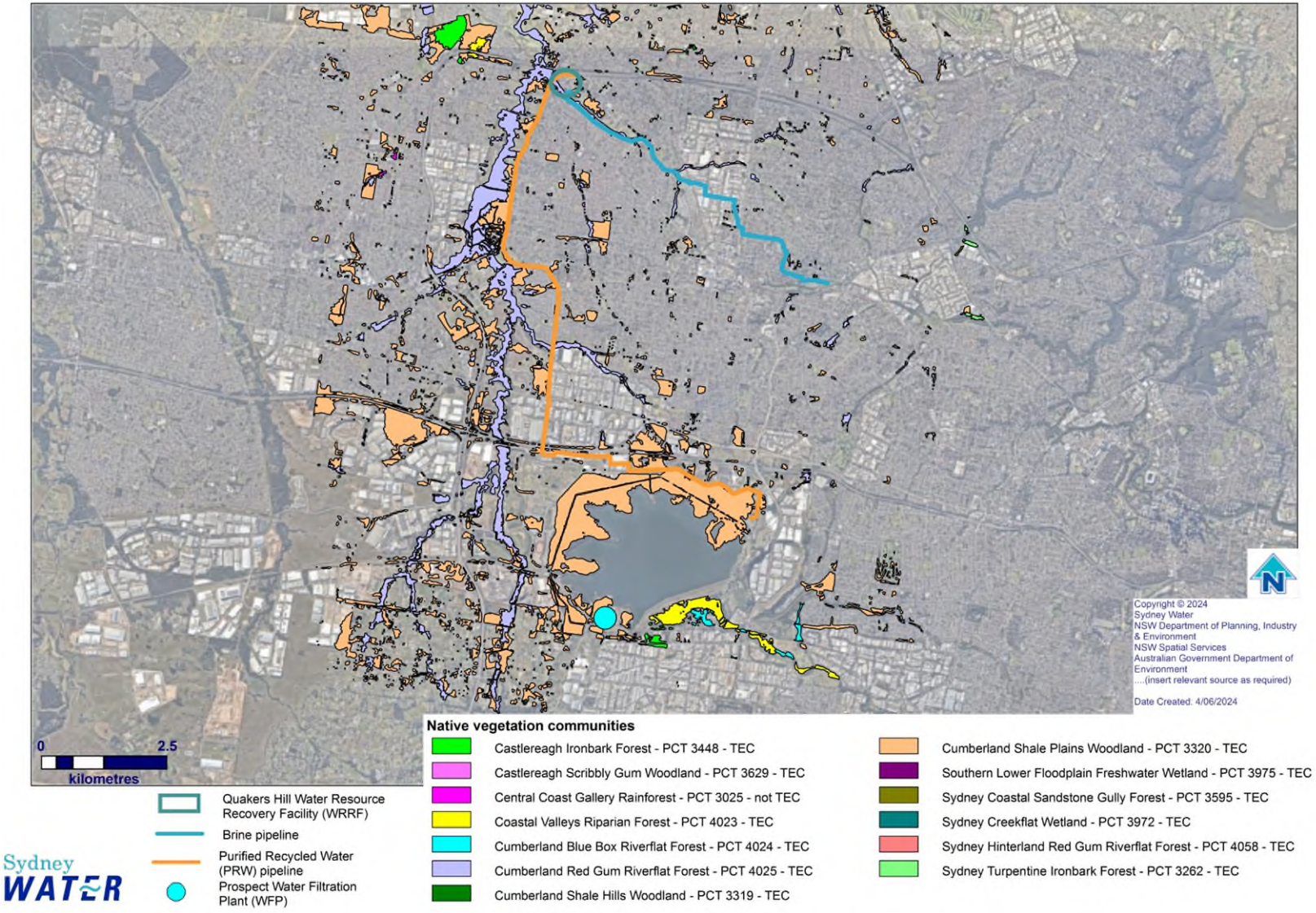

Figure 6-2 Threatened ecological communities near the project

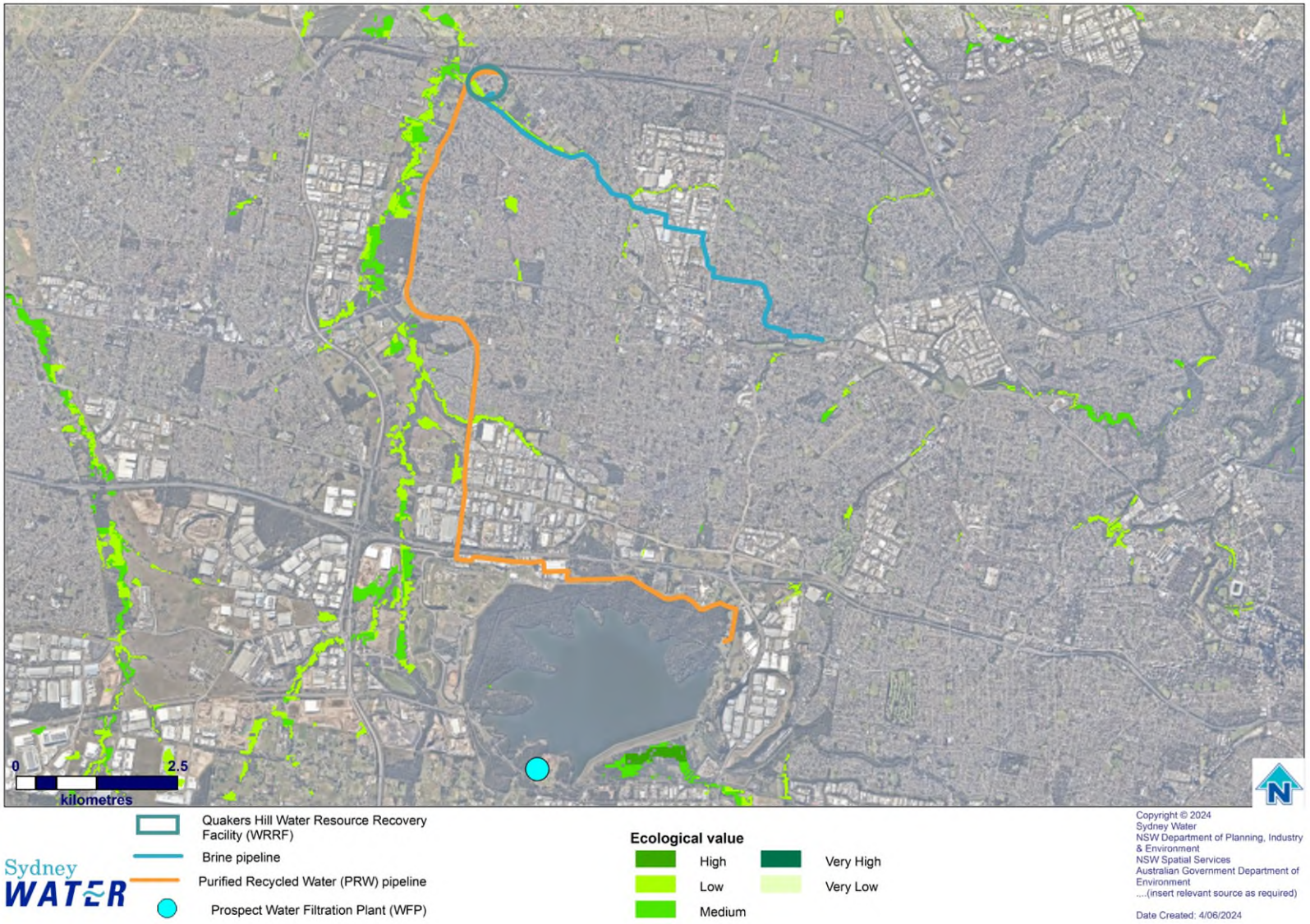

Figure 6-3 Groundwater dependent ecosystems near the project

6.5.1.3 Threatened fauna

Thirty three threatened fauna species have been mapped near the project area. The species with the highest number of sightings include:

- Grey-headed Flying-fox – *Pteropus poliocephalus* (408 sightings)
- Cumberland Plain Land Snail – *Meridolum corneovirens* (161 sightings)
- Large Bent-winged Bat – *Miniopterus orianae oceanensis* (64 sightings)
- Swift Parrot – *Lathamus discolor* (45 sightings)
- Eastern Coastal Free-tailed Bat – *Mormopterus norfolkensis* (34 sightings).

6.5.1.4 Priority weeds

Table 6-2 shows priority weeds previously identified at Quakers Hill WRRF and Prospect Reservoir, many of which are also listed as Weeds of National Significance (WoNS).

Table 6-2 Priority weeds previously recorded at Quakers Hill WRRF and Prospect Reservoir

Name	WoNS	Quakers Hill WRRF	Prospect Reservoir
African Boxthorn (*Lycium ferocissimum*)	Yes	Yes	No
African Olive (*Olea europaea subsp. cuspidata*)	Yes	No	Yes
Asparagus Fern (*Asparagus aethiopicus*)	Yes	Yes	Yes
Blackberry (*Rubus fruticosus sp. agg.*)	Yes	No	Yes
Bridal Creeper (*Asparagus asparagoides*)	Yes	Yes	Yes
Climbing Asparagus Fern (*Asparagus plumosus*)	Yes	Yes	No
Fireweed (*Senecio madagascariensis*)	Yes	Yes	Yes
Garden Asparagus (*Asparagus officinalis*)	Yes	Yes	No
Green cestrum (*Cestrum parqui*)	No	Yes	No
Lantana (*Lantana camara*)	Yes	No	Yes
Madeira Vine (*Anredera cordifolia*)	Yes	Yes	No
Pampas Grass (*Cortaderia jubata*)	No	No	Yes
Prickly Pear (*Opuntia spp., Cylindropuntia spp., Austrocylindropuntia spp.*)	Yes	No	Yes
Salix spp.	Yes	Yes	No
Silverleaf Nightshade *(Solanum elaeagnifolium)*	Yes	No	Yes

6.5.2 Conservation areas

Prospect Nature Reserve is located on the northern edge of Prospect Reservoir. The reserve was established under the *National Parks and Wildlife Act 1974* in 2007 and is managed by the National Parks and Wildlife Service (NPWS) in accordance with a Plan of Management (NPWS 2012). At over 325 ha, it is one of the largest reserves in western Sydney. The reserve contains a significant remnant of Cumberland Plain Woodland, and habitat for a variety of land-based threatened species.

The Cumberland Plain Conservation Plan (CPCP) boundary is about 1.5 km to 2 km west of the PRW pipeline and along the southern boundary of Prospect Reservoir (aligning with Fairfield LGA). Therefore, the project is outside the CPCP boundary and it is not relevant to the project.

Figure 6-4 shows Prospect Nature Reserve and the CPCP boundary.

No biodiversity stewardship sites, private conservation lands or other lands identified as offsets are located nearby and impacts on these types of conservation areas are unlikely.

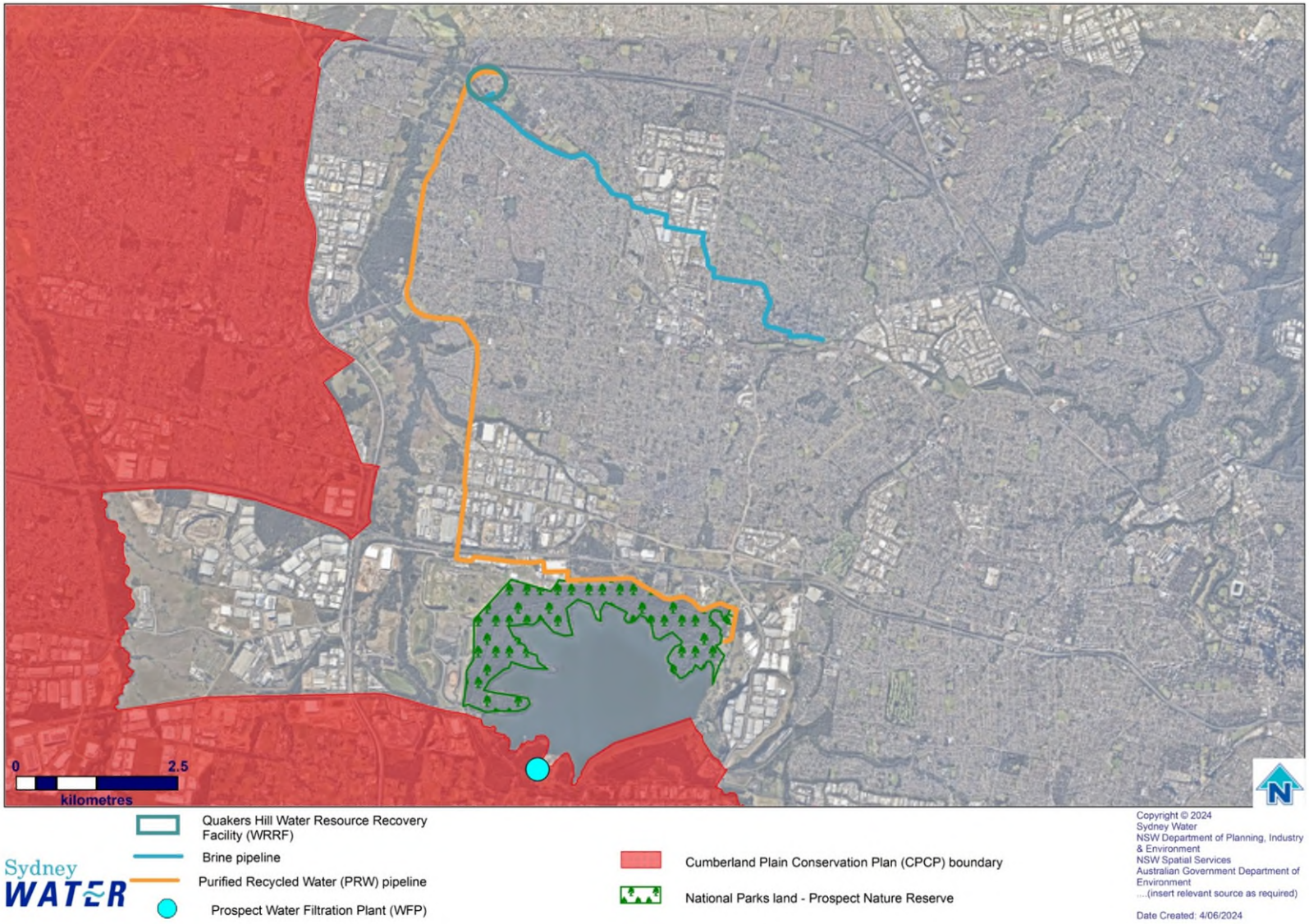

Figure 6-4 Prospect Nature Reserve and CPCP boundary

6.5.3 Potential impacts

6.5.3.1 Construction

The project would use existing cleared areas and follow existing roadways where practical, to avoid areas of high ecological value and potentially sensitive native vegetation/communities in the locality. This includes avoiding Prospect Nature Reserve.

Although direct impacts would be avoided where possible, unavoidable impacts may include:

- removal or disturbance of threatened ecological communities and threatened flora species
- removal or disturbance of habitat for threatened fauna species
- removal of potential or known marginal foraging habitat for migratory species
- the spread weeds and pathogens onto the project site by transport of machinery and materials.

Potential indirect impacts include sedimentation and erosion impacts on habitats and introduction or spread of weeds.

6.5.3.2 Operation

No impacts are anticipated.

6.5.4 Assessment approach

A biodiversity development assessment report (BDAR) will be prepared and will include:

- desktop constraints assessment
- field investigations across impact areas to ground-truth desktop assessment and inform vegetation and habitat mapping and impact assessment
- identification of appropriate measures to avoid, minimise and/or mitigate potential impacts including priority weeds.

6.6 Aboriginal heritage

6.6.1 Existing environment

Several sites listed on the Aboriginal Heritage Information System (AHIMS) database are close to the project. Most of the sites that have been recorded include open artefact scatters and potential archaeological deposits (PADs). Sites are found in higher concentration along waterways and in open space areas, such as Western Sydney Parkland where remnant vegetation is present. Some sites are scattered through developed areas, and there is also a submerged site within Prospect Reservoir. There are no declared Aboriginal Places near the project.

At the Quakers Hill WRRF known sites are located along the eastern site boundary and along Breakfast Creek. At Prospect, Prospect Nature Reserve is north of the reservoir and is important for its environmental, Aboriginal cultural heritage and non-Aboriginal heritage values. The reserve also holds cultural value to the Darug people and sits within the boundaries of the Deerubbin Local Aboriginal Land Council (LALC). Aside

from its cultural value, there are also known Aboriginal sites within the reserve including open artefact scatters, isolated finds and a scarred tree.

There is an existing Aboriginal Heritage Impact Permit (AHIP) C0002113 for works on the M4 Motorway that is active until September 2031. The PRW pipeline would intersect with this AHIP.

Where possible, most project works are located within previously disturbed environments such as road corridors, areas where other utilities have been installed and areas that have been cleared of vegetation. However in some instances, the project may directly impact Aboriginal sites. Some of the heritage listings discussed in this section would have natural heritage elements.

6.6.2 Potential impacts

6.6.2.1 Construction

The project is in residential and industrial areas that have been previously disturbed. Previous landfill and historical disturbance has affected the archaeological potential in the area.

The project would involve earthworks during construction, which would disturb the ground and may impact on Aboriginal heritage sites.

6.6.2.2 Operation

No impacts to Aboriginal sites are anticipated. The release of PRW into Prospect Reservoir and into Sydney's drinking water supply, and changes to flows in Breakfast Creek will be topics raised in consultation activities with First Nations communities outlined in section 5.

6.6.3 Assessment approach

An Aboriginal cultural heritage assessment report will be prepared and will include:

- identification of the Aboriginal sites and their significance through desktop and field assessment and in consultation with relevant stakeholders
- identification of the extent and significance of impacts associated with the project
- identification of the need for further archaeological testing and/or detailed archaeological excavations
- identification of appropriate measures to avoid, minimise and/or mitigate potential impacts.

6.7 Historic heritage

6.7.1 Existing environment

The project is likely to be located in or close to several local and State listed heritage items as shown in Table 6-3. Most of these items are located around Prospect Reservoir and Figure 6-5 shows the State listed heritage items in this area. There are no National or World Heritage listed items near the project. There is a fenced grave on the Quakers Hill WRRF near the PRW Discovery Centre, which is not listed on any heritage registers.

Table 6-3 Historic heritage items near the project

Item	Address	Listing
Bungarribee Homestead Complex – Archaeological Site	Doonside Road, Doonside	State (ID 01428), Local (Blacktown LEP 2015 ID A118)
Seven Milestones	Corner Brabham Drive and Great Western Highway, Huntingwood	Local (Blacktown LEP 2015 ID I29)
Royal Cricketers Arms Inn	385 Reservoir Road, Prospect	State (ID 00660)
Great Western Highway (former alignment)	Reservoir Road, Prospect	State (ID 01911), Local (Blacktown LEP 2015 ID I60)
Prospect Reservoir and surrounding area	Reservoir Road, Prospect	State (ID 01370), Section 170 (ID 4575804)
Veteran Hall (remains and archaeological site)	Great Western Highway, Prospect	State (ID 01351), Section 170 (ID 4575807)
Prospect Thornleigh Pumping Station (WP0138)	48 Reservoir Road, Prospect	Section 170 (ID 4574703)
Prospect Reservoir Valve House	East of Prospect Reservoir, Prospect	State (ID 01371)
Northern Suburbs Ocean Outfall Sewer (NSOOS)	Flushcombe Road Blacktown to Ocean Outfall at North Head (intersecting with the project at Seven Hills)	Section 170 (ID 4570286)

The items most likely to be impacted by the project include the NSOOS, and those located in and around Prospect Reservoir, as works are expected to, or have the potential to be undertaken within the curtilages of these items. These items are discussed in more detail below.

Prospect Reservoir and surrounding area is listed on the State Heritage Register (SHR) (ID 01370) because of its history since the 1880s as a central part of the Sydney Water supply system. As a part of the Upper Nepean Scheme, the Reservoir has continued to supply water to Sydney for over 136 years, and generally still operates in the same way as it was originally constructed. The listing includes Prospect Reservoir, landscape elements and all associated structures, including pumping stations, to the property boundary.

Veteran Hall (remains and archaeological site) is also located at Prospect to the east of the reservoir off Reservoir Road. Veteran Hall – House Remains is listed on the SHR (ID 01351). Veteran Hall and its surrounds are associated with the explorer and statesman, William Lawson, who built the first substantial house on the site in about 1821. The historical landscape around the house remains, including plantings, fences and access road provide important insight into the former landscape of the historical property.

Veteran Hall Archaeological Site is also listed on Sydney Water's Heritage and Conservation Register (ID 4575807). The listing includes the archaeological remains of the house, outbuildings and landscape with plantings along the road access to the site. It is also associated with components on the heritage-listed Prospect Reservoir lands, including the 'Avenue of Trees' along William Lawson Drive. Archaeological elements were also discovered when Prospect Reservoir water levels were reduced. These archaeological elements exist on WaterNSW land adjacent to Sydney Water's land. Given its early establishment date,

visible archaeological remains, and rich written and pictorial history that supports its interpretation, Veteran Hall is one of the two most significant archaeological sites and possibly the most significant historic site under Sydney Water's care.

Prospect Thornleigh Pumping Station (WP0138) is listed on Sydney Water's Heritage and Conservation Register (ID 4574703). Construction was completed in 1964, with the design of the station representative of water pumping stations constructed by the Water Board in the 1960s. The significant elements are the two pumping halls and intake chamber inclusive of surrounding reinforced concrete platform.

Prospect Reservoir Valve House is listed on the SHR (ID 0137) as it was a key element in the Upper Nepean Water Supply Scheme, having had a direct role in the supply and regulation of water to Sydney after the Scheme's inception in 1888. The valve house continues to be a central element of Sydney's water supply system.

The PRW pipeline would intersect with the Great Western Highway (former alignment) heritage item to the north of Prospect Reservoir, listed on the SHR (ID 01911) and Blacktown Local Environmental (item I60). This item is the only surviving original alignment of the 1818 Great Western Road that itself most likely followed an earlier Aboriginal track for a route over Prospect Hill. The road has the potential to retain highly significant archaeology of the convict and colonial eras.

The brine pipeline would connect to the Northern Suburbs Ocean Outfall Sewer (NSOOS), which is included on Sydney Water's section 170 Sydney Water Heritage and Conservation Register (ID 4570286). The NSOOS is the third major sewerage system built to service Sydney's wastewater needs.

The proposed PRW pipeline route passes the heritage curtilage of Bungarribee Homestead Complex – Archaeological Site, Seven Milestones and Royal Cricketers Arms Inn. It is likely that the pipeline would be within the road reserve and avoid these curtilages.

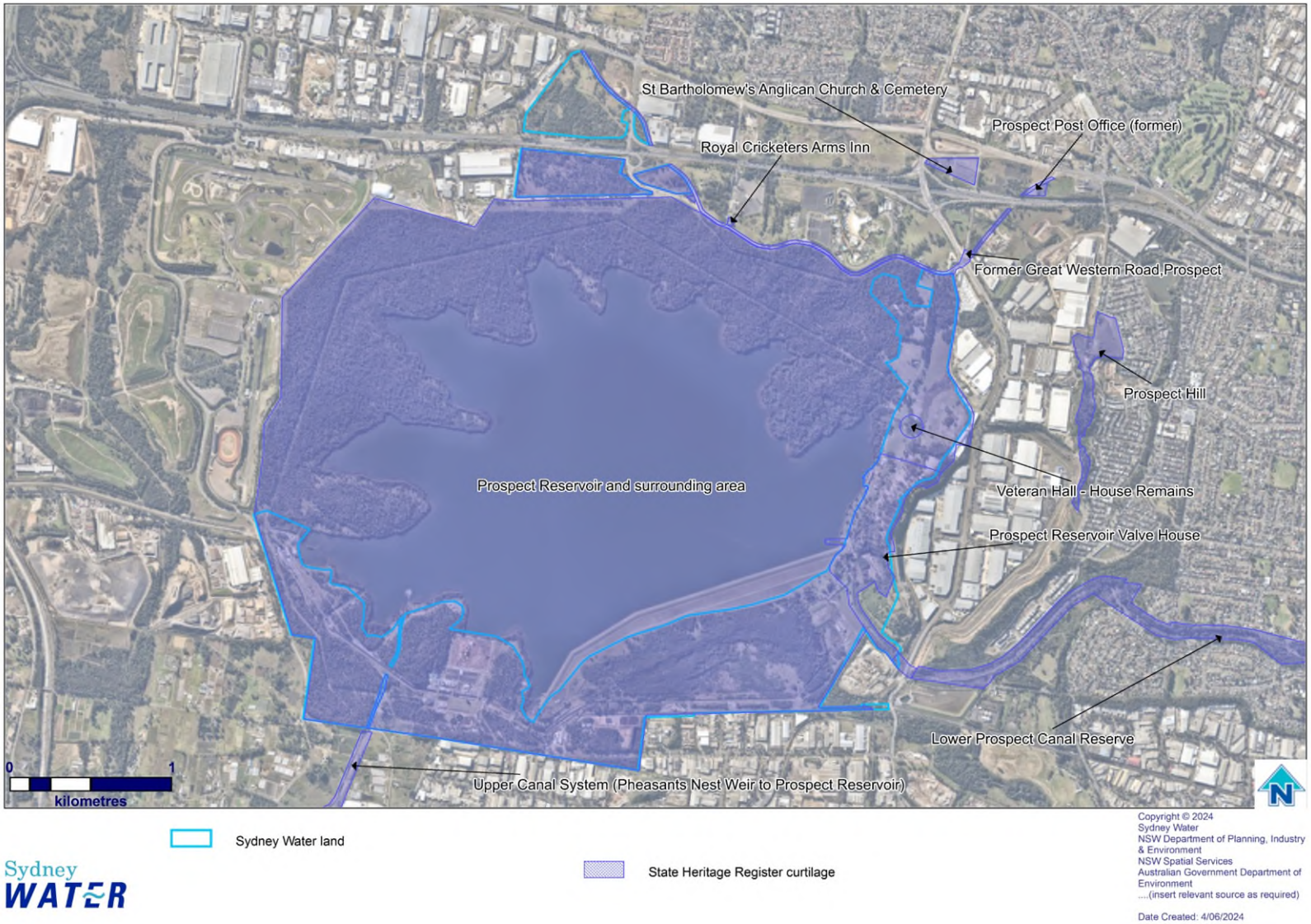

Figure 6-5 State listed heritage items around Prospect Reservoir

6.7.2 Potential impacts

6.7.2.1 Construction

Potential direct physical or indirect curtilage and setting impacts are anticipated on both State and local heritage items from construction activities in and around Prospect Reservoir for the PRW pipeline and new infrastructure at the reservoir.

This could include permanent impacts, such as partial demolition due to subsurface and excavation works, or temporary curtilage and setting impacts due to visual and amenity impacts from construction activities.

Temporary impacts on views to or from heritage items may also occur.

6.7.2.2 Operation

No impacts are anticipated.

6.7.3 Issues and assessment approach

An historic archaeological assessment and a statement of heritage impact will be prepared and will include:

- a survey to investigate areas of historic heritage and historical archaeological potential
- potential impacts on the identified historic heritage and potential archaeology
- identification of appropriate measures to avoid, minimise and/or mitigate potential impacts.

6.8 Traffic, transport and access

6.8.1 Existing environment

The road network near the project includes several major roads such as the M7 Motorway in the north, the Great Western Highway and M4 Motorway in the south.

The PRW pipeline is proposed to follow Quakers Hill Parkway which becomes Knox Road, Doonside Road and Brabham Drive in a north-south direction, crossing Richmond Road, the Great Western Highway and M4 Motorway. It would then follow Peter Brock Drive, Reservoir Road and William Lawson Drive. The brine pipeline is proposed to follow Breakfast Creek and local roads, with one major road crossing at Sunnyholt Road. There are driveways and other site access points along the proposed pipeline routes. These alignments are both indicative, with the final routes subject to change.

The proposed PRW pipeline route includes a pedestrian pathway that follows the eastern side Quakers Hill Parkway, and then Knox Road until the intersection with Cross Street at Doonside. A shared pathway follows the eastern side of Doonside Road from Gamarada Avenue south until Bungarribee Creek, whilst a pedestrian pathway also follows parts of Doonside Roads western side.

The proposed brine pipeline route includes a shared pathway along Breakfast Creek from the Quakers Hill WRRF until Davis Street at Marayong. Pedestrian pathways are also located along the industrial and residential areas of this alignment.

Local buses service much of the project area, with some bus stops located along the proposed pipeline alignments.

The T1 Western railway line crosses the area east-west. Train stations in the area include Doonside, Blacktown and Seven Hills. The PRW and brine pipelines would both cross this railway line.

Sydney Water owns the Quakers Hill WRRF site and land surrounding Prospect Reservoir. There is existing access and parking at both locations. There is public access to Sydney Water owned land at Quakers Hill WRRF on the southern side of Breakfast Creek, and at Prospect Reservoir along William Lawson Drive to Andrew Campbell Reserve.

6.8.2 Potential impacts

6.8.2.1 Construction

Access to existing properties is not anticipated to be substantially affected by the construction and operation of the project, as pipeline construction progressively moves along alignments. Most construction areas are accessible via the local road network, but new temporary access may be required in some locations (e.g. for locations in public reserves).

Potential impacts to traffic, transport and access include:

- increased volume of heavy and light vehicle movements, impacting traffic flows
- reduction in street parking along pipeline routes
- temporary road closures and traffic diversions, particularly where pipeline construction is required in or adjacent to roads
- temporary impact or diversion of pedestrians and cyclists
- temporary relocation of access to bus stops
- temporary disruption to property associated with adjacent pipeline construction
- temporary impact to public access to parts of Andrew Campbell Reserve and areas surrounding the location of the new storage tanks at Prospect Reservoir.

6.8.2.2 Operation

Additional traffic generation during operation is expected to be very low given the infrastructure built would become part of existing Sydney Water sites and networks. There may be some additional movements associated with activities such as chemical deliveries.

There would be some permanent loss of public access in the immediate vicinity of the storage tanks at Prospect Reservoir. Given they are steel structures (and therefore secure), the fenced area is likely to be very localised rather than requiring substantial land area and security fencing.

Acquisition of private land is not currently expected, however this would be confirmed during design development.

6.8.3 Assessment approach

A traffic and transport impact assessment will be prepared and will include:

- desktop background research and baseline survey of the existing traffic conditions on the surrounding road network

- identification of construction and operational access and haulage routes
- identification of public transport and active transport routes and potential impacts on these
- assessment of construction and operational traffic impacts on the road network including modelling where relevant
- identification of appropriate measures to avoid, minimise and/or mitigate potential impacts.

6.9 Air, odour and climate change

6.9.1 Existing environment

The existing environment is dominated by low density residential development and industrial areas.

Temperatures in the Sydney region have been increasing since about 1960, with higher temperatures experienced in recent decades. It is predicted that all temperature variables (average, maximum and minimum) will increase in the future.

In Western Sydney there are on average 10–20 hot days per year, where temperatures are greater than 35°C. It is projected that Western Sydney will see an additional 5 to 10 hot days by 2030, increasing to over 10 to 20 additional hot days per year by 2070.

The Sydney region experiences considerable rainfall variability across the region, from season-to-season and from year-to-year. Rainfall is also predicted to increase in the future.

The National Pollutant Inventory (NPI) identifies that there are about 45 industrial facilities or significant sources of air emissions within 2.5 km of the project area. These mainly include manufacturing facilities, including those that manufacture building and construction materials (paint, coatings resin, metal coating, iron and steel casting, concrete, polymer), vehicle parts, food, organic chemicals, and medical and surgical equipment. Other facilities include waste treatment and disposal, and the Quakers Hill WRRF. Emissions from these locations contribute to local air quality in the project area.

An odour control facility at the Quakers Hill WRRF treats emissions from the treatment processes and sludge screening storage facility.

6.9.2 Potential impacts

6.9.2.1 Particulate matter and odour

Construction

Potential air quality and odour impacts include construction activities such as demolition, earthworks and the use of plant and machinery which may generate dust and odour.

Operation

Given the water treated in the PRW Treatment Plant and released at Prospect Reservoir is already highly treated, ongoing emissions, including odour, are not expected during operation.

6.9.2.2 Greenhouse gases and climate change

Construction

Construction activities would generate direct and indirect greenhouse gas emissions through:

- traffic and equipment fuel use and combustion
- electricity use in running the equipment, machinery and site offices
- embodied energy in the materials used in construction, including their manufacture and transportation.

Opportunities to reduce the volume of greenhouse gas emissions will be identified in the EIS.

Climate change risks would primarily be associated with the occurrence of severe weather events such as flooding, which may require tailored erosion and sedimentation control measures.

Operation

Greenhouse gas emissions would be indirectly generated through the use of grid electricity, used to power the infrastructure.

Over the design life, assets would be subject to a changing climate, resulting in a potential vulnerability to future climate related risks including bushfire and flooding. These are discussed in section 6.12.2 and section 6.15.2. The project would have a positive impact in response to climate change by increasing resilience to changes in water availability.

6.9.3 Assessment approach

6.9.3.1 Particulate matter and odour

An air quality impact assessment will be prepared and will include:

- identification of sensitive receivers and characterisation of the local air quality environment
- collated data about expected project emissions
- a qualitative assessment of construction impacts
- identification and assessment of operational impacts
- analysis of the potential for cumulative impacts
- identification of appropriate measures to avoid, minimise and/or mitigate potential impacts.

6.9.3.2 Greenhouse gases and climate change

A greenhouse gas assessment will be prepared and will include:

- documentation and justification of an appropriate methodology for estimating greenhouse gas emissions for the project
- identification and quantification of the sources of greenhouse gas emissions associated with construction and operation of the project

- an assessment of reasonable and feasible measures to minimise greenhouse gas emissions and ensure energy efficiency
- identification of appropriate measures to avoid, minimise and/or mitigate potential impacts
- assessment of the risk and vulnerability of the project to climate change and potential future climate variability impacts on the operation and management of the project and associated delivery works.

6.10 Noise and vibration

6.10.1 Existing environment

Roads, suburban and industrial areas contribute to the noise in the project area. The Quakers Hill WRRF is bordered by Quakers Hill Parkway, an arterial road and the M7 Motorway, which is frequently used by heavy vehicles. Low density residential areas are located to the north, south and east of the Quakers Hill WRRF property boundary. The closest residential receivers to the part of the site likely impacted by the project are about 40-70 m east along Quakers Road and Melrose Avenue.

The proposed PRW pipeline route would pass through low-density residential areas that include businesses, churches and public recreation areas. Prospect Reservoir is largely surrounded by a range of businesses/warehouses, Prospect Nature Reserve and Andrew Campbell Reserve and nearby arterial roads and M4 Motorway.

The brine pipeline is proposed to follow Breakfast Creek from Quakers Hill WRRF, through areas of open space and public recreation, within a residential setting. Heading further east the brine pipeline is proposed to follow roads where possible, through a business and warehouse area in the suburb of Marayong before heading south through residential areas of Blacktown.

6.10.2 Potential impacts

6.10.2.1 Construction

Temporary noise impacts are expected to sensitive receivers along the project alignment. Noise impacts from pipeline construction are typically short-term for individual receivers as construction involves activities moving along the pipeline alignment. Noise impacts at Quakers Hill WRRF and Prospect Reservoir would be concentrated at these locations for a longer duration.

Temporary surface vibration from construction activities may lead to amenity impacts (human comfort) or cosmetic or structural damage to heritage-listed items.

Although most works are expected to be during daytime periods, night works may be required for some activities such as pipeline construction on major roads.

6.10.2.2 Operation

Noise from pipelines and infrastructure at Prospect Reservoir is unlikely as neither component includes equipment that is expected to generate noise. Noise from the PRW Treatment Plant is also unlikely as equipment that generates noise is expected to be located within buildings. However, this will be confirmed as design progresses.

6.10.3 Assessment approach

A noise and vibration impact assessment will be prepared and will include:

- identification of sensitive receivers likely to be impacted by project construction and operation
- desktop research on existing and future noise environment and current and future land uses
- existing baseline noise data and noise monitoring data to establish construction and operational noise criteria
- quantitative assessment at the PRW Treatment Plant and Prospect Reservoir where construction activities are proposed over a longer period and for operation at the PRW Treatment Plant if noise-generating activities are identified
- assessment of vibration impacts against the three main categories of vibration – human perception, effects on building contents and effects on structures
- a framework for an Out of Hours Work Strategy
- identification of appropriate measures to avoid, minimise and/or mitigate potential impacts.

6.11 Visual

6.11.1 Existing environment

The project area comprises two main visual landscapes including:

- urban and industrial areas including residential areas, public infrastructure, businesses and warehouses
- natural and green space areas including waterways, Western Sydney Parklands, Prospect Nature Reserve, Prospect Reservoir, local parks and reserves.

The key visual receivers that would be able to see the project include:

- residents
- business owners, employees and customers
- road commuters
- people walking and cycling along the road network
- recreational users of the above natural and green space areas.

6.11.2 Potential impacts

6.11.2.1 Construction

Pipeline construction activities would be temporarily visible immediately adjacent to pipeline alignments. Construction of the PRW Treatment Plant would largely be screened by existing infrastructure, vegetation and topography but may be visible to some nearby receivers, particularly around Quakers Road and Melrose Avenue. Construction at Prospect Reservoir would primarily be visible to recreational users of the

reservoir, with activities within the reservoir visible from public viewpoints such as George Maunder lookout and land-based construction activities visible to users of Andrew Campbell Reserve.

Construction activities would temporarily change the local character and amenity due to visible construction areas, dust, vegetation removal, equipment and materials.

6.11.2.2 Operation

Although the PRW Treatment Plant would be located within the Quakers Hill WRRF property boundary, it is proposed to be located near the site entrance and therefore the closest infrastructure to adjacent residential receivers along the eastern boundary, including on Quakers Road and Melrose Avenue.

The receiving tanks and baffles within Prospect Reservoir would also be located within an existing operational area and may be visible to users of Prospect Reservoir. Although the PRW water would be highly treated, there is potential for flow-on impacts to views across the reservoir, if PRW releases cause visible changes to aspects such as turbidity levels or the type or distribution of vegetation within the reservoir.

6.11.3 Assessment approach

A visual impact assessment will be prepared and will include:

- identification of landscape character zones, based on the relationship between natural, built and community elements and their sensitivity to change
- representative viewpoints and sensitive receptors
- assessment of the potential for landscape and visual impacts during construction and operation
- assessment of the significance of potential impacts
- identification of appropriate measures to avoid, minimise and/or mitigate potential impacts.

6.12 Bushfire

6.12.1 Existing environment

Bushfire prone land is mapped at Prospect Reservoir and in some areas along the PRW and brine pipeline routes.

6.12.2 Potential impacts

6.12.2.1 Construction

During construction there would be increased ignition risk from construction activities that have the potential to cause a bushfire.

6.12.2.2 Operation

No impacts to the pipelines are anticipated as they would be located below ground. There is potential for bushfire to impact the new infrastructure at Prospect Reservoir, which would be a similar risk to existing assets at the reservoir.

6.12.3 Assessment approach

The EIS will include:

- assessment of impacts for any works and infrastructure on bushfire prone land
- identification of appropriate measures to avoid, minimise and/or mitigate potential impacts, including emergency response procedures that address fire hazard and response.

6.13 Dam safety

6.13.1 Existing environment

Prospect Dam is along the southern edge of Prospect Reservoir. It is listed as a declared dam and is managed by WaterNSW. Declared dams are regulated by an independent regulator, Dams Safety.

6.13.2 Potential impacts

6.13.2.1 Construction

Construction works within and adjacent to Prospect Reservoir would need to minimise risk of damage to the dam structure. At this stage the main potential for impact is the construction of baffles and aeration systems within the reservoir, particularly if they are close to or attached to the dam wall.

6.13.2.2 Operation

The project is not expected to have any direct impacts on Prospect Dam during operation. However, any changes to the operational management of Prospect Reservoir as a result of the introduction of PRW and new infrastructure such as baffles and aeration will need to be considered.

6.13.3 Assessment approach

Sydney Water will work with WaterNSW assess any potential impacts on Prospect Dam and ensure consistency with its dam safety management system.

6.14 Dangerous goods and hazardous development

6.14.1 Existing environment

Operation of the Quakers Hill WRRF and Prospect WFP requires the use of some hazardous materials and dangerous goods. Hazardous building materials have been recorded at Quakers Hill WRRF and Sydney Water buildings at Prospect Reservoir including but not limited to:

- asbestos containing material
- lead paint.

State Environmental Planning Policy (Resilience and Hazards) 2021 (Resilience and Hazards SEPP) defines development that is potentially hazardous or potentially offensive. Water/sewage treatment is identified as an industry to which this SEPP might apply (under Appendix 3 of Applying SEPP 33, Department of Planning, 2011).

6.14.2 Potential impacts

6.14.2.1 Construction

During construction the project would require the transport, use and storage or hazardous materials and dangerous goods. These may include diesel fuel, petrol, lubricating and hydraulic oils, and grease and solvents.

Equipment failure, or incorrect storage or use of these materials may result in their release into the air, soil, surface water or groundwater.

6.14.2.2 Operation

Operation of the PRW Treatment Plant and infrastructure at Prospect Reservoir would require the use of some hazardous materials and/or dangerous goods, including water treatment chemicals.

6.14.3 Assessment approach

The EIS will include a consolidated assessment for hazardous materials and dangerous goods and include identification of appropriate measures to avoid, minimise and/or mitigate potential impacts. As project design progresses, we will consider whether the project is classified as potentially hazardous industry under section 3.2 of the Resilience and Hazards SEPP. If it did apply, a risk screening, and potentially a Preliminary Hazard Analysis would need to be undertaken.

6.15 Flooding

6.15.1 Existing environment

Blacktown City Council online flood mapping identifies areas of the project as being flood prone. These include:

- Quakers Hill WRRF – low flood risk precinct covers most of the existing operational area of the site
- Breakfast Creek (PRW and brine pipelines) – high flood risk precinct in the immediate vicinity of the creek, then medium and low risk precincts further away
- Blacktown Creek (brine pipeline) – high flood risk precinct in the immediate vicinity of the creek, then medium and low risk precincts further away
- Eastern Creek and Bungarribee Creek (PRW pipeline) – high flood risk precinct in the immediate vicinity of the creek, then medium and low risk precincts further away.

The high flood risk precincts are closest to the waterways, with low risk precincts up to 300 – 400 m away from the waterways.

Quakers Hill WRRF and parts of the pipeline alignments may be susceptible to the 1% Annual Exceedance Probability (AEP) flood event from overland flows. The AEP of a particular flood level/depth at a particular location is the probability that the flood level/depth will be equalled or exceeded in any one year.

Prospect Reservoir is not identified as flood prone land on the online mapping and is outside of the Eastern Creek Flood Study flood planning area.

6.15.2 Potential impacts

6.15.2.1 Construction

Construction may locally alter existing flood behaviour due to stockpiling of construction materials and spoil in the floodplain. Flooding may result in stockpiles of construction materials and spoil being washed into nearby waterways or floodwater entering the construction sites.

6.15.2.2 Operation

No impacts from the pipelines are anticipated as they would be located below ground.

There is unlikely to be a change to flood resilience at the Quakers Hill WRRF and Prospect Reservoir, and this will be confirmed as design progresses.

6.15.3 Assessment approach

A flood impact assessment will be prepared and will include:

- a review of relevant existing flood study reports and flood behaviours for the existing conditions
- assessment of potential flooding and hydrology impacts
- identification of appropriate measures to avoid, minimise and/or mitigate potential impacts.

6.16 Land and groundwater contamination

6.16.1 Existing environment

Contamination in the project area has the potential to occur in the soil, groundwater or sediments due to current and historic land uses. Historic development across the project area suggests the potential for fill material to be present.

Limited site investigations have been undertaken at the Sydney Water owned land at Prospect Reservoir. The northern section has the potential to be contaminated due to dumping of rubbish (in particular asbestos sheeting), which has previously been removed from the east of Prospect Reservoir along William Lawson Drive. As discussed in section 6.2.1, historical alum dosing at Prospect Reservoir created a sludge on the reservoir floor.

Asbestos has been previously discovered in the soil during upgrade works at the Quakers Hill WRRF. Groundwater monitoring at this site has also found some increased nutrients due to past activities, indicating potential for the groundwater to be contaminated.

The PRW pipeline is proposed to pass adjacent to one service station in the suburb of Eastern Creek that is a contaminated site reported to the EPA. A second service station site is within 200 m of the PRW pipeline also at Eastern Creek and reported to the EPA. The brine pipeline has multiple reported contaminated sites including petrol stations, a chemical industry and former brickworks/warehouse within about 1 km of the proposed pipeline route.

6.16.2 Potential impacts

6.16.2.1 Construction

The project is likely to encounter and disturb contaminated soils and sediments, particularly:

- asbestos in soil to the east of Prospect Reservoir and in previously disturbed areas of Quakers Hill WRRF
- alum sediments on the floor of Prospect Reservoir.

The exposure of contaminated materials during construction may increase the potential for contaminant mobilisation and may create additional exposure pathways to receiving environments including surface water and groundwater.

There is a potential for contamination of soils and/or groundwater due to spills and leaks of fuel, oils and other hazardous materials.

6.16.2.2 Operation

There is potential for sediment disturbance on the reservoir floor during operation, although this is expected to be localised around the release location. No other ongoing contamination impacts are expected once the project is operational.

6.16.3 Assessment approach

A Preliminary Site Investigation including desktop study and site investigation, followed by Detailed Site Investigation will be prepared for the project and will include:

- identification of contaminated soils, sediments, surface and groundwater within the project area
- assessing potential impacts of disturbing contaminated sites, considering potential receptors and exposure pathways
- identification of appropriate measures to avoid, minimise and/or mitigate potential impacts.

6.17 Waste

6.17.1 Existing environment

Under existing operations, grit and screenings from Quakers Hill WRRF are either composted at a resource recovery centre or disposed of at landfill. Sydney Water usually recycles the nutrient rich and dewatered sludge from the digester operations as biosolids, which is transported off-site and used as a fertiliser and soil enrichment product.

Illegal dumping of waste occurs on the land owned by Sydney Water at Quakers Hill WRRF that is south of Breakfast Creek and accessible to the public. The northern and eastern sides of Prospect Reservoir also have a high risk of rubbish dumping due to the accessibility of the area to the public.

6.17.2 Potential impacts

6.17.2.1 Construction

Typical construction waste would be generated and require appropriate management and disposal. Construction spoil from excavations may be contaminated and require appropriate treatment and/or disposal.

Construction and operation of the project would also require the use of natural resources.

6.17.2.2 Operation

Brine waste would be conveyed to the NSOOS for treatment at North Head WRRF. No other major waste streams are expected during operation, as the grit, screenings and biosolids generation occur at the existing Quakers Hill WRRF before water enters the PRW Treatment Plant.

6.17.3 Assessment approach

The EIS will include:

- identification of waste streams and approximate volumes generated during construction and operation
- identification of likely resources required
- assessment of impacts to quantify, characterise and classify wastes generated
- management strategies for the identification, handling, transport and disposal of hazardous substances
- identification of appropriate measures to avoid, minimise and/or mitigate potential impacts
- consideration of options for reusing materials, where appropriate.

6.18 Land

6.18.1 Existing environment

6.18.1.1 Stability

Soil instability can be caused by activities that modify or shape the landform or ground. Some potentially unstable land has been identified in the southeast corner of Prospect Reservoir. This land is currently outside of the project area and will be considered as design progresses. There are no nearby mine subsidence areas.

6.18.1.2 Soil chemistry

No acid sulfate soils are mapped within the project area. There are areas of localised salinity hazard across project area, and some areas of extensive salinity hazard mapped along PRW pipeline and brine pipeline alignments.

6.18.2 Potential impacts

6.18.2.1 Construction

Excavation to build the project may disturb land including areas affected by salinity.

6.18.2.2 Operation

There would be no ongoing impacts once the project is operational.

6.18.3 Assessment approach

A geotechnical investigation will be undertaken and will include:

- desktop assessment and geotechnical investigations to provide information on land stability
- soil sampling, including physical and chemical characteristics of the encountered soil types, their potential erosion risk and salinity limitations
- identification of appropriate measures to avoid, minimise and/or mitigate potential impacts.

6.19 Cumulative impacts

6.19.1 Existing environment

As discussed in section 2.3, there are several projects on DPHI's Major Projects Portal near the project. It is also likely that new projects would be initiated over time that may have concurrent construction or operation.

6.19.2 Potential impacts

The project could contribute to cumulative impacts during construction and operation associated with traffic generation, air quality, noise and vibration, visual amenity and social and economic impacts. It could also contribute to cumulative impacts on aspects such as heritage and biodiversity.

6.19.3 Assessment approach

Specialist studies will consider the potential for cumulative impacts, as identified in Appendix A. The outputs will inform a consolidated cumulative impact assessment. It is likely that many of these cumulative impact assessments will be qualitative and relevant in either the construction or operation phase.

Sydney Water will continue to engage with relevant major projects via established government frameworks to ensure effective engagement and cumulative impact mitigation.

6.20 Matters requiring no further assessment

Table 6-4 summarises the matters requiring no further assessment and the reason for this.

Table 6-4 Matters requiring no further assessment

Matter	Reason no further assessment needed
Access – port and airport facilities	There are no port or airport facilities close to the project.
Economic – livelihood, opportunity cost	These aspects will either be part of social impact assessment or are regulated through other pathways, such as Independent Pricing and Regulatory tribunal and INSW assurance processes.
Hazards and risks – coastal hazards, land movement	The project is not in a coastal area and no land movement issues have been identified.
Land – land capability, topography	There are no nearby agricultural areas, irrigation areas or other aspects relevant to land capability. Negligible changes to topography are proposed.

7. Glossary of terms and abbreviations

Term/acronym	Description
AGWR	Australian Guidelines for Water Recycling
AHIMS	Aboriginal Heritage Information System
AHIP	Aboriginal Heritage Impact Permit
BDAR	Biodiversity development assessment report
BOM	Bureau of Meteorology
CPCP	Cumberland Plain Conservation Plan
DPE	Department of Planning and Environment (now DPHI and NSW DCCEEW)
DPIE	Department of Planning, Infrastructure and Environment (now DPHI and NSW DCCEEW)
DPI	Department of Primary Industries
DPHI	Department of Planning, Housing and Infrastructure
NSW DCCEEW	Department of Climate Change, Energy, the Environment and Water (NSW)
EIS	Environmental Impact Statement
EPA	Environment Protection Authority
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
EP&A Act	*Environmental Planning and Assessment Act 1979*
EPL	Environment Protection Licence
GDE	groundwater dependent ecosystem
GDP	gross domestic product
GL	giga litres (one gigalitre is one billion litres)
GSWS	Greater Sydney Water Strategy
INSW	Infrastructure NSW
KFH	Key Fish Habitat
Km	kilometre
LALC	Local Aboriginal Land Council
LEP	Local Environmental Plan
LGA	Local Government Area
LPP	Local Planning Priority

Term/acronym	Description
LTCOP	Long-term Capital and Operational Plan
LSPS	Local Strategic Planning Statement
M	metres
ML	megalitres (one megalitre is one million litres). For context, an Olympic swimming pool would contain 2.5 ML.
NorBE	Neutral or Beneficial Effect
NPI	National Pollutant Inventory
NPWS	National Parks and Wildlife Service
NSOOS	Northern Suburbs Ocean Outfall Sewer
PADs	potential archaeological deposits
PCT	Plant Community Type
PRW	Purified Recycled Water Purified recycled water is water recycled from industry and homes (including from kitchens, showers and toilets) that has been purified to meet strict Australian Guidelines for Water Recycling to supplement drinking water sources. (Definition approved by NSW Health)
RFIS	Rainfall-independent water supplies
RRWS	Resilient and Reliable Water Supply
SBC	Strategic Business Case
SEARs	Secretary's Environmental Assessment Requirements
SEPP	State Environmental Planning Policy
SHR	State Heritage Register
SIA	Social Impact Assessment
SSI	State Significant Infrastructure
TEC	Threatened Ecological Community
TISEPP	State Environmental Planning Policy (Transport and Infrastructure) 2021
TN	Total Nitrogen
TOC	Total Organic Carbon
TP	Total Phosphorus
UV	ultra violet
WFP	Water Filtration Plant

Term/acronym	Description
WoNS	Weeds of National Significance
WRRF	Water Resource Recovery Facility

8. References

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Appendix A – scoping summary table

Level of assessment	Matter	Cumulative impact assessment	Community engagement	Relevant government plans, policies and guidelines	Scoping Report section
Detailed	Water – hydrology, water quality, availability	Y	Specific	• Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC, 2000) • Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG 2018) • Managing Urban Stormwater, Soils and Construction Volume 1, 4th Edition (Landcom, 2004) • Australian Guidelines for Water Recycling Phase 2 – Augmentation of Drinking Water Supplies (Environment Protection and Heritage Council, National Health and Medical Research Council, Natural Resource Management Ministerial Council, 2008) • Guidelines for Managing Risks in Recreational Water (National Health and Medical Research Council, 2008) • National Water Quality Management Strategy (Australian Government, 2018) • NSW Water Quality and River Flow Objectives (https://www.environment.nsw.gov.au/ieo/) • Risk-based Framework for Considering Waterway Health Outcomes in Strategic Land-use Planning Decisions (Office of Environment and Heritage, 2017)	6.2
Detailed	Social – way of life, community, accessibility, culture, health and wellbeing, surroundings, livelihoods, decision making systems	Y	Specific	Social Impact Assessment Guideline (DPIE, 2023)	6.3

Level of assessment	Matter	Cumulative impact assessment	Community engagement	Relevant government plans, policies and guidelines	Scoping Report section
Standard	Biodiversity – aquatic flora and fauna, terrestrial flora and fauna, conservation areas Hazards and risks – biosecurity	Y	General	**Aquatic flora and fauna** • Aquatic Ecology in Environmental Impact Assessment – EIA guideline (Marcus Lincoln Smith, 2003) • Policy and Guidelines for Fish Habitat Conservation and Management (Department of Primary Industries, Update 2013) • Why do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings (NSW Fisheries, 2003). **Terrestrial flora and fauna** • EPBC Act environmental offsets policy, (Department of Sustainability, Environment, Water, Population and Communities, 2012) • EPBC Act guidance documents for survey and assessment of matters of national environmental significance (various) • Guidance to assist a decision-maker to determine a serious and irreversible impact (Department of Planning Industry and Environment, 2019) • National Recovery Plans for Species and TEC, Conservation Advice and Listings (various) • NSW Biodiversity Assessment Method (BAM), and additional survey guidelines (various) • Significant impact guidelines - matters of national environmental significance (Department of the Environment, 2013) • Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities (Department of Environment and Conservation, 2004) • Managing biosecurity risk management in land use planning and development (DPI 2020)	6.4, 6.5

Level of assessment	Matter	Cumulative impact assessment	Community engagement	Relevant government plans, policies and guidelines	Scoping Report section
Standard	Heritage – Aboriginal, historic, natural	Y	Specific	**Aboriginal Heritage** • Aboriginal Cultural Heritage Consultation Requirements for Proponents (Department of Environment, Climate Change and Water, 2010) • Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW (Department of Climate Change and Water, 2010) • Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW (Office of Environment and Heritage, 2011) **Historic Heritage** • Assessing heritage significance: Guidelines for assessing places and objects against the Heritage Council of NSW criteria (Department of Planning and Environment, 2023) • Guidelines for preparing a statement of heritage impact (Department of Planning and Environment, 2023) • Assessing Significance for Historical Archaeological Sites and Relics (NSW Heritage, 2009) • Archaeological Assessments (Department of Urban Affairs and Planning, 1996) • Photographic Recording of Heritage Items using Digital Capture (Heritage Office, 2006) • State Agency Heritage Guide (Heritage Council of NSW and Heritage Office, 2005)	6.6, 6.7
Standard	Access – access to property, traffic and parking, road and rail facilities	Y	Specific	• Traffic Modelling Guidelines (Roads and Maritime Services, 2013) • Guide to Traffic Generating Developments (Roads and Traffic Authority, 2002)	6.8

Level of assessment	Matter	Cumulative impact assessment	Community engagement	Relevant government plans, policies and guidelines	Scoping Report section
				• Guide to Traffic Management Part 12: Integrated Transport Assessments for Developments (Austroads, 2020) • Guide to Traffic Management Part 3: Transport Studies and Analysis Methods (Austroads, 2020) • Future Transport Strategy 2056 (Transport for NSW, 2020)	
Standard	Air quality – atmospheric emissions, particulate matter, gases Amenity – odour	Y	General	Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales (NSW EPA, 2022)	6.9
Standard	Climate change	N	General	• AS 5334-2013: Climate change adaptation for settlements and infrastructure − A risk-based approach (2013) • Climate Change Impacts and Risk Management – A guide for business and development (Department of Environment and Heritage, 2006) • Infrastructure Sustainability Council of Australia (ISCA) Infrastructure Sustainability (IS) Rating Tool • NSW Climate Change Policy Framework (Office of Environment and Heritage, 2016) • NSW Government Resource Efficiency Policy (Office of Environment and Heritage, 2019) • United Nations Sustainable Development Goals • National Climate Resilience and Adaptation Strategy 2021-2025 (DAWE, 2021) • Greenhouse Gas Protocol, A Corporate Accounting and Reporting Standard (World Resources Institute, 2005)	6.9

Level of assessment	Matter	Cumulative impact assessment	Community engagement	Relevant government plans, policies and guidelines	Scoping Report section
				• National Greenhouse and Energy Reporting Scheme • National Greenhouse Accounts Factors 2023	
Standard	Amenity – noise, vibration, visual Built environment – design quality	Y	General	**Noise and vibration** • Interim Construction Noise Guideline (Department of Environment and Climate Change, 2009) • NSW 'Assessing Vibration; a technical guideline' regarding human comfort and to BS 7385 and DIN 4150 for damage to buildings (Department of Environment and Conservation, 2006) • NSW Road Noise Policy (Department of Environment, Climate Change and Water, 2011) • NSW Noise Policy for Industry (EPA, 2017) • Construction Noise and Vibration Strategy, (Transport for NSW, 2023) **Visual** • Guideline for Landscape Character and Visual Impact Assessment – EIA N04 (Transport for NSW, 2023)	6.10, 6.11
Standard	Built environment – private property, public land, public infrastructure	N	Specific		6.3
Standard	Hazards and risks – bushfire, dams safety, dangerous goods, environmental hazards, flooding,	N	General	**Bushfire** • Planning for Bush Fire Protection 2019 (Rural Fire Service 2019) **Dams** • Dams Safety NSW regulations and guidelines	6.12 to 6.17

Level of assessment	Matter	Cumulative impact assessment	Community engagement	Relevant government plans, policies and guidelines	Scoping Report section
	groundwater contamination, hazardous and offensive development, land contamination, waste Economic – natural resource use			**Flooding** • Floodplain Development Manual (NSW Government and Department of Infrastructure, Planning and Natural Resources, 2005) • Practical Consideration of Climate Change – Flood Risk Management Guideline (Department of Environment and Climate Change, 2007) • Australian Rainfall and Runoff – A guide to flood estimation (ARR 2016) **Groundwater** • Water Sharing Plan for the Greater Metropolitan Region Groundwater Sources 2023 • NSW Aquifer Interference Policy (NSW Department of Primary Industries, 2012) • Guide to Groundwater Management in NSW (Department of Planning and Environment, 2023). **Contamination** • Contaminated Land Guidelines: Sampling Design Part 1 – Application (NSW EPA, 2022) • Contaminated Land Guidelines: Sampling Design Part 2 – Interpretation (NSW EPA, 2022) • Contaminated Land Guidelines: Consultants Reporting on Contaminated Sites (NSW EPA, 2020) • Guidelines for the Assessment and Management of Groundwater Contamination (NSW EPA, 2007) • Guidelines on the Duty to Report Contamination under the *Contaminated Land Management Act 1997* (NSW EPA, 2015)	

Level of assessment	Matter	Cumulative impact assessment	Community engagement	Relevant government plans, policies and guidelines	Scoping Report section
				• National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended in 2013) • Guidelines for the NSW Site Auditor Scheme (Third Edition) (NSW EPA, 2017) **Waste and natural resources** • Waste Classification Guidelines (NSW EPA, 2014) • Asbestos Waste Strategy, 2019-2021 (NSW EPA, 2019) • NSW Circular Economy Policy Statement Too Good Too Waste (NSW EPA, 2019) • NSW Waste and Sustainable Materials Strategy 2041 – Stage 1: 2021-2027 (Department of Planning, Industry and Environment, 2021) **Health and safety** • Health Impact Assessment Guidelines, Environmental Health Committee (enHealth, 2017) • Environmental Health Risk Assessment: Guidelines for assessing human health risks from environmental hazards, 2012 (enHealth, 2012) • State Environment Planning Policy No. 33 – Hazardous and Offensive Development • Applying SEPP 33 Guideline, NSW DPIE (DPIE, 2011a)	
Standard	Land – stability, soil chemistry	N	General	Site Investigations for Urban Salinity - Guidance given in the Local Government Salinity Initiative booklets (DLWC 2002)	6.18
No further assessment	Access – port and airport facilities	N/A	N/A	N/A	N/A

Level of assessment	Matter	Cumulative impact assessment	Community engagement	Relevant government plans, policies and guidelines	Scoping Report section
No further assessment	Economic – livelihood, opportunity cost	N/A	N/A	N/A	N/A
No further assessment	Hazards and risks – coastal hazards, land movement	N/A	N/A	N/A	N/A
No further assessment	Land – land capability, topography	N/A	N/A	N/A	N/A