



Review of Environmental Factors

Wilton Water Resource Recovery Facility Upgrade

June 2026



Acknowledgement of Country

Sydney Water respectfully acknowledges the Traditional Custodians of the land and waters on which we work, live and learn. We pay respect to Elders past and present.

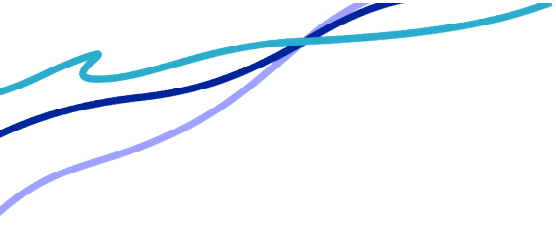


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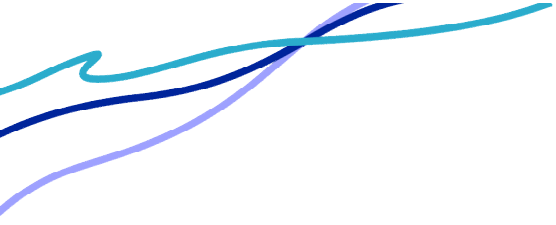


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Determination

This Review of Environmental Factors (REF) assesses potential environmental impacts of the Wilton Water Resource Recovery Facility (WRRF) Upgrade. The REF was prepared under Division 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act), with Sydney Water both the proponent and determining authority.

The Sydney Water Project Manager is accountable for ensuring the proposal is carried out as described in this REF. Additional environmental impact assessment may be required if the scope of work or work methods described in this REF change significantly following determination.

Certification

I certify that I have reviewed and endorsed this REF and, to the best of my knowledge, it is in accordance with the EP&A Act and the Environmental Planning and Assessment Regulation 2021 (EP&A Regulation). The proposal has been considered against matters listed in section 171 (Appendix A) and the guidelines approved under section 170 of the EP&A Regulation. The information it contains is neither false nor misleading.

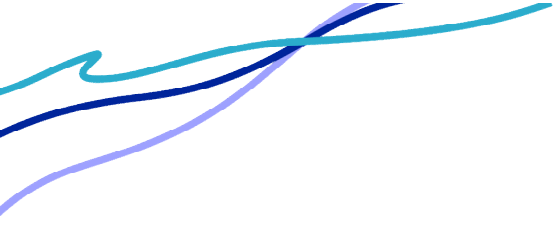
Prepared by:	Reviewed and endorsed by:	Endorsed by:
Jennifer Shaw Senior Environmental Scientist Sydney Water Date: 29/05/2026	Jonathan Dowling Environment Representative Sydney Water Date: 29/05/2026	Soheil Saemian Project Manager Sydney Water Date: 31/05/2026

Decision Statement

The main potential construction environmental impacts of the proposal include impacts to biodiversity and amenity impacts (e.g. noise, dust and traffic). During operation, the main potential impacts are associated with water quality, geomorphology and aquatic ecology. The proposal will not be carried out in a declared area of outstanding biodiversity value and is not likely to significantly affect threatened species, populations or ecological communities, or their habitats. Therefore, a Species Impact Statement (SIS) and/or Biodiversity Development Assessment Report (BDAR) is not required.

Given the nature, scale and extent of impacts and implementation of the mitigation measures outlined in this REF, the proposal is unlikely to have a significant impact on the environment. Therefore, we do not require an Environmental Impact Statement (EIS) and the proposal may proceed.

Determined By:	Jill Berwick, A/Senior Manager, Environment and Heritage Services Sydney Water		Date: 18/06/2026
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1 Executive Summary

Sydney Water proposes to upgrade our Wilton Water Resource Recovery Facility (WRRF) in the Wollondilly local government area. The proposal forms part of our Wilton Integrated Servicing Program (WISP) and will increase the amount of wastewater that can be treated, to accommodate forecast growth in the Wilton Growth Area.

We propose to modify and expand wastewater treatment processes, including constructing and operating a new advanced water treatment system (AWTS) that will use reverse osmosis, and new treated water discharge pipe from the Wilton WRRF to a tributary of Stringybark Creek. We also propose to increase existing precautionary and emergency discharge volumes via an existing discharge location (to a different tributary of Stringybark Creek) (the proposal). The Wilton WRRF is regulated by and will operate in accordance with its environment protection licence (EPL).

Construction of the proposal is expected to start mid 2026 and take about 2 years to complete. The main construction locations are:

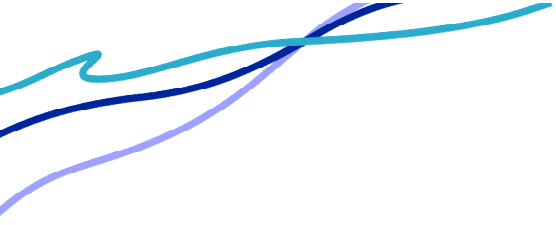
- Wilton WRRF and areas directly to the east and south. This will involve constructing buildings and other structures for the new and upgraded treatment processes
- the treated water discharge pipe and headwall, which will be built mainly along local roads and private land. The pipeline (about 975 m in length) will be laid below ground by open trenching. The headwall will be a pre-cast concrete structure installed in and on the bank of a tributary of Stringybark Creek.

Sydney Water has considered a range of options and refined the proposal to minimise environmental impacts. The proposal aligns with the principles of ecologically sustainable development.

The main construction impacts include the removal of native vegetation and amenity impacts (e.g. noise, dust and traffic). These will be largely temporary, and we will implement mitigation measures to manage these impacts, as part of a Construction Environmental Management Plan.

During operation, the main impacts will be to water quality, geomorphology and aquatic ecology from increasing the existing precautionary and emergency discharge volumes and new local discharge of advanced treated water to tributaries of Stringybark Creek. The proposal will result in measurable changes to receiving water quality. However, these changes will be small relative to background variability and insufficient to produce a material change in receiving water quality condition. Geomorphology impacts are expected to be minor and active in-stream interventions and monitoring will be carried out to minimise the risk of erosion. Aquatic species are also likely to be tolerant to the proposed changes in water quality and direct toxicity risk to aquatic organisms will be low. With the proposed mitigation measures, operational noise, odour and visual impacts will be negligible.

This review of environmental factors (REF) assesses the proposal's environmental impacts and will be determined by Sydney Water under Division 5.1 of the *Environmental Planning and Assessment Act 1979*. Sydney Water has been consulting with the community and other stakeholders throughout proposal planning and will continue this as design and construction progress.



2 Introduction

2.1 Context

Sydney Water provides water, wastewater, recycled water and some stormwater services to over 5 million people. We operate under the *Sydney Water Act 1994* and have 3 equal objectives to protect public health, protect the environment and be a successful business.

We are a statutory State-owned corporation and are classified as a public authority, and a determining authority for the proposal under Division 5.1 of the EP&A Act. This REF assesses the potential environmental impacts associated with the Wilton WRRF Upgrade and identifies mitigation measures that avoid or minimise potential impacts.

2.2 Proposal background and need

2.2.1 Proposal scope overview

The Wilton WRRF currently receives wastewater from Wilton and Bingara Gorge, which is treated to produce high-quality recycled water. This recycled water is supplied to homes and businesses in Bingara Gorge via a purple pipe network. Recycled water is used for non-potable purposes such as watering gardens, flushing toilets and clothes washing. Surplus recycled water is stored in 2 onsite lagoons with capacities of 20 ML and 60 ML for temporary storage. This surplus recycled water is used for irrigating the Bingara Gorge Golf Course (the Golf Course). When the storage lagoons are at capacity, excess recycled water is discharged from the existing discharge location to a tributary of Stringybark Creek as precautionary or emergency discharges. Figure 3-4 in Section 3 shows the location of the existing infrastructure and irrigation areas.

The proposal includes:

- wastewater treatment infrastructure upgrades to increase the capacity of the WRRF from 1.5 megalitres per day (ML/D) to 3.6 ML/D of average dry weather flow (ADWF)
- a new advanced water treatment system (AWTS) with capacity to treat and discharge up to 1.5 ML/D
- a new treated water discharge pipe from the AWTS to a tributary of Stringybark Creek.

Figure 3-5 in Section 3 shows the proposed infrastructure.

While the WRRF will be upgraded to have the capacity to treat 3.6 ML/D of wastewater, it will operate at a maximum capacity of 2.3 ML/D ADWF, based on predicted wastewater demand until about 2032 and available treated wastewater management capacity. Release of the treated wastewater from the WRRF follows a 3-tiered approach comprising the following:

- supply recycled water to the existing and expanded purple pipe network
- continue to supply recycled water to irrigate the Golf Course

- release to the environment:
 - new discharge from the AWTS to a tributary of Stringybark Creek, of about 1.5ML/D (via the new treated water discharge pipe)
 - increase the volume of recycled water released via the existing discharge location (i.e. precautionary and emergency discharge) to 100 ML/year.

Refer to Figure 3-2 for a process flow diagram showing how wastewater flows into the WRRF, is treated and how treated wastewater from the WRRF is managed under existing and future operation.

Additional treated wastewater management capacity will be provided through a combination of increased permanent irrigation of public open space, temporary agricultural irrigation, and supplementary lagoon storage. These opportunities are currently being progressed through commercial agreements and may defer the need for immediate investment in the proposed AWTS. A final commitment to the delivery timeframe of the AWTS will be determined in late 2026, taking into account the status of commercial arrangements for additional irrigation and storage, the outcomes of an Effluent Management Strategy review (under the Environment Protection Licence (EPL)), and the associated compliance risk.

2.2.2 Proposal background

The Western Parklands of Sydney are expected to grow to 1.2 million people by 2036. The Greater Sydney Commission's Regional Plan includes several priority growth corridors to support development required to cater for this population growth. Plans for new land releases in the Wilton Growth Area (Figure 2-2), and other priority growth centres were developed to meet population growth within the nearby Greater Macarthur Growth Area (GMGA) (Figure 2-1). The Wilton Integrated Servicing Program (WISP) is Sydney Water's plan to ensure the right infrastructure is delivered at the right time to support this growth. The proposal forms part of the WISP.

Development in the Wilton Growth Area started ahead of wastewater servicing by Sydney Water. The Bingara Gorge Recycled Water Plant (now referred to as the Wilton WRRF) was constructed in 2017 and operated privately under a *Water Industry Competition Act 2006* scheme (WICA scheme), with capacity to provide wastewater and recycled water as a decentralised service catering for up to 2,200 dwellings. The WRRF and associated network forms the Bingara Water Recycling Scheme (BWRS).

In June 2022 Sydney Water acquired the BWRS, as a key component of our Wilton servicing strategy for wastewater management. The BWRS is regulated by EPL 20335. Veolia currently hold the EPL for the BWRS and operates and maintains the BWRS for Sydney Water under an Operation and Maintenance agreement.

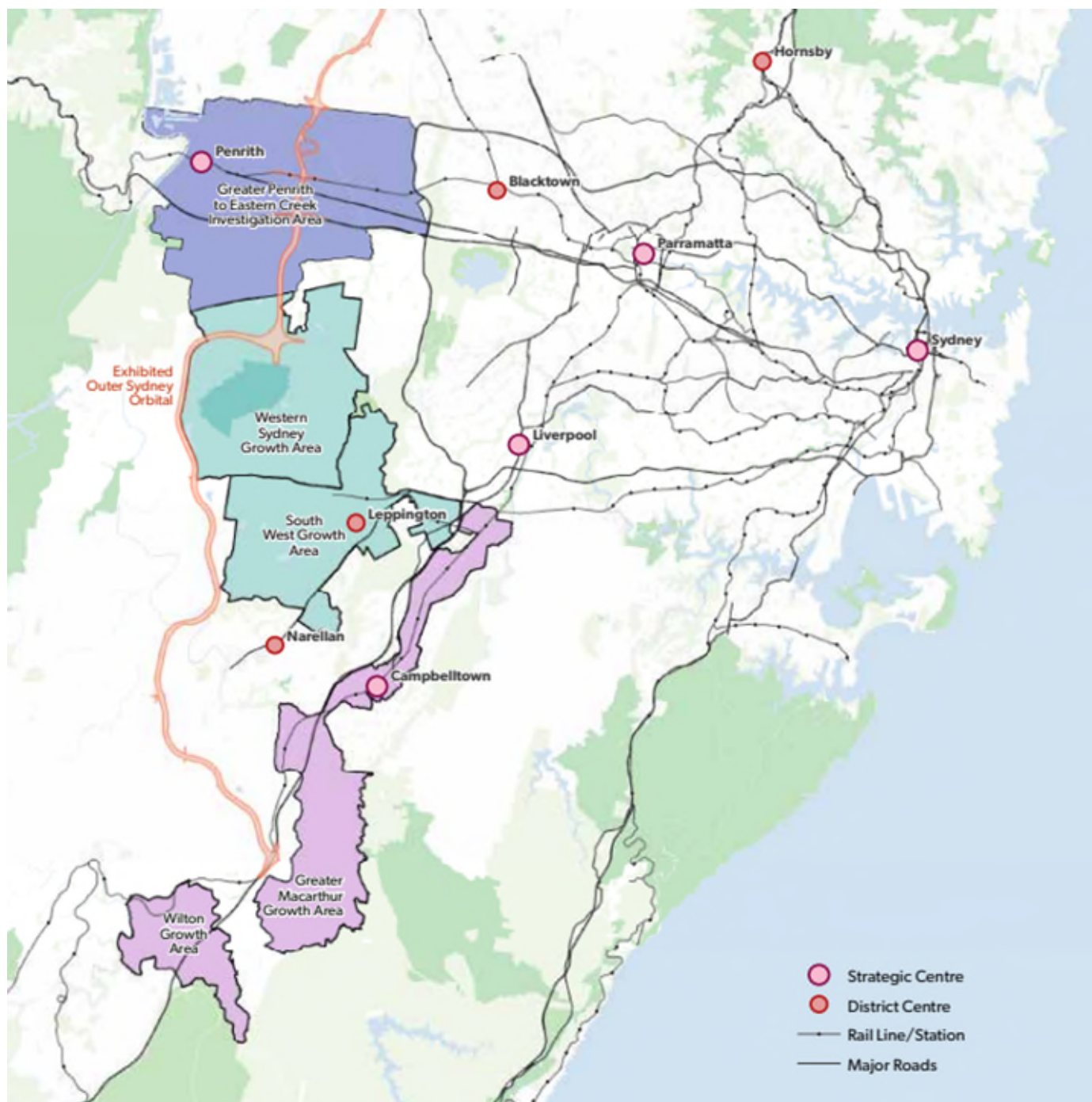
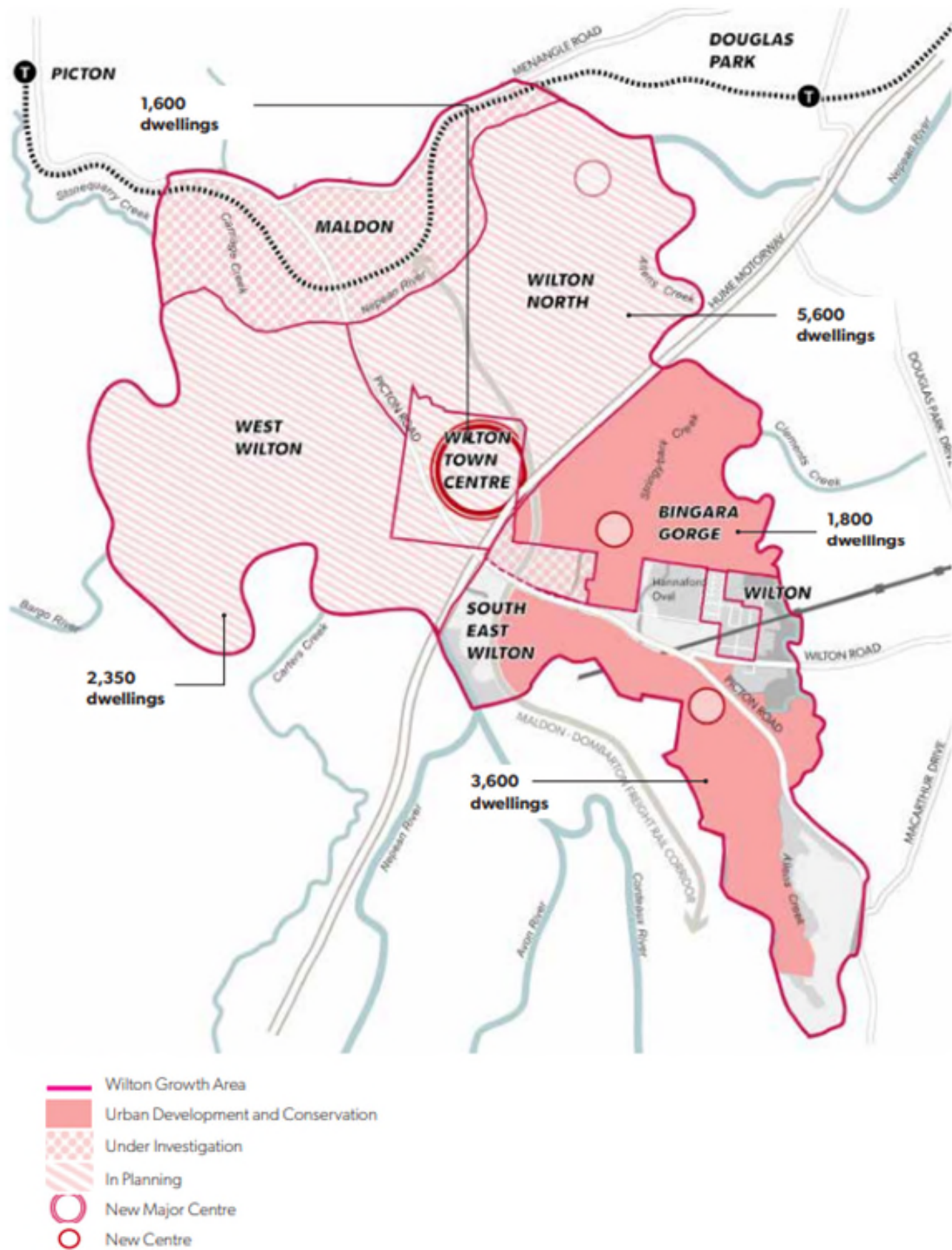
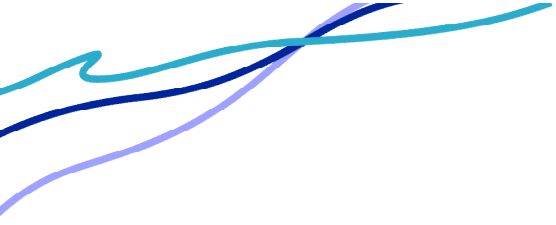


Figure 2-1 Regional context. Wilton Growth Area south of the Greater Macarthur Growth Area (DPE, 2018)





2.2.3 Proposal need

2.2.3.1 Growth

The Wilton Growth Area is proposed to be a community of about 15,000 homes and employment areas, with 1,500 dwellings currently provided with water and wastewater services. The immediate demand for servicing is to cater for growth from 1,500 dwellings to about 3,200 dwellings by 2028.

To service this growth in line with the WISP, Sydney Water plans to upgrade the WRRF capacity and options for treated wastewater management.

2.2.3.2 EPL variation – scale of the WRRF

Sydney Water (and Veolia) requested a variation to the EPL in February 2026 to increase the scale of the WRRF from 0-20 ML/year to 219-1,000 ML/year. The original scale of the WRRF in the EPL only accounted for direct discharges to the environment (i.e. precautionary and emergency discharges) and excluded:

- recycled water via the purple pipe network
- irrigation by the Golf Course
- onsite storage dynamics.

The NSW Environment Protection Authority (EPA) approved the EPL variation in April 2026, and the scale of the plant in the EPL is now 219-1,000 ML/year.

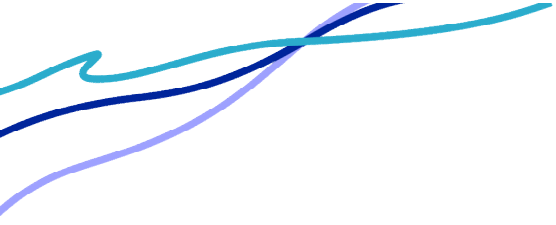
The variation aimed to:

- align the EPL with actual system inflows, recycled water use, irrigation volumes and environmental discharge
- address operational constraints that limit the ability to manage flows during wet weather or high inflow periods.

While dry weather wastewater inflows to the WRRF from Wilton have remained relatively steady over time, inflows from Bingara Gorge have increased consistently from about 300 kilolitres per day (KL/D) to about 700 KL/D over the past 5 years as the community has continued to grow. The combined dry weather inflow from Wilton and Bingara Gorge was about 820 KL/D in February 2026.

Despite the significant increase in total inflows, demand for recycled water via the purple pipe network has remained consistent, on average 280 KL/D. Golf Course usage is reduced during the winter months but also declines when there is consistent rainfall (reducing irrigation opportunities). The difference in future inflows and recycled water demand means a permanent discharge is required.

In 2025, RM Consulting Group Pty Ltd (RMCG) was engaged by Sydney Water to develop a water balance model for the WRRF. This model was used to assess long term system performance and support planning for rapid growth in the Wilton Growth Area. The modelling evaluated the interaction of irrigation, recycled water use and lagoon storage over a 20-year historical climate sequence from 2004 to 2024, with rainfall data serving as input parameters into the model.



The model showed that while the AWTs will reduce the reliance on precautionary and emergency discharges, there is potential that these discharges will need to be increased as growth in the Wilton Growth Area increases. To manage this, Sydney Water proposes to increase the maximum precautionary and emergency discharges to 100 ML/year.

As part of the EPL variation in April 2026, the EPA included a requirement to prepare an Effluent Management Strategy to consider the longer-term options for the site and servicing of the area. Sydney Water is preparing this analysis, with further detail provided on this in subsequent sections. Another variation to the EPL to accommodate operation of the AWTs and the new discharge location will be sought by late 2027/early 2028.

2.2.4 Proposal objectives

The proposal objectives are to:

- provide new wastewater services to service development in the Wilton Growth Area
- support the rollout of land release and infrastructure
- meet Sydney Water's statutory and regulatory obligations.

2.2.5 Development of the proposal and consideration of alternatives/options

Sydney Water explored high level options for servicing population growth including construction of a new WRRF or upgrading the existing WRRF. Ultimately, acquiring and upgrading the existing WRRF was preferred, as it utilises existing infrastructure, and minimises impacts to the environment and community.

Sydney Water then carried out a series of strategic planning investigations to identify and assess alternative treated wastewater management options to service growth in the Wilton Growth Area. These investigations considered the short, medium and long-term evolving growth forecasts, regulatory requirements, environmental constraints, and opportunities for water recycling and beneficial reuse.

The assessment of these alternatives has been iterative and informed by the Wilton New Town Sub-Regional Plan (Sydney Water, 2019), the Wilton Integrated Servicing – Review of Servicing Strategy (Sydney Water, 2023), subsequent reviews triggered by the deferral of the Upper Nepean Advanced Water Recycling Centre (AWRC) project (discussed below) and recent water balance modelling.

2.2.5.1 Treated wastewater management options

Nature-based polishing systems

Options incorporating nature-based solutions (i.e. raingarden or wetland polishing systems) were assessed in the Wilton New Town Sub-Regional Plan as a means of improving effluent quality and providing additional reuse or positive environmental outcomes. However, these solutions would require large areas of land, are subject to variable hydraulic performance, and do not eliminate the need for alternative effluent management strategies during prolonged wet weather conditions.

Expanded recycled water reuse (purple pipe network)

Configurations incorporating expanded recycled water supply via the purple pipe network were assessed. These options sought to maximise reuse within the catchment for residential, open space, and potential commercial or light industrial purposes. Expanding the purple pipe network has now been committed to for some additional areas within Wilton North, Bingara Gorge and South East Wilton. While this reduces the number of precautionary and emergency discharges, recycled water demand alone would be insufficient to manage volumes during wet weather and low demand periods.

Additional irrigation and storage

The long-term wastewater servicing strategy for Wilton, as identified in the Macarthur Regional Plan (Sydney Water, 2022a), is to transfer wastewater flows from the Wilton catchment to the proposed future regional Upper Nepean AWRC. In the interim, prior to this regional consolidation, the treated wastewater management approach identified in the Wilton Integrated Servicing – Review of Servicing Strategy (2023) involved local reuse within the Wilton catchment. This would primarily be through temporary irrigation and expansion of effluent storage to manage variability in demand and climatic conditions.

Local advanced treated water discharges

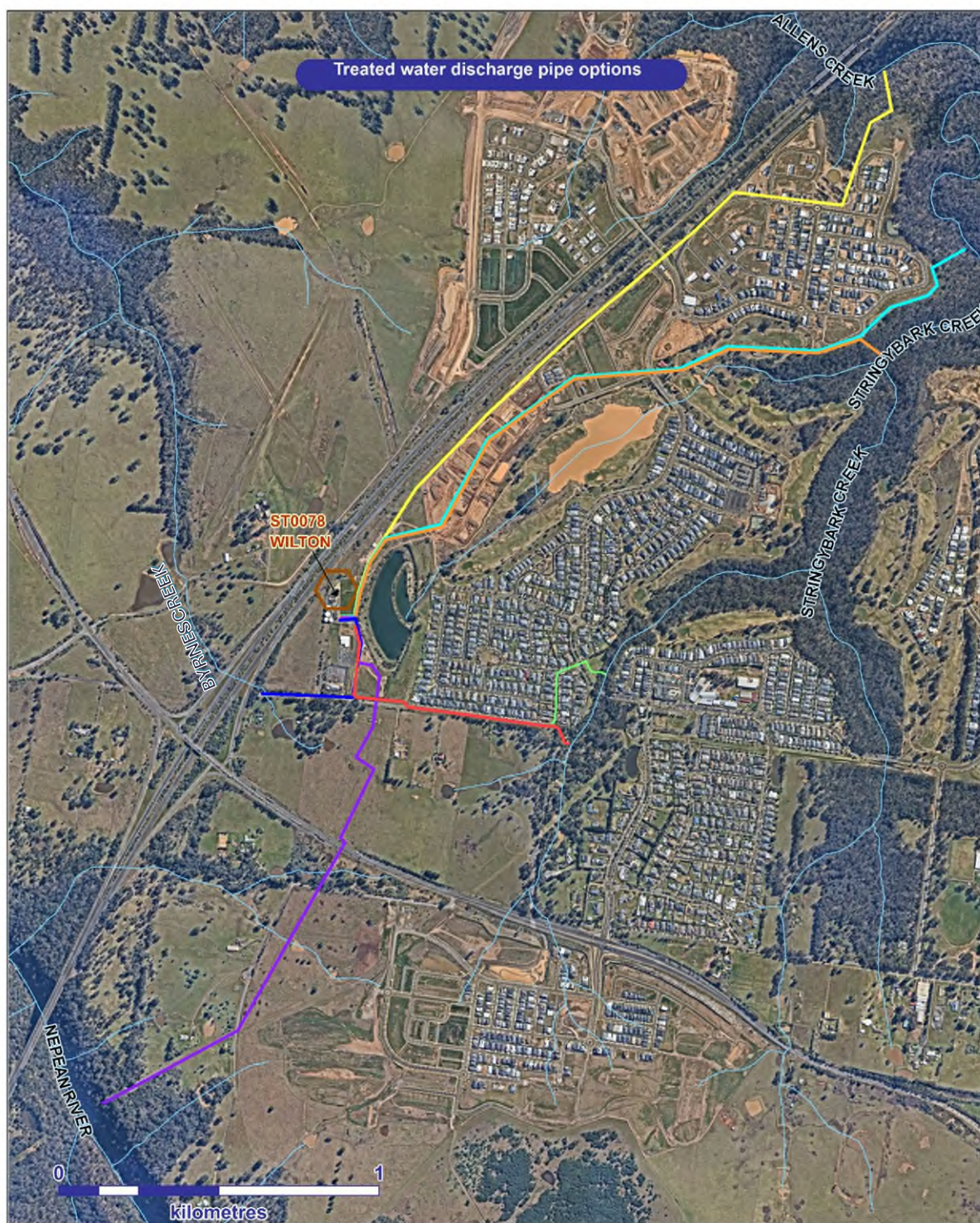
Advanced treatment options, including reverse osmosis (RO), were assessed to produce high-quality treated water suitable for controlled environmental discharge. While associated with higher operating costs, advanced treatment provides greater operational flexibility, improved quality, and enhanced capacity to manage inflow variability and environmental compliance risks.

This option does not present a full treated wastewater management solution and is currently limited in capacity by brine (a RO by-product) management due to the decentralised system and needs to be paired with additional reuse to viably service growth.

Seven potential discharge locations to local watercourses were initially identified and assessed (Table 2-1 and Figure 2-3).

Table 2-1 Discharge location options

Option	Receiving watercourse	Length of pipe from the WRRF (km)
1	Allens Creek	2.6
2	Stringybark Creek near Cuttriss Crescent	2.5
3	Stringybark Creek near Cuttriss Crescent	2.1
4	Stringybark Creek near Sutton Crescent	1.3
5	Stringybark Creek near Kangaloon Close	1.0
6	Byrnes Creek	0.6
7	Nepean River	2.0



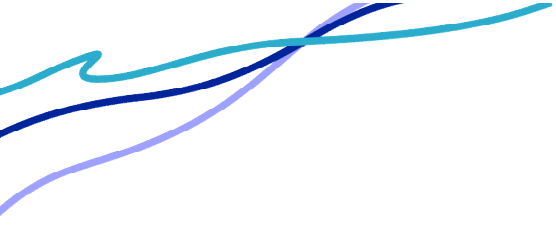
- Treated water discharge pipe options**
- Option 1
 - Option 2
 - Option 3
 - Option 4
 - Option 5
 - Option 6
 - Option 7

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Figure 2-3 Treated water discharge pipe options



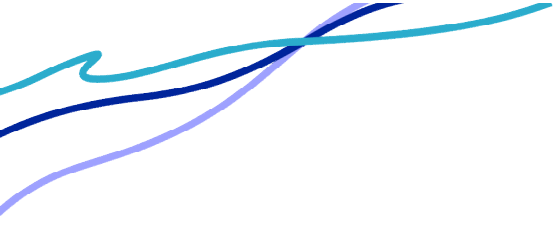
These options were progressively shortlisted based on:

- cost and constructability
- geomorphological stability
- expected water quality outcomes
- environmental approvals constraints
- impacts on native vegetation.

Several options (1, 2 and 6) were eliminated due to steep terrain, extensive vegetation clearance, sensitive receiving environments, or excessive pipeline lengths and costs. Short-listed options were further assessed (refer to Table 2-2), with the preferred discharge location (option 5) selected based on shortest alignment, constructability, and minimisation of environmental impact.

Table 2-2 Assessment of short-listed treated water discharge location options

Option	Cost and constructability	Geomorphology	Water quality	Environmental approvals	Vegetation impact
3	Challenging construction, long alignment and moderate cost	Stable creek bed	Treated water not expected to impact Stringybark Creek	Vegetation at Option 3 is protected by an existing Commonwealth approval condition associated with the Bingara Gorge residential development	High impact to threatened vegetation
	Constructible, shortest alignment and moderate cost	Undercut banks and finer sediment bed upstream	Treated water not expected to impact Stringybark Creek	Vegetation at Option 4 is protected by an existing Commonwealth approval condition associated with the Bingara Gorge residential development	Impact to about 0.01 ha of threatened vegetation
	Constructible, shortest alignment and lowest cost	Undercut beds and finer sediment downstream	Treated water not expected to impact Stringybark Creek	Option 5 and part of the treated water pipeline would be located in 'avoided land' under the Cumberland Plain Conservation land.	Impact to about 0.2 ha of threatened vegetation
	High cost, long alignment with road crossings	Not assessed due to high cost and high vegetation impact			High impact to threatened vegetation



Regional wastewater servicing

As discussed above, the regional Upper Nepean AWRC proposed for servicing the GMGA is also intended to provide long term wastewater servicing for the Wilton Growth Area. The Upper Nepean AWRC was planned to be operational and receive wastewater from Wilton in 2032. However, Sydney Water deferred the delivery of the Upper Nepean AWRC due to the NSW government's ongoing review of infrastructure requirements to service the GMGA. As such, the Upper Nepean AWRC is not expected to be operational until 2036-2040.

Following the deferral of the Upper Nepean AWRC, interim treated wastewater management alternatives were reassessed to ensure continuity of service. Alternatives examined included:

- increased reliance on irrigation with expanded storage volumes
- greater frequency of precautionary and emergency discharges
- integration of advanced treatment with a new local environmental discharge.

Exclusive reliance on irrigation and storage was initially discounted due to the large storage volumes required during wet weather and associated cost and land requirements. Sydney Water has subsequently actively engaged with developers, Wollondilly Shire Council and other government agencies to identify irrigation and storage opportunities. There is substantial opportunity for temporary agricultural irrigation (about 80 hectares (ha)), permanent irrigation of public open space (up to 37 ha) and additional lagoon storage volume (about 140 ML), which is currently being pursued through commercial agreements. Advanced treatment and precautionary and emergency discharges will also form part of the treated wastewater management Effluent Management Strategy. Increased treated wastewater management capacity from additional irrigation, storage and the purple pipe network may defer investment in the proposed AWTS. As noted above, an Effluent Management Strategy is being prepared by Sydney Water which will include a review of the longer-term options.

2.2.5.2 Preferred option

Having regard to the alternatives assessment above, the proposal currently comprises:

- continued wastewater treatment at the WRRF with increased capacity to treat up to 3.6 ML/D of inflow
- up to 2.3 ML/D treated wastewater management capacity, consisting of:
 - supplying recycled water to the purple pipe network and the Golf Course for irrigation
 - constructing and operating an AWTS with a capacity of 1.5 ML/D
 - constructing a treated water discharge pipe from the AWTS to a tributary of Stringybark Creek.

Inflow to the WRRF is predicted to increase above 2.3 ML/D ADWF as development continues beyond 2028-2032. The WRRF treated wastewater management capacity will be augmented through increased supply of recycled water (through the purple pipe network), temporary agricultural irrigation, permanent irrigation of public open space and additional storage, to defer or reduce reliance on advanced treatment.

Separate to this proposal, Sydney Water is concurrently progressing the following;

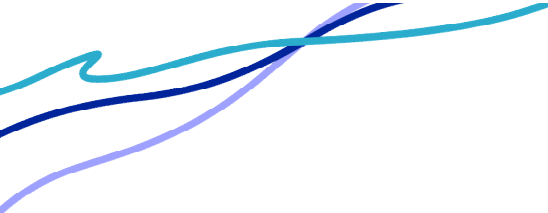
- expanding the purple pipe network to service additional areas. The purple pipe network will also provide irrigation of public open space managed by Wollondilly Shire Council and North Wilton School
- expanding existing Golf Course irrigation areas
- land use agreement for recycled water storage lagoons to be constructed on developer land
- temporary irrigation of agricultural land leased from developers and government agencies (TfNSW corridor) for up to 15 years
- transferring excess flows out of catchment in line with interim and long-term servicing strategies for the GMGA.

2.3 Consideration of Ecologically Sustainable Development

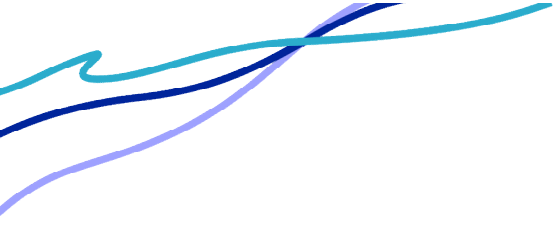
Table 2-3 considers how the proposal aligns with the principles of ecologically sustainable development (ESD).

Table 2-3 Consideration of principles of ecologically sustainable development (ESD)

Aspect	Relevance to proposal
Precautionary principle – <i>if there are threats of serious or irreversible environmental damage, lack of scientific uncertainty should not be a reason for postponing measures to prevent environmental degradation. Public and private decisions should be guided by careful evaluation to avoid serious or irreversible damage to the environment where practicable, and an assessment of the risk-weighted consequences of various options.</i>	The proposal will not result in serious or irreversible environmental damage and mitigation measures have been designed to reduce scientific uncertainty relating to the proposal. This includes the requirement for ongoing water quality and geomorphic monitoring of downstream watercourses during operation of the proposal and adaptive management as required.
Inter-generational equity – <i>the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations.</i>	The proposal will help to meet the needs of future generations by providing a reliable wastewater service to existing and future development in the Wilton Growth Area.
Conservation of biological diversity and ecological integrity – <i>conservation of the biological diversity and ecological integrity should be a fundamental consideration in environmental planning and decision-making processes.</i>	The proposal will not significantly impact on biological diversity or impact ecological integrity. The proposal includes the removal of a total of 1.20 ha of native vegetation, which is a critically endangered ecological community (CEEC) listed under the <i>Biodiversity Conservation Act 2016</i> (BC Act). Of the 1.2 ha, 0.09 ha is also a CEEC listed under the <i>Environment Protection and Biodiversity Conservation Act 1999</i> (EPBC Act). Of this total, 0.12 ha is within excluded land and 0.08 ha is within avoided land mapped under the NSW Cumberland Plain Conservation Plan (CPCP). The construction footprint has been minimised as much as possible, particularly within avoided land. Significant impacts to the



Aspect	Relevance to proposal
	CEEC are unlikely. Impacts to threatened flora and fauna were also considered unlikely to be significant.
Improved valuation, pricing and incentive mechanisms— <i>environmental factors should be included in the valuation of assets and services, such as ‘polluter pays’, the users of goods and services should pay prices based on the full life cycle costs (including use of natural resources and ultimate disposal of waste) and environmental goals</i>	The proposal will provide cost efficient use of resources and provide optimum outcomes for the community and environment. The proposal will allow the Wilton WRRF to treat increasing volumes of wastewater from expanding development and meet EPL obligations.



3 Proposal description

3.1 Proposal details

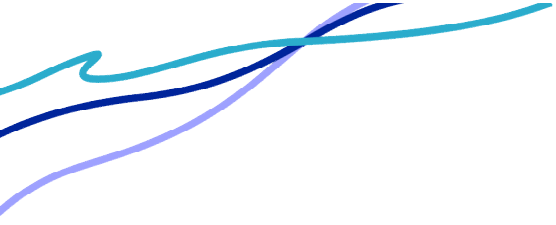
3.1.1 WRRF upgrades and AWTS

Sydney Water proposes to upgrade the WRRF by modifying and expanding existing wastewater treatment processes and constructing a new AWTS (using RO) and treated water discharge pipe. Refer to Figure 3-2 for a flow diagram showing existing and future processes.

The proposed upgrade will construct infrastructure with a capacity to treat 3.6 ML/D of wastewater inflow to the WRRF. However, the WRRF will operate at a maximum capacity of 2.3 ML/D ADWF as discussed in Section 2.2.1. The management of treated wastewater from plant inflows above 2.3 ML/D is outside the scope of this REF and will be subject to separate environmental assessment and approvals.

The upgrade will include the following new infrastructure adjacent to the existing WRRF (Figure 3-1):

- 2 fine screen systems
- 2 activated sludge (AS) tank
- 3 membrane bioreactors (MBR)
- 2 ultraviolet (UV) units
- chlorine contact tank (CCT)
- odour control unit (OCU)
- sludge storage tank
- access roads
- fencing and access gates
- 4 chemical dosing systems
- generator
- electrical switchroom
- blower/compressor building including
- 30 kW solar panels on blower/compressor building
- high voltage (HV) pad-mounted substation with electrical cabling
- low voltage (LV) power supply and controls network
- onsite stormwater detention system (OSD) and stormwater network
- potable and recycled water supply site network

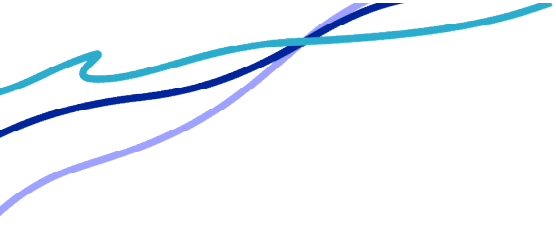
- 
- AWTS (including a new pumping station, RO skid, recovery RO skid and switchboard).

Two existing fine screens will be disconnected and decommissioned during operation of the proposal. These decommissioned assets will be left in place.

Refer to Appendix B for indicative WRRF upgrade and AWTS design layouts.



Figure 3-1 WRRF upgrade and AWTS areas



3.1.2 Treated water discharge pipe and headwall

The proposal includes about 975 m of new OD500 pipe installed using open trenching methods, to discharge advanced treated water from the AWTS to a tributary of Stringybark Creek (hereafter referred to as the AWTS discharge location). The pipeline will include a new maintenance hole on Condell Park Road (Figure 3-5).

The treated water discharge pipe outlet at the Stringybark Creek tributary will comprise a concrete headwall about 2.7 m wide, 1.4 m long and 1.4 m high (Figure 3-3), with photos of the location in Section 6.1.3. The headwall will sit 0.5 m above the 1% Annual Exceedance Probability (AEP) flood level (about 180 m AHD); this will be about 1.7 m above the creek bed.

The following erosion control features have been incorporated into the treated water discharge pipe and headwall design:

- drop maintenance holes near the headwall to dissipate flow energy (locations of maintenance holes along the treated water discharge pipe to be confirmed in the next phase of design)
- angling the headwall so that it faces more downstream and not perpendicular to the receiving watercourse
- limiting the treated water discharge velocity
- concrete headwall with rock rip rap.

Additional measures to control bank stability and erosion downstream of the AWTS discharge location are discussed in Section 6.1.3.

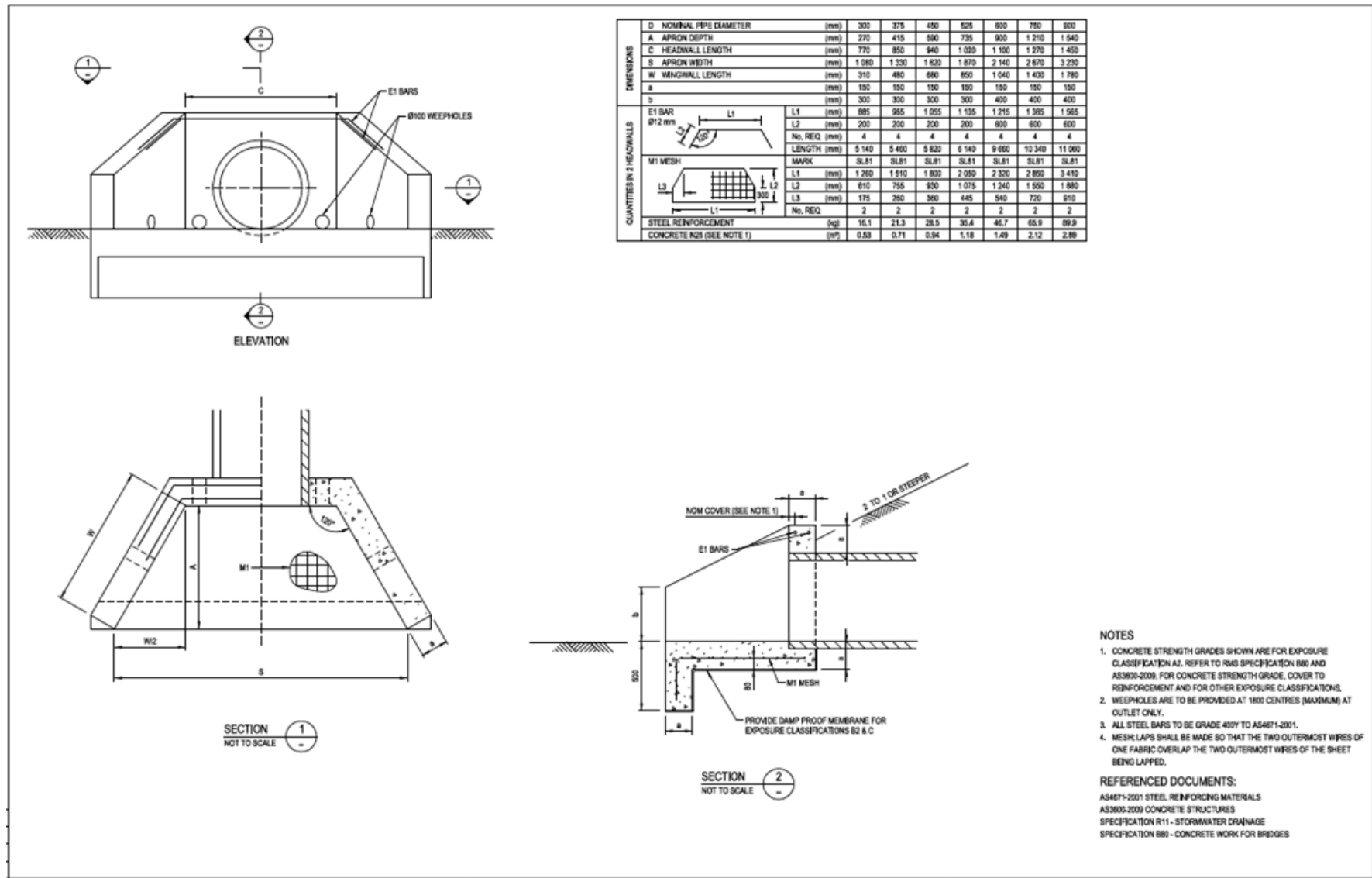


Figure 3-3 Standard headwall design

3.2 Location and ownership

The proposal is in Wilton, within the Wollondilly local government area (LGA). The lots within the construction corridor are owned by Sydney Water, private developers and private landowners. These lots include:

Table 3-1 Location

Lot/ DP	Ownership	Construction proposed within this lot
Lot 301/ DP1184442	Private	WRRF upgrade, access track
Lot 302/ DP1184442	Sydney Water	WRRF upgrade and access track
Lot 303/ DP1184442	Sydney Water	WRRF upgrade, access track, HV electrical work
Lot 200/ DP1195273	Private	Access track and construction compound
Lot 10/ DP702024	TfNSW	Access track
Lot 66/ DP280094	Private	Access track
Lot 5/ DP836296	Private	Treated water discharge pipe, headwall, in-stream treatment works
Lot 1/ DP280014	Private	In-stream treatment works
Lot 1/ DP270536	Private	In-stream treatment works
Condell Park Road	Wollondilly Shire Council	Treated water discharge pipe, maintenance hole

3.3 Methodology

3.3.1 Pre-construction work

Pre-construction work includes investigations such as geotechnical, contamination and surveys. Geotechnical and contamination investigations may include boreholes, test pits and monitoring wells.

We will also:

- prepare management plans and procedures including a Construction Environmental Management Plan (CEMP), a Community and Stakeholder Engagement Plan (CSEP), site inductions and safety plans
- liaise with stakeholders in accordance with Sydney Water's community engagement strategy, including:
 - local authorities (Wollondilly Shire Council)
 - utility providers (e.g. gas and electricity)
 - regulators (as required)
 - developers

- private landholders
- the Golf Course
- establish and mobilise site, including:
 - mark out the designated construction areas including access routes, areas for temporary material and machinery storage
 - set up temporary construction compound with site sheds and amenities, and provide these sites with temporary water and electricity services
 - install erosion and sediment controls and remove approved vegetation
 - deliver and store materials and equipment.

A construction compound, and main and alternative construction access tracks are shown on Figure 3-5. An existing compound on Sydney Water property south of the WRRF will be retained as a permanent administration office. Additional construction compound sites or access roads may be required. Should this occur, previously cleared areas will be used where feasible. The exact location of any additional compound sites or access roads will be chosen by the Delivery Contractor, in consultation with the landowner(s) and approved by Sydney Water's Project Manager as described in the mitigation measures in Section 6.

3.3.2 Construction

3.3.2.1 Wilton WRRF upgrade

The WRRF upgrade construction works will include:

- earthworks to establish required levels
- construct a concrete pad
- construct new upgrade structures
- electrical and mechanical fit out
- construct permanent site access
- commissioning
- demobilise and restore the site.

3.3.2.2 Trenching for treated water discharge pipe installation

The treated water discharge pipe will be constructed by open trenching. The construction corridor for open trenching is typically about 20 m wide. The construction corridor width may be restricted in certain areas such as to minimise environmental impacts or in road reserves to avoid private property impact.

The treated water discharge pipe will generally be installed in a trench with a standard cover of up to 2.5 m. Trenches will be about 1.5 m wide and 2.5 m deep. Construction activities associated with trenching will include:

- install erosion and sediment control measures
- implement traffic management measures at the start and end of each shift
- provide temporary access to properties where trench routes impact driveway access
- excavate trenches to required depth and width
- stockpile spoil material on the upslope side of trenches, or at temporary site compounds
- shore trenches, depending on trench depth
- spread granular material such as sand or gravel along the bottom of the trench before pipe laying
- lift pipes using cranes or similar equipment
- backfill the trench with bedding material and excavated soil
- compact the trench fill material and restore areas disturbed by the construction works
- test and commission the pipeline.

It is estimated that about 3 m of pipe could be installed per shift using this method. This distance can vary each day based on a range of factors including the weather and ground conditions.

3.3.2.3 Creek headwall and in-stream intervention works

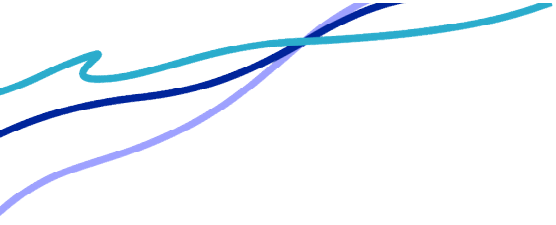
The AWTS discharge location is in a tributary of Stringybark Creek. A partial coffer dam in the watercourse may be required to construct the headwall. Installation will require excavation of the western creek bank to level the area for the headwall construction. The headwall will be pre-cast off site and installed on site with a rock rip-rap dissipation structure.

As discussed in Section 3.1.2, construction will also include downstream erosion protection works within the creek bed and banks. These works will not require any excavation or vegetation removal. Materials and equipment will be carried on foot to the Stringybark Creek tributary and installed by hand. Recommended erosion protection works are discussed in Section 6.1.3.

3.3.3 Commissioning

Commissioning involves testing and running the new equipment to ensure it works correctly and is integrated with existing plant operations. The exact commissioning steps depend on the type of the equipment, but typically include:

- pressure and vacuum test pipelines
- test utilities, telemetry and switchboards
- inspect and performance test of equipment, joints and fittings
- test any emergency systems.



3.3.4 Restoration

Disturbed areas will be restored to a condition similar to their pre-existing condition in consultation with landowners. This may include:

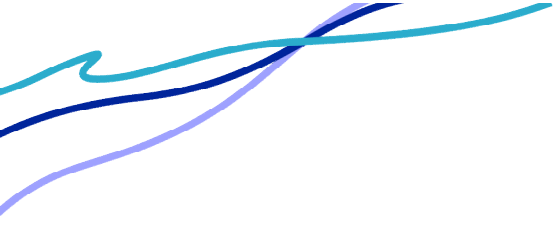
- backfilling and restoring Wollondilly Shire Council roads
- dismantling, cleaning and restoring site compound areas
- removing environmental controls
- reinstating topsoil and groundcover
- reusing cleared vegetation as mulch where possible
- reinstating removed habitat such as hollow logs and tree hollows
- revegetating to offset cleared vegetation.

Revegetation will be carried out in accordance with Sydney Water's SWEMS0025.11 Guideline for native revegetation following construction. Refer to Section 6.1.5 for further details on native vegetation clearing and offsets.

3.3.5 Materials and equipment

Construction of the proposal will involve the use of a range of vehicles, equipment and machinery, which will indicatively include:

- | | |
|--|-----------------------------|
| • Excavator (24T) | • Elevated work platforms |
| • Truck and trailers | • Bogie trucks |
| • Trench rollers | • Hiab trucks |
| • Cranes (13T – 350T) | • Forklifts/telehandlers |
| • Compactors (8-10T) | • Concrete trucks |
| • Vibratory roller (8-10T) | • Hand tools |
| • Plate compactors | • Road saw |
| • Tippers (2T) | • Excavator hammer (13-20T) |
| • Float trucks (to move large equipment) | • Asphalt paver. |
| • Delivery trucks | |



3.3.6 Workforce

About 80 full time equivalent construction workers will be required. About 2 crews of 4 workers will be at a single trench location per shift. This will fluctuate depending on the construction activities being performed.

3.3.7 Work hours

Work and deliveries will be scheduled to occur during standard daytime hours of:

- 7am to 6pm, Monday to Friday
- 8am to 1pm, Saturdays.

The proposal is expected to require work outside these hours at times for the WRRF upgrades. This may include concreting works, installation of formwork and reinforcement, occasional deliveries to the compound during construction and isolation works during commissioning. Work outside of these hours will be required to meet delivery timeframes driven by system capacity and population growth. Isolations during commissioning will require shutdowns outside normal operational hours to maintain network continuity. This has been assessed, and mitigation measures are provided in Section 6.

3.4 Proposal timing

Construction of the WRRF upgrade and AWTS is expected to start mid 2026 and take about 2 years to complete. Construction of the treated water discharge pipe will take about one year.

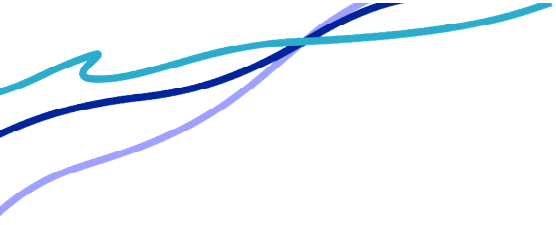
3.5 Operation

The proposal will result in a change in operation of the WRRF by increasing the treatment capacity, increasing precautionary and emergency discharges up to 100 ML/year and introducing a new permanent discharge to the environment. While the increased scale of the WRRF has been approved in a recent EPL variation (refer section 2.2.3.2), a variation to the EPL will be sought for the new AWTS discharge location. Veolia will continue to operate the WRRF and hold the EPL.

The proposal will increase the WRRF capacity to 3.6 ML/D, however, will only operate up to 2.3 ML/D ADWF. Operation up to 2.3 ML/D will result in:

- about 0.46 ML/D of recycled water supplied to the purple pipe network
- about 0.34 ML/D of recycled water sent to the storage lagoons for Golf Course irrigation
- up to 1.5 ML/D of advanced treated water discharged to the Stringybark Creek tributary.

Recycled water is currently pumped from the treated water storage tanks at the WRRF to residents in Bingara Gorge via the existing purple pipe network (Figure 3-4). The purple pipe network will be expanded by developers to include some areas in the next stage of development, including Wilton North, Bingara Gorge, South East Wilton. The existing and expanded purple pipe network will provide about 0.46 ML/D recycled water demand.



The remaining water in the treated water tanks will be transferred to the storage lagoons. Recycled water will continue to be supplied to the Golf Course irrigation system from the storage lagoons (about 0.34 ML/D), via a pumping station (Figure 3-4).

Recycled water above the purple pipe and irrigation demand will be treated by the AWTS for discharge to the environment. The AWTS may operate intermittently depending on the purple pipe demand and irrigation demand.

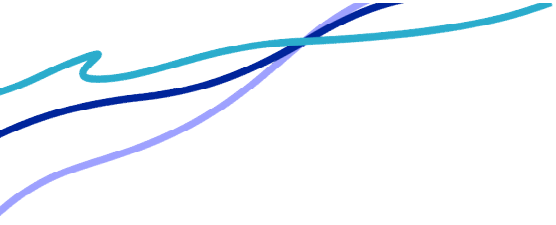
Treated wastewater management will follow the below hierarchy during operation of the proposal:

1. supply recycled water to the existing and expanded purple pipe network
2. continue to supply recycled water to irrigate the Golf Course
3. discharge from the AWTS to a tributary of Stringybark Creek via the treated water discharge pipe
4. discharge of precautionary and emergency discharges via the existing discharge location.

The following wastewater treatment by-products will be collected and disposed off-site at a licensed facility:

- additional washed screenings
- additional biosolids
- RO brine.

During wet weather, stormwater infiltrates the wastewater system. Peak wet weather inflow to the WRRF is about 10.5 ML/D. This results in the storage lagoons filling as the demand for recycled water and irrigation decreases during wet weather. Precautionary and emergency discharges, as defined in the EPL, will be used to discharge recycled water from the storage lagoons to a tributary of Stringybark Creek up to a maximum of 100 ML/year at the existing discharge location (Figure 3-4).



3.6 Field assessment area and changes to the scope of work

The construction footprint is shown on Figure 3-5 and includes all areas that will be disturbed by construction of the proposal. This includes areas of ground disturbance, construction compounds, access tracks, stockpile areas etc. Technical specialist reports have defined their own study area or survey area based on the construction footprint, site constraints and predicted impacts. The study areas and survey areas for individual specialist reports are defined in the relevant sub-sections of Section 6.1 of this REF.

The proposal shown in this REF is indicative and based on the latest concept design at the time of REF preparation. The final proposal may change based on detailed design and/ or construction planning. The general mitigation measures outline when changes to the proposal trigger supplementary environmental impact assessment. If required, further assessment must be prepared in accordance with SWEMS0019. An addendum is not required provided the change:

- remains within the construction corridor and has no net additional environmental impact, or
- is outside the construction corridor but reduces the overall environmental impact of the proposal (subsection 5.4(a) of the EP&A Act).

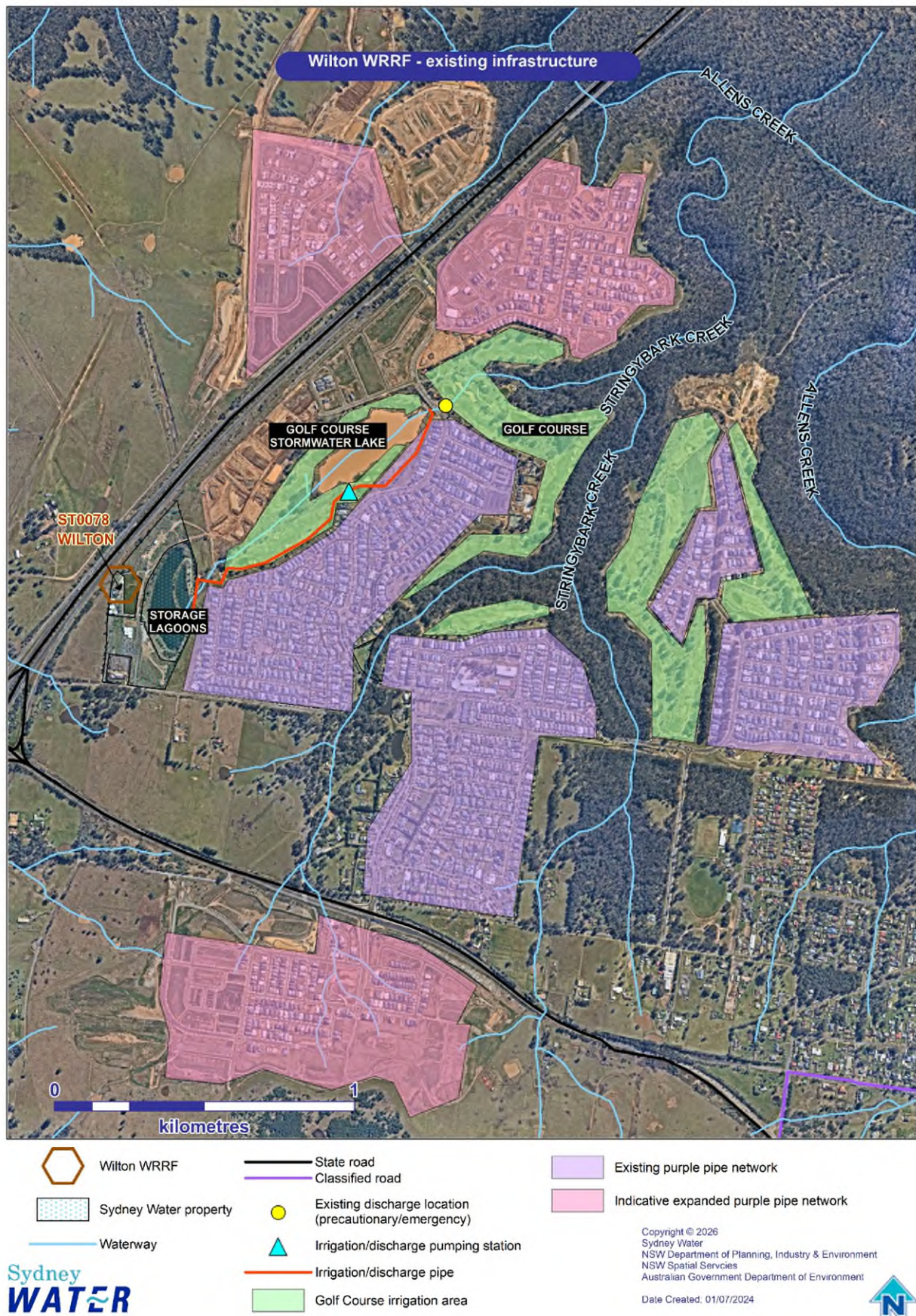


Figure 3-4 Existing infrastructure

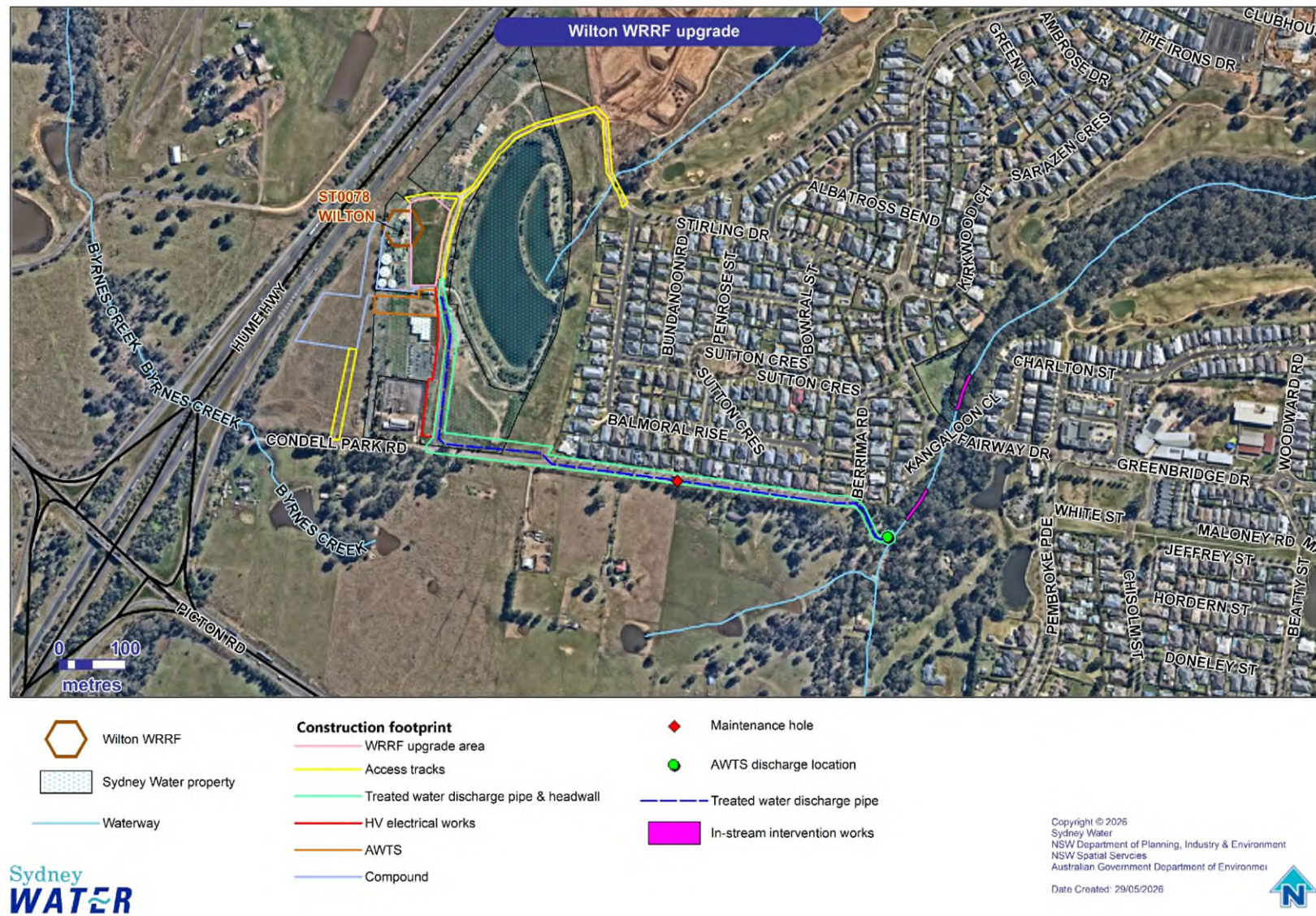
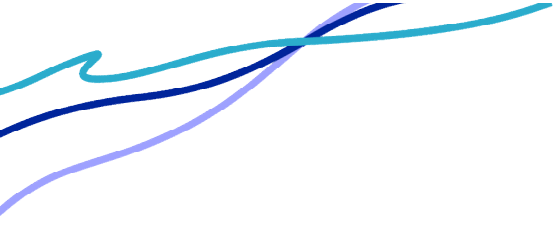


Figure 3-5 Location of the proposal



4 Consultation

4.1 Community and stakeholder consultation – general

Our approach to community and stakeholder consultation is guided by Sydney Water’s community and stakeholder engagement strategy.

Stakeholder and community engagement is a planned process of initiating, building and maintaining effective relationships with external parties who have an interest or may be impacted by our activities. Community and stakeholder engagement:

- enables us to explain our strategy, policy, proposals, proposal or programs
- gives the community and stakeholders the opportunity to share their knowledge and provide feedback about issues or concerns
- enables us to better understand community and stakeholder views in our decision-making processes alongside safety, environment, economic, technical and operational factors.

The nature, scale and extent of the proposal’s potential impact has been evaluated in this REF. If our work impacts the community in some way, we will consult with affected groups throughout the proposal. This includes engaging with the broader community and stakeholders during planning and strategy development, or before making key decisions.

We will also provide Wollondilly Shire Council and other key stakeholders with reasonable notice before we would like to commence work. This includes consultation about matters identified in environmental planning instruments such as public safety issues, temporary work on council owned land, and full or partial road closures of council managed roads (refer below).

4.2 Community and stakeholder consultation – proposal

We consider community and stakeholder engagement an important part of the infrastructure planning process.

Consultation with the local community and key stakeholders in relation to the proposal has been underway since early 2025.

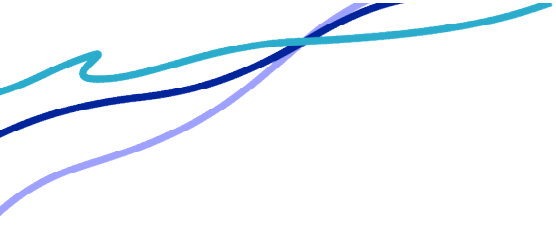
A number of communication and engagement tools have been used to understand views of the local community and stakeholders and to keep them informed about the progress of the proposal. Some of these include:

- individual online and face-to-face meetings
- update letters and newsletters
- a freecall information line – 1800 678 098
- a project email address - wiltonnewtown@sydneywater.com.au
- a dedicated project page on the Sydney Water website - sydneywater.com.au/wilton-new-town
- a community drop-in centre for project enquiries at 150 Condell Park Road, Wilton.

A summary of the consultation completed to date for the proposal, including some consultation outcomes, are provided in Table 4-1 below.

Table 4-1 Community and stakeholder consultation summary

Stakeholder	Consultation method	Topics & outcomes
Developers	• Site and online meetings • Emails • Phone calls	• Enquiries from developers about the expected timing of water and wastewater servicing in the Wilton Growth Area. This included the planned capacity of these new services and when new developments can expect to be able to connect. Regular meetings arranged with developers to provide updates on the proposed timing of Sydney Water's WISP projects, including this proposal. • Discussions with developers about construction timeframes, coordinating access via their property during construction and use of their property for a construction compound. • Treated water discharge pipe alignment option with potential implication to existing EPBC Act approval held by a developer. It was decided to change the proposed location of the treated water discharge pipe to another location that will not impact the developer's EPBC approval conditions.
Wollondilly Shire Council	• Regular online meetings • Emails • Phone calls • Site meetings	• Growth in the area and the WISP progress. • Traffic management along Council managed roads during construction, particularly Condell Park Road which is a residential street and the main access route to the WRRF. Alternate construction access to the WRRF proposed to split traffic routes, to minimise traffic, noise and dust impacts on local residents. Construction traffic mitigation measures are included in Section 6.1.10. • Sharing flood modelling and stormwater drainage information undertaken by Council to assist with planning and design of the proposal. • Design and treated water discharge pipe alignment details along Council managed roads. Sydney Water will refer to Council's procedure and requirements for road restoration.
Potentially impacted private properties	• Phone calls • Emails • Face to face meetings • Letters and newsletters	• Direct consultation with private landowner about access for surveys. • Distributed general project information - newsletters sent to over 2,200 residents.
Bingara Gorge Golf Course	• Phone calls • Emails	• Access for surveying the environment downstream of the existing discharge location. • Query about access during construction. Confirmed that the Golf Course will continue to have access to the leased area of land (north of the WRRF) during construction of the WRRF.
Veolia	• Online meetings • Site meetings • Phone calls • Emails	• Consultation regarding the proposal design and future operation, as Veolia is the current EPL holder and operator of the WRRF. Incorporated Veolia's feedback into the proposal design and effluent management planning.



4.3 Consultation required under State environmental Planning Policies and other legislation

Sydney Water must consult with councils and other authorities for work in sensitive locations or where the work may impact other agencies' infrastructure or land. This is specified in the State Environmental Planning Policy (Transport and Infrastructure) 2021 (TISEPP).

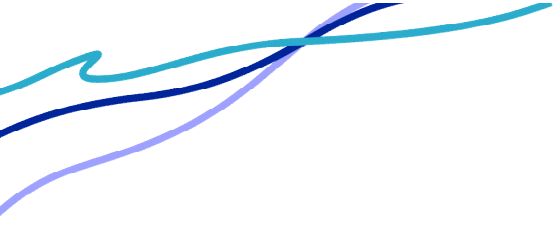
Consultation with Subsidence Advisory NSW was required under section 2.15(2)(f) of the TISEPP, as well as Part 3 of the *Coal Mine Subsidence Compensation Act 2017*, as the proposal is on land mapped under the Wilton and Appin Mine Subsidence Zones. Subsidence Advisory NSW was contacted on 19 May 2025 to inform them of the proposal and concept design. A response was received from Subsidence Advisory NSW on 27 May 2025 advising that the G8 Surface Development Guidelines (SDG) are relevant to the proposal. The G8 SDGs do not apply any development restrictions to the proposal and do not require design approval from Subsidence Advisory NSW. Subsidence Advisory NSW were consulted again in November 2025 regarding the WRRF upgrade detailed design and the treated water discharge pipe. Subsidence Advisory NSW's response was consistent with their previous advice.

Consultation was required under section 2.10(1)(b)(d)(e) of the TISEPP as the proposal will generate traffic, require partial road closures and excavation on council managed roads. Wollondilly Shire Council was consulted on 26 March 2026. At the time of writing, no response was received from council. The Delivery Contractor will continue to consult council and any requests will be considered as part of the CEMP. Further, Sydney Water will refer to council's road restoration procedure, as per feedback received from earlier discussions with council.

Sydney Water notified the Bradfield Development Authority (formerly the Western Parkland City Authority) on 20 April 2026 as the proposal has a capital investment value of over \$30 million and is in the Western City operational area. The Bradfield Development Authority did not respond.

The proposal is in land mapped under the NSW Cumberland Plain Conservation Plan (CPCP). The proposal will impact up to 0.08 ha of avoided land under the CPCP. As such, notification to the DPHI is required, including submitting a Consistency Statement Application. As part of a voluntary acquisitions program for the CPCP, DPHI plan to acquire areas of avoided land relevant to the proposal. Sydney Water met with DPHI in February 2026 to discuss the proposal and a potential future easement from DPHI for infrastructure on this land. DPHI confirmed that they do not have objections to the proposed treated water discharge pipeline.

Sydney Water's Environmental Regulatory Team and Veolia (as the current EPL holder) began consultations with the NSW EPA in 2023 to discuss the current challenges facing the WRRF, in particular, effluent management. A meeting was held with the NSW EPA in late 2025 to discuss short, medium and long term solutions, including maximising reuse, increasing irrigation and an AWTS. As discussed in Section 2.2.3.2, in February 2026, Sydney Water (via Veolia) submitted an EPL variation to the NSW EPA to increase the scale of the WRRF from 0-20 ML/year to 219-1,000 ML/year. This was approved in April 2026. The addition of an AWTS and treated water discharge pipe to the Stringybark Creek tributary forms part of ongoing development of an Effluent Management Strategy for the WRRF and will require another EPL variation. As a result, technical specialists were engaged and detailed environmental assessments have been carried out and summarised in



Section 6 of this REF. This includes modelling and assessment of water quality, geomorphology, hydrology and aquatic ecology. Following determination of this REF, Sydney Water will meet with the EPA to discuss the outcomes from this REF including predicted noise levels, waterway studies and provide an update on the development of the long term Effluent Management Strategy.

5 Legislative requirements

5.1 Previous approvals

The following summarises the approval history of relevance to this proposal.

Bingara Gorge Recycled Water Plant Environmental Impact Statement

An Environmental Impact Statement (EIS) was prepared to construct and operate a sewage treatment plant (previously called the Bingara Gorge Recycled Water Plant) under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) (Planit Consulting, 2013). The WRRF was declared designated development under Schedule 3 of the Environmental Planning and Assessment Regulation 2000 (repealed). Solo Water submitted the EIS with a development application (DA) to Wollondilly Shire Council on behalf of Lendlease (project proponent). Before determination, an addendum to the EIS was submitted to include a sewer rising main (Planit Consulting, 2014). The Sydney West Region - Joint Regional Planning Panel (consent authority under Schedule 4A (now Division 9.1) of the EP&A Act) determined the EIS in 2014 with Conditions of Approval (CoAs).

The approval was for the WRRF to be constructed in stages with an ultimate capacity to treat 2000 equivalent tenement (ET) (about 1.5 ML/D), servicing the Bingara Gorge and Wilton Village developments. The WRRF will provide irrigation water to the adjacent Golf Course, open space and recycled water for domestic reuse to the developments via a purple pipe network. The sewer rising main was to connect Wilton Village to the WRRF.

In 2015, Lendlease submitted a DA and Statement of Environmental Effects for alterations and additions to the WRRF. Wollondilly Shire Council approved the DA in September 2015 with new CoAs, which superseded the previous DA and CoAs.

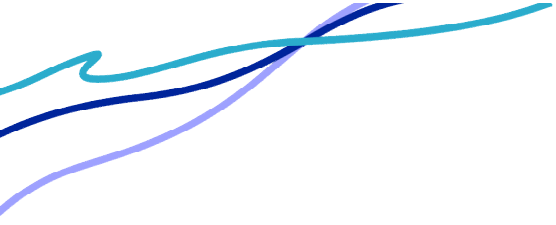
This proposal is being assessed under Division 5.1 of the EP&A Act (REF). However, the existing CoAs have been reviewed to ensure this proposal is not inconsistent with the previous approvals.

Other approvals

Since acquisition of the WRRF and development of the WISP, a number of other projects have been approved by Sydney Water under Part 5, Division 5.1 of the EP&A Act. These are summarised below.

In 2024, an REF for the Wilton Growth Area – wastewater infrastructure was approved. This included 2 new pumping stations, and associated gravity and pressure pipelines connecting the pumping stations to the WRRF. This project will connect new development in the Wilton Growth Area to the Sydney Water wastewater network.

In 2025, an REF for the Wilton Growth Area - drinking and recycled water infrastructure was approved (Sydney Water, 2025a). This project was aimed at providing drinking and recycled water services to support development in the Wilton Growth Area. This included new drinking and recycled water reservoirs and pipelines outside of the WRRF, and a new recycled water pumping station at the WRRF. Recycled water from the WRRF will be pumped to the recycled water reservoir and supplied to customers. This project is currently being constructed, planned for completion by 2027.



In 2025, an REF for an additional feed tank at the WRRF was approved (Sydney Water, 2025b). The feed tank is intended to operate in parallel with the existing feed tank and will allow the WRRF operators to balance flows through the WRRF during wet weather.

5.2 Strategic context

The following strategic plans have been considered in relation to the proposal.

5.2.1 Greater Sydney Region Plan: A Metropolis of Three Cities (Greater Sydney Commission, 2018)

This plan is a long-term strategic plan for the Greater Sydney area. The plan divides the metropolitan area into 3 interconnected cities: Western Parkland City, Central River City, and Eastern Harbour City.

The plan sets a 40-year vision (to 2056) and establishes a 20-year plan to manage population growth and change for Greater Sydney, in the context of social, economic, and environmental matters. It aims to create new jobs, provide more housing choices, improve transport connectivity, and enhance the natural and built environment. The plan is structured around the key strategies of:

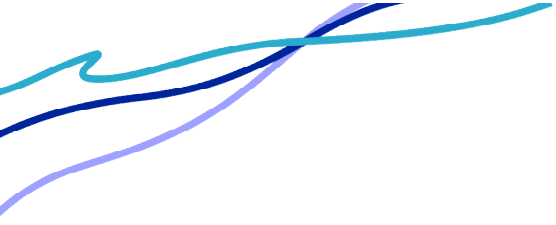
- infrastructure and collaboration
- liveability
- productivity
- sustainability.

The proposal directly supports the first key strategic area by state government investment through Sydney Water's delivery of critical wastewater infrastructure in future growth areas. It also supports the other key strategies by improving and expanding wastewater servicing to enhance liveability for current and future populations, enables development and greater productivity opportunities. This proposal will support sustainability by recycling wastewater and returning it back to the environment.

Wilton is in the Western Parkland City as defined by the Greater Sydney Commission's vision for Sydney. The Western Parkland City is projected to grow in population from 740,000 in 2016 to 1.1 million by 2036, and to well over 1.5 million by 2056. There are 4 main growth areas identified for the Western Parkland City being:

- Greater Macarthur Growth Area
- Greater Penrith to Eastern Creek investigation areas
- Western Sydney Aerotropolis
- Wilton Growth Area.

The proposal will service the Wilton Growth Area.



5.2.2 Wilton 2040: A Plan for the Wilton Growth Area (DPE, 2018)

This plan outlines the planned land use changes for the study area and identifies a range of planning principles for precinct planning. Relevant planning principles considered during planning of the proposal include:

- Create healthy, livable places, and respond to climate change.
- Incorporate development that protects, maintains or restores watercourse health and the community's environmental values and uses of watercourses through a risk-based approach to managing the cumulative impacts of development.
- Ensure an integrated approach to drinking water, wastewater and stormwater services is considered to drive more sustainable water management outcomes.
- Incorporate development that fosters the relationship between water, landscapes, and urban living, to enhance human and social wellbeing, and promote community co-design and governance in urban water strategies.

The proposal will provide recycled water to residences, reducing the demand for drinking water and contributing to more sustainable water management. The discharge to Stringybark Creek from the AWTS will be high quality and will maintain watercourse health. The proposal is consistent with the plan.

5.2.3 Integrated Water Management Strategy (IWMS) (Wollondilly Shire Council, 2020a)

This strategy outlines Wollondilly Shire Council's strategic direction for managing water into the future so that it can continue to play a prominent role in supporting and improving the quality of life, and the preservation of rural living in Wollondilly LGA. Wollondilly Shire Council's vision for water is to maintain pristine creeks and rivers to be swimmable, ecologically rich and diverse. Council believes this can be achieved by new development having zero net impact on the watercourses, with no extra stormwater runoff entering the watercourse, and wastewater being treated and reused. This strategy examines possible wastewater options which could be implemented to achieve a zero-net impact as aspired to by Council. It concludes that wastewater should be reused locally, reused through a regional reuse scheme to replenish/ augment other supplies, or exported from the catchment altogether. The proposal is generally consistent with this IWMS as it will enable the WRRF to continue to supply recycled wastewater for local re-use as a priority and return high quality treated water back to the environment.

5.2.4 Wollondilly 2040 Local Strategic Planning Statement (Wollondilly Shire Council, 2020a)

This document outlines the vision for Wollondilly Local Government Area (LGA) for land use planning over the next 20 years. The vision can be summarised as 'an enviable lifestyle of historic villages, modern living, rural lands and bush' and was adopted in March 2020. Our proposal is consistent with the below planning priorities:

- Planning priority 1 - ‘aligning infrastructure provision with community needs.’ This includes partnering with Sydney Water to identify and build major infrastructure. Sydney Water is building infrastructure to support long-term servicing of the area.
- Planning priority 3 - ‘establishing a framework for sustainable managed growth.’ This includes partnering with Sydney Water to find long-term servicing solutions for wastewater disposal. Sydney Water will recycle wastewater and discharge clean water to the environment.
- Planning priority 4 - ‘creating vibrant, healthy and sustainable communities in our new town in Wilton’. This includes advocating for infrastructure to be in place before further release of land for housing. This proposal will service development in Wilton.
- Planning priority 13 - ‘protecting biodiversity and koala habitat corridors.’ This includes retaining native vegetation and maintaining important habitat corridors for native wildlife. Sydney Water has minimised impacts to biodiversity during design and construction, including identifying specific mitigation measures to minimise impact to koala habitat.

5.2.5 Wollondilly Rural Lands Strategy (Wollondilly Shire Council, 2021)

The Rural Lands Strategy provides a framework for managing growth, change and development for rural land in Wollondilly LGA over the next 20 years. It will guide future Wollondilly LEP 2011 amendments and potential re-zonings.

Under Action 3.4.2 of this strategy, there is a commitment for Council to continue working with Sydney Water to provide secure, sustainable and long-term water supply solutions, including the expansion of its water recycling plant (now water resource recovery facility) to provide recycled water.

Our proposal is consistent with this study, as it involves upgrading the WRRF and is supporting long-term recycled water supply within the LGA.

5.3 Environmental legislation

Sydney Water is the proponent and determining authority under the EP&A Act. The proposal does not require development consent and is not classified as State significant infrastructure. We have assessed this proposal under Division 5.1 of the EP&A Act. This REF has concluded that the proposal is unlikely to have a significant impact on the environment.

The following environmental planning instruments (Table 5-1) and legislation (Table 5-2) are relevant to the proposal. Table 5-2 also documents any licences and permits required, and timing and responsibility for obtaining them.

Table 5-1 Environmental planning instruments relevant to the proposal

Environmental Planning Instrument	Relevance to proposal
Wollondilly Local Environmental Plan 2011 (Wollondilly LEP)	The proposal is located on land zoned as follows: • E4 (General Industrial) • RU2 (Rural Landscape) • RU4 (Primary Production Small Lots)

- R2 (Low Density Residential).

The AWTS discharge location is also in 'sensitive land' shown on the Wollondilly LEP Natural Resources – Biodiversity Map and Natural Resources – Water Map. While the proposal is permitted without development consent, Section 6 of this REF has assessed potential impacts on the factors listed in Section 7.2 (Biodiversity protection) and 7.3 (Water protection) of the Wollondilly LEP.

State Environmental Planning Policy
(Precincts – Western Parkland City) 2021

Sydney region growth centres (Chapter 3)

The Western Parkland City SEPP coordinates the release of land for residential, employment and other urban development, in the Western Parkland City area. Chapter 3 applies to growth centres, including the Wilton Growth Area.

The Wilton Growth Area was not subject to biodiversity certification as part of the Sydney Growth Centres SEPP 2006 (repealed). Therefore, any impacts to biodiversity are subject to environmental and ecological assessment under the EP&A Act, BC Act and EPBC Act (refer Section 6.1.5).

State Environmental Planning Policy
(Transport and Infrastructure) 2021
(TISEPP)

Section 2.126 of the TISEPP permits development for sewage treatment plants without consent in a prescribed zone, in the prescribed circumstances. It also permits development for the purpose of sewage reticulation systems without consent on any land in the prescribed circumstances.

The proposal involves upgrades to a sewage treatment plant in land zoned E4 (General Industrial), which is a 'prescribed zone'. The treated water discharge pipe meets the definition of sewage reticulation which can be undertaken without consent on any land in the prescribed circumstances.

As Sydney Water is a public authority and the works will be undertaken by or on behalf of Sydney Water (i.e. a prescribed circumstance), the proposal is permissible without consent.

State Environmental Planning Policy
(Biodiversity and Conservation) 2021
(BCSEPP)

Koala habitat protection (2020 and 2021) (Chapter 3 and 4)

These chapters aim to encourage the proper conservation and management of areas of natural vegetation that provide koala habitat. This is to ensure that permanent free-living populations are protected in their present range, and to reverse the current trend of population decline.

The SEPP contains prescriptions for the consideration of 'potential koala habitat' and 'core koala habitat' for developments within local government areas listed in schedule 2 of the SEPP.

The proposal lies within the Wollondilly LGA, which is in the Central Coast and Central/Southern Tablelands Koala management areas. Development that is being carried out under TISEPP is not subject to the planning provisions of the BCSEPP. However, the aims and management actions have been considered as applicable (see Section 6.1.5 of this REF).

Water catchments (Chapter 6)

Chapter 6 of this SEPP applies as the proposal is within the Hawkesbury-Nepean Catchment, a regulated catchment. Section 6 of this REF assessed potential environmental impacts on water quality and quantity, aquatic ecology, flooding and recreation and public access. The

Environmental Planning Instrument

Relevance to proposal

assessment confirmed that potential impacts are minor and meet the requirements of part 6.2 of the SEPP (refer to Appendix A).

Strategic conservation planning (Chapter 13)

Chapter 13 of this SEPP contains development controls for areas mapped under the CPCP (DPE, 2022). The proposal is on certified - urban capable land, excluded land and avoided land (refer to Figure 6-17 to Figure 6-19).

Works on certified – urban capable land do not require further biodiversity assessment if they are consistent with the CPCP.

Avoided land is land identified for biodiversity protection and is not certified for development. However, the Environmental Planning and Assessment Amendment (Avoided Land) Regulation 2022 contains provisions for essential infrastructure. Sections of the proposal on avoided land must follow the notification and reporting requirements in Section 201A of the Environmental Planning and Assessment Amendment (Avoided Land) Regulation 2022.

The proposal has been designed to minimise native vegetation impacts on avoided land and meets the objectives listed in Section 2.3 and 3.3 of the *Cumberland Plain Conservation Plan Guidelines for Infrastructure Development 2022*. Sydney Water will notify DPHI and submit a consistency statement within 30 days of REF determination.

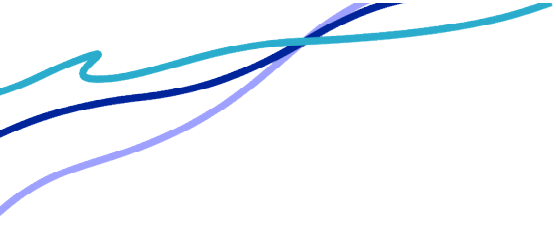
Excluded land is not included in the CPCP, typically due to development approvals or other relevant processes already existing on the land. Measures to mitigate impact to excluded land are included in Section 6.1.5 of this REF.

Table 5-2 Consideration of key environmental legislation

Legislation	Relevance to proposal	Permit or approval	Timing and responsibility
<i>Protection of the Environment Operations Act 1997 (POEO Act)</i>	Sewage treatment is a scheduled activity under the POEO Act. The proposal is covered by an existing EPL (20335). A variation to EPL 20335 is required for operational changes to the WRRF discussed in Section 3.5.	EPL variation	Prior to operation, Sydney Water
	There is a requirement under Part 5.7 of the POEO Act to immediately report any pollution incidents to the relevant authority where material harm to the environment is caused or threatened. The contractor is responsible for immediately reporting such incidents during construction in accordance with SWEMS0009 Responding to incidents with an environmental impact. The WRRF operator is responsible for immediately reporting incidents during operation.	N/A	Delivery Contractor, during construction. WRRF operator during operation.

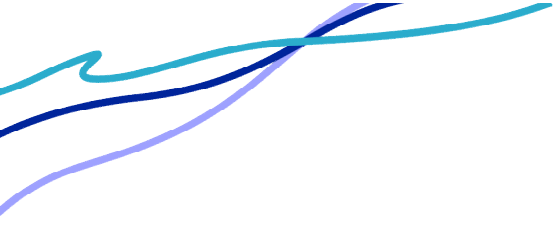
Legislation	Relevance to proposal	Permit or approval	Timing and responsibility
<i>Biodiversity Conservation Act 2016 (BC Act)</i>	Protection of listed species and ecological communities in NSW falls under the BC Act. A terrestrial biodiversity ecology assessment (GHD, 2026b) identified the potential impact to BC Act listed ecological communities and species to occur in the construction footprint. The proposal will remove 0.2 ha of Cumberland Shale-Sandstone Ironbark Forest and potential habitat for threatened bat species and the Cumberland Plain Land Snail. However, assessments of significance confirmed no significant impacts are expected to any aquatic or terrestrial threatened species or communities listed under the BC Act. Preparation of a SIS or opting in to the NSW Biodiversity Offsets Scheme is not required. Biodiversity certification Biodiversity certification was conferred on land mapped under the CPCP in accordance with Part 8 of the BC Act. The proposal is on land classified as certified - urban capable land, excluded land and avoided land. The impact on threatened species, communities and their habitats in non-certified land is described in Section 6.1.5. Significant impacts are unlikely. Sydney Water must notify the Department of Planning, Housing and infrastructure (DPHI) about the proposed impact to native vegetation on avoided land.	REF, notification to DPHI (including consistency statement)	Pre-construction, Sydney Water
<i>National Parks and Wildlife Act 1974 (NPW Act)</i>	The proposal is not within or adjacent to a national park. An Aboriginal Heritage Due Diligence Assessment was completed for the proposal (KNC, 2026) and summarised in Section 6.1.6 of this REF. The proposal will not impact any known Aboriginal object or archaeological sites.	N/A	N/A
<i>Water Act 1912/ Water Management Act 2000 (WM Act)</i>	Section 60A of the WM Act states that it is an offence to take water without a licence. A Water Supply Work Approval (WSWA) is required under Section 90(2) for all activities that involve dewatering groundwater (e.g. dewatering an excavation such as a trench or excavation), irrespective of volume. The proposal is not anticipated to dewater any groundwater. Under s.64 of the Water Management (General) Regulation 2025, public authorities (including Sydney Water) are exempt from the requirement to obtain a Controlled Activity Approval for works on waterfront land under the WM Act.	N/A	N/A

Legislation	Relevance to proposal	Permit or approval	Timing and responsibility
<i>Roads Act 1993</i>	Works will be within 100 m of a State Road (Hume Motorway). However, the proposal will not be working in the road corridor or road related area (footpath or nature strip adjacent to a road). As such, a Road Occupancy Licence from TfNSW is not required. The proposal will impact council managed roads. A Traffic Management Plan (TMP) will be prepared for the proposal and council will be notified about impact to council managed roads.	Notification to Wollondilly Shire Council	Pre-construction, Delivery Contractor
<i>Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)</i>	Under the EPBC Act, actions that have, or are likely to have, a significant impact on Matters of National Significance (MNES) require Commonwealth approval. A significant impact test was prepared for impact to the EPBC Act listed Shale Sandstone Transition Forest. The test found that a significant impact is unlikely. The proposal will remove habitat of threatened species. Significant impact tests were prepared for impacts to the Grey-headed Flying-fox and Koala. The proposal is unlikely to have a significant impact on any these species. There are no other MNES near the proposal and therefore no impact to MNES is expected. Biodiversity certification In 2024 the Western Sydney Strategic Assessment was approved under section 146 of the EPBC Act, approving actions associated with the CPCP. This approval means that actions completed in accordance with the program do not require separate referral, assessment or approval under the EPBC Act.	REF, notification to DPHI (including consistency statement)	Pre-construction, Sydney Water
<i>Coal Mine Subsidence Compensation Act 2017</i>	Part 3 of this Act and section 2.15(2)(f) of TISEPP define the need to consult with the Mine Subsidence Authority before construction within Mine Subsidence Zones. The proposal is within the Wilton and Appin Mine Subsidence Zones. Consultation outcomes are summarised in Section 4.3.	Consultation	Pre-construction, Sydney Water
<i>Fisheries Management Act 1994 (FM Act)</i>	The aquatic ecology assessment assessed the potential impact to threatened species listed in the FM Act. The assessment found that the proposal will not impact threatened species. The proposal is not in mapped Key Fish Habitat (KFH). The nearest KFH is mapped about 700 m downstream of the proposal. The proposal is unlikely to result in the loss of KFH.	N/A	N/A



Legislation	Relevance to proposal	Permit or approval	Timing and responsibility
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As such, notification under s.199 to DPIRD Fisheries is not required.



6 Environmental assessment

Section 6.2 describes the existing environment and assesses direct and indirect impacts of construction and operation. It also identifies mitigation measures to minimise impacts. These will be incorporated into contract documents and a Construction Environmental Management Plan (or similar) prior to starting work.

6.1 Environmental aspects, impacts and mitigation measures

6.1.1 Topography, geology and soils

6.1.1.1 Existing environment

The topography in the Wilton area is undulating and largely follows natural contours, sloping downhill toward major watercourses (e.g. Nepean River, Cataract River). Land at the WRRF falls to the north east towards Stringybark Creek. Condell Park Road forms a small hill and falls towards the WRRF to the west and towards Stringybark Creek to the east.

Geology within the construction footprint is mapped as Ashfield Shale and Hawkesbury Sandstone, and soils are mapped as Blacktown residual and Hawkesbury colluvial. No acid sulfate soils or salinity have been mapped within the construction footprint.

The construction footprint is within the Wilton and Appin Mine Subsidence Districts. Underground mining has occurred in areas surrounding the proposal. These mine sites include Illawarra Coal at Appin, Tower and West Cliff Collieries, and Tahmoor Mine (MSEC, 2022). While mining may occur in Wilton in future, a large portion of the proposal is unlikely to experience mine subsidence movements as part of the mining lease for Illawarra Coal has been relinquished in agreement with property developers. As discussed in Section 4.3, there are no development restrictions on the proposal due to mine subsidence.

A search of the EPA Contaminated Land Record on 26 May 2026 identified one known contaminated site reported to the EPA within 1 km of the proposal. Condell Park Homestead is about 900 m north-east of the proposal. Contamination activity type at this location is unclassified and regulation under the *Contaminated Land Management Act 1997* (NSW) is not required.

In addition, the risk of contamination within the Wilton Growth Area was assessed in a Detailed Site Investigation (DSI) (Sydney Water, 2022b). The DSI included boreholes within 200 m of the proposal. No asbestos contaminating materials (ACM) were observed on the ground or detected in soil samples. Further, soil samples tested for concentrations of contaminants of potential concern indicated that the chemical hazards to human and ecological health posed by fill and deeper natural materials are low and acceptable.

Potential contamination sources within the construction footprint include:

- fill material from road construction
- agricultural land use
- residential development – demolition of structures and poor waste removal

- general dumping/ fill/ stockpile locations.

A contamination assessment report (AECOM, 2026) was prepared for the AWTS and the treated water discharge pipe alignment. The assessment included soil and water sampling to understand the ground condition, evaluate any contamination risk and classify soils for waste disposal. The assessment found that the risk posed by soil or groundwater contamination to both human and ecological receptors is minimal.

6.1.1.2 Potential impacts

The main potential impact to topography, geology and soils during construction is erosion and sedimentation. Construction activities involve vegetation removal, trenching, excavation and temporary stockpiling of excavated material. Excavated material will be stockpiled within the construction footprint, next to the open trenches, or within compound and laydown areas. In the event of rainfall, stockpiled material has the potential to erode and lead to sedimentation on land and within watercourses.

Earthworks are required to establish the levels for the WRRF upgrades and AWTS construction. Earthworks in this area will produce about 3,300 m³ of spoil. Sediment-laden runoff from disturbed ground or from stockpiled material has potential to enter the WRRF stormwater system or to flow off site. Runoff entering the WRRF stormwater system will flow to the OSD where sediment will settle out of the water. However, stormwater flowing from the site during construction has potential to impact water quality in local watercourses.

The treated water discharge pipe is about 975 m long and will be trenched. Trenching will produce about 3,600 m³ of spoil. The spoil will be stockpiled beside works and will be reused as backfill where possible, with excess removed as pipeline construction progresses. Run off from the trenching work along Condell Park Road will flow to the vegetated road verge and is not expected to impact Stringybark Creek at the eastern end of the pipe or roadside stormwater to the west.

The environmental risk will be greatest where trenching, excavating and stockpiling occurs close to watercourses and drainage lines, such as excavations for the treated water discharge pipe and headwall. Construction of the headwall and flow diffusion structure(apron) will require excavation of the creek bed and bank. The work will be carried out in periods of low flow to minimise impact to the tributary of Stringybark Creek. Heavy rain during the work has potential to result in bank erosion.

Excavated material will be stockpiled as far as practicable from watercourses including, where feasible, in the construction corridor. The potential impacts of erosion and sedimentation are expected to be readily managed with implementation of the mitigation measures in Table 6-1.

Temporary access tracks will be required during construction. All temporary access tracks will be removed following the completion of construction and the pre-existing ground levels restored.

While no significant soil contamination has been identified, there remains the potential for unexpected contamination to be encountered during construction. Mitigation measures are provided in Table 6-1 to avoid, mitigate and manage potential contamination impacts.

The proposal will permanently change the surface topography as the WRRF upgrade and AWTS area will need to be levelled and concreted. Management of changes to stormwater flows due to changed topography has been considered in the design (refer to Section 6.1.2). Areas disturbed for construction of the treated water discharge

pipe will be restored to its original topography following construction. The creek bed and bank will be stabilised to minimise the risk of erosion during operation (refer to Section 6.1.3).

6.1.1.3 Mitigation measures

With the implementation of the mitigation measures below, impacts to topography, geology and soils can be adequately managed, and residual impacts are expected to be minor.

Table 6-1 Environmental mitigation measures – topography, geology and soils

Mitigation measures

Prevent sediment moving offsite in accordance with Managing Urban Stormwater, Soils and Construction, Volume 1 and 2A (Landcom 2004 and DECC 2008), including, but not limited to:

- develop a Soil and Water Management Plan (SWMP) as part of the CEMP
- divert surface runoff away from disturbed soil and stockpiles
- install sediment and erosion controls before construction starts
- reuse topsoil where possible and stockpile separately
- inspect controls at least weekly and immediately after rainfall
- rectify damaged controls immediately
- remove controls once surfaces have been stabilised, including removing trapped sediment in drainage lines.

Include a Stockpile Management Plan (SMP) as part of the SWMP to adequately manage any proposed temporary and permanent stockpiles. This will include detail on:

- exact location of stockpiles
- minimising stockpile size
- height, slopes and batters
- preventing mixing and cross contamination
- consideration of future maintenance
- capping
- erosion and sediment control
- restoration.

The Stockpile Management Plan will be approved by the Sydney Water Project Manager in consultation with the Environmental Representative and Contamination and Hazardous Materials team.

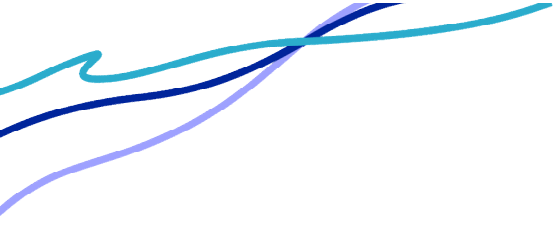
Minimise ground disturbance and stabilise disturbed areas progressively.

Delivery Contractor to ensure imported material is Virgin Excavated Natural Materials (VENM) or meets a relevant NSW EPA Resource Recovery Order and Resource Recovery Exemption, or is a commercially supplied material that is not waste.

If using materials that are subject to a NSW EPA Resource Recovery Order/Exemption the Delivery Contractor must ensure the conditions in that Order/Exemption are strictly adhered to.

Stop work in the immediate vicinity of suspected contamination. Indicators of contamination include discoloured soil, anthropogenic material within fill, asbestos, chemical or petrol odours and leachate. Contain disturbed material on an impermeable surface and cordon areas off. Notify the Sydney Water Project Manager and the Environmental Representative (who will contact the Contamination and Hazardous Materials team) to agree on proposed management approach.

Stop work during heavy rainfall or in waterlogged conditions when there is a risk of sediment loss off site.



Sweep up any sediment/soil transferred off site at least daily, or before rainfall.

Eliminate ponding and erosion by restoring natural landforms to the pre-works condition.

Delivery contractors should consider pre-mobilisation and post-demobilisation soil sampling on compound sites to confirm no residual impacts.

6.1.2 Surface water and groundwater

6.1.2.1 Surface water quality

A water quality assessment was prepared for the proposal's operation stage (BMT, 2026). A summary of the assessment is included below, including consideration of potential construction and operation impacts.

Existing environment

The proposal is in the Stringybark Creek catchment. Stringybark Creek flows into Allens Creek, which then flows into the Nepean River (Figure 6-1). The upper reaches of Stringybark and Allens Creek are ephemeral (i.e. they are dry most of the time with flows developing only during sustained rainfall events), whereas the lower reaches generally have a permanent baseflow.

The wider Wilton catchment (Figure 6-1) is mainly characterised by forested and rural land-use conditions. The most populated and urbanised areas are in the western portion of the catchment draining into Stringybark Creek, whereas the eastern and southern portions of the catchment draining into Allens Creek are characterised by very low density rural residential and agricultural land-use such as grazing, cropping and animal production.

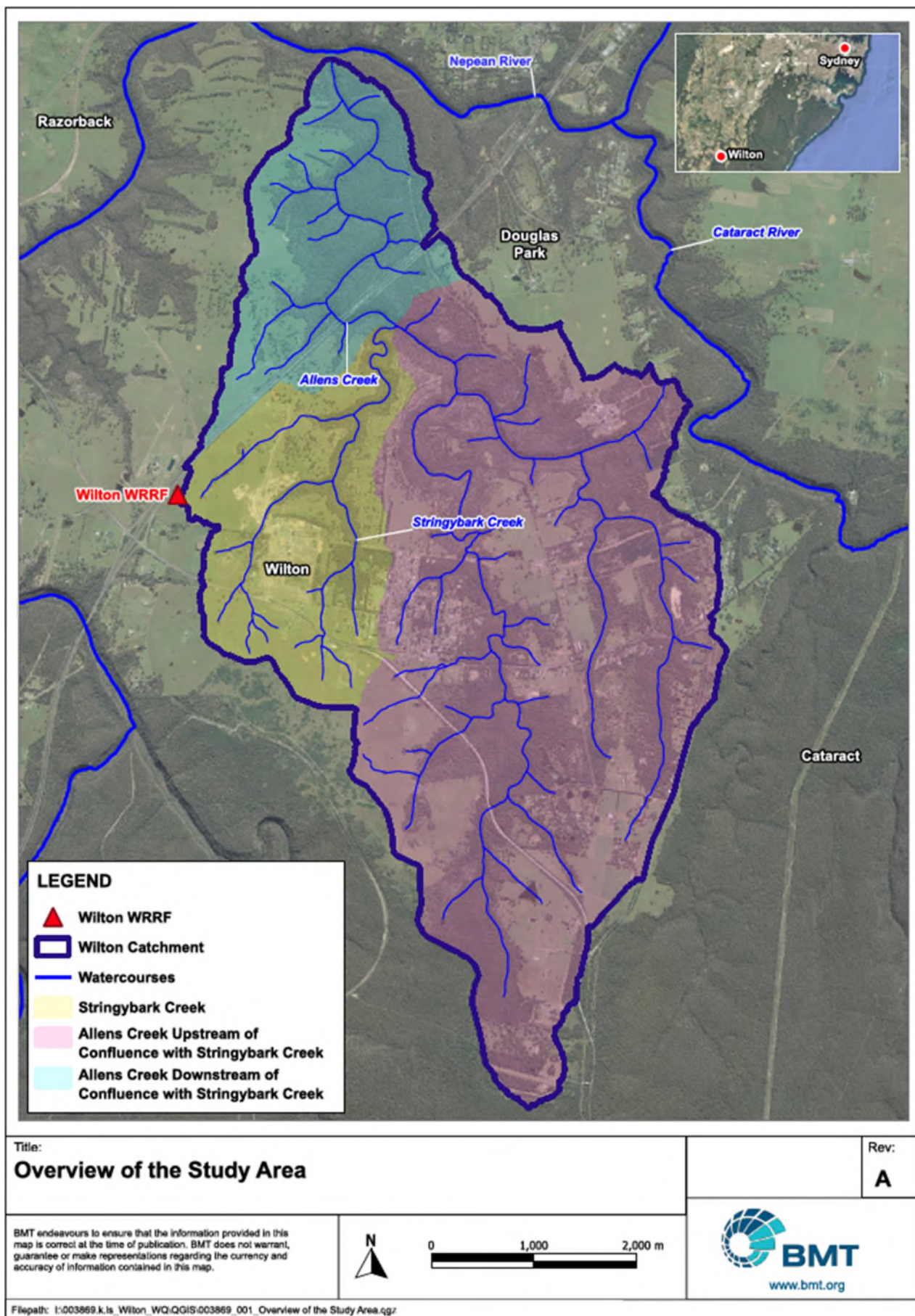


Figure 6-1 Wilton catchment

The Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG (2018)) water quality guidelines divide Australia into a series of drainage divisions with the aim of providing specific Default Guideline Values (DGVs) for each division. The Wilton catchment is included in the Southeast Coast drainage division, where the ANZG (2018) guidelines recommend adopting the same DGVs originally defined by the superseded ANZECC & ARMCANZ (2000) water quality guidelines.

Table 6-2 includes a summary of the DGVs recommended for the Southeast Coast division for slightly to moderately disturbed ecosystems. The guidelines provide a set of different DGVs for Upland River (i.e. elevation higher than 150 metres Australian Height Datum (mAHD)) and Lowland River (i.e. elevation lower than 150 mAHD). Most of the Wilton catchment can be classified as Upland River. However, the non-ephemeral sections of the creeks are located in the portion classified as Lowland River. Therefore, both DGVs were adopted for this assessment. The Upland River DGVs represent the most conservative water quality objectives, and the Lowland River DGVs considered the least conservative.

Table 6-2 Recommended Default Guideline Values (ANZG, 2018; ANZECC & ARMCANZ, 2000)

Parameter	Upland River (mg/L)	Lowland River (mg/L)
Total Nitrogen (TN)	0.25	0.50
Total Phosphorus (TP)	0.02	0.05
Ammonia (NH ₄)	0.013	0.02
Oxidised Nitrogen (NO ₃)	0.015	0.04
Ortho Phosphorus (PO ₄)	0.015	0.02

Baseline water quality sampling was carried out at 6 sampling locations along Stringybark Creek and Allens Creek between November 2024 and May 2025 (Figure 6-2). No precautionary or emergency discharges were released from the existing discharge location during this period. The Stringybark Creek catchment is characterised by significant urban development. Therefore, the pollutant concentrations are expected to be higher in this creek when compared to Allens Creek upstream of the confluence with Stringybark Creek.

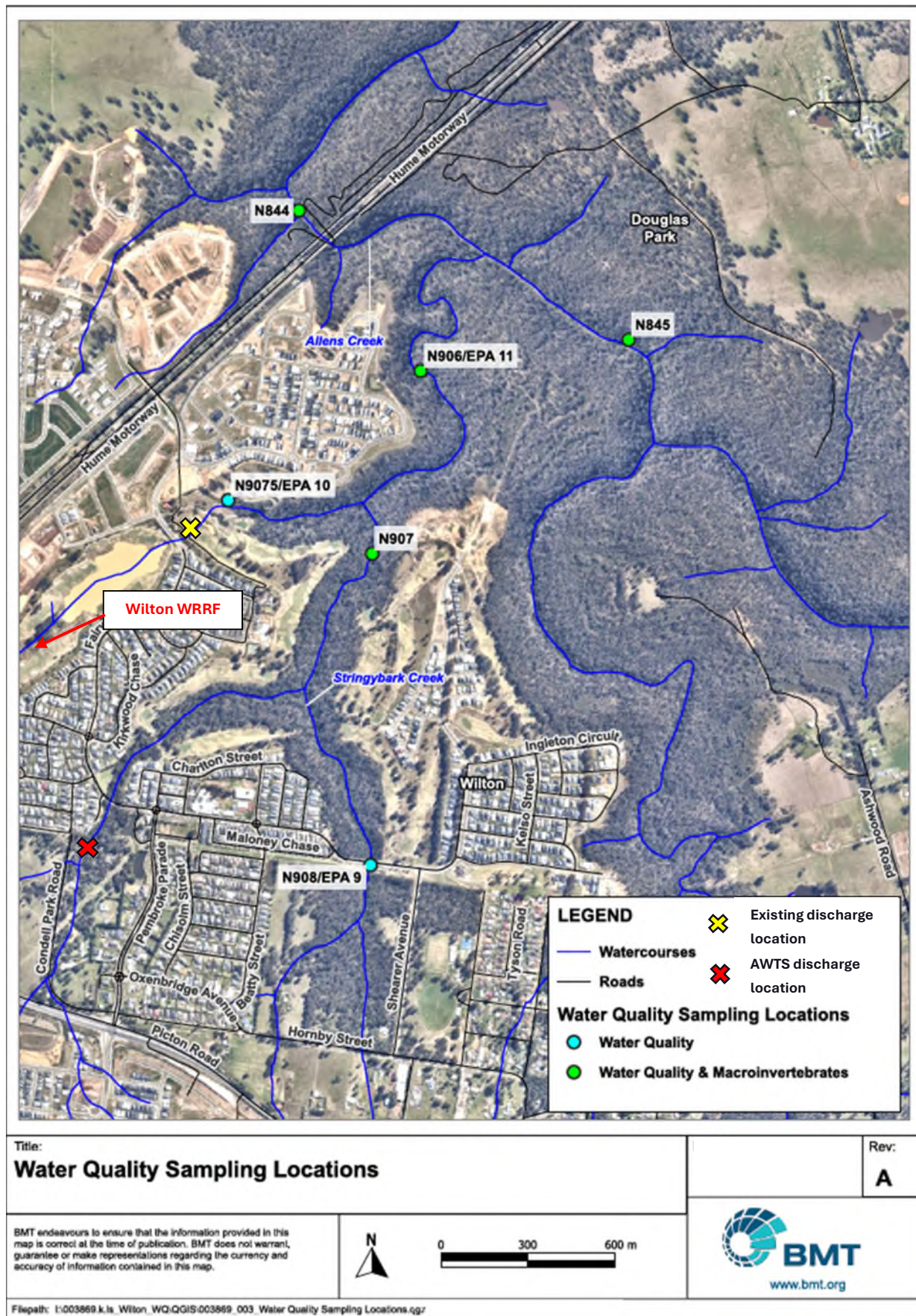
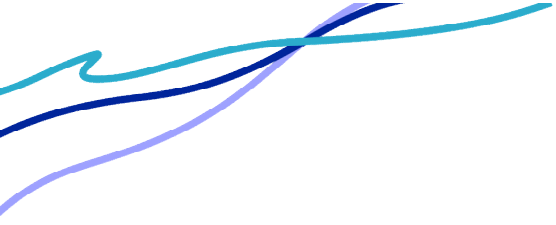


Figure 6-2 Water quality sampling locations

Note: EPA 9, EPA 10 and EPA 11 point labels refer to EPL required monitoring locations.



The N908 and N9075 sampling locations are located on ephemeral sections of Stringybark Creek. These ephemeral sections are also characterised by localised terrain depressions where flows are trapped, leading to the formation of small standing water ponds.

A comparison between water quality sampling measured concentrations against the DGVs for each parameter is summarised in Table 6-2. The comparison shows that Allens Creek, upstream of the confluence with Stringybark Creek, generally has lower recorded concentrations than other sampling locations, but still exceeds some DGVs. Stringybark Creek, including upstream of the WRRF, has elevated nutrient concentrations and frequent baseline exceedance well in excess of DGVs.

Table 6-3 Comparison between measured concentrations and DGVs

Parameter	DGV (upland/lowland) (mg/L)	Measured concentrations (minimum and maximum concentrations) (mg/L) between November 2024 and May 2025					
		Stringybark Creek (N908 sampling location)	Stringybark Creek (N907 sampling location)	Stringybark Creek (N9075 sampling location)	Stringybark Creek (N906 sampling location)	Allens Creek upstream of confluence with Stringybark Creek (N845 sampling location)	Allens Creek downstream of confluence with Stringybark Creek (N844 sampling location)
TN	0.25/0.5	0.3-5.59	0.39-1.58	0.5-2	0.44-1.11	0.19-0.48	0.21-0.98
TP	0.02/0.05	0.012-0.187	0.009-0.088	0.012-0.113	0.013-0.066	0.008-0.029	0.11-0.95
NH ₄	0.02/0.013	<0.01-0.06	<0.01-0.03	<0.01-0.28	<0.01-0.02	<0.01-0.01	<0.01-0.06
NO ₃	0.015/0.04	0.01-5.3	0.03-1.18	0.04-0.85	0.05-0.76	<0.01-0.12	0.01-0.54
PO ₄	0.015/0.02	0.002-0.008	<0.002-0.007	<0.002-0.022	<0.002-0.008	<0.002-0.003	0.002-0.017

Hawkesbury-Nepean Nutrient Management Framework

The EPA has developed a regulatory framework to manage nutrient load inputs to the Hawkesbury Nepean River from wastewater treatment plants (EPA, 2025). The objective is to meet the community’s environmental values for the river and provide wastewater treatment plant operators with alternatives to meet those nutrient loads. The framework has been applied to Sydney Water’s existing Environment Protection Licences. While nutrient concentrations and nutrient load limits from the framework are applied to the WRRF EPL, the framework for nutrient trading and offsetting does not apply to the licence as the licence is held by Veolia.

The framework divides the river system into different zones and proposes separate load limits for TN and TP within each zone. Discharges from the WRRF to the Nepean River are in Yarramundi subzone 1. The framework acknowledges the small contribution of the WRRF to nutrient loads in the system as the licence does not allow the discharge of effluent in dry or moderate wet weather conditions. This contribution will increase due to the proposed increase in discharges from the WRRF. However, the framework includes nutrient load limits for a wastewater treatment plant in Wilton, as well as the Bingara Gorge plant (Wilton WRRF). This accounts for the residential growth in the Wilton Growth Area to 24,000 equivalent population (EP). Sydney Water’s Effluent Management Strategy review under the EPL will identify future strategies, including the potential for increased discharges. Changes to the EPL to reflect increased discharges from the WRRF and the requirements of the framework are likely to be required.

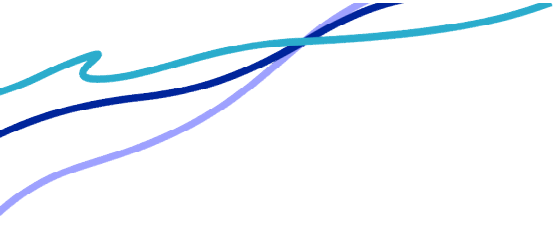
Table 6-4 Interim load limits for wastewater treatment plants servicing Wilton

Treatment plant	2030 EP	Interim TN load limit (kg/yr)	Interim TP load limit (kg/yr)
Wilton WRRF (Bingara Gorge plant in the framework)	6,000	1,000	20
Wilton	24,000	3,900	70

Potential construction impacts

During construction, the proposal will involve vegetation removal, excavation, stockpiling and potential storage of fuels and chemicals in the construction compound. Construction of the headwall in the tributary of Stringybark Creek will also require riparian vegetation removal and some excavation of the creek bed. The main construction impacts on surface water quality include erosion, sedimentation and accidental spills and leaks.

Most of the proposed works including the construction compound will occur at the WRRF, about 500 m from the nearest watercourse. Headwall construction in the tributary of Stringybark Creek will aim to occur during dry periods when flows are lower, and the risk of sedimentation is minimised. However, a partial coffer dam may be used, allowing flows to pass around the works. Construction impacts to water quality will be managed in accordance with the mitigation measures in Table 6-11 and will be minor.



Potential operation impacts

The new AWTS discharge (i.e. advanced treated water) and increased precautionary and emergency discharge volumes have the potential to impact on water quality in the receiving watercourses during operation. The new AWTS discharge location is shown on Figure 3-5 and existing discharge location is shown on Figure 3-4.

Methodology

The water quality assessment methodology included the following steps:

1. a water quality assessment model (the model) was developed of the Stringybark Creek and Allens Creek catchment
2. the model was validated using the baseline water quality sampling data collected
3. the validated model was used to simulate pollutant concentrations in different scenarios
4. the simulated concentrations were compared against baseline concentrations to understand the proposal's potential impacts on Stringybark Creek and Allens Creek as well as at the confluence with the Nepean River.

The modelled scenarios included:

- Scenario 1 (S1) - Baseline: represents the existing conditions of the catchments (i.e. no AWTS discharge or precautionary/emergency discharges are applied to the model). The concentrations and masses calculated by the model for this scenario are those resulting from the existing land-use conditions of the catchments.
- Scenario 2 (S2) - AWTS discharge: simulates the existing conditions of the catchments with the proposed AWTS discharge applied (1.5 ML/D).
- Scenario 3 (S3) - AWTS discharge and increased precautionary/emergency discharge up to 100 ML/year: simulates the existing conditions of the catchments with the AWTS discharge and precautionary/emergency discharges applied.

Each discharge scenario has been simulated for 3 representative years consisting of the driest (2006), median (2012) and wettest years (2022). There are no rainfall gauges in the Stringybark and Allens Creek catchments, so data was taken from 10 rainfall gauges nearest to the proposal.

The model used the following AWTS discharge assumptions:

- constant discharge of 1.5 ML/D with the proposed pollutant concentrations in Table 6-5
- the discharge does not contain pathogens such as enterococci and faecal coliforms, due to the treatment technology proposed
- the TP released by the discharge will be completely in the form of PO_4 (i.e. no organic phosphorus will be released).

Table 6-5 Proposed AWTS discharge concentration assumptions

Parameter	Concentration (mg/L)
TN	0.6
TP	0.015
NH ₄	0.15
NO ₃	0.4
PO ₄	0.015

The model used the following precautionary/emergency discharge assumptions:

- discharges will occur during the highest rainfall days each year with the proposed concentrations in Table 6-6
- a maximum of 3 ML/D will be discharged in accordance with existing EPL volume/mass limits
- the discharge does not contain pathogens such as enterococci and faecal coliforms
- the TP released by the discharge will be completely in the form of PO₄, (i.e. no organic phosphorus will be released).

It should be noted that the proposed precautionary/emergency discharge concentrations represent current water quality from the storage lagoons. TN and TP concentration limits in the EPL were reduced in July 2025, and the current TP concentration does not meet the new limit. Sydney Water will continue discussions with the EPA about this matter.

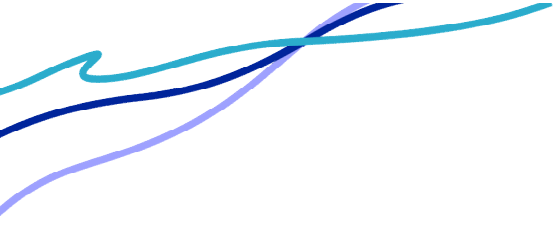
Table 6-6 Proposed precautionary/emergency discharge concentration assumptions

Parameter	Concentration (mg/L)
TN	3.5
TP	0.2
NH ₄	0.01
NO ₃	2.5
PO ₄	0.2

The parameters included in the model simulations have been selected based on the pollutants included in the water quality sampling data collected between November 2024 and May 2025, which have been used for the model validation.

Results

The 50th percentile concentration results for S1 vs S2 are presented in Table 6-7, and S1 vs S3 are presented in Table 6-8. It should be noted that the results are not reported for the N908, N9075 and N845 monitoring locations. N908 and N845 are not affected by the AWTS discharges or precautionary/emergency discharges.



While N9075 is located downstream of the existing discharge, it is in the immediate receiving drainage line of the Stringybark Creek tributary, which is characterised by limited near-field mixing and intermittent flow conditions. The modelling is designed to assess impacts under well-mixed, flowing conditions within defined receiving waters. The assessment therefore focused on locations where flows are more sustained and mixing conditions are more reliably represented by the model.

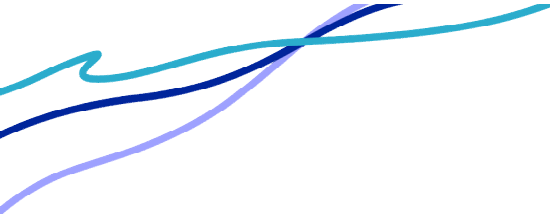
The concentration results have been colour-coded as follows:

- blue cells show concentration values that are below the most conservative DGV
- orange cells show concentration values between the Upland River DGV and Lowland River DGV
- purple cells show concentration values that are above the most conservative DGV.

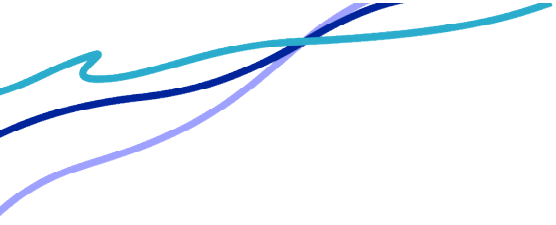
Organic nitrogen (Org-N) was included in S3 to reflect the broader spectrum of nitrogen species that may be present in the precautionary/emergency discharges, where nitrogen may not be fully oxidised to inorganic forms (e.g. nitrate/nitrite). In contrast, advanced treated water (i.e. AWTS discharges) is assumed to have very low Org-N concentrations due to the high level of treatment and removal efficiency. Therefore, Org-N was included for S3 to ensure a conservative and environmentally protective assessment of nitrogen-related impacts.

Table 6-7 Concentration results - S1 vs S2

	S1				S2			
Parameter (mg/L)	Nepean River confluence	N844 (Allens Creek downstream of confluence with Stringybark Creek)	N906 (Stringybark Creek)	N907 (Stringybark Creek)	Nepean River confluence	N844 (Allens Creek downstream of confluence with Stringybark Creek)	N906 (Stringybark Creek)	N907 (Stringybark Creek)
Driest Year								
TN	0.20	0.28	0.47	0.45	0.22	0.29	0.50	0.50
TP	0.003	0.007	0.009	0.006	0.004	0.007	0.009	0.009
NH ₄	0.003	0.005	0.008	0.008	0.012	0.013	0.050	0.057
NO ₃	0.031	0.041	0.087	0.088	0.051	0.060	0.177	0.192
PO ₄	0.001	0.001	0.002	0.002	0.002	0.002	0.006	0.006
Median Year								
TN	0.42	0.47	0.71	0.70	0.43	0.47	0.69	0.68
TP	0.009	0.012	0.017	0.019	0.009	0.012	0.018	0.019
NH ₄	0.006	0.007	0.012	0.012	0.011	0.012	0.036	0.039
NO ₃	0.075	0.081	0.146	0.149	0.084	0.090	0.188	0.197
PO ₄	0.001	0.002	0.003	0.003	0.002	0.002	0.005	0.005
Wettest Year								



	S1				S2			
Parameter (mg/L)	Nepean River confluence	N844 (Allens Creek downstream of confluence with Stringybark Creek)	N906 (Stringybark Creek)	N907 (Stringybark Creek)	Nepean River confluence	N844 (Allens Creek downstream of confluence with Stringybark Creek)	N906 (Stringybark Creek)	N907 (Stringybark Creek)
TN	0.37	0.40	0.55	0.52	0.37	0.41	0.55	0.52
TP	0.015	0.018	0.025	0.026	0.015	0.018	0.025	0.025
NH ₄	0.005	0.006	0.009	0.008	0.008	0.009	0.023	0.023
NO ₃	0.070	0.075	0.118	0.120	0.075	0.079	0.144	0.147
PO ₄	0.001	0.001	0.002	0.002	0.001	0.002	0.003	0.003



Concentrations in Table 6-7 show measurable but modest increases relative to baseline, with impacts most evident at downstream sites (N906 and N907). For the driest year:

- TN increases from about 0.45-0.47 mg/L to 0.50 mg/L, marginally exceeding the lowland DGVs
- NO₃ increases to about 0.192 mg/L, still well above DGVs
- NH₄ increases to about 0.050-0.057 mg/L.

TN and NO₃ exceed DGVs under both S1 and S2. These results demonstrate that the AWTs discharges will result in incremental increase of nitrogen species, particularly NO₃ and NH₄. Changes are flow-dependent, with greatest elevations in the driest year, and only minor changes in the median and wettest years. TP and PO₄ remain low and are not materially affected. This confirms that baseline condition controls DGV exceedance and that RO discharge contributes marginal increases in magnitude.

Table 6-8 Concentration results – S1 vs S3

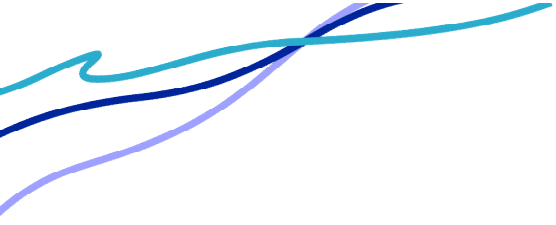
	S1				S3			
Parameter (mg/L)	Nepean River confluence	N844 (Allens Creek downstream of confluence with Stringybark Creek)	N906 (Stringybark Creek)	N907 (Stringybark Creek)	Nepean River confluence	N844 (Allens Creek downstream of confluence with Stringybark Creek)	N906 (Stringybark Creek)	N907 (Stringybark Creek)
Driest Year								
TN	0.20	0.28	0.47	0.45	0.26	0.32	0.65	0.49
TP	0.003	0.007	0.009	0.006	0.004	0.007	0.009	0.009
NH ₄	0.003	0.005	0.008	0.008	0.012	0.013	0.049	0.056
NO ₃	0.031	0.041	0.087	0.088	0.069	0.077	0.259	0.191
PO ₄	0.001	0.001	0.002	0.002	0.003	0.003	0.011	0.006
Org-N*	0.164	0.229	0.373	0.358	0.179	0.230	0.342	0.243
Median Year								
TN	0.42	0.47	0.71	0.70	0.44	0.48	0.75	0.68
TP	0.009	0.012	0.017	0.019	0.009	0.012	0.018	0.020
NH ₄	0.006	0.007	0.012	0.012	0.011	0.012	0.036	0.039
NO ₃	0.075	0.081	0.146	0.149	0.095	0.100	0.237	0.196
PO ₄	0.001	0.002	0.003	0.003	0.002	0.003	0.008	0.005

S1

S3

Parameter (mg/L)	Nepean River confluence	N844 (Allens Creek downstream of confluence with Stringybark Creek)	N906 (Stringybark Creek)	N907 (Stringybark Creek)	Nepean River confluence	N844 (Allens Creek downstream of confluence with Stringybark Creek)	N906 (Stringybark Creek)	N907 (Stringybark Creek)
Org-N*	0.343	0.379	0.550	0.544	0.334	0.368	0.477	0.445
Wettest Year								
TN	0.37	0.40	0.55	0.52	0.38	0.41	0.59	0.52
TP	0.015	0.018	0.025	0.026	0.015	0.018	0.025	0.025
NH ₄	0.005	0.006	0.009	0.008	0.008	0.009	0.023	0.023
NO ₃	0.070	0.075	0.118	0.120	0.080	0.084	0.166	0.147
PO ₄	0.001	0.001	0.002	0.002	0.002	0.002	0.005	0.003
Org-N*	0.296	0.323	0.422	0.393	0.292	0.317	0.401	0.350

*no specific GDVs available.



Similar to S2, the results for S3 in Table 6-8 show that impacts are most evident at downstream sites (N906 and N907). For the driest year:

- TN increases to 0.65 mg/L, exceeding the most conservative DGV at N906
- TP remains largely unchanged
- NH_4 increases to 0.056 mg/L exceeding the most conservative DGV
- NO_3 noticeably increases, still above the DGVs
- PO_4 shows small but measurable increases remaining below DGVs.

Precautionary/emergency discharges primarily influence short-term concentration peaks, particularly for NO_3 , NH_4 and, to a lesser extent, PO_4 . These effects are most evident under low-flow (dry year) conditions, where dilution is limited. However, median concentrations and overall water quality condition are only marginally affected, indicating that precautionary/emergency discharges represent a short-duration, event-driven influence rather than a sustained change in receiving water quality.

Mass balance refers to the cumulative pollutant loads. The mass balance results provide a comprehensive understanding of the key water quality impacts affecting the catchment when compared to pollutant concentrations.

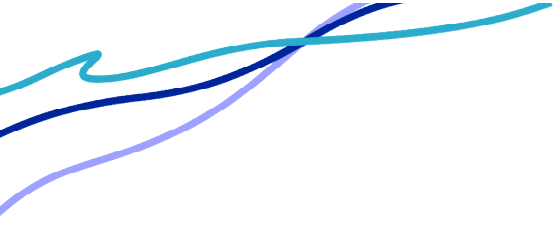
Comparisons between the mass balance results of S1 vs S3 (baseline, without precautionary discharge vs proposed operational scenario) are presented in Table 6-9. The tables also include the percentage differences, that have been colour-coded as follows:

- blue cells show mass changes ranging between 0% and 10%
- yellow cells show mass changes ranging between 10% and 50%
- orange cells show mass changes ranging between 50% and 100%
- purple cells show mass changes higher than 100%.

Table 6-9 Mass balance results - S1 vs S3

Volume/ Parameter (cumulative)	S1				S3				Differences (%)			
	Nepean River confluence	N844 (Allens Creek)	N906 (Stringybark Creek)	N907 (Stringybark Creek)	Nepean River confluence	N844 (Allens Creek)	N906 (Stringybark Creek)	N907 (Stringybark Creek)	Nepean River confluence	N844 (Allens Creek)	N906 (Stringybark Creek)	N907 (Stringybark Creek)
Driest Year												
Volume (ML)	10,754	6,378	1,090	810	11313	6963	1530	1250	5.2%	9.2%	40.3%	54.4%
TN (kg)	3,105	3,037	1,041	840	3736	3671	1676	1207	20.3%	20.9%	61.0%	43.7%
TP (kg)	248	254	105	88	265	273	124	106	6.9%	7.3%	18.0%	20.8%
NH ₄ (kg)	53	51	18	15	139	142	104	100	161.5%	178.7%	475.8%	569.3%
NO ₃ (kg)	494	483	192	156	925	908	609	399	87.2%	87.9%	217.2%	155.6%
PO ₄ (kg)	11	11	4	3	36	36	29	12	228.4%	230.5%	618.5%	314.0%
Org-N (kg)	2,558	2,503	831	669	2673	2622	964	708	4.5%	4.7%	15.9%	5.8%
Median Year												
Volume (ML)	19,380	16,176	2,777	2,239	19,922	17,007	3,489	2,650	2.8%	5.1%	25.7%	18.4%
TN (kg)	11,264	10,770	3,027	2,600	11,940	11,227	3,537	2,766	6.0%	4.2%	16.8%	6.4%
TP (kg)	1,130	1,028	395	308	1,160	1,064	422	334	2.6%	3.5%	6.7%	8.6%
NH ₄ (kg)	165	162	49	42	252	264	141	134	52.7%	63.0%	187.6%	217.9%

S1		S3							Differences (%)			
Volume/ Parameter (cumulative)	Nepean River confluence	N844 (Allens Creek)	N906 (Stringybark Creek)	N907 (Stringybark Creek)	Nepean River confluence	N844 (Allens Creek)	N906 (Stringybark Creek)	N907 (Stringybark Creek)	Nepean River confluence	N844 (Allens Creek)	N906 (Stringybark Creek)	N907 (Stringybark Creek)
NO ₃ (kg)	2,097	1,879	725	551	2557	2569	1240	778	21.9%	36.7%	71.0%	41.2%
PO ₄ (kg)	34	33	12	10	61	58	40	19	78.0%	77.2%	236.8%	87.6%
Org-N (kg)	9,002	8,729	2,253	2,007	9131	8394	2156	1855	1.4%	-3.8%	-4.3%	-7.6%
Wettest Year												
Volume (ML)	38,616	35,301	6,430	4,959	39,097	36,155	7,289	5,325	1.2%	2.4%	13.4%	7.4%
TN (kg)	22,243	20,788	5,606	4,116	22,710	21,554	6,427	4,766	2.1%	3.7%	14.6%	15.8%
TP (kg)	2,573	2,391	792	613	2,575	2,420	832	614	0.1%	1.2%	5.0%	0.2%
NH ₄ (kg)	314	304	89	69	398	380	175	162	26.9%	25.0%	96.5%	135.0%
NO ₃ (kg)	4,309	3,920	1,331	1,030	4741	4402	1793	1302	10.0%	12.3%	34.7%	26.4%
PO ₄ (kg)	64	59	21	17	91	93	51	25	42.1%	57.1%	143.9%	48.6%
Org-N (kg)	17,620	16,564	4,186	3,017	17,571	16,771	4,459	3,301	-0.3%	1.3%	6.5%	9.4%



The modelling identifies that worst-case impacts occur under low-flow (driest year) conditions, where dilution capacity is reduced. However, even in the driest year, TN and TP exhibit negligible or minor changes between S1 and the discharge scenarios (S2 and S3). PO₄ concentrations also remain below the most conservative DGVs across all scenarios. NO₃ and NH₄ are the most responsive parameters to the proposed discharges, exhibiting the largest proportional increases.

Precautionary/emergency discharges primarily influence short-term concentration peaks, rather than long-term median conditions. However, even under these conservative scenarios, the magnitude of change remains:

- small relative to background variability, and
- insufficient to produce a material change in receiving water quality condition.

In addition, the increased precautionary/emergency discharges will remain within the current EPL load limits. The current EPL specifies load limits of 1000 kg for TN and 20 kg for TP. The increased precautionary/emergency discharges will result in loads of 350 kg for TN and 20 kg for TP.

Modelling shows that at N844 (downstream of the confluence with Allens Creek) and at the Nepean River confluence, the parameters generally return to levels similar to the modelled background scenario (S1).

From an ecotoxicological perspective, EPL conditions and ANZG guidelines emphasize species protection and stressor/chronic toxicity thresholds which are more sensitive to NO₃ and NH₄ than the other parameters. The modelling shows that direct toxicity risk to aquatic organisms is low across all scenarios, with all predicted NO₃ and NH₃ concentrations well below chronic and acute toxicity thresholds for freshwater species. The primary ecological pathway of concern is therefore chronic nutrient enrichment, rather than acute toxic effects. Impacts to aquatic ecosystems are assessed in Section 6.1.4.

The water quality modelling assessed the worst case scenario where the AWTS operates constantly. In practice, the AWTS will be used after the irrigation and recycled water demand is met. This means the AWTS will generally be used in wetter periods when there is more flow in the creeks and the dilution capacity is increased. Further, it should be noted that S1 does not consider existing precautionary/emergency discharges that occur under the current EPL. As such, results of the comparisons against S1 are likely to be conservative.

Overall, the proposal will result in measurable but incremental changes to receiving water quality, within a system that is already characterised by elevated nutrient concentrations and frequent baseline exceedance of DGVs. In this context, the modelled discharges are considered to represent a proportionate and acceptable environmental outcome in the receiving system. Refer to Appendix A for consideration of matters under Part 6.2 of the BCSEPP for a proposal within a 'regulated catchment'.

6.1.2.2 Flooding

Some areas of the proposal intersect areas modelled as being in the 10%, 1%, 1 in 500 Annual Exceedance Probability (AEP) and Probable Maximum Flood (PMF) flood extents (Wollondilly Shire Council, 2023). These areas include the access track north of Stirling Drive and the AWTS discharge location. The Wollondilly Shire Council study flood extents are relatively similar for all of these events. All other areas, including the WRRF upgrade area are not expected to be impacted by flooding. In the event of flooding during construction, larger scale erosion and sedimentation could occur as work areas may be inundated. The risk of this occurring will be

limited as most of the proposal is outside the flood mapping extents. Additional mitigation measures to avoid and manage potential impacts in the event of a flood are provided in Table 6-11.

As discussed in Section 3.3.2, construction of the headwall may require the use of a coffer dam in a tributary of Stringybark Creek. The coffer dam will only extend across part of the creek allowing flows to pass through the unobstructed portion of the channel. The partial coffer dam will ensure that flows in the creek are maintained and that they do not spill out of bank.

Currently, stormwater runoff from the WRRF roofed and paved areas are directed to an underground OSD prior to discharge to existing maintenance holes south of the WRRF. Stormwater captured in bunded areas of the WRRF is sent back to the head of works for treatment.

During operation, additional concreted surfaces for the WRRF upgrade will increase the total impervious area of the WRRF. The WRRF upgrade and AWTS design includes an additional OSD and pipe arrangement to accommodate stormwater runoff from up to a 1% AEP rainfall event. The new stormwater pipe arrangement will also discharge to an existing maintenance hole. The downstream stormwater network’s hydraulic capacity was also assessed to confirm it can accommodate the proposed additional stormwater. Like the existing arrangement, stormwater captured in bunded areas will also be sent back to the head of works for treatment. The proposal is unlikely to have an adverse impact to the existing drainage system or flooding.

The proposal will increase precautionary and emergency discharges from the existing discharge location up to 100 ML/year. Discharges are likely to be more frequent, as opposed to larger volumes. Further, these are likely to be carried out during wet weather when these discharges will contribute a comparatively small percentage of flows in the receiving watercourse. The tributary of Stringybark Creek downstream of the existing discharge location also turns into a deeper gorge formation past the Golf Course, and flows are unlikely to cause flooding in the surrounding residential areas.

When the AWTS operates, the treated water discharge pipe will introduce a constant flow to a tributary of Stringybark Creek. Table 6-10 compares the flow from the AWTS to the 1% AEP, the 10% AEP and the PMF. The AWTS discharge is predicted to have a minimal impact on flooding, with the flow contributing to only 0.22% of the overall flow during the 10% AEP.

Table 6-10 AWTS impact on flooding in Stringybark Creek

Flow from AWTS/D	Flow from AWTS/s	PMF flow/s	1 AEP flow/s	10 AEP flow/ s	AWTS as percentage of PMF	AWTS as percentage of 1% AEP	AWTS as percentage of 10% AEP
1.5 ML	0.02 m ³	95.2 m ³	16.5 m ³	8 m ³	0.02	0.11	0.22

6.1.2.3 Groundwater

Groundwater dewatering during construction of the proposal is not anticipated. Geotechnical investigations carried out for the WRRF upgrade area (WSP, 2025a) drilled boreholes ranging from 1.2 metres below ground level (mbgl) to 6 mbgl. No groundwater was encountered during the investigations. Excavation to a depth of 6 m at the WRRF upgrade area is required and is unlikely to encounter groundwater.

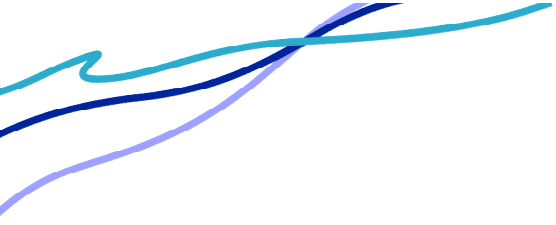
Subsequent geotechnical investigations were carried out along the treated water discharge pipe alignment ranging from 0.9 mbgl to 8.3 mbgl (AECOM, 2026). Groundwater monitoring wells installed in select boreholes recorded groundwater levels at typically about 4 to 6 mbgl, occurring within the underlying bedrock. Excavation to about 2.5 m is required for the treated water discharge pipe works and is unlikely to encounter groundwater.

6.1.2.4 Mitigation measures

With the implementation of the mitigation measures below, impacts to surface water and groundwater can be adequately managed, and residual impacts are expected to be low.

Table 6-11 Environmental mitigation measures – surface water and groundwater

Mitigation measures
Surface water quality
Keep functioning spill kit on site for clean-up of accidental chemical/fuel spills. Keep the spill kits stocked and located for easy access.
Locate portable site amenities, chemical storage and stockpiles of erodible materials away from watercourses and drainage lines.
Sydney Water will monitor up and downstream of the discharge points as part of the Sydney Water Aquatic Monitoring (SWAM) program. The locations will be finalised in consultation with the EPA.
Flooding
Schedule the works outside of predicted heavy rain periods.
Locate portable site amenities, chemical storage and stockpiles of erodible materials away from watercourses, drainage lines and flood prone areas (1% AEP).
Groundwater
If the potential for intercepting groundwater is identified after the REF is determined, Sydney Water will obtain a groundwater Water Supply Works Approval. The Delivery Contractor is responsible for: - providing expert hydrogeological technical information to obtain the approvals - preparing a Dewatering Management Plan - complying with the conditions of the approvals (such as protecting water quality; minimising aquifer extraction volumes, monitoring extraction with flow meters and recording volumes).
Store all chemicals and fuels away from drainage lines and in accordance with relevant Australian Standards and Safety Data Sheets. Record stored chemicals on site register. Ensure bunded areas have 110% capacity of the largest chemical container, or an additional 25% capacity of the total volume stored within (whichever is greater). Tightly secure chemicals and fuels in vehicles. Clearly label all chemicals.
Conduct refuelling, fuel decanting and vehicle maintenance in compounds where possible. If field refuelling is necessary, designate an area away from watercourses and drainage lines with functioning spill kits close by.
Conduct any equipment wash down within a designated washout area.



6.1.3 Geomorphology and hydrology

A geomorphology assessment (ARUP, 2026) including hydraulic modelling was prepared for the proposal's operation stage assessing impacts from flows to the receiving watercourses from:

- increased precautionary and emergency discharges up to 100 ML/year
- a new AWTS discharge.

For the purposes of the geomorphology assessment, the system into which the existing storage lagoon discharge is released is referred to as Stringybark Creek North, and the AWTS discharge is released to Stringybark Creek South.

The hydraulic modelling for Stringybark Creek North models flows starting from a hydraulic feature about 100 m downstream of the existing discharge location, where there is an overland flow path to the Stringybark Creek North tributary (Figure 6-3). This location makes no material difference to the modellings results and assessment.

A summary of the assessment is included below.

6.1.3.1 Existing environment

Stringybark Creek North

The Stringybark Creek North site inspection was carried out on 11 December 2025 to capture representative geomorphic features, areas of observed instability, and transitions in channel form. The watercourse was systematically divided into 7 reaches, each characterised by unique geomorphological features and varying degrees of stability and erosion (Figure 6-3). No soil samples were collected, as the channel was observed to be predominantly rock-controlled with minimal to no accessible soil material for sampling.



Figure 6-3 Site inspection transect - Stringybark Creek North

Note: emergency spillway represents the location 100 m downstream of the existing discharge location where flows are modelled from.

The inspection suggested that the system is in a stable and balanced state, with bed and banks predominantly rock-controlled and minor evidence of active erosion. Observations indicate long-term geomorphic stability, with minimal signs of acute disturbance. As shown in Figure 6-3, an upstream urban drainage watercourse enters the system from the north in the division of Reaches 1 and 2 and likely represents a key source of episodic runoff and sediment input during rainfall events. The poorly defined banks and flow paths observed in these reaches indicate that they function as part of a broader floodplain or overland flow corridor. Reach 4 contained a waterfall formation, after which the channel transitions into a gorge formation with steep, rock-controlled banks.

A reach-scale morphological classification of the watercourse was undertaken based on the available digital elevation model. Next, an integrated typology assessment combined the reach-scale morphological classification with mapped on-site features to provide an understanding of geomorphic behaviour along Stringybark Creek North. The typology classification and assessment results are included in Table 6-12 and shown in Figure 6-4.

Table 6-12 Typology classification - Stringybark Creek North

Morphological class	Morphology	Typology	Description
0	Undefined banks and streamline	0	Rock controlled
1	Wide, shallow, and steep stream; gentle banks slopes; low asymmetry	1	Rock controlled banks and bed
2	Narrow, shallow, and steep stream; steep banks slopes; low asymmetry	2A	Rock controlled banks and bed
		2B	Pool system; rock controlled banks and bed
3	Wide, deep; and steep stream; gentle banks slopes; low asymmetry	3A	Rock controlled banks and bed
		3B	Pool system; rock controlled banks and bed
4	Narrow, deep, and flat stream; steep banks slopes; high asymmetry	4A	Rock controlled banks and bed
		4B	Wetland system
5	Narrow, shallow, and steep stream; gentle banks slopes; high asymmetry	5	Rock controlled banks and bed



Figure 6-4 Typology assessment - Stringybark Creek North

Note: emergency spillway represents the location 100 m downstream of the existing discharge location where flows are modelled from.

Stringybark Creek South

The Stringybark Creek South site inspection was carried out on 20 August 2025. The watercourse was systematically divided into 5 distinct reaches, each characterised by its geomorphological features and varying degrees of stability and erosion in relation to upstream and downstream reaches (Figure 6-5).



Figure 6-5 Site inspection transect - Stringybark Creek South

Note: proposed discharge location refers to the AWTS discharge location.

The system was dominated by instream features, with the most dominant being a rock waterfall located within Reach 5. While the overall system was generally stable with rock-controlled bed and banks, there were several localised areas of acute and chronic erosion. The most geomorphologically vulnerable areas were observed in Reaches 2 and 3, where the presence of fine sediments, incised banks, and evidence of recent flood-driven erosion suggest heightened susceptibility to geomorphic change (Figure 6-6 and Figure 6-7). The accumulation of fine sediments in certain pools and beds may be readily mobilised during high-flow events, contributing to downstream sedimentation. Instream vegetation and emergent wetlands were observed in Reaches 3 and 4, providing some stabilisation and habitat complexity. The long-term erosion process associated with the waterfall-like formation in Reach 5 with ongoing headward migration is likely to influence channel stability and morphology in the long term.

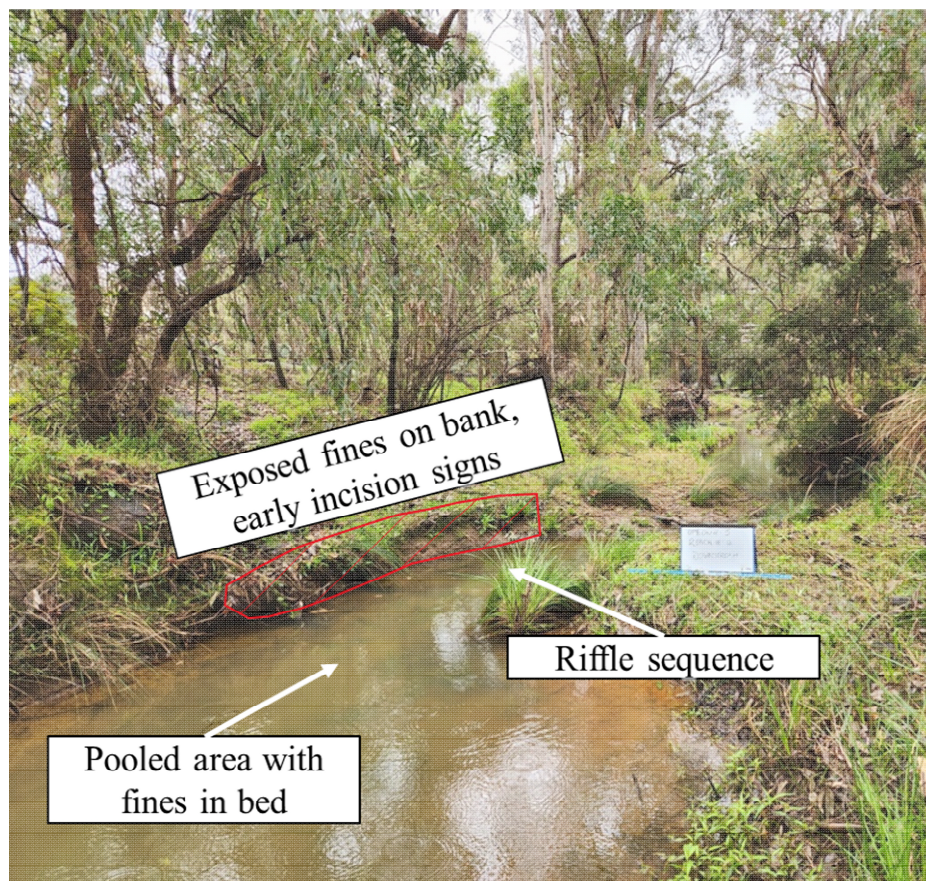


Figure 6-6 Pooled area in Reach 2 with exposed fine sediments (fines) on the banks

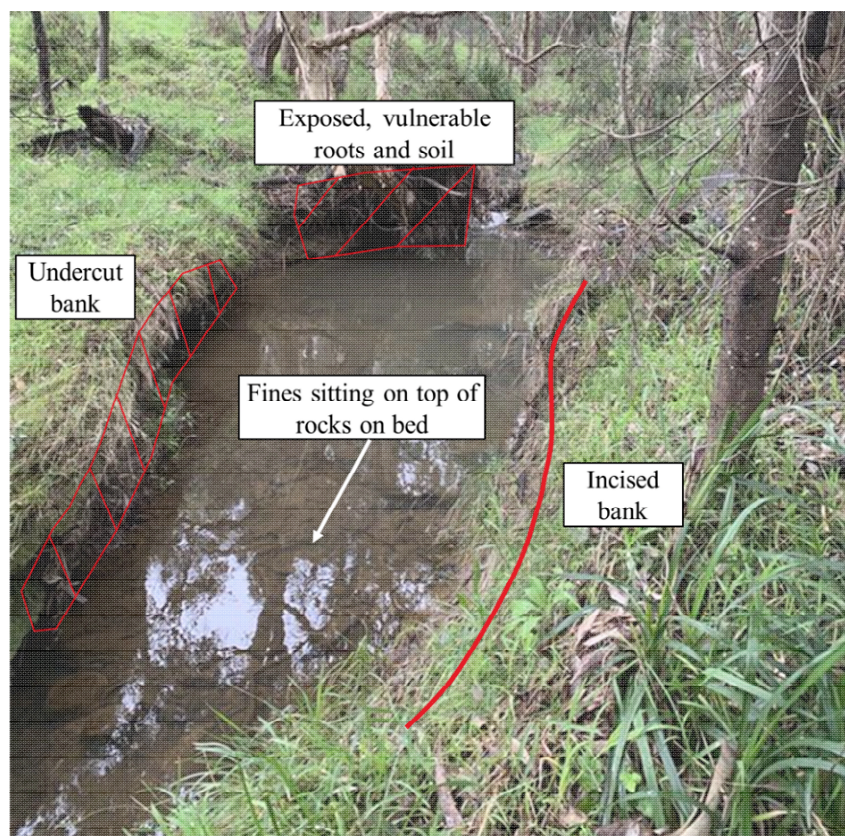


Figure 6-7 Incised banks in Reach 3

Soil samples were collected from Reach 1, Reach 2 and Reach 3 and analysed using the modified Emerson Aggregate Test to assess their dispersive and slaking characteristics. The results showed that the soil aggregates did not disperse in water, suggesting a low risk of structural breakdown due to chemical dispersion. However, the slaking behaviour suggested that the soils may be structurally weak and prone to erosion under certain hydrological conditions, such as intense rainfall or rapid wetting. No soil samples were collected within Reaches 4 and 5, as the channel was observed to be predominantly rock-controlled with minimal to no accessible soil material for sampling.

A reach-scale morphological classification of the watercourse was undertaken based on the available digital elevation model. Next, an integrated typology assessment combined the reach-scale morphological classification with mapped on-site features to provide an understanding of geomorphic behaviour along Stringybark Creek South. The typology classification and assessment results are included in Table 6-13 and shown in Figure 6-8.

Table 6-13 Typology classification – Stringybark Creek South

Morphological class	Morphology	Typology	Description
1	Narrow, shallow and steep stream; gentle banks slopes; low asymmetry	1A	Rock controlled bed and banks; steep and vegetated banks
		1B	Rock controlled banks; interspersed rock and soil
		1C	Incised banks
		1D	Pool system; interspersed rock and soil
		1E	Rock controlled bed and banks
		1F	Rock chute
2	Wide, deep and flat stream; steep banks slopes; high asymmetry	2A	Rock controlled bed and banks; steep and vegetated banks
3	Wide, deep and flat stream; steep banks slopes; low asymmetry	3A	Rock controlled bed and banks; steep and vegetated banks
		3B	Undercut and incised banks
		3C	Mostly soil in bed and banks
		3D	Instream vegetation
		3E	Rock controlled bed and banks
4	Wide, shallow and flat stream; steep banks slopes; high asymmetry	4A	Pool system; interspersed rock and soil
		4B	Instream vegetation
		4C	Undercut and incised banks

Morphological class	Morphology	Typology	Description
		4D	Instream vegetation



Figure 6-8 Typology assessment - Stringybark Creek South

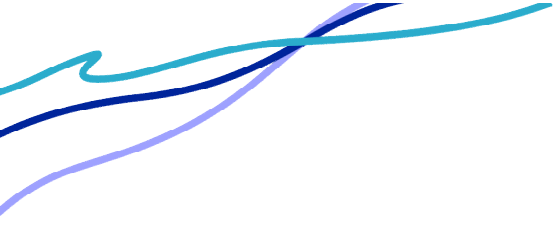
Note: proposed discharge location refers to the AWTS discharge location.

6.1.3.2 Potential impacts

Stringybark Creek North

A one-dimensional (1D) HEC-RAS hydraulic model of Stringybark Creek North was developed to characterise the system behaviour in terms of flow depth, velocity, shear stress, and stream power across a representative envelope of flow conditions (modelled scenarios) ranging from 1 ML discharged over 24 hours to 2 ML discharged over one hour. Stringybark Creek North modelled scenarios included precautionary and emergency discharges up to 100 ML/year during very low to no existing natural flows, and during or following wet weather events.

Under low-flow and frequent rainfall event scenarios, increased precautionary and emergency discharges results in a substantial increase in baseflow when compared to existing conditions. This increase in baseflow leads to measurable increases in velocity and shear stresses along the modelled reaches. However, absolute



velocities and shear stresses remain below thresholds associated with erosion of coarse bed or bank materials. Over time, the shift from intermittent to more persistent flows driven by the increased precautionary and emergency discharges has the potential to influence sediment mobilisation, fine sediment redistribution and vegetation-hydrology interactions. These effects are expected to be subtle and progressive over the long term, rather than as observable short-term erosion.

Under higher magnitude wet weather event scenarios, modelled velocities and shear stresses are dominated by catchment-derived runoff, and the contribution of the precautionary and emergency discharges becoming negligible in relative terms. During these events, hydraulic forces increase rapidly across the channel, and any erosion or geomorphic adjustment is expected to be driven almost exclusively by storm flows.

Overall, an increase in storage lagoon discharge volumes of up to 100 ML/year is not anticipated to result in short-term geomorphological damage or material concern within the system. The assessed reaches are predominantly rock-controlled, with limited fine sediment availability, and minimal evidence of active erosion or instability. Observations indicate that the channel is currently stable and operating within a long-term equilibrium condition. As a result, the system is expected to exhibit a low sensitivity to the increased precautionary and emergency discharges and no erosion control in-stream interventions are currently expected to be required for Stringybark Creek North. Mitigation measures in Table 6-14 include monitoring to detect potential gradual or cumulative geomorphic changes.

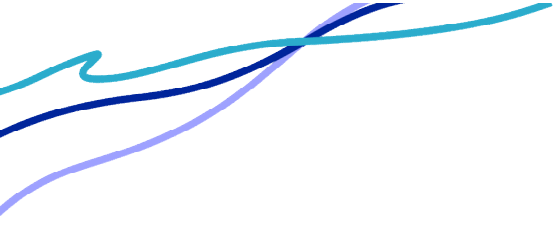
Stringybark Creek South

Similar to Stringybark Creek North, a 1D hydraulic model was also developed for Stringybark Creek South. Modelled scenarios included AWTS discharges ranging from 1-3 ML/D during very low to no existing natural flows, and during or following wet weather events.

Reach 1

At the AWTS discharge location, modelled velocity and shear stress exhibit substantial spatial variability for the modelled scenarios. Some areas experience relatively rapid increases in velocity and shear stress at low flows, exceeding thresholds for fine-grained and weakly structured materials, while other areas show a more gradual increase in both velocity and shear stress with increasing flow. Overall, the combined velocity and shear stress results indicate a potential for localised low-flow-driven mobilisation of fine sediments at and immediately downstream of the discharge location, with more extensive mobilisation expected during higher wet-weather events where hydraulic energy increases across a broader portion of the channel.

Reach 1 is generally stable due to the presence of rock controls on the banks and localised sections of the bed. However, field observations, soil testing, and hydraulic results indicate the presence of fine sediment infill within a mixed substrate matrix, making parts of the reach locally susceptible to entrainment and redistribution of fine sediments, particularly under sustained low-flow conditions. While Reach 1 is not expected to undergo major morphological change, localised fine sediment mobilisation and redistribution may occur under both AWTS discharges and wet-weather flow conditions.



Impacts in this reach will be largely managed through the treated water discharge pipe and headwall design features discussed in Section 3.1.2. Residual impacts will be managed through the mitigation measures in Table 6-14.

Reach 2 and 3

In contrast to Reach 1, the areas of incised banks (typologies 3B and 4C) in Reach 3 show comparatively low hydraulic forcing under low to moderate flows, with both velocity and shear stress generally remaining below material thresholds. This behaviour aligns with field observations of these reaches as pool-dominated with limited visible flow at low discharge, where fine sediments accumulate within pools and along bank margins. Under larger wet-weather events, both velocity and shear stress increase significantly across these areas and exceed thresholds of coarser substrate materials.

Overall, Reach 2 and Reach 3 are identified as the most erosion-prone sections of the Stringybark Creek South system with the presence of incised banks, locally fine-dominated substrates, evidence of recent flood-driven adjustment, and observed sensitivity during moderate to high flow events. These reaches exhibit characteristics consistent with an actively adjusting system, where episodic wet weather flows drive bed and bank instability, and low, constant flows can cause degradation of localised areas. This behaviour may be explained by changes in the catchment conditions and hydraulic controls from the private developments upstream of the treated water discharge location. Overall, the system is expected to continue adjusting within its natural variability, provided that in-stream interventions focuses on the most sensitive reaches and avoids unnecessary structural control. Forecast AWTS discharge flows are small relative to natural rainfall-driven events, and widespread geomorphic change in response to the AWTS discharges is not anticipated or predicted. Low-intensity, process-supporting erosion control interventions are recommended and shown in Figure 6-9 and Table 6-14.



Figure 6-9 Indicative extent of erosion control measures for Stringybark Creek South

Note: proposed RO discharge refers to the AWTS discharge location.

Reach 4 and 5

The waterfall formation in Reach 5 is characterised by consistently high velocities and shear stresses. Despite this elevated hydraulic energy, the bed within this reach is strongly rock-controlled (typologies 1A, 2A and 3A). As a result, exceedance of soil-based velocity and shear stress thresholds is not indicative of erosion risk for the reach but rather suggests the potential for highly localised erosion within small sediment pockets, margins, or transition zones between rock controls. Widespread bed or bank adjustment is unlikely in these areas.

In general, Reaches 4 and 5 are characterised by strong bedrock control and waterfall or gorge-like morphology, exhibit high hydraulic energy but low overall geomorphic sensitivity under the modelled scenarios. As a result, active in-stream interventions are not recommended. Rather, monitoring is recommended to confirm the continued stability and detect potential gradual or cumulative changes. Refer to the mitigation measures in Table 6-14.

6.1.3.3 Mitigation measures

With the implementation of the mitigation measures below, impacts to geomorphology and hydrology can be adequately managed, and residual impacts are expected to be low.

In-stream interventions

In-stream intervention selection for the proposal has been guided by a hierarchy that prioritises compatibility with natural geomorphic and ecological processes, proportionality to identified risks, and avoidance of unnecessary structural control. At the highest level of preference are process-supporting and low-intensity interventions. Where geomorphic sensitivity is higher and evidence of active adjustment or instability is present, the hierarchy allows for targeted, moderate-intensity interventions that address specific erosion mechanisms without constraining the entire channel system.

Monitoring and adaptive management

Monitoring is recommended to confirm that the watercourse response to the proposal operation and that any interventions remain consistent with the geomorphic character and behaviour observed during the geomorphology assessment. Information obtained through monitoring should be used to inform whether the existing intervention approach remains appropriate, and whether refinement or escalation of measures is required.

Table 6-14 Environmental mitigation measures – geomorphology and hydrology

Mitigation measures

Sydney Water will engage a suitably qualified geomorphology consultant prior to construction to prepare a geomorphology management plan.

The plan must:

- Establish a pre and post-operational monitoring program for Stringybark Creek North and Stringybark Creek South
- Include site inspections following significant rainfall or flood events to identify evidence of new erosion, bank instability, bed disturbance or obstruction.

Establish an adaptive management approach which includes identifying geomorphic or ecological triggers that might indicate a need for intervention. This could include maintenance/planting of riparian vegetation along the creek banks, providing additional protection/stabilisation to creek feature that are impacted.

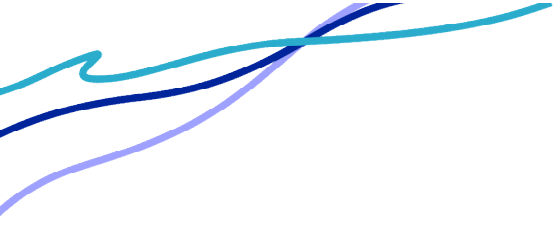
Undertake monitoring in accordance with the geomorphology management plan, including:

- pre-operation monitoring to establish baseline condition between construction and operation
- post-operation monitoring frequency should initially be higher following the introduction of altered flow conditions associated with the proposal and reduced over time if the system remains stable/adjusting within anticipated limits.

Implement additional adaptive management or intervention measures as identified in the geomorphology management plan.

Install low intensity creek interventions in reach 2 and 3 of the southern tributary of Stringybark Creek before the start of operation of the treated water discharge pipeline. Low intensity interventions may include:

- Riparian vegetation restoration – planting to reinforce banks through root structure
- Instream woody habitat (snags) - single logs or log complexes, anchored or keyed into banks or bed
- Jute mesh / erosion control blankets - used on banks and exposed soils to limit surface erosion
- Coir logs / fibre rolls - installed along toe or margin zones to reduce local velocities and trap sediment
- Live staking - viable woody cuttings driven into banks or floodplain soils so that they root and grow, providing mechanical reinforcement through root development and flexible above-ground structure
- Targeted bed improvements (rock sills, grade stabilisers, timber pins) - bed-level control features designed to control sediment transport without forming dominant hydraulic drops.



Design and construction of the headwall and in-stream intervention works to reference the following Department of Primary Industries (DPI) Water guidelines to protect waterfront land:

- [Guidelines for instream works on waterfront land](#)
- [Guidelines for outlet structures on waterfront land](#)
- [Guidelines for riparian corridors on waterfront land](#).

Stabilising and rehabilitate all disturbed areas including topsoiling, revegetation, mulching, weed control and maintenance in order to adequately restore the integrity of the riparian corridor.

6.1.4 Aquatic ecology

An aquatic ecology assessment was prepared for the proposal and summarised below (Eco Logical Australia, 2026). The aquatic ecology study area covers areas upstream and downstream of the AWTS discharge location and existing discharge location (refer to Figure 6-10).

6.1.4.1 Existing environment

The aquatic ecology study area consists of two 2nd order streams, one 3rd order stream and one 4th order stream (Figure 6-10), forming part of the Allens Creek catchment, within the greater Nepean River catchment. No threatened species of fish or aquatic plants are known or expected to occur in, or upstream of the aquatic ecology study area. The AWTS discharge location and existing discharge location are not in Key Fish Habitat (KFH); the nearest KFH is about 700 m downstream (Figure 6-11).

Ecologists carried out field surveys on 27-29 August and 25 November 2025. Aquatic fauna, water quality and macroinvertebrate sampling locations are shown in Figure 6-12.

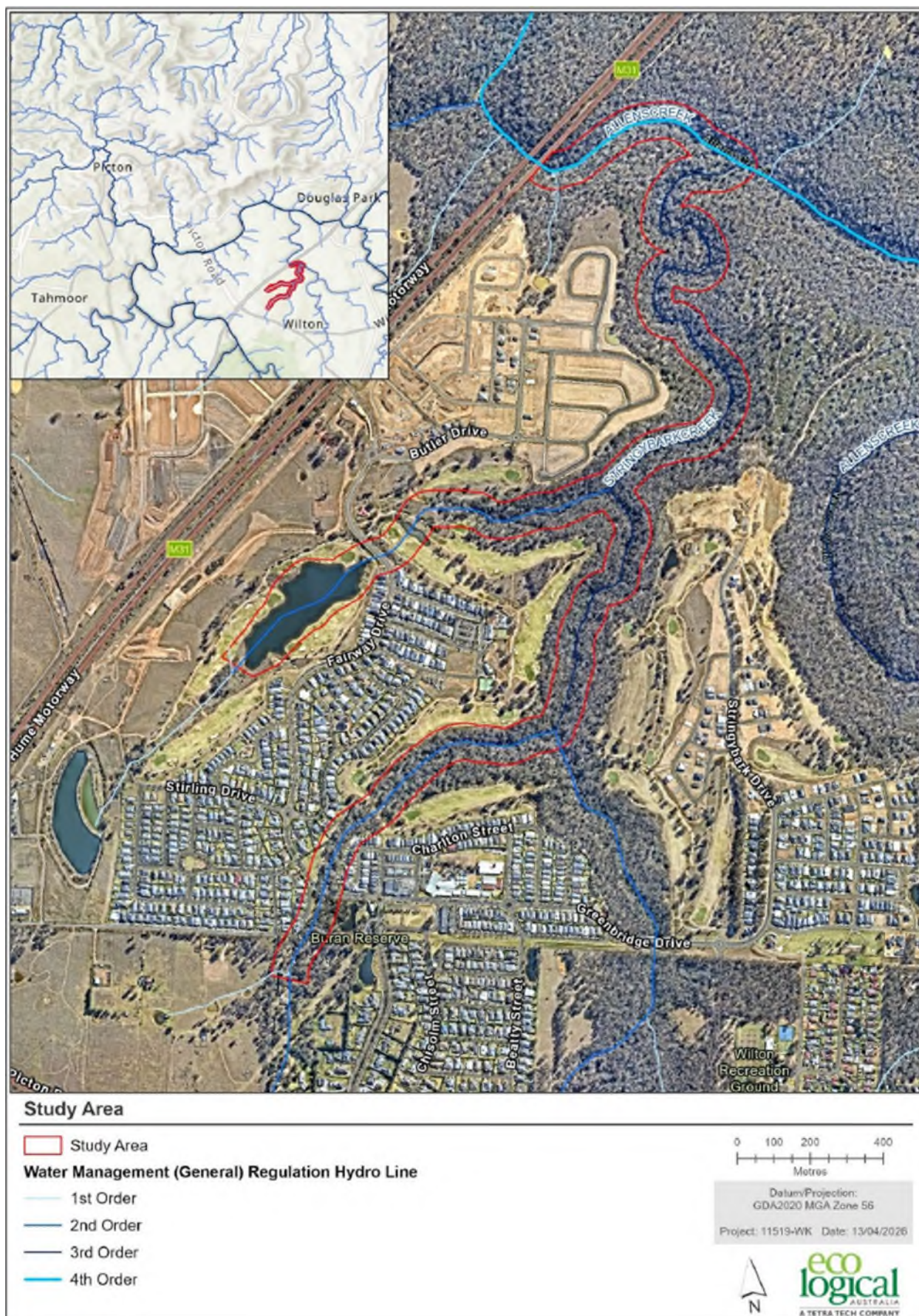


Figure 6-10 Aquatic ecology study area

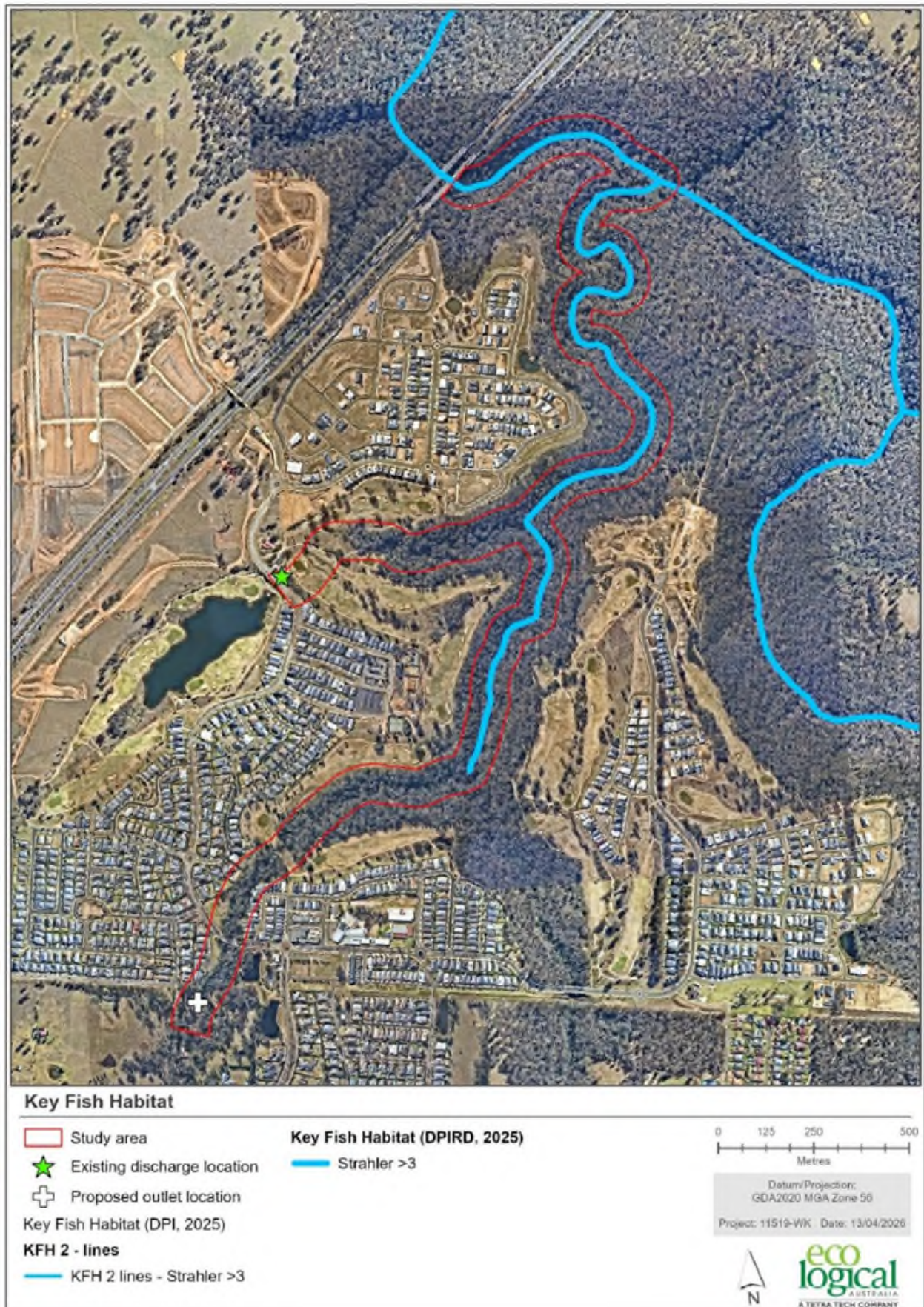


Figure 6-11 Key Fish Habitat

Note: Proposed outlet location refers to the AWTS discharge location

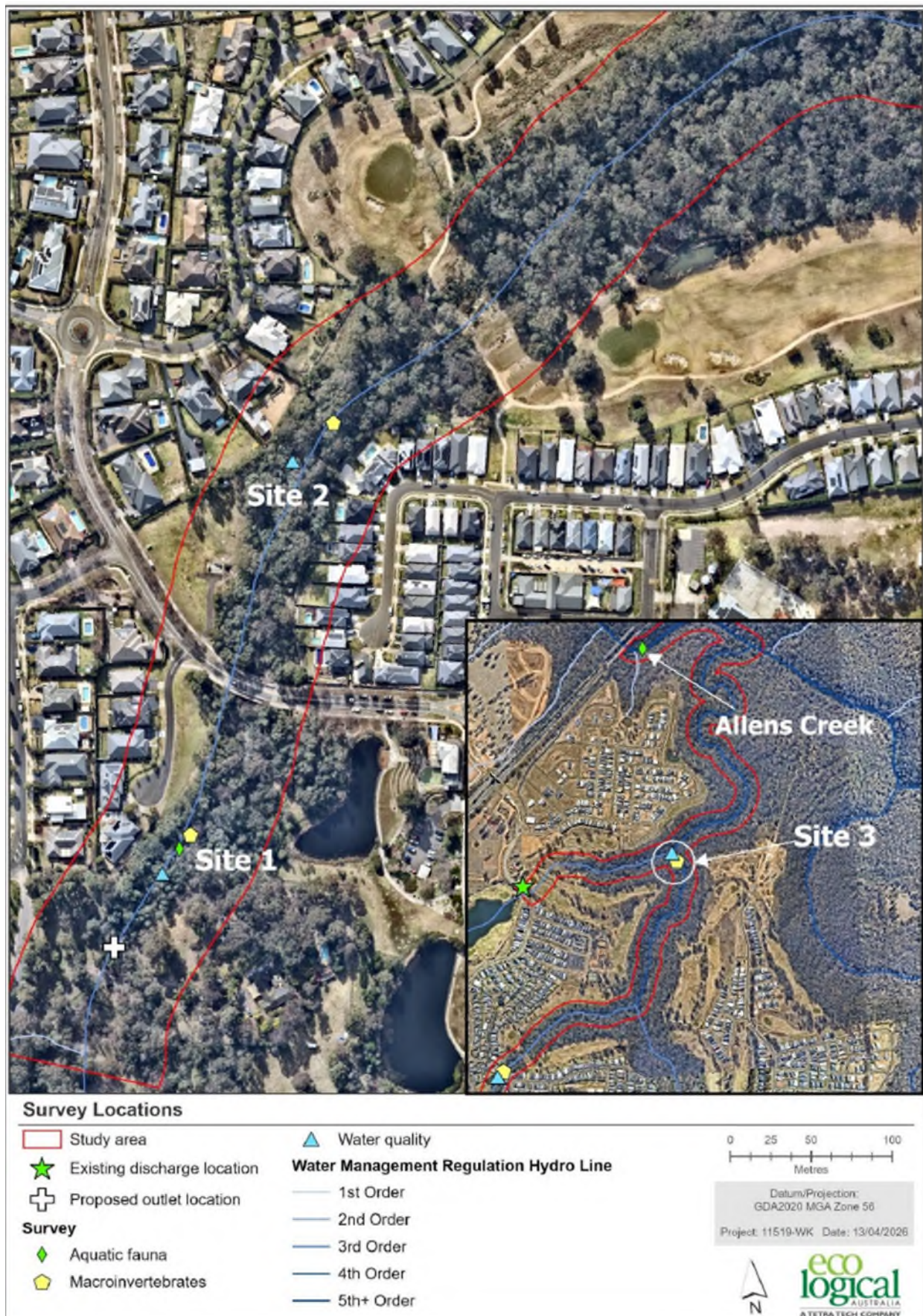
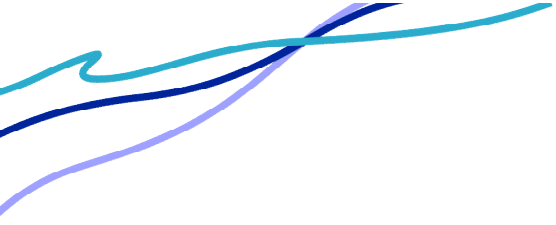


Figure 6-12 Aquatic ecology sampling locations

Note: Proposed outlet location refers to the AWTS discharge location



Riparian and aquatic condition

Downstream of the AWTS discharge location, the watercourse contains a range of aquatic habitat features that provide good structure and variability. Habitat types include pools, riffles and runs immediately downstream, and more dynamic features such as rapids and flow constrictions further downstream (refer to Figure 6-13 and Figure 6-14). A private culvert exists immediately upstream of the proposed AWTS discharge location.

The riparian zone downstream of the AWTS discharge location varies in width due to previous vegetation clearing and is bounded by the Golf Course and residential development. The riparian zone is about 5-10 m wide at the AWTS discharge location.

Downstream of the existing discharge location, a small wetland extends into the Golf Course. The flow path then becomes more representative of an ephemeral stream, with minor channelisation leading to a dam/water hazard within the Golf Course. The dam/water hazard has a spillway directing flow overland to a tributary of Stringybark Creek where the riparian vegetation is more established, and a defined channel is evident. The watercourse provided a variety of fluvial aquatic habitats, including riffles, runs, pools, rapids and cascades (refer to Figure 6-15 and Figure 6-16).



Figure 6-13 AWTS discharge location: channel facing downstream (top left), opposing bank (top right) and facing the bank that the headwall will be installed on (bottom)



Figure 6-14 Representative photos of the reach about 1 km downstream of the AWTS discharge location



Figure 6-15 Existing discharge location: existing discharge (top left), facing downstream (top right) and the immediate receiving environment of existing discharges on the golf course (bottom).



Figure 6-16 Representative photos of the reach downstream of the existing discharge location

In-situ water quality

In-situ water quality samples were collected at 3 sites (Figure 6-12) for the purposes of the aquatic ecology assessment. All in-situ water quality parameters for which guideline values were available were above the ANZECC and ARMCANZ (2000) guideline range for slightly disturbed upland rivers at all 3 sites, except for turbidity at Site 3.

Temperature, conductivity and turbidity all showed a decreasing trend downstream, potentially due to reduced disturbance of the watercourse and riparian area further downstream. Salinity and pH remained consistent across the 3 sites. Dissolved oxygen was similar between Site 1 and Site 2, then increased at Site 3, potentially due to the influence of the unnamed tributary converging with Stringybark Creek. A detailed assessment of impacts on water quality is included in Section 6.1.2.1.

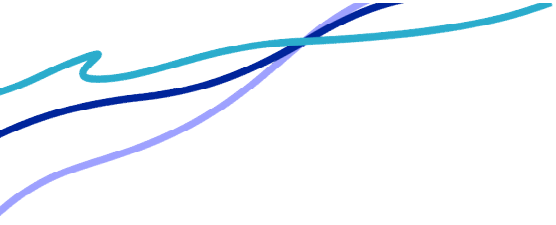
Aquatic fauna

Aquatic fauna captured during the field survey are shown in Table 6-15. Other species identified from previous studies within 5 km of the aquatic ecology study area were also considered in this assessment and include:

- *Anguilla australis* (shortfin eel)
- *Gobiomorphus coxii* (Cox's gudgeon)
- *Philypnodon grandiceps* (flathead gudgeon)
- *Macquaria australasica* (Macquarie perch)
- *Macquaria novemaculeata* (Australian bass).

Table 6-15 Aquatic fauna captured

Class	Scientific name	Common name	Native status	Site 1	Allens Creek
Fish	<i>Anguilla reinhardtii</i>	longfin eel	Native	1	-
Fish	<i>Gambusia holbrooki</i>	eastern mosquitofish	Exotic	3	-
Fish	<i>Gobiomorphus australis</i>	striped gudgeon	Native	5	1
Fish	<i>Retropinna semoni</i>	Australian smelt	Native	-	1
Crustacean	<i>Atyidae</i>	freshwater shrimp	Native	1	63
Total abundance				10	65
Species richness				4	3



Macroinvertebrates

A total of 26 macroinvertebrate taxa were detected across the 3 sites. Site 1 recorded the highest abundance, with 3 taxa groups (*Orthocladinae*, *Simuliidae* and *Tatoidae*) accounting for 128 of the 176 individuals. By contrast, Site 2 recorded the lowest abundance but the highest taxonomic richness (18 families), indicating greater habitat heterogeneity and conditions that support a more diverse macroinvertebrate assemblage (i.e. community of aquatic invertebrates).

Macroinvertebrate taxa were assigned a Stream Invertebrate Grade Number — Average Level (SIGNAL) score. SIGNAL scores are from 1 to 10, with lower scores indicating more tolerant taxa that can withstand a wider range of environmental stressors, including common water pollutants such as suspended sediments and nutrient enrichment. All 3 sites were dominated by tolerant taxa (SIGNAL score ≤ 6), with only a small number of sensitive taxa (SIGNAL score ≥ 7) detected.

Weighted SIGNAL scores summarise the pollution sensitivity of a macroinvertebrate assemblage. The weighted SIGNAL scores indicate that the macroinvertebrate assemblage at Site 2 will be marginally more sensitive to pollution than Site 1 and Site 3. However, the scores remained relatively low and indicate an existing level of pollution at all sites. It is likely that the macroinvertebrate assemblages at all 3 sites are tolerant to a moderate level of pollution including changes in water chemistry.

SIGNAL scores were also used to assign a water quality rating at each site (Gooderham and Tsyrlin, 2002). Site 1 immediately downstream of the proposed treated water discharge pipe was classified as “severely polluted” and Site 2 and 3 are classified as ‘moderately polluted’.

6.1.4.2 Potential construction impacts

Potential impacts to aquatic ecology during construction include:

- removal of riparian vegetation with the potential to destabilise the creek bank, cause erosion and loss of habitat
- partial blockage of waterway and fish passage if a coffer dam is required
- general disturbance in the construction footprint
- accidental spills
- unexpected aquatic fauna finds.

The treated water discharge pipe alignment and headwall makes use of existing cleared or sparsely vegetated riparian corridors. The headwall will be immediately downstream of an existing culvert, avoiding additional vegetation clearing. Further, no construction compounds or laydown areas are proposed adjacent to the headwall. The potential disturbance to fish passage from the partial coffer dam is reduced as the watercourse is ephemeral and would likely only facilitate fish passage during heavy rainfall periods. Potential impacts to aquatic ecology during construction will be managed through the mitigation measures in Table 6-11.

6.1.4.3 Potential operation impacts

Additional flow

Additional flow from increasing the existing precautionary and emergency discharges and new AWTS discharge into tributaries of Stringybark Creek can alter the area and structure of available habitat for aquatic organisms, impose hydraulic stress that causes displacement and fragmentation, and disrupt life-cycle cues required for spawning, migration or hatching.

While a change to aquatic habitat from the AWTS discharge is probable, it is unlikely to constitute an adverse impact. The channel downstream of the proposed treated water discharge is capable of conveying high flows, such that a moderate rise in water level will inundate adjacent areas and offset the loss of shallow-water habitat. Evidence of dynamic flows including flood debris on the banks and in-stream log jams, indicates that existing aquatic fauna would be adapted to variable flow regimes and fluctuating habitat availability. Further, an increase in water level will create additional aquatic habitat, which may improve conditions for aquatic fauna. Additional flows are also unlikely to prevent migration of existing aquatic species.

The additional flow from an increase in precautionary and emergency discharges from the existing discharge location is unlikely to cause new or severe impacts to downstream aquatic ecology. This is due to the intermittent nature of the watercourses, the catchment's existing large discharge regime, steep channel gradient, channel roughness and downstream flow attenuation.

A new headwall at the AWTS discharge location will involve concentrating discharges to one point on the creek bank and channel. This could erode and increase suspended solids potentially blanketing the stream substrate and reduce light penetration, compromising ecological processes. However, as discussed in Section 3.1.2, the structure will be designed to dissipate discharge velocities and minimise the potential for erosion and scouring. Further, the channel at the AWTS discharge location is dominated by bedrock and large boulders. The creek bed composition would be suitable to absorb high energy or persistent discharges.

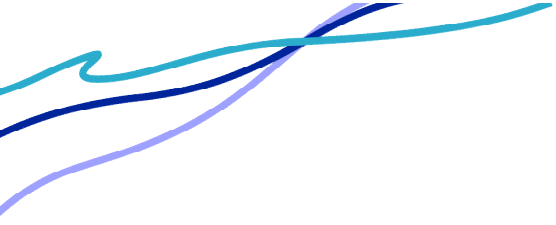
Water quality impacts

Aquatic fauna

Changes to water quality from increases to the existing precautionary and emergency discharge and new AWTS discharge can have detrimental effects on aquatic fauna by inducing physiological stress, reducing growth and reproductive success, and altering community composition and food resources.

The proposal may have a relatively limited effect on the parameters tested compared to other catchment pressures, such as land clearing and residential development. The in-situ water quality results indicate that the aquatic ecology study area is, under current conditions, slightly to moderately disturbed. Accordingly, aquatic fauna downstream of the AWTS discharge location and existing discharge location are likely to be accustomed to water quality conditions outside the ANZECC and ARMCANZ (2000) guideline ranges.

The water quality assessment (BMT, 2026) compared results of the water quality modelling against the ANZG (2018) and the ANZECC and ARMCANZ (2000) guidelines to assess toxicity thresholds for aquatic species. The water quality assessment concluded that the proposal will remain well within ANZECC toxicity guidelines for the captured species in Table 6-15, but ammonia concentrations slightly exceed 'ideal' habitat conditions for



sensitive species (striped gudgeon, Australian smelt, freshwater shrimp). While acute toxicity is highly unlikely, maintaining ammonia as low as practicable is important for protecting sensitive species and preserving ecological integrity, especially for shrimp and smelt that prefer pristine, low-nutrient environments.

The additional species identified from previous studies (shortfin eel, Cox's gudgeon, flathead gudgeon, Macquarie perch, Australian bass) have also been assessed below.

Shortfin eel is tolerant to moderate nutrient loads. However, elevated levels of oxidised nitrogen and ammonium that trigger eutrophication would adversely impact this species. The water quality modelling predicts that oxidised nitrogen will remain below the chronic toxicant value for aquatic ecosystem protection and that ammonia concentrations will remain well below the ANZECC and ARMCANZ trigger values. It is therefore unlikely that the proposal will have an adverse impact on shortfin eel.

There is limited literature addressing Cox's gudgeon's ability to tolerate changes in water quality. However, this species is closely related to striped gudgeons, which can persist in disturbed systems, including under altered water quality conditions such as nutrient enrichment. It would therefore be likely that this species would be tolerant of the modelled changes to water quality.

Flathead gudgeon's also have limited literature available. However, the species has been caught in a range of water bodies with varying water physicochemical parameters, indicating that the species would be tolerant to changes to the parameters. However, as discussed above, modelled ammonia will slightly exceed ideal habitat conditions and should be maintained as low as practicable.

Macquarie perch and Australian bass are commonly found in riverine habitats with deep pools. These species are unlikely to be present within the aquatic ecology study area. However, they would likely occur in the Nepean River downstream. The water quality modelling shows that all parameters will meet the ANZG (2018) DVGs at the Nepean River confluence monitoring point except for nitrate. However, nitrate currently exceeds the DGVs at the Nepean River confluence monitoring point and the proposal is not expected to result in a material change in water quality.

Downstream water quality monitoring is recommended during operation. Refer to mitigation measures in Table 6-11 and Table 6-16.

Macroinvertebrates

The macroinvertebrates immediately downstream of the AWTS discharge location exhibited strong tolerance to degraded water quality and more sensitive families were absent. This may reflect historical upstream disturbance, including extensive residential development. The invertebrates present immediately downstream of the AWTS discharge location are therefore likely to withstand moderate changes in water quality associated with the proposal. Further downstream, overall macroinvertebrate tolerance to pollution is likely to remain high, as they already occur in a moderately polluted environment.

The watercourse downstream of the existing discharge location is likely to be in similar or poorer condition than the upstream sites, as the tributary has been highly modified by construction of the Golf Course, a large stormwater lake and surrounding residential development. The receiving environment is likely to be tolerant of moderate changes in water quality, and an increase in precautionary and emergency discharges is unlikely to

adversely affect the downstream macroinvertebrate assemblages. Further, wetland areas containing emergent aquatic vegetation between the existing discharge and the downstream reach with a defined riparian zone would assist with nutrient uptake and retention, thereby improving water quality prior to downstream transport. Similarly, if precautionary and emergency discharges occur predominantly during higher-flow periods, the discharge would be rapidly diluted, and any potential impacts associated with elevated discharge concentrations would be reduced.

6.1.4.4 Mitigation measures

With the implementation of the mitigation measures below and water quality monitoring mitigation measure in Table 6-11, impacts to aquatic ecology can be adequately managed, and residual impacts are expected to be low.

Table 6-16 Environmental mitigation measures – aquatic ecology

Mitigation measures
Do not use any chemicals that are labelled as ‘harmful to marine life’ or ‘Class 9 Environmentally hazardous’ as part of the proposed activities.
Stabilise and rehabilitate all disturbed areas including topsoiling, revegetation, weed control and maintenance in order to adequately restore and improve the integrity of the riparian corridor.
If a coffer dam is required during construction, it should only span part of the channel width to allow watercourse flow to continue while it is in place. Minimise the duration required for instream works.
During in-stream works (including the duration the coffer dam is in place), ensure sediment controls are in place that prevent sediment plumes from travelling downstream. This may include use of a silt curtain.
In stream works should start gradually to allow time for aquatic fauna to remove themselves.
Engage a suitably qualified ecologist to relocate fauna trapped by the coffer dam.
Minimise duration of in-stream works.
Replace any in-stream aquatic habitat (snags) which need to be moved while undertaking headwall installation works once works are complete.

6.1.5 Terrestrial ecology

A Biodiversity Assessment Report (BAR) was prepared for the proposal (GHD, 2026b). The BAR study area includes a wider area than the construction footprint and is shown on Figure 6-17 to Figure 6-19. The BAR also uses the term ‘locality’ which refers to a 10 km radius of the BAR study area.

The BAR included:

- a desktop assessment including database searches for flora and fauna previously recorded
- flora and fauna field surveys

- likelihood of occurrence assessment for threatened flora and fauna based on the desktop assessment and the field survey
- assessments of significance for those species that are likely to occur (and recorded during the field surveys) in the BAR study area and have a moderate likelihood of a significant impact
- discussion of the potential impacts of the proposal
- identification of site-specific mitigation measures to minimise and mitigate potential impacts of the proposal.

6.1.5.1 Existing environment

Field surveys were carried out on 12-13 February 2026 and 5 March 2026 to ground truth biodiversity values identified during desktop assessment and identify any other threatened biota. Surveys were conducted with reference to current biodiversity assessment guidelines including the Biodiversity Assessment Methodology (BAM). The field surveys focussed on the identification of vegetation types, the presence and extent of threatened ecological communities (TECs) in the BAR study area and an assessment of the value of habitats present for threatened biota. Based on the desktop assessment results, Koala Spot Assessment Technique (SAT) and active searches for the endangered Cumberland Plain Land Snail (*Meridolum corneovirens*) were conducted within the riparian corridor. Anabat surveys to detect microbats were also carried out over one night adjacent to the bridge on Fairway Drive.

Native vegetation throughout the BAR study area has been substantially cleared and modified by historic and ongoing agricultural, industrial and urban development. There are some large tracts of native vegetation that remain in the locality, primarily associated with the riparian corridor of Stringybark Creek, the Nepean River as well as the Upper Nepean State Conservation Area (about 2 km south of the proposal). Other vegetation typically occurs as small fragments scattered throughout a modified landscape.

The proposal contains areas categorised as ‘Certified urban-capable’, ‘Excluded land’ and ‘Avoided land’ in the Wilton Growth Area, under the CPCP (refer to Figure 6-17 to Figure 6-19). Certified urban-capable land is certified for development and does not require further biodiversity assessment under the BC Act or EPBC Act, if it remains consistent with the CPCP and its approvals. Excluded land is land that has not been included in the CPCP and requires biodiversity assessment. Avoided land is land with high biodiversity value not suitable for urban development. However, as discussed in Section 5.3, there are provisions for essential infrastructure which are relevant to the proposal.

Vegetation

Plant community types (PCTs) and vegetation zones within the BAR study area are shown on Figure 6-17 to Figure 6-19 and included in Table 6-17.

The BAR study area also contains 31 planted street trees. Of these, 25 are exotic *Pinus* species, and the remaining 6 are local native species (i.e. *Eucalyptus tereticornis* and *Acacia parramattensis*). Refer to Figure 6-17 to Figure 6-19.

Table 6-17 Vegetation in the construction footprint

PCT ID	Plant community type	Condition	Area in the construction footprint (ha)	BC Act associated TEC status	EPBC Act associated TEC status
3321	Cumberland Shale-Sandstone Ironbark Forest	Good	0.03	CEEC - Shale Sandstone Transition Forest in the Sydney Basin Bioregion	CEEC - Shale Sandstone Transition Forest in the Sydney Basin Bioregion
3321	Cumberland Shale-Sandstone Ironbark Forest	Moderate	0.06	CEEC - Shale Sandstone Transition Forest in the Sydney Basin Bioregion	CEEC - Shale Sandstone Transition Forest in the Sydney Basin Bioregion
3321	Cumberland Shale-Sandstone Ironbark Forest	Low	1.11	CEEC - Shale Sandstone Transition Forest in the Sydney Basin Bioregion	Not listed (does not meet condition thresholds for EPBC Act-listed CEEC)
N/A – Exotic grassland	N/A	N/A	1.32	Not listed	Not listed
N/A – cleared and hardstand areas	N/A	N/A	1.94	Not listed	Not listed

CEEC = critically endangered ecological community

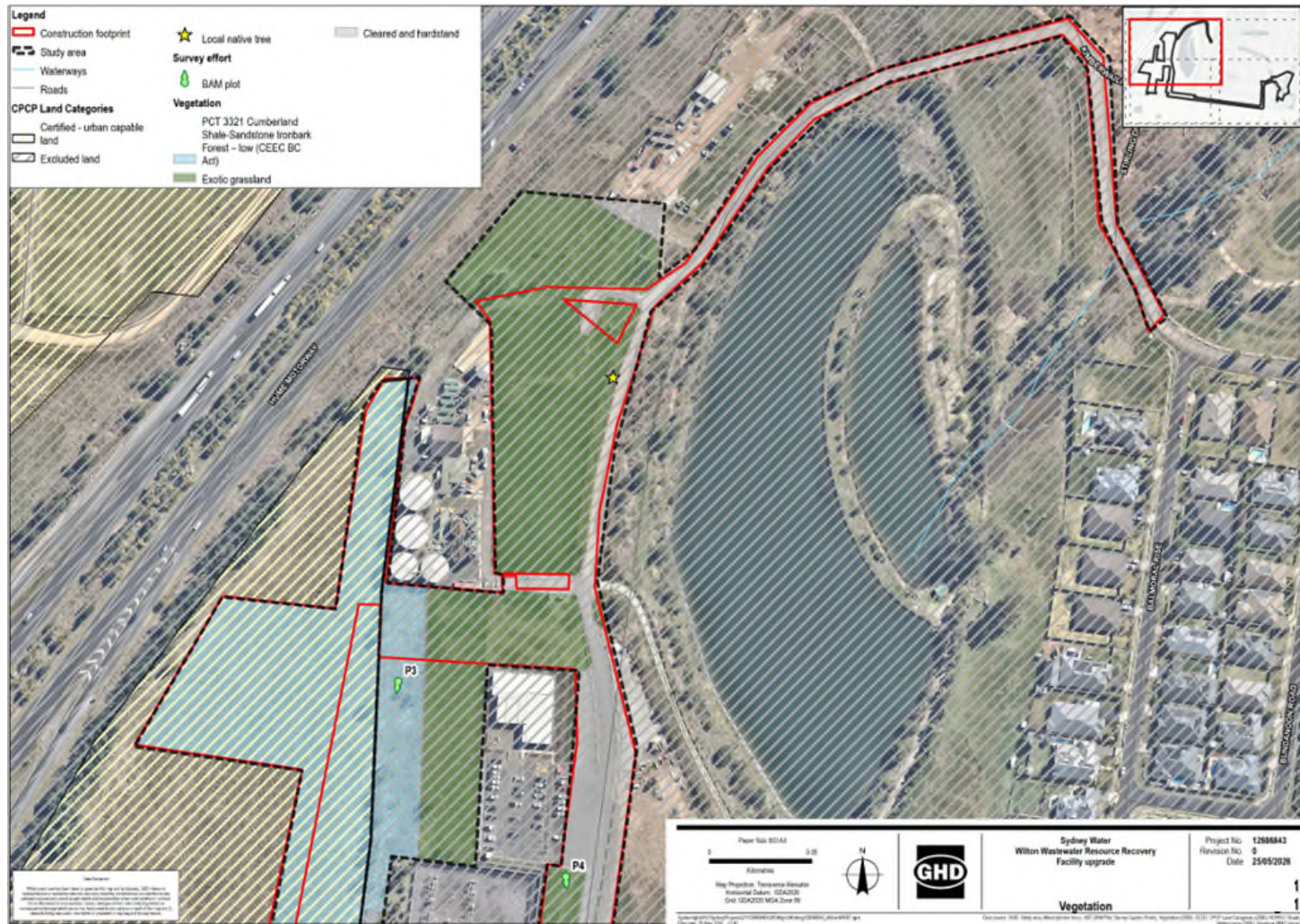


Figure 6-17 PCTs and vegetation zones (1 of 3)

Threatened flora

No threatened flora species were recorded during the field surveys completed for this assessment, nor have any been recorded in the construction footprint in the past. Much of the BAR study area has been subject to clearing for development and associated disturbances, as well as weed invasion, edge effects and changed hydrological regimes, and does not represent suitable habitat for many threatened flora species predicted to occur.

Table 6-18 identifies 8 threatened flora species that have the potential to occur within the BAR study area based on the presence of suitable habitat and number of records within the locality.

Table 6-18 Threatened flora that may occur in the BAR study area

Scientific name	BC Act Status	EPBC Act Status	Likelihood of occurrence
<i>Acacia bynoeana</i>	E	V	Possible
<i>Dillwynia tenuifolia</i>	V	-	Possible
<i>Epacris purpurascens</i> var. <i>purpurascens</i>	V	-	Possible
<i>Grammitis stenophylla</i>	E	-	Possible
<i>Grevillea parviflora</i> subsp. <i>parviflora</i>	V	V	Possible
<i>Pimelea spicata</i>	E	E	Possible
<i>Prasophyllum fuscum</i>	CE	V	Possible
<i>Pultenaea pedunculata</i>	E	-	Possible

V = vulnerable, E = endangered, CE = critically endangered

Fauna

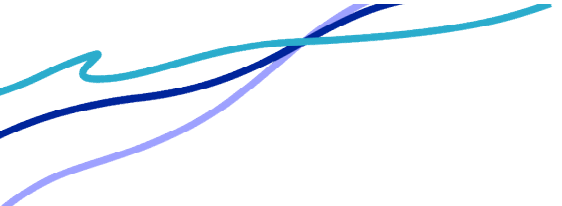
Two threatened fauna species were recorded during the site inspection, the Southern Myotis (*Myotis macropus*) listed as vulnerable under the BC Act and the Grey-headed Flying-fox (*Pteropus poliocephalus*) listed as vulnerable under both the BC Act and EPBC Act (refer to Figure 6-20). Threatened fauna species which could occur, based on habitats in the study area and previous records in the locality, are listed in Table 6-19.

No migratory species were recorded during field surveys. There is potential for migratory woodland bird species to forage on occasion within the BAR study area during their migration to breeding habitats elsewhere. However, habitat in the BAR study area is unlikely to be important habitat for migratory species as it would not support an ecologically significant proportion of the population, is not critical to the lifecycle of these species and is not at the limit of these species' range.

Table 6-19 Threatened fauna that may occur within the BAR study area

Common name	Scientific name	BC Act Status	EPBC Act Status	Likelihood of occurrence
Birds				
Barking Owl	<i>Ninox connivens</i>	V	-	Possible
Black-chinned Honeyeater (eastern subspecies)	<i>Melithreptus gularis gularis</i>	V	-	Possible
Brown Treecreeper (eastern subspecies)	<i>Climacteris picumnus victoriae</i>	V	V	Possible
Diamond Firetail	<i>Stagonopleura guttata</i>	V	V	Possible
Dusky Woodswallow	<i>Artamus cyanopterus cyanopterus</i>	V	-	Likely
Flame Robin	<i>Petroica phoenicea</i>	V	-	Possible
Fork-tailed Swift	<i>Apus pacificus</i>	-	C,J,K	Possible
Gang-gang Cockatoo	<i>Callocephalon fimbriatum</i>	V	-	Possible
Little Eagle	<i>Hieraaetus morphnoides</i>	V	-	Possible
Little Lorikeet	<i>Glossopsitta pusilla</i>	V	-	Possible
Masked Owl	<i>Tyto novaehollandiae</i>	V	-	Possible
Powerful Owl	<i>Ninox strenua</i>	V	-	Possible
Regent Honeyeater	<i>Anthochaera phrygia</i>	CE	CE	Possible
Scarlet Robin	<i>Petroica boodang</i>	V	-	Possible

South-eastern Glossy Black-Cockatoo	<i>Calyptorhynchus lathami lathami</i>	V	V	Possible
South-eastern Hooded Robin	<i>Melanodryas cucullata cucullata</i>	E	E	Possible
Speckled Warbler	<i>Chthonicola sagittata</i>	V	-	Possible
Spotted Harrier	<i>Circus assimilis</i>	V	-	Possible
Square-tailed Kite	<i>Lophoictinia isura</i>	V	-	Possible
Swift Parrot	<i>Lathamus discolor</i>	E	CE	Possible
Turquoise Parrot	<i>Neophema pulchella</i>	V	-	Possible
Varied Sittella	<i>Daphoenositta chrysoptera</i>	V	-	Possible
White-bellied Sea-Eagle	<i>Haliaeetus leucogaster</i>	V	C	Possible
White-throated Needletail	<i>Hirundapus caudacutus</i>	-	V,C,J,K	Possible
Mammals				
Eastern Coastal Free-tailed Bat	<i>Micronomus norfolkensis</i>	V	-	Likely
Eastern False Pipistrelle	<i>Falsistrellus tasmaniensis</i>	V	-	Likely
Greater Broad-nosed Bat	<i>Scoteanax rueppellii</i>	V	-	Likely
Grey-headed Flying-fox	<i>Pteropus poliocephalus</i>	V	V	Recorded
Koala	<i>Phascolarctos cinereus</i>	V	V	Likely
Large Bent-winged Bat	<i>Miniopterus orianae oceanensis</i>	V	-	Possible



Large-eared Pied Bat	<i>Chalinolobus dwyeri</i>	E	E	Possible
Little Bent-winged Bat	<i>Miniopterus australis</i>	V	-	Likely
Southern Myotis	<i>Myotis macropus</i>	V	-	Recorded
Yellow-bellied Sheathtail-bat	<i>Saccolaimus flaviventris</i>	V	-	Likely

Snails

Cumberland Plain Land Snail	<i>Meridolum corneovirens</i>	E	-	Likely
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CE= critically endangered, E= endangered, V= vulnerable, C= Migratory under the China- Australia migratory bird agreement, J= Migratory under the Japan- Australia migratory bird agreement, K= Migratory under the Korea- Australia migratory bird agreement.



Figure 6-20 Fauna survey locations, habitat features, threatened fauna

Priority Weeds

Plant species identified as ‘priority weeds’ under the *Biosecurity Act 2015* for the Greater Sydney region were recorded in the BAR study area and are listed in Table 6-20 with their associated biosecurity duty.

Table 6-20 Priority weeds in the BAR study area

Scientific name	Common name	Requirements
<i>Olea europaea</i> subsp. <i>cuspidata</i>	African Olive	Regional Recommended Measure An exclusion zone is established for all lands in Blue Mountains City Council and Central Coast local government areas. The remainder of the region is classified as the core infestation area. Whole region: The plant or parts of the plant are not traded, carried, grown or released into the environment. Exclusion zone: The plant is eradicated from the land and the land kept free of the plant. Core infestation area: Land managers prevent spread from their land where feasible. Land managers reduce impacts from the plant on priority assets.
<i>Asparagus asparagoides</i>	Bridal Creeper	Prohibition on dealings Must not be imported into the State or sold *this requirement also applies to the Western Cape form of bridal creeper.
<i>Opuntia</i> species	Prickly pears - Opuntias	Prohibition on certain dealings Must not be imported into the state, sold, bartered, exchanged or offered for sale. For all <i>Opuntia</i> species except for <i>Opuntia ficus-indica</i> (Indian fig).
<i>Rubus fruticosus</i> species aggregate	Blackberry	Prohibition on dealings Must not be imported into the State or sold
<i>Senecio madagascariensis</i>	Fireweed	Prohibition on dealings Must not be imported into the State or sold

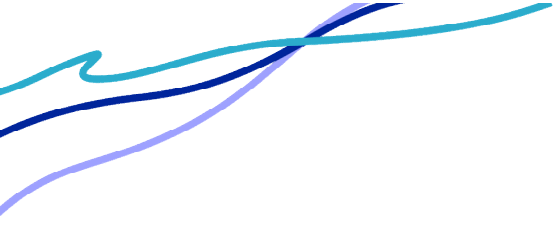
6.1.5.2 Potential impacts

Vegetation

The potential impacts of the proposal on flora and fauna will primarily be due to vegetation clearing in the construction footprint, with associated impacts on habitat for threatened flora and fauna species. Impacts will include the removal of a total of 1.20 ha of native vegetation (refer to Table 6-21). Of this total, 0.12 ha is within excluded land and 0.08 ha is within avoided land.

The proposal will also remove up to 25 exotic planted street trees in the construction footprint. However, this is considered a worst-case scenario as trenching for the treated water discharge pipe will occur on the southern side of Condell Park Road (opposite side of the street trees).

An assessment of significance (AoS) pursuant to Section 7.3 of the BC Act was prepared for the proposed impacts on Shale Sandstone Transition Forest in the Sydney Basin Bioregion on excluded land and avoided



land. Impacts resulting from the proposal have also been considered with reference to the EPBC Act *Significant Impact Guidelines 1.1 Matters of National Environmental Significance* (significant impact guidelines). The assessment found that the proposal is unlikely have a significant impact on the local or regional occurrence of the CEEC.

Table 6-21 Direct impacts on vegetation in the construction footprint

Vegetation types	BC Act status	EPBC Act status	Vegetation within certified – urban capable land (ha)	Vegetation within excluded land (ha)	Vegetation within avoided land (ha)	Total (ha)
PCT 3321 - Cumberland Shale-Sandstone Ironbark Forest – good condition	Shale Sandstone Transition Forest in the Sydney Basin Bioregion	Shale Sandstone Transition Forest of the Sydney Basin Bioregion	0.0	0.0	0.03	0.03
PCT 3321 - Cumberland Shale-Sandstone Ironbark Forest – moderate condition	Shale Sandstone Transition Forest in the Sydney Basin Bioregion	Shale Sandstone Transition Forest of the Sydney Basin Bioregion	0	0.01	0.05	0.06
PCT 3321 - Cumberland Shale-Sandstone Ironbark Forest – low condition	Shale Sandstone Transition Forest in the Sydney Basin Bioregion	Not listed	1.0	0.11	0.0	1.11
Exotic Grassland	N/A	N/A	0.0	1.32	0.0	1.32
Total area of vegetation			1.0	1.44	0.08	2.52
Total area of native vegetation			1.0	0.12	0.08	1.20

Threatened flora

As outlined in Table 6-18, 8 threatened flora species have a 'possible' likelihood of occurrence within the BAR study area based on the presence of suitable habitat. Given that suitable habitat is present, the proposal may remove potential habitat for these flora species. However, due to the lack of previous records of these species from the BAR study area and the relatively small areas of potential habitat that will be removed in the construction footprint, the proposal is considered to have a low likelihood of a significant impact on these species.

Threatened fauna

The proposal will involve native vegetation removal in excluded and avoided land, which represents potential habitat for some threatened fauna species. Two threatened fauna species were recorded during the field survey and 8 threatened fauna species are considered to have a 'likely' chance of occurrence in the BAR study area. Of these species, 6 have a moderate potential for impact (refer to Table 6-22).

While not assessed further, it should be noted that the proposal will also result in removal of up to 1 ha of threatened fauna habitat in certified-urban capable land.

Table 6-22 Threatened fauna species with the highest potential for impact

Common name	Impact in the construction footprint	Potential for impact
Birds		
Dusky Woodswallow	Removal of 0.09 ha of potential foraging habitat from excluded and avoided lands (PCT 3321 moderate and good conditions).	Low. Removal of a small area of potential foraging habitat.
Mammals		
Eastern Coastal Free-tailed Bat	Removal of 0.20 ha of potential habitat from excluded and avoided lands (all occurrences of native vegetation). Removal of one hollow-bearing tree that represent potential breeding and roosting habitat.	Moderate. Removal of potential breeding and roosting habitat. Removal of a small area of potential foraging habitat.
Eastern False Pipistrelle	Removal of 0.20 ha of potential habitat from excluded and avoided lands (all occurrences of native vegetation). Removal of one hollow-bearing tree that represent potential breeding and roosting habitat.	Moderate. Removal of potential breeding and roosting habitat. Removal of a small area of potential foraging habitat.
Greater Broad-nosed Bat	Removal of 0.20 ha of potential habitat from excluded and avoided lands (all occurrences of native vegetation). Removal of one hollow-bearing tree that represent potential breeding and roosting habitat.	Moderate. Removal of potential breeding and roosting habitat. Removal of a small area of potential foraging habitat.
Grey-headed Flying-fox	Removal of 0.09 ha of potential foraging habitat from excluded and avoided lands (PCT 3321 moderate and good conditions).	Low. No removal of breeding habitat. Highly mobile species with a large home range. Removal of a small area of known foraging habitat.

No roost camps in the study area. No impact to any breeding habitat.

Koala	Removal of 0.09 ha of potential foraging habitat from excluded and avoided lands (PCT 3321 moderate and good conditions).	Low. Removal of a small area of potential foraging habitat.
Large Bent-winged Bat	Removal of 0.20 ha of potential habitat from excluded and avoided lands (all occurrences of native vegetation). No impact to breeding habitat.	Low. Removal of a small area of potential foraging habitat.
Southern Myotis	Removal of 0.03 ha of potential foraging habitat from avoided land (PCT 3321 good condition only). Removal of one hollow-bearing tree that represent potential breeding and roosting habitat.	Moderate. Removal of potential breeding and roosting habitat. Removal of a small area of potential foraging habitat.
Yellow-bellied Sheathtail-bat	Removal of 0.20 ha of potential habitat from excluded and avoided lands (all occurrences of native vegetation). Removal of one hollow-bearing tree that represent potential breeding and roosting habitat.	Moderate. Removal of potential breeding and roosting habitat. Removal of a small area of potential foraging habitat.
Gastropod		
Cumberland Plain Land Snail	Removal of 0.03 ha of potential foraging habitat from avoided land (PCT 3321 good condition only).	Moderate. Largely sedentary species unable to avoid construction impacts. Potential for mortality of individuals during construction.

Given the proposal has the potential to have a moderate impact on the Cumberland Plain Land Snail and hollow-dependant microbat species, AoS were prepared for these species. AoSs were also prepared for the Grey-headed Flying-fox as it was recorded during field surveys, and for the Koala given the large number of records in the locality and the existing connectivity to extensive areas of remnant native vegetation mapped as Koala habitat. Impacts to the Grey-headed Flying-fox and Koala were also considered in reference to the outcomes of the EPBC Act significant impact guidelines. The proposal is unlikely to have a significant impact on any threatened fauna listed under the BC or EPBC Act.

Indirect impacts

The proposal has the potential for the following indirect impacts:

- wildlife connectivity and habitat fragmentation
- weed invasion and edge effects
- soil and water pollution
- introduction of pests and pathogens
- noise, light and vibration.

With implementation of the mitigation measures in Section 6.1.5.3, indirect impacts from the proposal are expected to be minor.

Avoiding and minimising impacts

As discussed in Section 2.2.5, Sydney Water assessed multiple alignment options for the treated water discharge pipe. Options to the north in Allens Creek and to the south in the Nepean River were discounted due to the requirement to clear substantial native vegetation, including potential Koala habitat. The remaining options were assessed against criteria such as constructability, geomorphology, and potential impacts on water quality and conservation areas, informing shortlisted alignments for further investigation.

To inform the shortlisted options assessment, early biodiversity constraints mapping was carried out to classify areas of low and high biodiversity value in accordance with the CPCP. Option 4 was initially preferred as it traversed exotic grassland and native woodland associated with the Shale Sandstone Transition Forest CEEC near the tributary of Stringybark Creek and was outside of avoided land. However, it would impact conservation areas managed under the Bingara Gorge Environmental Management Plan, as well as Southern Myotis (*Myotis Macropus*) roosting habitat near the bridge on Fairway Drive. As such, Sydney Water adopted an alternative alignment to the south to avoid impacts (Option 5, i.e. the preferred option). The construction footprint for the preferred option has been minimised as much as possible, including removal of a proposed stockpile area in avoided land. Despite these refinements, some impacts to native vegetation, particularly within riparian zones at the eastern end of the construction footprint, are unavoidable due to engineering constraints and the need to access the creek line.

Biodiversity offsets

Sydney Water's Biodiversity Offset Guide (SWEMS0019.13) identifies offset options for Sydney Water activities that fall outside statutory requirements. Table 6-23 and Table 6-24 includes a summary of non-statutory offset calculations for the proposal. Only vegetation impacts in excluded land and avoided land require offsetting under the Biodiversity Offset Guide.

Table 6-23 Summary of non-statutory native vegetation offsets

Biodiversity value	Impact within excluded land	Impact within avoided land	Offset multiplier (moderate impact)	Offset requirement
Shale Sandstone Transition Forest	0.12 ha	0.08 ha	3	0.60 ha

Table 6-24 Summary of non-statutory tree offsets

Tree type	Offset multiplier	Number on site	Offset requirement
Locally native	3	6	18
Exotic	1	25	25
Tree hollow	2 nest boxes or salvaged hollows (for each removed)	1	2

Table 6-25 outlines the offsetting options available to Sydney Water, ranked by offsetting priority. Where possible, it is the first preference for offsetting to occur on the site of impact. If this is not achievable, a nearby site either owned by Sydney Water or the local council (Wollondilly Shire Council) should be chosen. If this is not achievable, the purchase or retirement of biodiversity credits from a Biodiversity Stewardship Site should be considered.

Sydney Water proposes to offset vegetation at a program level, offsetting all vegetation impacts from construction of drinking water, recycled water and wastewater in the Wilton Growth Area. The WRRF and a new reservoir site in South East Wilton have been identified as potential offset sites.

Table 6-25 Biodiversity offsetting options

Residual loss of biodiversity values resulting from works	Offset options - moderate impacts
Threatened vegetation Threatened flora and/or fauna habitat Non-threatened native vegetation	- On site: native revegetation or bushland restoration AND/ OR - Nearby site: native revegetation or bushland restoration OR - Sydney Water offset site bushland restoration OR - Purchase and retire biodiversity credits generated by Sydney Water Offset sites or from the open market.
Tree removal	- On site: tree replacement AND/ OR - Nearby site: tree replacement.

6.1.5.3 Mitigation measures

With the implementation of the mitigation measures below, impacts to terrestrial ecology can be adequately managed, and residual impacts are expected to be low.

Table 6-26 Environmental mitigation measures – terrestrial ecology

Mitigation measures

Provided it is essential for delivering the project, Sydney Water's Project Manager can approve the following vegetation removal and tree trimming, without additional environmental assessment (but only after consultation with the Environmental and Community Representatives and affected landowners). Sydney Water considers vegetation removal in these circumstances has minimal environmental impact.

- Any minor:
 - vegetation trimming or
 - removal of exotic vegetation or
 - removal of planted native vegetationwhere the vegetation is not a threatened species (including a characteristic species of a threatened community or population), heritage listed, in declared critical habitat or in a declared area of outstanding biodiversity value.
- Any removal of remnant vegetation where there is no net change to environmental impact (e.g. a different area of vegetation is removed but the total area is the same or less than assessed in the REF).

Written explanation of the application of this clause (including justification of the need for trimming or removal and any proposed revegetation) should be provided when seeking Project Manager approval. Any impacts to native vegetation and trees must be offset in accordance with the Biodiversity Offset Guideline ([SWEMS0019.13](#)).

Note that this mitigation measure does not apply to vegetation within avoided land mapped under the CPCP.

Pre-clearance surveys will be undertaken by a qualified ecologist and the required survey methodology will be developed for target species as part of the CEMP.

Surveys should include:

- Pre-clearing surveys for the Cumberland Plain Land Snails, with any located individuals to be relocated to appropriate habitat adjacent to the construction footprint.
- Pre-clearing surveys for Koalas. If Koalas are identified, implement a tree-felling protocol and translocation plan as required.
- A procedure for clearing potential habitat, including hollow-bearing trees and stags (if required).

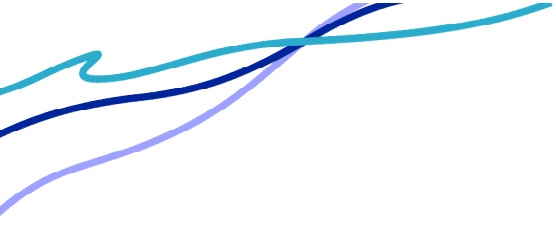
An arborist must be engaged to advise on the ability to retain trees within the construction footprint and protect trees outside the construction footprint with protective measures, before construction commences.

If trees within the construction footprint can be retained, protect the trees in accordance with the requirements of Australian Standard 4970-2009 for the Protection of Trees on Development Sites. For example, do not damage tree roots unless absolutely necessary, and where roots >50 mm are impacted within the Tree Protection Zone, engage a qualified arborist to maintain structural integrity and tree health.

If more than 10% of the Tree Protection Zone is to be affected, a suitably qualified and experienced arborist would be required to advise on the ability for the tree to be retained and survive.

Vegetation removal must not occur until:

- the area to be removed has been physically delineated with signage and high visibility fencing. Fencing should be designed to allow fauna to exit the site during clearing activities
- the Delivery Contractor's Environmental Representative has confirmed consistency with approval documentation
- pre-clearing surveys have been completed, if relevant and
- Sydney Water Project Manager has provided written authorisation to commence clearing.



Implement hygiene protocols to prevent the introduction and spread of weed propagules and soil pathogens. This will include exclusion zones around retained areas of native vegetation. Weed species will be managed in accordance with the DPIE *Hygiene Guidelines for invasive plants and pathogens (2020)*.

Weed management during construction and operation of the project will take into account relevant guidance in the CPCP's Weed Control Implementation Strategy.

Any priority weeds will be managed according to the requirements of the *NSW Biosecurity Act 2016*.

Record Pesticides and Herbicides use in accordance with [SWEMS0017](#).

Install temporary Koala-exclusion fencing before construction within the riparian corridor and include appropriate access treatments such as gates or koala bridges to ensure the integrity and connectivity of koala corridors is maintained.

Minimise vegetation clearance and disturbance, including impacts to standing dead trees and riparian zones, as far as possible. Where possible, limit clearing to trimming rather than the removal of whole plants.

Clearing of mature and hollow-bearing trees must be avoided where possible. Any additional hollow-bearing trees identified during pre-clearing surveys or prior to construction should be retained if possible, and if not, hollows should be salvaged and relocated into adjacent vegetation where practical.

In areas of intact native vegetation, large pieces of fallen timber (e.g. with a diameter of >20 cm) within the construction footprint should be salvaged and reinstated following construction, where practical.

Stockpiles of fill or vegetation should be placed within existing cleared areas (and not within areas of adjoining native vegetation).

All open trenching will be backfilled, fenced off or covered (e.g. with boards) at the completion of construction each day to minimise the risk of injury or mortality to animals as a result of falling into the excavated trench line.

Open trenches will be checked each morning, before the start of construction, to salvage any fauna that have fallen in, and move them to a safe (and appropriate) nearby location. Protocols will be developed to deal with the removal of injured or dangerous animals (e.g. snakes).

If any threatened species (flora or fauna) is discovered during the works, stop work immediately and notify the Sydney Water Project Manager. Allow fauna to move away un-harassed. If fauna fails to move away on its own, engage a local wildlife rescue service or the ecologist to assist with fauna removal and rescue.

Work will only recommence once the impact on the species has been assessed, and appropriate control measures implemented.

Salvage and relocation of habitat features (e.g. leaf litter, hollow logs and branches) into adjacent areas of retained vegetation, taking care not to spread any weed propagules or material.

If any damage occurs to vegetation outside of the construction footprint (as shown in the CEMP), notify the Sydney Water Project Manager and Environmental Representative so that appropriate remediation strategies can be developed.

Offset residual impacts to native vegetation and trees in accordance with the Biodiversity Offset Guideline (SWEMS0019.13).

If replanting near Sydney Water pipelines refer to '*Which trees can damage wastewater pipes?*' link from [Sydney Water website](#) to help identify suitable species.

Map and report native vegetation clearing greater than 0.01 ha in extent (and any associated rehabilitation) to the Sydney Water Environmental Representative. Track vegetation clearing as per [SWEMS0015.26 Contractor Native Vegetation Clearing and Rehabilitation template](#).

Notify potentially affected residents of any tree removal.

A Total Fire Ban Exemption is required for all non-essential work in TOBAN periods.

Staff and contractors should use the Sydney Water Total Fire Ban Exemption Framework to determine exemption permissibility and approval pathway.

6.1.6 Heritage

6.1.6.1 Aboriginal heritage

An Aboriginal Heritage Due Diligence (AHDD) assessment identified potential Aboriginal heritage impacts through desktop assessments and on-site investigations (KNC, 2026).

The AHDD study area includes a wider area than the construction footprint and is shown on Figure 6-21.

Existing environment

A search of the Aboriginal heritage information management system (AHIMS) database and a review of prior Aboriginal heritage studies identified several Aboriginal heritage sites in the region (Figure 6-21). Aboriginal sites recorded in the region consist of low density artefact scatters, isolated finds and rock shelter sites with art, archaeological deposit and/or archaeological potential. These have mostly been identified on elevated landforms in proximity to major creeks and their tributaries. However, there are no recorded sites in the AHDD study area.

Background research and previous investigations identified a [REDACTED] [REDACTED] (Figure 6-22). No new Aboriginal objects or Aboriginal archaeological sites were identified within the AHDD study area during site inspection.

One local heritage item [REDACTED] [REDACTED] [REDACTED]

However, the item is not located within the AHDD study area as no Aboriginal shelter sites associated with the item have been recorded within the AHDD study area.

Archaeological evidence suggests that while Aboriginal objects are known to occur in and near the AHDD study area, the likelihood of intact subsurface deposit will vary significantly based on the level of environmental and anthropomorphic disturbance. The majority of the AHDD study area was found to have been disturbed and modified by construction of the existing WRRF, earthmoving activities, past and current residential development and existing water and utilities related infrastructure.

This information has been redacted to protect sensitive Aboriginal heritage information.

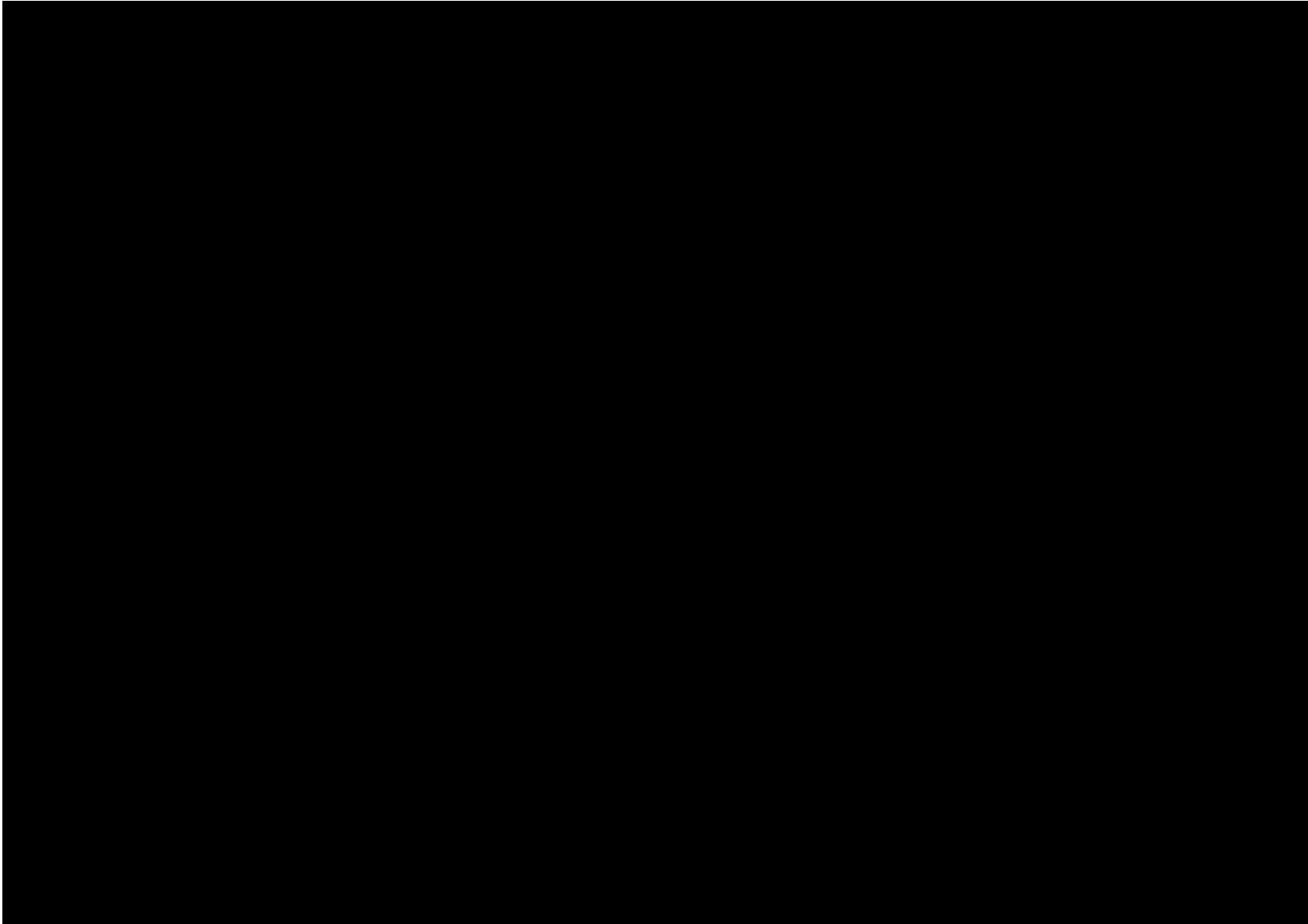


Figure 6-21 Aboriginal heritage - AHIMS search

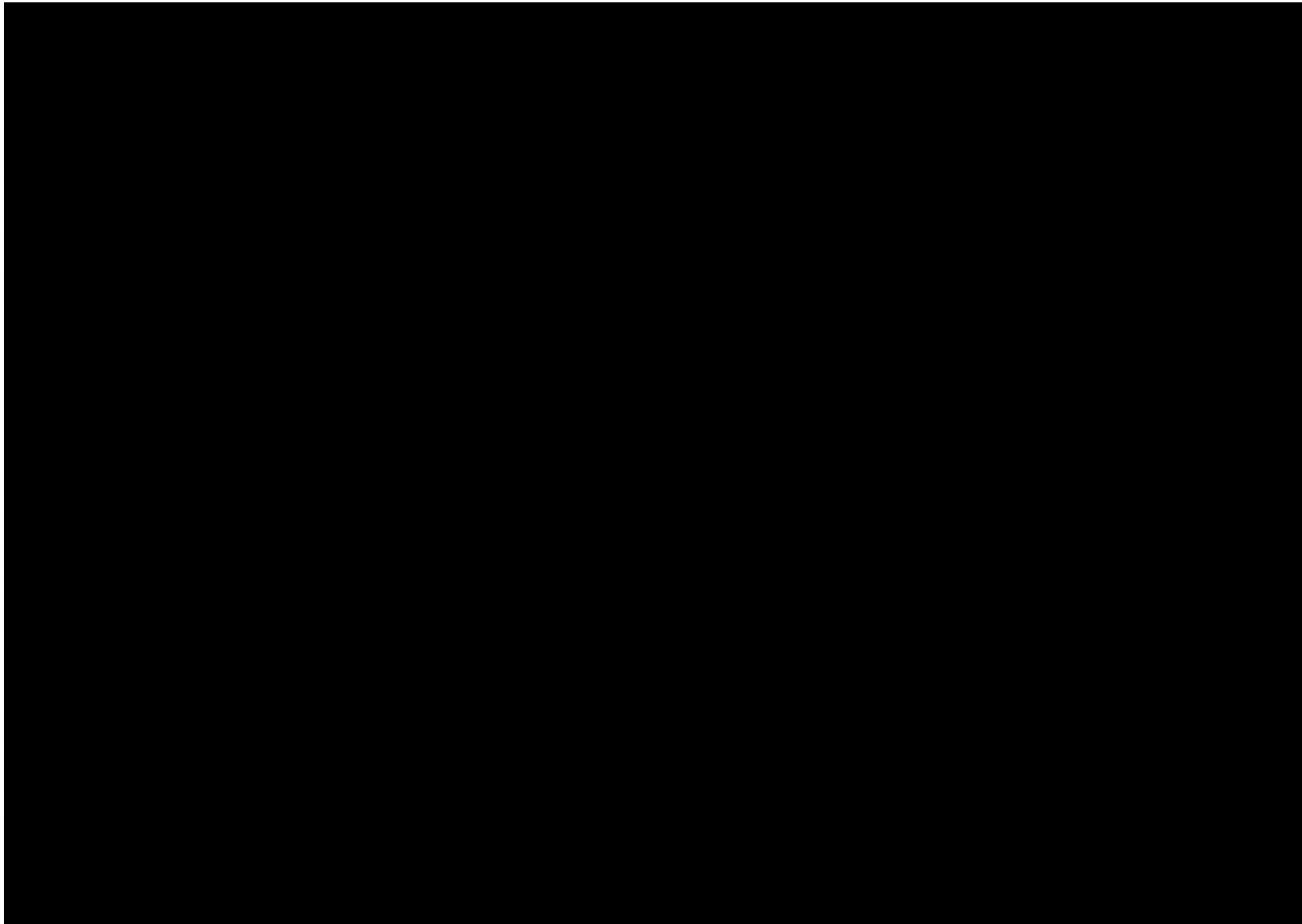
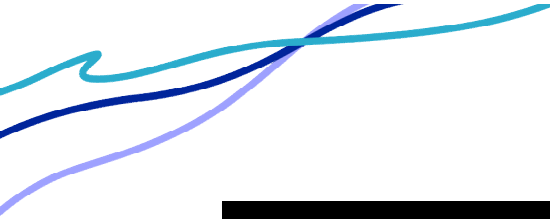


Figure 6-22 Results of the AHDD

Potential impacts

Work will largely be occurring in areas with evidence of historic widespread clearing, agricultural use, and ground disturbance. Vegetation removal and ground disturbance in previously undisturbed areas will be avoided where possible.

As discussed in Section 3.3.2, low impact in-stream intervention works will be required [REDACTED]

[REDACTED]. The construction methodology and footprint has been designed to avoid impact to these sites. Provided that works remain within the AHDD study area, there are no further Aboriginal archaeological constraints to the proposal and according to the Heritage NSW *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales*, and works may proceed with caution.

6.1.6.2 Non-Aboriginal heritage

Existing environment and potential impacts

There are no non-Aboriginal heritage-listed items within 200 m of the proposal. The proposal will not impact any listed heritage items.

6.1.6.3 Mitigation measures

With the implementation of the mitigation measures below, impacts to heritage can be adequately managed, and residual impacts are expected to be negligible.

Table 6-27 Environmental mitigation measures – heritage

Mitigation measures

Sydney Water and the Delivery Contractor will avoid the identified areas of archaeological sensitivity and the registered location of [REDACTED].

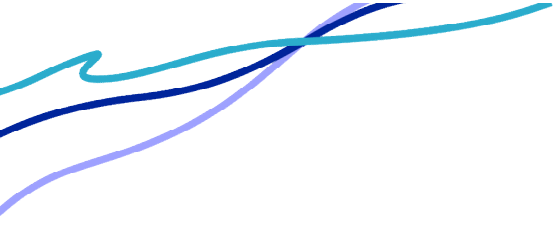
In-stream intervention works in the tributaries of Stringybark Creek will not involve excavation or vegetation removal. Materials and equipment will be carried on foot and installed by hand.

Do not make publicly available or publish, in any form, Aboriginal heritage information on sites / potential archaeological deposits, particularly regarding location.

Repeat the basic AHIMS search if it is older than 12 months. Conduct additional assessment if new sites are registered and could be impacted by the works.

If any Aboriginal object or non-Aboriginal relic is found, cease all excavation or disturbance in the area and notify Sydney Water Project Manager in accordance with [SWEMS0009](#).

Sydney Water will prepare a toolbox talk to inform contractors about the heritage significance of the heritage sites near the construction footprint as part of the general site induction package. The induction would identify why the sites are significant, the contractors' statutory obligations relating to heritage and to unexpected finds. It will include protection methods to be used during construction to prevent accidental damage during construction works.



6.1.7 Noise and vibration

A Noise and Vibration Impact Assessment (NVIA) was prepared for the proposal (GHD, 2026a) and summarised below.

6.1.7.1 Existing environment

The nearest sensitive receivers potentially impacted by the construction of the project are considered rural residential receivers for the purposes of the assessment. Other sensitive receivers in the NVIA study area include commercial and industrial land uses, active recreational areas and educational facilities. The existing noise environment comprises rural land uses affected by road traffic noise, with residential dwellings near a road.

Three noise catchment areas (NCAs) have been defined for the proposal to group areas based on the types of sensitive receivers present and the ambient acoustic environments (Figure 6-23).

Background noise monitoring was carried out at 2 representative residential receiver locations between 17-28 February 2025 (refer to Figure 6-23). Data for this assessment has been supplemented with noise monitoring data gathered as part of a nearby project (refer to monitoring location NM3, Figure 6-23).

The monitoring results have been used to establish NCA specific rating background noise levels (RBLs). Construction noise management levels (NMLs) were then derived using the RBLs and criteria from the *Interim Construction Noise Guideline* (ICNG) (DECC NSW, 2009).

The construction NMLs during recommended standard hours represent a noise level that will require mitigation measures if exceeded. Refer to Table 6-28 for the NMLs.

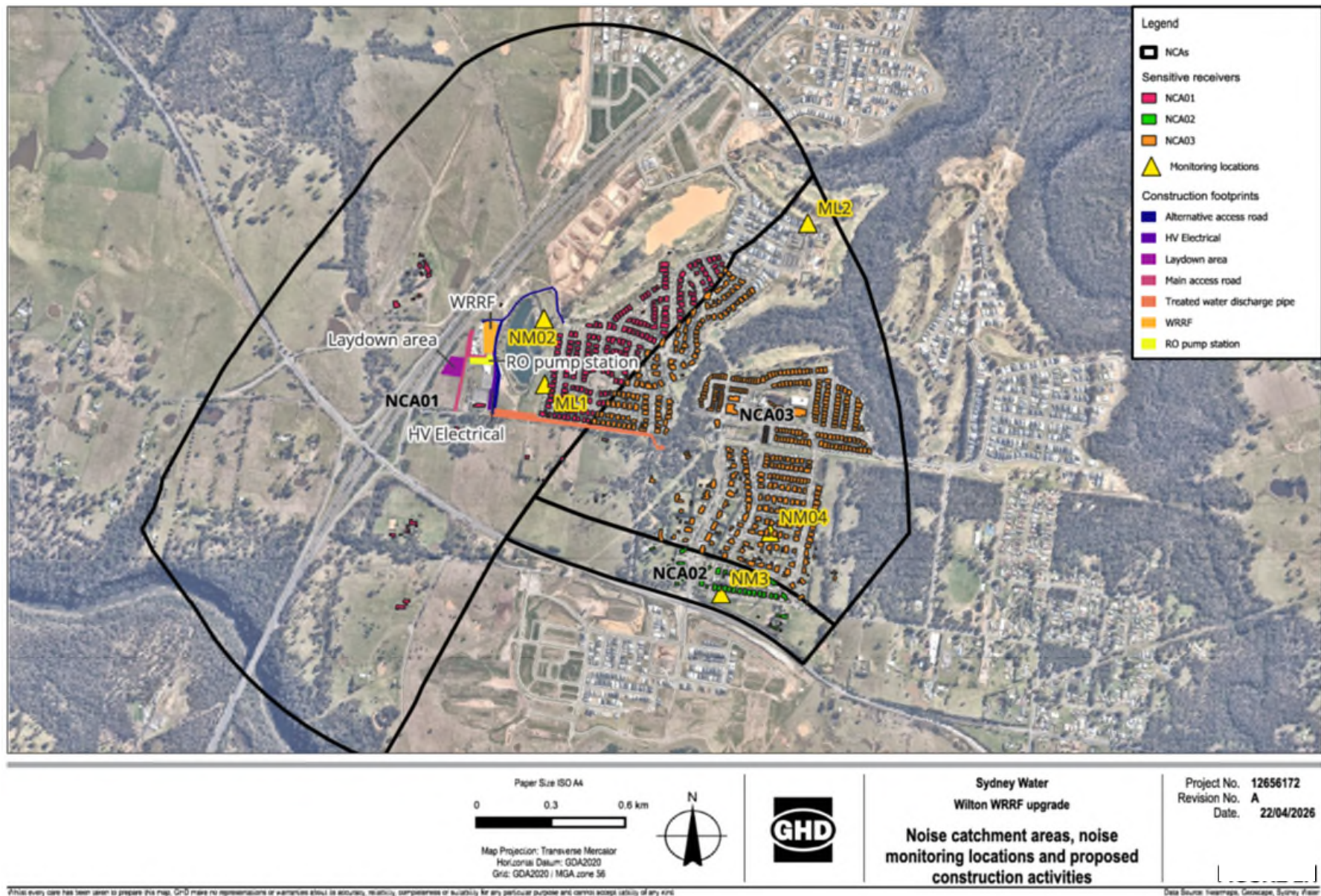


Figure 6-23 Noise catchment areas

Table 6-28 Construction noise management levels

Construction noise management levels, $L_{Aeq,15\text{ min}}$ dBA*					
Receiver type	Recommended standard hours ¹		Outside recommended standard hours ² (noise affected)		
	Noise affected	Highly noise affected	Day	Evening	Night
Residential (NCA01)	50	75	45	45	45
Residential (NCA02)	58	75	53	46	39
Residential (NCA03)	45	75	40	37	35
Educational facilities	55 (external) – when in use ³				
Active recreation areas	65 (external) – when in use				
Commercial	70 (external) – when in use				
Industrial	75 (external) – when in use				

* $L_{Aeq,15\text{ min}}$ = The A-weighted equivalent continuous (energy average) sound pressure level of the construction works under consideration over a 15-minute period and excludes other noise sources such as from industry, road, rail and the community. dBA = A-weighted decibels.

Note 1: recommended standard hours:

- Monday to Friday: 7 am to 6 pm
- Saturday: 8 am to 1 pm
- No work on Sundays or public holidays.

Note 2: outside recommended standard hours (i.e. out of hours work (OOHW)):

- Day - Saturday 1pm to 6pm and Sunday 8am to 6pm
- Evening - Monday to Friday between 6pm to 10pm
- Night - Monday to Friday between 10pm to 7am.

Note 3: Based on 10 dB attenuation through an open window to achieve an internal level of 45 dBA.

The WRRF operates under an EPL, which includes noise limits at specific monitoring points (refer to Figure 6-24).

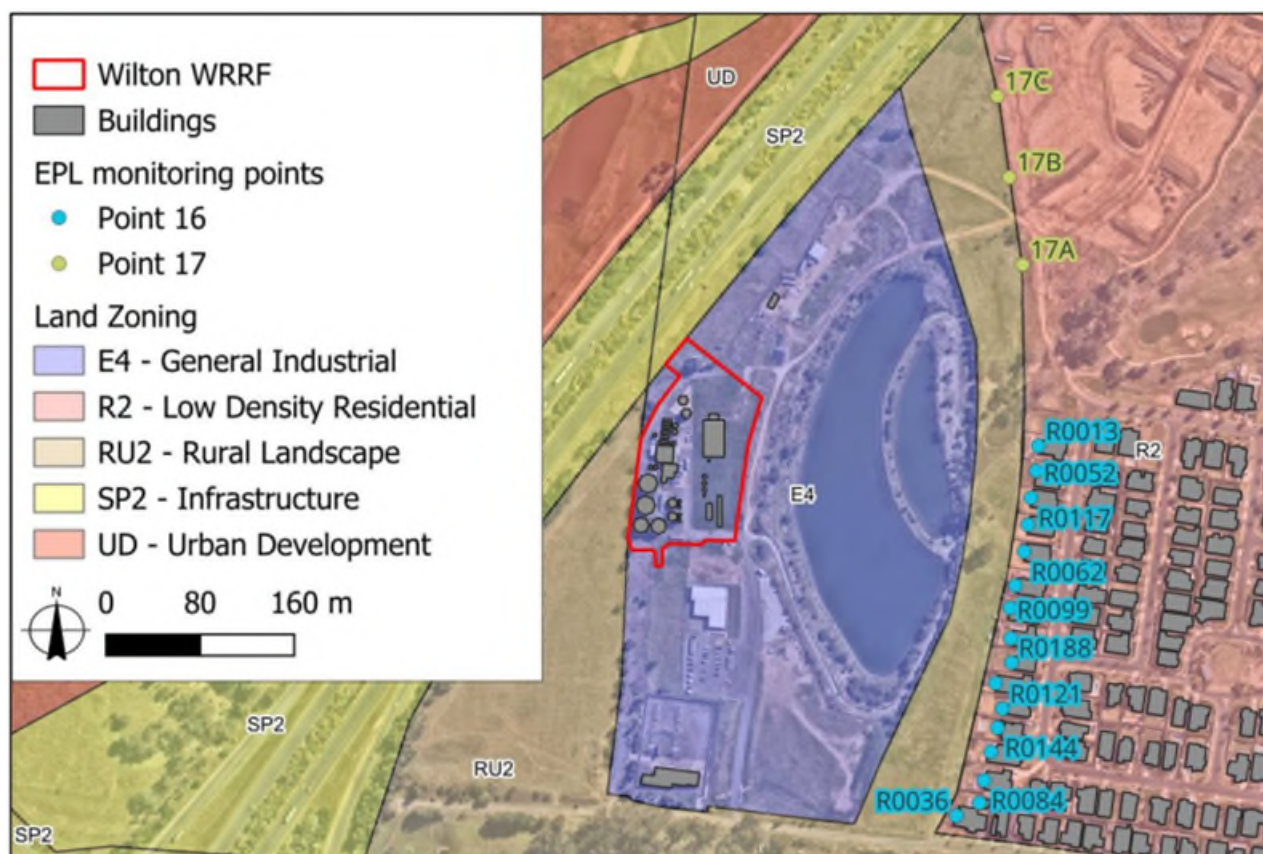


Figure 6-24 EPL assessment locations

The Noise Policy for Industry (NPfI) (EPA, 2017) provides guidance on the assessment of operational noise impacts. The NPfI includes both intrusiveness and project amenity noise levels that are designed to protect receivers from noise significantly louder than the background level, and to limit the total noise level from industry near a receiver. The NPfI project noise trigger levels (PNTLs) provide an objective for assessing a project and are not mandatory limits required by legislation. The PNTLs assist the regulatory authorities to establish licensing conditions.

The PNTLs reflect the most stringent noise level requirements derived from the intrusiveness and project amenity noise level. The PNTLs are provided in Table 6-29.

Table 6-29 Operational project noise trigger levels

NCA	Receiver type	Assessment period ¹	Intrusive noise level $L_{Aeq,15\text{ min}}$ dBA	Project amenity noise level ² $L_{Aeq,15\text{ min}}$ dBA	Project noise trigger level $L_{Aeq,15\text{ min}}$ dBA
NCA01	Rural residential receivers	Day	45	48	45
		Evening	45	43	43
		Night	45	38	38
	Suburban residential receivers	Day	45	53	45
		Evening	45	43	43

		Night	45	38	38
		Day	53	48	48
	Rural residential receivers	Evening	46	43	43
		Night	39	38	38
NCA02		Day	53	53	53
	Suburban residential receivers	Evening	46	43	43
		Night	39	38	38
		Day	40	48	40
	Rural residential receivers	Evening	37	43	37
		Night	35	38	35
NCA03		Day	40	53	40
	Suburban residential receivers	Evening	37	43	37
		Night	35	38	35
	Commercial premises	When in use	N/A	63	63
	Industrial premises	When in use	N/A	68	68
	Active recreation	When in use	N/A	53	53
	Educational premises	When in use	N/A	45	45

Note 1: The NPfI defines time periods as follows:

- Day as 7 am to 6 pm Monday to Saturday and 8 am to 1 pm Sunday & Public Holidays
- Evening as 6 pm to 10 pm
- Night as the remaining periods.

Note 2: The project amenity noise levels ($L_{Aeq,15min}$) have been calculated by subtracting 5 dB from the recommended amenity noise levels and applying a 3 dB addition to the $L_{Aeq,period}$ noise level to convert the amenity noise level to a $L_{Aeq,15min}$.

6.1.7.2 Potential construction impacts

Key noise and vibration generating activities for the proposal include:

- WRRF upgrade works
- construction of the treated water discharge pipe
- construction and use of compounds and access roads

- HV electrical works
- equipment vibration.

Construction activities of the treated water discharge pipe and HV electrical works will progress along their respective alignments. Most of the works are proposed to be undertaken during standard hours. However, where required, some activities such as concreting works, installation of formwork and reinforcement and occasional deliveries to the compound will occur outside standard hours, which is referred to as out-of-hours works (OOHW).

Construction noise

A noise model was prepared based on different scenarios including construction timing, equipment used and methodology. The model was used to predict construction noise levels at sensitive receivers for each construction scenario. The predicted construction noise levels were compared against the established NMLs to determine the extent of potential exceedances during construction activities.

Table 6-30 and Table 6-31 present the number of sensitive receivers where NMLs are exceeded and are potentially impacted during standard hours and OOHW.

It should be noted that the only industrial receiver is predicted to exceed the NML (Wilton Zone Substation at 152 Condell Park Road) during the treated water discharge pipe and HV electrical construction activities.

Table 6-30 Summary of construction noise impacts for all NCAs - standard hours

Construction scenario	Number of receivers subject to clearly audible noise (1-10 dBA above NML)	Number of receivers subject to moderately intrusive noise (10-20 dBA above NML)	Number of receivers subject to highly intrusive noise (>20 dBA above NML)	Number of highly noise affected receivers (>75 dBA)
WRRF upgrade – early works				
CS01 (excavation)	19	0	0	0
CS02 (backfilling)	33	0	0	0
CS03 (pipe installation)	3	0	0	0
WRRF upgrade – main works				
CS04 (excavation)	3	0	0	0
CS05 (backfilling)	32	0	0	0
CS06 (concreting)	47	0	0	0
CS07 (concurrent excavation & concreting)	55	0	0	0

CS08 (concurrent backfilling & concreting)	55	0	0	0
CS09 (installing formwork & reinforcement)	0	0	0	0
Treated water discharge pipe				
CS10 (Typical construction activity – e.g. pipe delivery and installation, trench excavation and backfill)	336	71	51	26
CS11 (Lower intensity construction activity – e.g. truck movements along pipeline alignment/corridor)	71	25	27	19
Compound and access road construction and use				
CS12 (Construction of compound area and access roads)	55	12	0	0
CS13 (use of construction compound)	0	0	0	0
HV electrical work				
CS14 (cable laying)	124	2	0	0

Table 6-31 Summary of construction noise impacts for all NCAs - OOHW

Construction scenario	Number of receivers subject to noticeable noise (1-5 dBA above NML)	Number of receivers subject to clearly audible noise (5-15 dBA above NML)	Number of receivers subject to moderately intrusive noise (15-25 dBA above NML)	Number of receivers subject to highly intrusive noise (>25 dBA)
OOHW – Day (Saturday 1pm to 6pm and Sunday 8am to 6pm)				
CS06	99	48	0	0
CS07	131	57	0	0
CS08	131	57	0	0

CS09	10	0	0	0
CS13	4	0	0	0

OOHW – Evening (Monday to Friday between 6pm to 10pm)

CS06	179	64	0	0
CS07	227	76	0	0
CS08	227	76	0	0
CS09	11	0	0	0
CS13	4	0	0	0

OOHW – Night (Monday to Friday between 10pm to 7am)

CS06	261	79	0	0
CS07	331	104	0	0
CS08	331	104	0	0
CS09	13	0	0	0
CS13	5	0	0	0

Sleep disturbance impacts

The potential for sleep disturbance was assessed by using the predicted noise levels from the OOH maximum noise level events and evaluating these against sleep disturbance criteria. The criteria were developed using the NPf and the *Road Noise Policy* (DCCEW, 2011).

Construction scenarios predicted to cause maximum noise level events above the L_{Amax} (i.e. the maximum A-weighted sound level measured over a specific time period) screening criteria of 52 dBA include:

- concreting works – CS06, CS07 and CS08
- use of the compound for oversized deliveries – CS13.

The number of sensitive receivers predicted to be impacted by sleep disturbance are shown in Table 6-32.

Table 6-32 Summary of sleep disturbance impacts

Range in predicted L_{Amax} noise level (dBA)	Number of residential receivers predicted to experience maximum noise levels within range	
	CS06, CS07 and CS08	CS13
52-60	92	3
60-75	14	0
More than 75	0	0

Construction traffic noise

Major roads used for the proposal will be Picton Road and the Hume Motorway. Existing light and heavy traffic volumes on these roads will be significantly higher compared to the proposed movements. Therefore, impacts from construction road traffic noise are not anticipated on these roads.

Construction vehicles will access the proposal via the proposed main or alternative access roads, which will connect to Condell Park Road and Stirling Drive respectively. Construction traffic is likely to affect sensitive receivers along local roads. As such, traffic on local roads will be managed in accordance with a traffic management plan (TMP) which will be prepared by the Delivery Contractor and will detail specific routes that construction traffic and local traffic will follow throughout the construction phase.

Potential impacts from construction noise can be managed by applying the mitigation measures in Table 6-34.

Construction vibration

Construction activities at the WRRF are not anticipated to exceed human comfort and structural damage criteria due to the distance to sensitive receivers. Potential vibration impacts will be limited to construction of the treated water discharge pipe and access roads (i.e. construction scenarios CS10, CS11, CS12 and CS14), which will include excavation of the open trench and compacting the ground using rollers.

Safe working buffer distances to comply with the human comfort and structural damage criteria were calculated using the *Environmental Noise Management Manual* (RMS, 2001). The following number of sensitive receivers have been identified within the buffer distances:

- 22 sensitive receivers within the human comfort buffer distance of 15 m for CS10, CS11 and CS14
- 2 sensitive receivers within the human comfort buffer distance of 45 m for CS12
- 5 sensitive receivers within the structural damage buffer distance of 4 m for CS10, CS11 and CS14.

Appropriate measures have been provided in Table 6-34 to minimise the potential building damage vibration impacts during construction.

6.1.7.3 Potential operation impacts

Noise modelling was used to predict the effects of noise generated by the existing and upgraded WRRF. The predicted noise levels at representative receiver locations (Figure 6-25) are presented in Table 6-33 and are compared against the PNTLs and EPL noise limits for the following scenarios:

- Existing WRRF, which includes all existing noise sources
- Upgraded WRRF, which includes all existing and proposed new noise sources.

Table 6-33 Predicted operational noise levels at representative receiver locations

Receiver ID	Time period	EPL noise limit (dBA)	PNTL (dBA)	Predicted operational noise levels L _{Aeq,15 min} (dBA)	
				Existing WRRF	Upgraded WRRF
R0003	Day	N/A ¹	45	21	33
	Evening	N/A ¹	43		
	Night	N/A ¹	38		
R0013	Day	40	45	13	37
	Evening	40	43		
	Night	40	38		
R0136	Day	N/A ¹	45	13	31
	Evening	N/A ¹	43		
	Night	N/A ¹	38		
R0188	Day	40	45	21	38
	Evening	40	43		
	Night	40	38		
R0219	Day	40	45	17	36
	Evening	40	43		
	Night	40	38		
17A (EPL Point 17)	Day	29	45	13	35
	Evening	29	43		
	Night	29	38		

17B (EPL Point 17)	Day	29	45	16	33
	Evening	29	43		
	Night	29	38		
17C (EPL Point 17)	Day	29	45	16	33
	Evening	29	43		
	Night	29	38		

Note 1: The EPL does not specify a noise limit at these receivers.

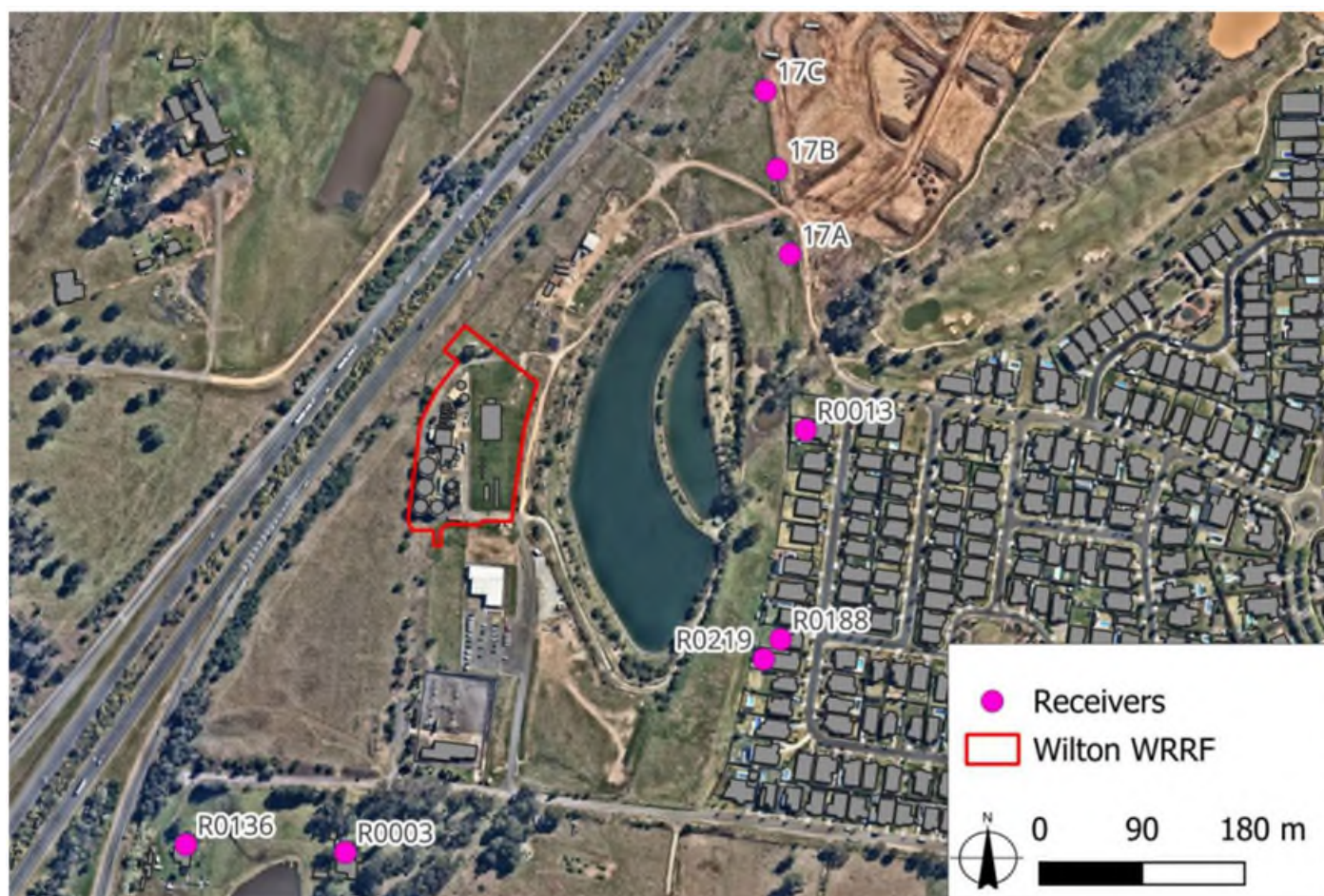


Figure 6-25 Representative residential receiver locations

The noise levels at all residences representing Point 16 are predicted to comply with the EPL noise limit of 40 dBA. At the receiver locations representing Point 17, the predicted noise level is at most 35 dBA, which exceeds the EPL noise limit of 29 dBA. However, the operational noise level from the existing and upgraded WRRF are predicted to comply with the PNTLs at all sensitive receivers. Point 16 and Point 17 have a similar noise environment and distance to the WRRF, indicating that the existing EPL noise limit at Point 17 may be more stringent based on historical land uses, and may not reflect the current noise environment. It should also be

noted that the predicted noise levels in this assessment are conservative. Sydney Water will continue to consult with the EPA about the EPL limits and the community about potential operational noise impacts.

The upgraded WRRF will be operational 24 hours a day, however, no maximum noise events are anticipated to occur at night as the nature of operations is continuous. As such no sleep disturbance impacts are expected to occur during operation of the WRRF upgrade.

6.1.7.4 Mitigation measures

With the implementation of the mitigation measures below, noise and vibration impacts can be adequately managed, and residual impacts are expected to be low.

Table 6-34 Environmental mitigation measures – noise and vibration

Mitigation measures

Works must comply with the ICNG, including scheduling work and deliveries during standard daytime working hours of 7am to 6pm Monday to Friday and 8am to 1pm Saturday where reasonable. No work to be scheduled on Sundays or public holidays. The Proposal will also be carried out in accordance with:

- Sydney Water's Noise Management Procedure SWEMS0056
- ICNG.

Reasonable and feasible noise mitigation measures should be implemented to mitigate noise impacts.

Incorporate standard daytime hours noise management safeguards into the CEMP:

- Notify the potentially affected residents prior to the commencement.
- Describe the nature of works; the expected noise impacts; approved hours of work; duration, complaints handling and contact details.
- Determine need for, and appropriate timing of respite periods.
- Ongoing engagement with the community on the construction times.
- Implement a complaint handling procedure for dealing with noise complaints.
- Plant or machinery will not be permitted to warm-up near residential dwellings before the nominated working hours.
- Appropriate plant will be selected for each task, to minimise the noise impact (e.g. all stationary and mobile plant will be fitted with residential type silencers).
- Engine brakes will not be used when entering or leaving the work site(s) or within work areas.
- Regularly inspect and maintain equipment in good working order.
- Arrange work sites where possible to minimise noise (e.g. generators away from sensitive receivers, minimise use of vehicle reversing alarms).
- Schedule noisy activities around times of surrounding high background noise (local road traffic or when other noise sources are active).

Conduct a dilapidation survey / asset condition assessment prior to works which have potential to damage existing structures.

Monitor compliance with the recommended vibration levels in DIN 4150-3 1999: Structural Vibration – Part 3; Effects of vibration on structures.

Consider less vibration intensive methodologies where practicable and use only the necessary sized and powered equipment.

For works required beyond standard daytime hours, the Delivery Contractor would:

- Justify the need for out of standard daytime work.
- Consider potential noise impacts and: implement the relevant standard daytime hours safeguards; Sydney Water's Noise Management Code of Behaviour (SWEMS0056.01) and other reasonable and feasible management measures.
- Identify community notification requirements, including requirements for any respite periods.
- Seek approval from the Sydney Water Project Manager in consultation with Sydney Water's Environment and communications representatives.

For planned night works, the Delivery Contractor would:

- Justify the need for night works.
- Consider potential noise impacts and implement the relevant out of hours safeguards and other reasonable and feasible management measures.
- Identify community notification requirements (i.e. for scheduled night work (not emergency works)), including requirements for any respite periods.
- Notify all potentially impacted residents and sensitive noise receivers not less than one week prior to commencing night work.
- Seek approval from the Sydney Water Project Manager in consultation with Sydney Water's Environment and communications representatives.
- The Delivery Contractor's environmental representative would consult with authorities as required and assess whether additional impact assessment is required, including the need for additional mitigation measures such as noise monitoring, noise barriers, and notification of affected landholders.
- Activities likely to generate the highest levels of noise would be scheduled to occur at the beginning of the shift (prior to 10 pm, during the 6 pm to 10 pm evening period) to minimise the potential for sleep disturbance.
- All workers would be briefed on the need to minimise noise as a result of their activities. This would be included in a noise management plan.

The Delivery Contractor must communicate with the impacted residents clearly explaining the duration and noise level of the works and inform the residents of any respite periods.

Compliance noise monitoring should be undertaken at sensitive receivers directly adjacent to the trenching alignment during construction works.

Implementing acoustic treatments such as acoustic intake louvres, attenuated exhaust fans and insulating the roof of the blower room would reduce potential operational noise impacts at the receivers and should be considered in the design.

6.1.8 Air and energy

6.1.8.1 Existing environment

The WRRF is in a rural residential area off the Hume Motorway, with the closest residential receivers about 250 m to the east in Bingara Gorge. The proposed treated water discharge pipe will be installed in the road corridor, directly adjacent to private residences. Existing air quality will be influenced by vehicle emissions, ongoing residential development and the WRRF treatment activities.

There are no National Pollution Inventory (NPI) sites within 1 km of the proposal.

6.1.8.2 Potential impacts

Construction

The proposal will potentially result in air quality impacts from:

- dust generated during construction e.g. excavation and stockpiling
- dust generated by construction vehicles travelling on disturbed/ unsealed access routes
- emissions from construction machinery, equipment and vehicles.

Dust and emissions have the potential to impact on air quality and amenity of nearby sensitive receivers. The construction activities and restoration of disturbed areas will be undertaken progressively. This will minimise potential air quality impacts and reduce the exposure of any one sensitive receiver to dust emissions.

Some odour may be generated during construction when works involve opening, modifying, or connecting to existing infrastructure at the WRRF. Activities such as tying in new pipelines, accessing existing chambers, or isolating and redirecting wastewater flows can temporarily release odours. These impacts are typically short-term and localised.

Construction activities will be temporary and will not significantly increase Sydney Water's overall energy use.

These potential air quality and energy use impacts will be localised, short term in nature, and unlikely to have a major impact with the application of mitigation measures in Table 6-36.

A life cycle carbon assessment was prepared for the WRRF upgrade concept design and summarised in Section 6.1.12.

Operation

Odour modelling (Airen Consulting, 2025) was carried out to assess the potential air quality impacts during operation of the proposed WRRF upgrade in accordance with the NSW EPA *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW* (Approved Methods). A summary of the assessment is included below.

Existing odour sources at the Wilton WRRF include (Figure 6-26):

- Odour control unit (OCU)
- 4 membrane bioreactors (MBR)
- 2 BioSep MBRs
- 2 screening bins
- McBerns filter.

Proposed additional (new) odour sources at the WRRF include (Figure 6-26):

- OCU
- MBR
- Activated sludge tanks.



Figure 6-26 Modelled odour sources at the WRRF

The assessment used impact assessment criteria outlined in the Approved Methods. Impacts are measured using odour units (OU). The relevant odour assessment criteria are shown in Table 6-35 and apply to existing and potentially sensitive receptors. The criteria define a sensitive receptor as including ‘a location where people are likely to work or reside; this may include a dwelling, school, hospital, office or public recreational area’.

The impact assessment criteria range from 2 OU for urban areas with a population of more than 2,000 people exposed, to 7 OU for a single dwelling. The criteria assumes that 7 odour units at the 99th percentile would be acceptable to the average person, meaning the odour level does not exceed 7 OU more than 1% of the time.

Table 6-35 NSW EPA odour assessment criteria

Indicator	Averaging time	Population of affected community	Impact assessment criteria (odour units)
Odour	Nose-response, 99 th percentile	Single rural residence ($\leq \sim 2$)	7
		~10	6
		~30	5
		~125	4
		~500	3
		Urban (>2000) and/or schools and hospitals	2

Dispersion modelling was used to simulate odour levels in the vicinity of the WRRF using representative odour emissions and meteorological data. Odour concentrations were predicted within an area of 3 km x 2 km. The assessment assumed that impacts may occur above 2 OU.

Figure 6-27 shows modelled odour levels at the 99th percentile (shown as OU contours), due to emissions from the existing and upgraded WRRF. The results show that existing and upgraded WRRF emissions are unlikely to cause adverse odour impacts to nearby sensitive receptors. The maximum extent of the 2 OU contour is about 200 m from the WRRF.

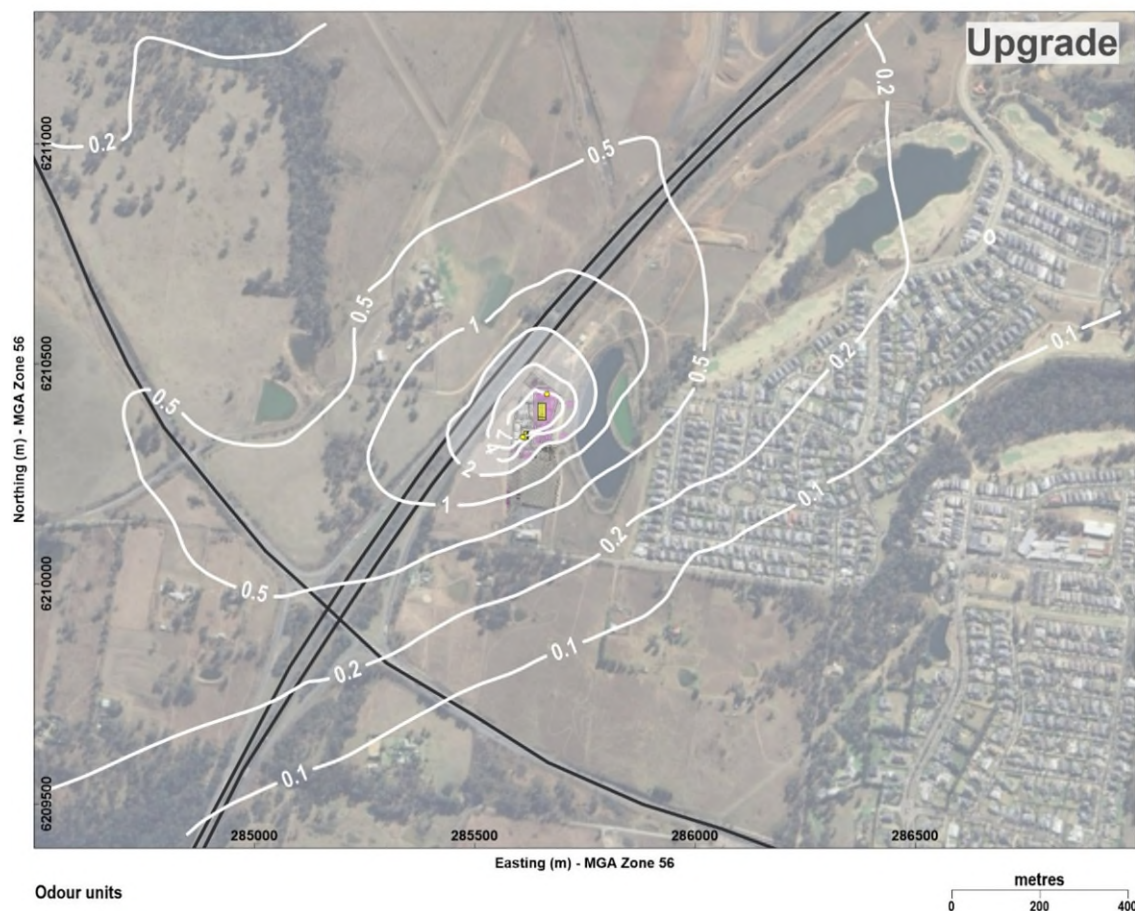


Figure 6-27 Odour unit contours around the Wilton WRRF

Operating the existing WRRF requires about 10,500 kilowatt hours (kWh) of daily power. As the proposal will increase the capacity of the WRRF, operation will require an estimated additional 24,000 kWh of daily power. However as mentioned in Section 3.1, the blower/compressor building will include solar panels capable of generating up to 30 kW (720 kWh) to offset some of the additional energy consumption.

6.1.8.3 Mitigation measures

With the implementation of the mitigation measures below, impacts to air and energy can be adequately managed, and residual impacts are expected to be minor.

Table 6-36 Environmental mitigation measures – air and energy

Mitigation measures

Use alternatives to fossil fuels where practical and cost-effective.

Track energy use as per [SWEMS0015.28 Contractor NGER template](#).

Minimise the potential for odours (eg minimise the number of open access chambers, close maintenance holes overnight.)

Maintain equipment in good working order, comply with the clean air regulations of the *Protection of the Environment Operations Act 1997*, have appropriate exhaust pollution controls, and meet Australian Standards for exhaust emissions.

Switch off vehicles/machinery when not in use.

Implement measures to prevent offsite dust impacts, for example:

- Water exposed areas (using non-potable water source where possible such as water from excavation pits).
- Cover exposed areas with tarpaulins or geotextile fabric.
- Modify or cease work in windy conditions.
- Modify site layout (place stockpiles away from sensitive receivers).
- Vegetate exposed areas using appropriate seeding.

Cover all transported waste.

Explore opportunities to reduce or offset operational energy consumption at the WRRF.

6.1.9 Waste and hazardous materials

6.1.9.1 Existing environment and potential impacts

Sydney Water's corporate objectives include to be a resource recovery business with an increasing portfolio of circular economy products and services. This includes reducing waste through recycling and re-use, and encouraging suppliers to minimise waste. The Delivery Contractor will seek opportunities to reduce, recycle and reuse materials. This will be documented in a Waste and Resource Recovery Plan. All waste material will be classified in accordance with the EPA Waste Classification Guidelines (NSW EPA, 2014).

The proposal will generate the following types of construction waste:

- Spoil from excavations (about 3,300 m³ for the WRRF upgrade works and 3,656 m³ for the treated water discharge pipe)
- Vegetation waste from vegetation removal (about 2.5 ha of exotic/native)
- General construction waste.

Soil will temporarily be stockpiled within the construction footprint. Wherever possible, suitable excavated spoil will be re-used on site for backfilling, landscaping and other uses. If the spoil is unsuitable for re-use due to its geotechnical or contamination characteristics (including asbestos), spoil will be tested, classified and disposed of at an appropriately licensed facility. Additionally, weedy and non-weedy vegetation waste is expected to be generated and will need to be managed as separate waste streams to avoid cross-contamination.

As discussed in Section 6.1.1, there are no known sources of contamination within the construction footprint. However, unexpected finds may occur and will be managed using Sydney Water's standard processes.

As outlined in Section 3.5, the proposal will generate the following additional waste during operation:

- additional washed screenings (about 3,900 kg monthly)
- additional biosolids (about 900 kg weekly)
- RO brine (up to 0.2 ML/D). Brine (highly saline liquid waste) is a new waste stream for the WRRF and is a by-product of the RO technology in the AWTS.

The washed screenings and RO brine will be collected and taken off site to a licensed facility for disposal. As per the existing arrangement, the biosolids will be collected and sent to a horticultural products manufacturing facility off-site to be used for composting.

6.1.9.2 Mitigation measures

With the implementation of the mitigation measures below, impacts to waste and hazardous materials can be adequately managed, and residual impacts are expected to be low.

Table 6-37 Environmental mitigation measures – waste and hazardous materials

Mitigation measures

The Delivery Contractor will prepare a Waste and Resource Recovery Plan (WRRP) to appropriately manage and classify any materials including soils, construction/demolition wastes and associated stockpiles. The WRRP will form part of the CEMP.

The WRRP will be approved by the Sydney Water Project Manager in consultation with the Environmental Representative and Contamination and Hazardous Materials team.

The WRRP should include:

- expected waste types and their location
- delineation of waste /resource types including identification of likely vertical and lateral extents (where warranted)
- visual monitoring of materials during excavation and measures to be undertaken to prevent co-mingling / cross-contamination of waste / resource types
- ex-situ waste and resource recovery classification program, including timing relative to project / excavation phases as well as proposed hold points

- waste minimisation and resource recovery methodologies (including consideration of onsite reuse or management if contaminated)
- roles and responsibilities in relation to stockpile and material management and monitoring program
- proposed onsite reuse locations and reuse methodology (if applicable)
- proposed offsite reuse, offsite recycling and / or offsite disposal locations / facilities
- legislative compliance requirements
- consideration of future maintenance
- site restoration.

Manage waste in accordance with relevant legislation and maintain records to show compliance eg waste register, transport and disposal records. Record and submit [SWEMS0015.27 Contractor Waste Report](#).

Provide adequate bins for general waste, hazardous waste and recyclable materials.

Minimise stockpile size and ensure delineation between different stockpiled materials.

Manage waste and excess spoil in accordance with the NSW EPA Resource Recovery Orders and Exemptions (if applicable) and / or Waste Classification Guidelines. Where materials are not suitable or cannot be reused onsite or offsite, recycle where appropriate. Recycle soils at a licensed soil recycling facility or dispose at an appropriately licenced landfill facility.

Prevent pollutants from escaping including by covering skip bins.

Dispose excess vegetation (non-weed) that cannot be used for site stabilisation at an appropriate green waste disposal facility.

If fibro or other asbestos containing material is identified, restrict access and follow Sydney Water's Asbestos Management – Minor Works procedure, Document Number 746607 and SafeWork NSW requirements. Contact Sydney Water Project Manager (who will consult with the Contamination and Hazardous Materials team propertyenvironmental@sydneywater.com.au).

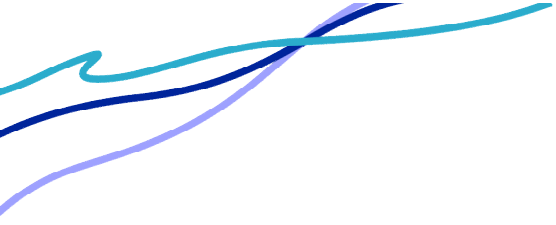
6.1.10 Traffic and access

6.1.10.1 Existing environment

The road network providing access to the proposal is dominated by 2 main roads. Hume Motorway (to the west of the proposal) running in a roughly north-east/south-west direction is intersected by Picton Road (to the south of the proposal) which runs in a roughly north-west/south-east direction. The Hume Motorway and Picton Road are both State roads. The most recent traffic volumes from traffic counters closest to the proposal include (TfNSW, 2023):

- Picton Road 250 m east of Janderra Lane (traffic counter 07406) – about 8,000 vehicles westbound and 4,000 vehicles eastbound per day (data from 2013)
- Hume Motorway 900 m east of Pheasants Nest Road (traffic counter 07736) – about 13,000 vehicles northbound and 18,000 vehicles southbound per day (data from 2021).

Current traffic volumes are likely higher than those listed here, due to population growth within surrounding suburbs and LGAs since this data was collected.



Existing access to the WRRF is via Condell Park Road. The nearest bus stop to the proposal is at Pembroke Parade after Greenbridge Drive (bus route 901), about 1 km east of the WRRF.

6.1.10.2 Potential impacts

At its peak, the proposal is expected to require about 20 heavy vehicle and 160 light vehicles per day. However, on average this may be closer to 4 heavy vehicles and 20 light vehicles per day. Other factors such as car-pooling among workers, public holidays, and workdays with reduced staffing levels may mean that actual daily movements will be lower than estimated.

Sydney Water is constructing drinking water, recycled water and wastewater infrastructure, including pipelines and a pumping station at Condell Park Road. There is potential for cumulative traffic impacts as construction of several projects occur concurrently. This has potential to impact residents on Condell Park Road, Berrima Road and Sutton Crescent.

The main access to the WRRF upgrade area and compound will be via Condell Park Road and alternate access via Stirling Drive. This two-route construction access approach is aimed at optimising the split of construction traffic. It is expected that the split of construction traffic will minimise the impact on road service levels and reduce the risk of significant traffic-related issues.

Based on existing traffic volumes, Hume Motorway and Picton Road are unlikely to be impacted by the proposed additional vehicle movements.

Partial and full road closures may be required for constructing the treated water discharge pipe in the road reserve. This may include temporary adjacent footpath closures. The proposal may also temporarily impact access to private properties along Condell Park Road, Berrima Road and Sutton Crescent. Access to a property will not be blocked without consultation with occupants of that property. Street parking will be temporarily impacted during the treated water discharge pipe trenching works. However, as construction of the treated water discharge pipe will move progressively along the alignment, traffic and access impacts will be short-term.

Construction vehicles are likely to use Pembroke Parade to access the WRRF however, impacts to the bus stop or any public transportation are not anticipated.

During operation there will be additional light vehicle movements for additional employees at the WRRF. There will also be additional truck movements to and from the WRRF to collect RO brine and additional wastewater treatment by-products for off-site disposal. This is unlikely to affect surrounding road service levels or cause significant traffic-related issues.

6.1.10.3 Mitigation measures

With the implementation of the mitigation measures below, impacts to traffic and access can be adequately managed, and residual impacts are expected to be low.

Table 6-38 Environmental mitigation measures – traffic and access

Mitigation measures

Prepare a Traffic Management Plan (TMP) as part of the CEMP in consultation with the relevant traffic authority. This will include:

- confirmation of haulage routes
- access arrangements to the construction footprint, including entry and exit locations
- management of vehicle movement including measures to encourage rideshare, management of oversized vehicles, materials transport
- traffic control and safety measures
- consultation and notification requirements
- a response plan for any construction-related traffic incident
- monitoring, review and amendment plans for traffic management measures
- coordination with nearby developments if construction periods and routes overlap
- an oversize and/or over mass (OSOM) transport management plan

Repair any damage on local roads (e.g. potholes) progressively as the construction moves along the proposal alignment. Road restoration will be done in consultation with Wollondilly Council.

Erect signs to inform road users of the proposed work, trucks turning and any temporary road closures.

Notify potentially impact residents of changes to traffic conditions due to construction traffic.

Construction vehicles, plant and machinery are to be parked within the construction footprint or on nearby available roads where possible.

Ensure work vehicles do not obstruct vehicular or pedestrian traffic, or private driveway, public facility or business access unless necessary and only if appropriate notification has been provided.

Minimise traffic impacts near residential properties, schools and businesses by consulting with them (e.g. no major materials deliveries at school drop off or pick up times).

Manage sites to allow people to move safely past the work, including alternative pedestrian, bicycle, pram and wheelchair access.

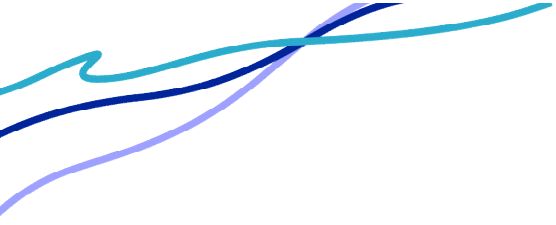
6.1.11 Social and visual

The potential social impacts from noise, vibration, traffic, air quality and access are considered in the sections above.

A visual impact assessment (VIA) carried out for the proposal is summarised below (Aurecon, 2026).

6.1.11.1 Existing environment

The proposal is about 10 km south-east of Picton and about 63 km south-west of Sydney's central business district. It is near key transport routes including Picton Road (B88), Wilton Road and is east of Hume Motorway/Remembrance Driveway (M31).



The area around the proposal features a generally undulating terrain, combining flat areas with gentle slopes, creating varying elevations. The storage lagoons to the east of the WRRF upgrade area sit on a lower elevation to the WRRF, and slopes upwards towards Balmoral Rise.

The landscape around the WRRF upgrade area comprises open grassy fields and dense vegetation surrounding the adjacent storage lagoons. Towards the north-west, trees and tall grass line both sides and the median of the Hume Motorway.

The proposal is in a rural/residential area and subject to urban development. The visual character of the surrounding area is a mix of farmland, highway infrastructure and low-density residential areas. The proposal is in an area experiencing rapid transformation due to urban development, including construction currently underway in Wilton North.

The closest existing residential properties near the WRRF upgrade area are along Balmoral Rise, typically 1-2 storeys high. The Golf Course is north-east of the WRRF upgrade area, existing Sydney Water construction site offices to the south and the existing WRRF to the west.

6.1.11.2 Potential impacts

Construction

There will be temporary visual impacts during construction associated with the establishment of site compounds and worksites, earthworks, and stockpiling.

Construction activities at the WRRF will be barely visible to the nearest residents on Balmoral Rise, resulting in negligible impacts. Construction of the treated water discharge pipe will be visible to nearby residents and road users. However, impacts will be temporary as construction will move progressively along the alignment. Further, the additional earthworks required for this proposal are not significant compared to current and proposed construction in the area.

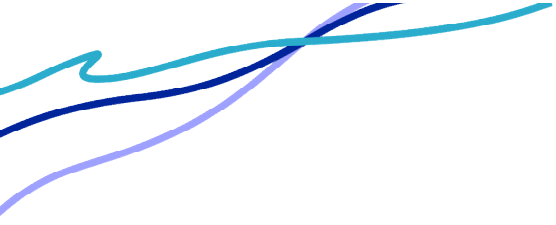
Operation

The VIA study area is a 500 m radius of the WRRF upgrade area (Figure 6-28). The VIA study area is determined by the distance at which it is considered that the proposal will become either indiscernible to the human eye or will occupy a small proportion of the visual field of view. This distance is directly related to the scale and height of up to 15 m (i.e. tallest new structure being a vent shaft) for the proposed new infrastructure, and the viewing properties of the typical human eye.

The extent of potential visibility from a given viewing location was identified using topographical data in a visual envelope map (VEM). Three viewpoints (VPs) were selected within the VEM, and views validated during a field visit to account for potential screening and filtering effect on these views from topography, existing vegetation and built form. Refer to the VEM and VPs in Figure 6-28.

The VPs factor in existing and future residential dwellings with sensitive visual receivers, closest to the proposal on Balmoral Rise, Stirling Drive and the future Kimberwaili Road:

- VP1 - 220 m east of the WRRF upgrade area, within the existing residential property at 12 Balmoral Rise

- 
- VP2 - 260 m southeast of the WRRF upgrade area, within the existing residential property at 28 Balmoral Rise
 - VP3 - 155 m northeast of the WRRF upgrade area, along the existing access road for the site.

Illustrative photomontages produced for the VPs demonstrate the most noticeable impacts on day 1 and year 10 of operation (Figure 6-29 to Figure 6-37).

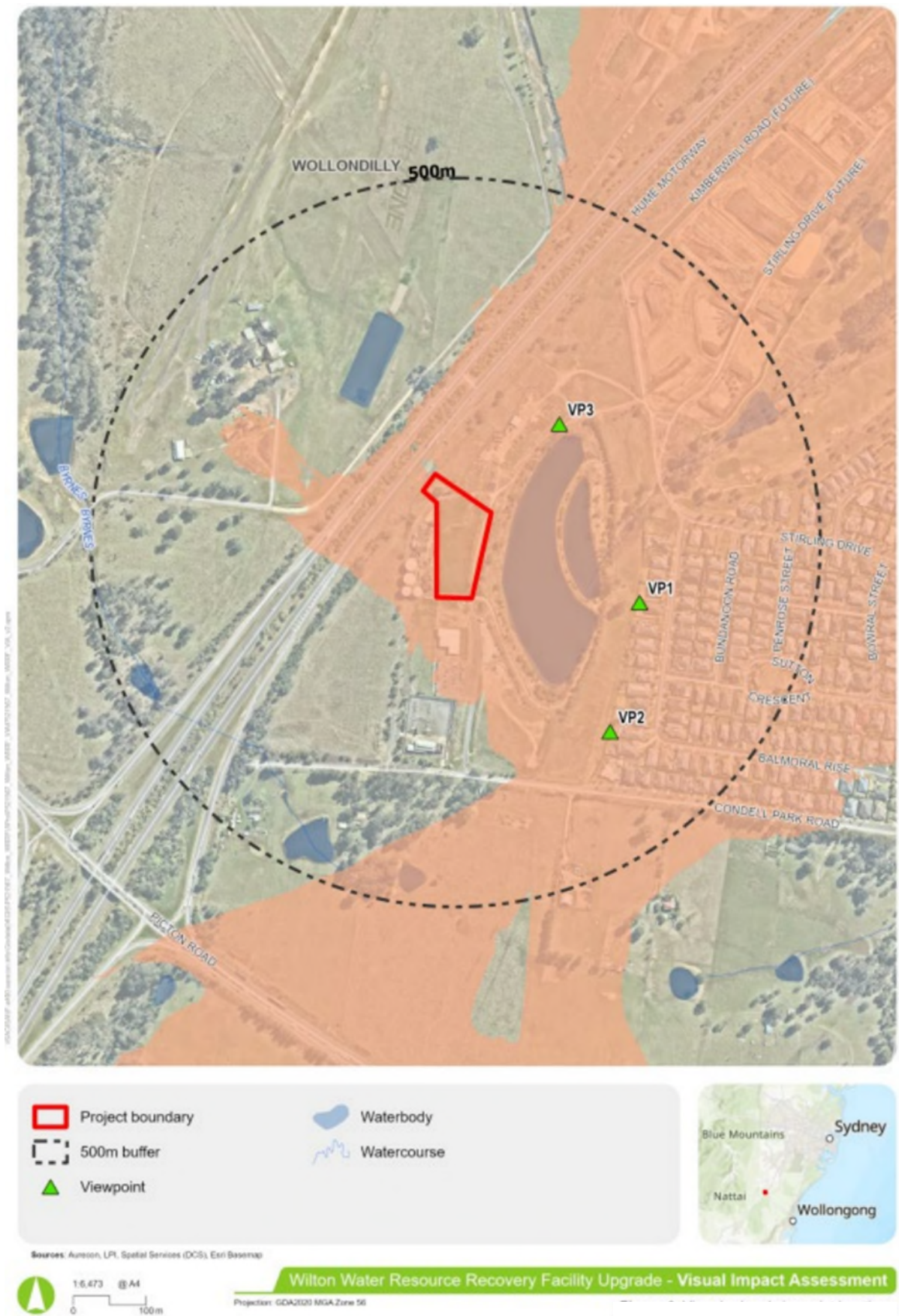


Figure 6-28 Visual envelope mapping (VEM) and viewpoint locations



Figure 6-29 VP1 at day 1 of operation



Figure 6-30 VP1 at day 1 of operation (proposal location shown in red)



Figure 6-31 VP1 at year 10 of operation (screened by intervening vegetation)



Figure 6-32 VP2 at day 1 of operation



Figure 6-33 VP2 at day 1 of operation (proposal location shown in red)



Figure 6-34 VP2 at year 10 of operation (screened by intervening vegetation)



Figure 6-35 VP3 at day 1 of operation



Figure 6-36 VP3 at day 1 of operation (proposal location shown in red)



Figure 6-37 VP3 at year 10 of operation (screened by intervening vegetation)

The proposal is a key piece of infrastructure which will service the urban residential growth in the Wilton Growth Area. The key visual components include the blower/compressor building (up to 10 m high), a vent shaft (up to 15 m) and sludge tanks (up to 6 m).

Neighbouring and future residents in the area will experience some visual impacts. The proposal is expected to be constructed prior to completion of future residential housing to the northeast (near VP3). At present, the closest residential receivers are located along Balmoral Rise, directly east of the WRRF upgrade area. However, existing vegetation along the adjacent storage lagoons already offer substantial screening for residents along Balmoral Rise.

The visual impacts for the proposal at day 1 of operation and residual impacts once mitigation measures are carried out at year 10, are summarised in Table 6-39. The proposal will have moderate to negligible visual impacts during operation.

Table 6-39 Summary of visual impacts

Viewpoint	Receivers and location	Visual impact at day 1	Visual impact at year 10 ¹
VP1	Residents 220 m east	Negligible	Negligible
VP2	Residents 260 m east	Moderate-low	Negligible
VP3	Motorists/construction workers 155 north-east Future residents	Negligible	Negligible

Note 1: Residual impact after applying vegetation screening mitigation measure.

6.1.11.3 Mitigation measures

With the implementation of the mitigation measures below, social and visual impacts can be adequately managed, and residual impacts are expected to be low.

Table 6-40 Environmental mitigation measures – social and visual

Mitigation measures

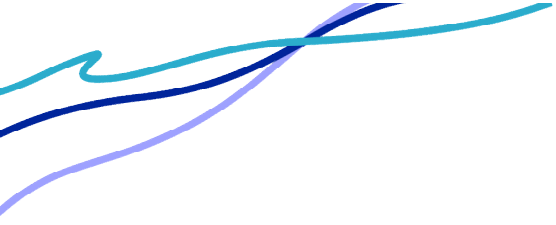
Undertake works in accordance with Sydney Water Communications policies and requirements including:

- Notify impacted residents and businesses.
- Erect signs to inform the public on nature of work.
- Treat community enquiries appropriately.

Restore work sites to pre-existing condition or better.

Maintain work areas in a clean and tidy condition.

A mid-green colouring is recommended for the new Wilton WRRF upgrade elements such as sludge tanks and buildings, to blend into and increase the screening vegetation depth of appearance.



Vegetation screening:

- Consider providing additional vegetation screening along the northern and eastern boundaries of the Wilton WRRF, where there are clearest views of the facility for future residents to the northeast.
- Vegetation screening should include native trees to screen elements up to 10 m tall. Native vegetation may include trees to 10 m height and understorey shrubs to provide a visual screen.
- Any planting proposed will need to ensure compliance with Wollondilly Shire Council recommended native planting lists and any Asset Protection Zone (APZ) buffers.
- If replanting near Sydney Water pipelines, also refer to 'Which trees can damage wastewater pipes?' link from [Sydney Water website](#) to help identify suitable species.

Site lighting is to be designed to minimise glare issues and light spillage into adjacent areas and should be consistent with the requirements of Australian Standard 4282-1997 *Control of the obtrusive effects of outdoor lighting*.

6.1.12 Cumulative and future trends

6.1.12.1 Potential cumulative environmental impacts

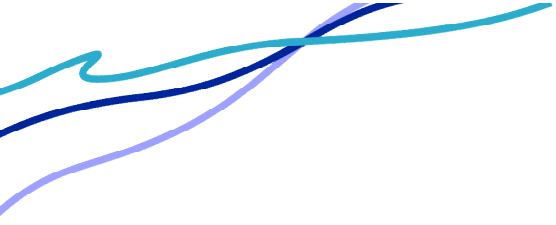
Other works close by include:

- New residential development in the Wilton Growth Area
- Transport for NSW (TfNSW) Picton Road upgrade, including the Hume Motorway and Picton Road intersection
- Sydney Water WISP projects at the WRRF and in the surrounding Wilton Growth Area
- Various small scale residential projects within 5 km of the proposal that are unlikely to present a cumulative impact risk.

There is potential for cumulative impacts with other concurrent Sydney Water projects around the WRRF, in particular, traffic impacts on Condell Park Road. Traffic for the proposal to and from the WRRF will be split between Condell Park Road and Stirling Drive to reduce pressure on Condell Park Road. Other potential cumulative impacts include air quality and noise impacts. The Delivery Contractor will coordinate with the WRRF operations team (i.e. Veolia) and Sydney Water project managers to minimise potential cumulative impacts.

Construction by developers (e.g. earthworks, access road and residences) may result in a cumulative impact with this proposal. The Picton Road upgrade could result in cumulative impacts with the proposed work around Condell Park Road. However, at the time of writing this REF, the Picton Road upgrade project has not been funded and there is no construction timeframes proposed. The Delivery Contractor will work with developers, council and TfNSW to reduce impacts as required.

The current and future development in the area, and change in land use from large semi-rural blocks to low density residential development, will have broadscale impacts on some environmental impacts, particularly native vegetation and watercourse health. Once these residential developments are in place, earthworks will have changed the topography and visual features of the landscape, with an increase in hardstand, a subsequent likely increase in runoff, a decrease in quantity of remnant vegetation, and increased noise from increased traffic. Constructing the proposal in accordance with the mitigation measures in this REF (including



avoidance of impacts by designing out vegetation impacts) will minimise cumulative impacts from this scope of works.

6.1.12.2 Future trends

Future trends that could impact the proposal were considered, such as bushfires, flooding, extreme heat and extreme storm events related to climate change.

The proposal has considered future trends and is unlikely to be impacted by, or further exacerbate them because:

- it is largely outside of bushfire prone land; some vegetation removal will be required for the proposal which is not expected to increase or significantly change bushfire risk
- it is largely outside of flood prone land and is not expected to cause any changes to existing flood patterns (refer to Section 6.1.2). Additionally, the WRRF upgrade has been designed to withstand multiple flood scenarios
- it has been sized to meet planned future wastewater management needs based on predicted future population size
- it will continue to treat wastewater and produce recycled water for re-use (domestic and irrigation)
- 30 kW solar array will be installed on the blower/compressor building to provide renewable energy to the WRRF.

A life cycle carbon assessment was prepared for the WRRF upgrade concept design (WSP, 2025b). The largest emissions are anticipated to be generated during operation of the WRRF, with key sources being:

- embodied emissions from the production of additional supplied chemicals for use in the wastewater treatment process (particularly sodium hydroxide and sodium hypochlorite)
- fuel use from trucking biosolids to land application and nitrous oxide and methane emissions from its decomposition in the land application.

While the life cycle carbon assessment identified key operational emissions sources, opportunities to reduce emissions largely focussed on the design and construction phases. A workshop was held to explore carbon reduction opportunities to be taken into the detailed design phase. Several initiatives were chosen to be adopted and include:

- replacing concrete pipe stormwater detention with a vegetated ditch instead of concrete pipes
- considering lower carbon concrete for slabs for the new UV, switch room and blower building
- using reclaimed asphalt pavement for road surfaces
- using excess excavated fill for landscape features on site.

The above reduction initiatives focus largely on the construction phase and are estimated to have a carbon reduction of about 148 – 160 tonnes of carbon dioxide equivalent.

Due to design timeframes, the life cycle carbon assessment did not include assessment of the AWTS or the treated water discharge pipe. However, Sydney Water's Greenhouse Gas (GHG) Estimator Tool will be used during construction to record emissions and potentially identify further opportunities for emissions reductions.

6.1.12.3 Mitigation measures

With the implementation of the mitigation measures below, cumulative impacts can be adequately managed, and residual impacts are expected to be low.

Table 6-41 Environmental mitigation measures – cumulative and future trends

Mitigation measures

Continue engagement with key stakeholders (e.g. developers, TfNSW, council, existing residents, Wilton WRRF operations, Sydney Water project managers) during planning and construction to minimise cumulative impacts.

The following opportunities for emissions reductions will be adopted during the detailed design and construction phase:

- replacing concrete pipe stormwater detention with a vegetated ditch instead of concrete pipes
- considering lower carbon concrete for slabs for the new UV, switch room and blower building
- using reclaimed asphalt pavement for road surfaces
- using excess excavated fill for landscape features on site.

Sydney Water's Greenhouse Gas (GHG) Estimator Tool will be used during construction to record emissions and potentially identify further opportunities for emissions reductions.

6.1.13 General environmental management

Table 6-42 Environmental mitigation measures – general environmental management

Mitigation measures

Prepare a Construction Environmental Management Plan (CEMP) addressing the requirements of this environmental assessment. The CEMP should specify licence, approval and notification requirements. Prior to the start of work, all project staff and contractors will be inducted in the CEMP.

The CEMP must be readily available on site and include a site plan which shows:

- go/no go areas and boundaries of the construction footprint including locations of lay-down and storage areas for materials and equipment
- location of environmental controls (such as erosion and sediment controls, fences or other measures to protect vegetation or fauna, spill kits)
- location and full extent of any vegetation disturbance.

Sydney Water's Project Manager (after consultation with the environmental and community representatives and affected landowners) can approve temporary ancillary construction facilities (such as compounds and access tracks), without additional environmental assessment or approval if the facilities:

- limit proximity to sensitive receivers
- do not disrupt property access
- have no impact to known items of non-Aboriginal and Aboriginal heritage
- are outside high risk areas for Aboriginal heritage

- use existing cleared areas and existing access tracks
- have no impacts to remnant native vegetation or key habitat features
- have no disturbance to watercourses
- do not require additional safeguards beyond those included in the EIA
- do not disturb contaminated land or acid sulfate soils
- will be rehabilitated at the end of construction.

The Delivery Contractor must demonstrate in writing how the proposed ancillary facilities meet these principles. Any facilities that do not meet these principles will require additional environmental impact assessment.

The agreed location of these facilities must be shown on the CEMP site plan and appropriate environmental controls installed.

Should the proposal or methodology change from the EIA, no further environmental assessment is required provided the change:

- remains within the construction footprint for the EIA and has no net additional environmental impact or
- is outside the construction footprint for the EIA but:
 - reduces impacts to biodiversity, heritage or human amenity or
 - avoids engineering (for example, geological, topographical) constraints and
 - after consultation with any potentially affected landowners and relevant agencies.

The Delivery Contractor must demonstrate in writing how the changes meet these requirements, for approval by Sydney Water's Project Manager in consultation with the environmental and community representatives.

Prepare an Incident Management Plan (IMP) outlining actions and responsibilities for:

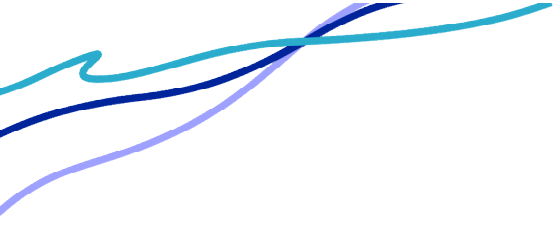
- predicted/onset of heavy rain during works
- spills
- unexpected finds (eg heritage and contamination)
- other potential incidents relevant to the scope of works.

All site personnel must be inducted into the IMP.

To ensure compliance with legislative requirements for incident management (eg *Protection of the Environment Operations Act 1997*), Follow [SWEMS0009](#) and attach [SWEMS0009](#) to the CEMP.

Complaints to be managed in accordance with Sydney Water's Complaints Procedure and relevant Community Engagement Plan.

Assign single person with accountability for coordinating communication and information flow across contractors and consultants and provide the contact details of this person in the CEMP.

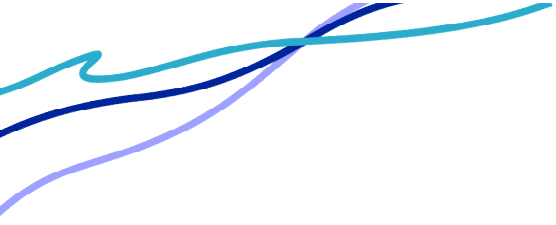


7 Conclusion

Sydney Water has prepared this REF to assess the potential environmental impacts of the Wilton WRRF Upgrade. The proposal is required to service growth in the Wilton Growth Area.

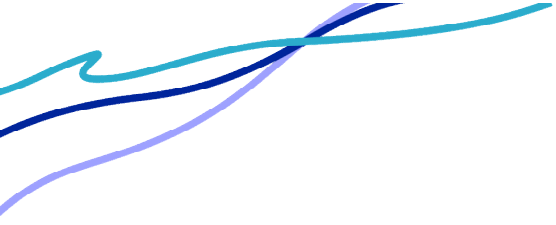
The main potential construction environmental impacts of the proposal include impacts to biodiversity and amenity impacts (e.g. noise, dust and traffic). During operation, the main potential impacts are associated with water quality, geomorphology and aquatic ecology. Given the nature, scale and extent of impacts and implementation of the mitigation measures outlined in this REF, the proposal is unlikely to have a significant impact on the environment. Therefore, an environmental impact statement is not required under Division 5.1 of the EP&A Act.

The REF considers how the proposal aligns with the principles of ESD. The proposal will not result in the degradation of the quality of the environment and will not pose a risk to the safety of the environment.



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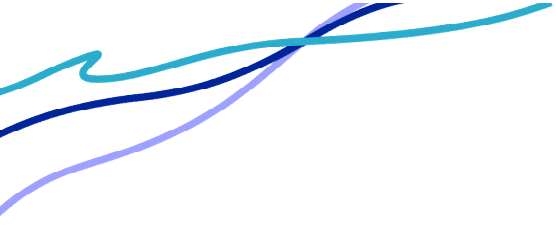
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Appendices

Appendix A – Section 171 and 171A checklist

Section 171 of the EP&A Regulation requires a determining authority to take into account the environmental factors specified in the environmental factors guidelines that apply to an activity (a proposal). The *Guidelines for Division 5.1 Assessments* (DPHI, 2026) are applicable guidelines for the proposal. The guidelines identify the environmental factors to be considered, which refers to and lists the factors included in section 171(2) of the EP&A Regulation.

These environmental factors are listed below in Table A-1 below, along with the corresponding findings of the REF assessment.

Table A-1 Consideration of environmental factors under Section 171 of the EP&A Regulation

Section 171 Checklist	REF finding
Any environmental impact on a community	There may be short-term impacts on the community associated with construction noise, air quality and traffic. During operation, noise, traffic, air quality and visual impacts will be negligible. There will be environmental improvements by providing a reliable wastewater service to the expanding Wilton Growth Area.
Any transformation of a locality	The proposal will include new structures as part of the WRRF upgrade. However, this will be in keeping with existing structures and visual impacts will be negligible. The proposal will not significantly transform the locality.
Any environmental impact on the ecosystems of the locality	The proposal will have minor impacts to ecosystems of the locality during construction from vegetation removal and works within a tributary of Stringybark Creek. The proposal will also include introduction of a new treated water discharge to a tributary of Stringybark Creek. The proposal will ultimately lead to environmental improvements by ensuring a reliable wastewater service will collect and treat wastewater, minimising any impacts on the ecosystem.
Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of the locality	The proposal will not reduce these factors.
Any effect upon a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or any other special value for present or future generations	The proposal will not have any effect upon these factors. In-stream interventions aimed at mitigating geomorphic impacts will avoid known Aboriginal heritage and areas of archaeological sensitivity.
Any impact on the habitat of any protected animals (within the meaning of the Biodiversity Conservation Act 2016)	The proposal will have a minor impact on the habitat of protected animals due to vegetation clearing, with potential associated impacts on habitat for threatened flora and fauna species. Pre-clearing inspections will identify and manage any native fauna that may be present on site. Vegetation removal identified in this REF has been

Section 171 Checklist

REF finding

minimised where possible and represents a worst case scenario.

Any endangering of any species of animal or plant or other form of life, whether living on land, in water or in the air

The proposal will not endanger any species.

Any long-term effects on the environment

The proposal may have long-term benefits from introduction of a new treated water discharge, which could create additional aquatic habitat in a tributary of Stringybark Creek. With ongoing monitoring and adaptive management, any long-term impacts to geomorphology and water quality are expected to be minor.

The proposal will also have a long-term benefit by providing a reliable and modern wastewater service for the Wilton Growth Area.

Any degradation of the quality of the environment

The proposal will maintain the quality of the environment.

Any risk to the safety of the environment

The proposal will ensure the safety of the environment.

Any reduction in the range of beneficial uses of the environment

The proposal will maintain the range of beneficial uses of the environment.

Any pollution of the environment

Environmental mitigation measures will mitigate the potential for the proposal to pollute the environment. The proposal will operate in accordance with EPL 20335.

Any environmental problems associated with the disposal of waste

Waste disposal will be in accordance with the environmental mitigation measures, and no environmental problems associated with the disposal of waste are expected.

Any increased demands on resources (natural or otherwise) that are, or are likely to become, in short supply

The proposal will not affect demand on resources.

Any cumulative environmental effect with other existing or likely future activities

The proposal may have minor cumulative construction impacts with ongoing and future residential development and WISP projects. Mitigation measures will be implemented to minimise impacts.

Any impact on coastal processes and coastal hazards, including those under projected climate change conditions

The proposal will not have any impact on these factors.

Any applicable local strategic planning statements, regional strategic plans or district strategic plans made under the EP&A Act, Division 3.1

The proposal is to service growth and the applicable strategic planning statements or plans have been considered in the system planning and options selection process.

Any other relevant environmental factors.

The proposal has been assessed against the factors listed above, and there are no other relevant environmental factors to consider.

Section 171A of the EP&A Regulation imposes additional requirements on a determining authority to take into account certain matters under Part 6.2 of the BCSEPP for a proposal within a ‘regulated catchment’. The regulated catchments are defined under the BCSEPP, and include:

- the Sydney Drinking Water Catchment,
- the Sydney Harbour Catchment,
- the Georges River Catchment,
- the Hawkesbury-Nepean Catchment.

As the proposal is within the Hawkesbury-Nepean catchment, the requirements of Section 171A(1) are applicable guidelines for the proposal, and are considered below in Table A-2 below.

Table A-2 Consideration of environmental factors under Section 171A of the EP&A Regulation

Section 171A checklist (Development in regulated catchments)	REF finding
BCSEPP – Section 6.6(1) - Water quality and quantity	
In deciding whether to grant development consent to development on land in a regulated catchment, the consent authority must consider the following:	
(a) whether the development will have a neutral or beneficial effect on the quality of water entering a watercourse	Mitigation measures will be implemented during construction to ensure that the proposal has a neutral impact on water quality in the tributaries of Stringybark Creek. During operation, the proposal will result in measurable changes to receiving water quality, within a system that is already characterised by elevated nutrient concentrations. The magnitude of change will be small relative to background variability and will not result in a material change to the receiving water quality condition. Ongoing water quality monitoring will occur during operation. Refer to Section 6.1.2.
(b) whether the development will have an adverse impact on water flow in a natural waterbody	If required, construction in the Stringybark Creek tributary may require the use of a partial coffer dam which will maintain flows around the coffer dam. The proposal will contribute to but will not adversely affect water flows within the tributary of Stringybark Creek during operation.
(c) whether the development will increase the amount of stormwater run-off from a site	The proposal will increase the area of impervious surfaces through expansion of the WRRF. However, the design incorporates stormwater management, and the final landform will ensure that the proposal will not increase the volume of stormwater run-off from the site.
(d) whether the development will incorporate on-site stormwater retention, infiltration or reuse	The WRRF upgrade designs include an additional on-site stormwater retention and pipe arrangement to accommodate stormwater runoff from up to a 1% AEP

rainfall event. This will connect to the existing stormwater network which has adequate hydraulic capacity.

(e) the impact of the development on the level and quality of the water table

Excavations during construction are not expected to encounter groundwater.

Operation of the proposal may contribute to more persistent baseflow in the Stringybark Creek tributaries from increased precautionary and emergency discharges and new treated water discharges. Impacts to the level and quality of the groundwater are expected to be minor.

(f) the cumulative environmental impact of the development on the regulated catchment

The proposal is required to support development in the Wilton Growth Area. Potential cumulative impacts from the proposal are expected to be minor and temporary. With the implementation of the environmental mitigation measures in Section 6.1.12, the potential for cumulative impacts between the proposal and other projects within the catchment is low.

(g) whether the development makes adequate provision to protect the quality and quantity of ground water.

As detailed in item 6.6(1)(e) above, impacts to the level and quality of the groundwater are expected to be minor.

BCSEPP – Section 6.6(2) - Water quality and quantity

Development consent must not be granted to development on land in a regulated catchment unless the consent authority is satisfied the development ensures:

(a) the effect on the quality of water entering a natural waterbody will be as close as possible to neutral or beneficial

Mitigation measures will be implemented during construction to ensure that the proposal has a neutral impact on water quality in the tributaries of Stringybark Creek. During operation, the proposal will result in measurable changes to receiving water quality, within a system that is already characterised by elevated nutrient concentrations. The proposal will include advanced treatment to minimise water quality impacts. The magnitude of change will be small relative to background variability and will not result in a material change to the receiving water quality condition. Ongoing water quality monitoring will occur during operation. Refer to Section 6.1.2.

(b) the impact on water flow in a natural waterbody will be minimised

The proposal involves increases to the existing precautionary and emergency discharges and a new treated water discharge to tributaries of Stringybark Creek. The precautionary and emergency discharges will primarily occur during periods of wet weather when there are already increased flows in the watercourse. Additionally, discharges will be released in accordance with the EPL limits.

The treated water discharge will be a permanent discharge up to a maximum of 1.5 ML/day. The proposal will result in a change to the flow regime, however is not anticipated to adversely affect water flows.

BCSEPP – Section 6.7(1) - Aquatic Ecology

In deciding whether to grant development consent to development on land in a regulated catchment, the consent authority must consider the following:

- (a) whether the development will have a direct, indirect or cumulative adverse impact on terrestrial, aquatic or migratory animals or vegetation

The proposal will involve removal of vegetation, including a small area of riparian vegetation. There may be indirect impacts through habitat removal. Aquatic species are likely to be tolerant to additional and new discharges during operation of the proposal and changes to water quality. Direct, indirect or cumulative adverse impacts to terrestrial, aquatic or migratory animals or vegetation of the locality will be minor.

- (b) whether the development involves the clearing of riparian vegetation and, if so, whether the development will require:
- (i) a controlled activity approval under the *Water Management Act 2000*, or
 - (ii) a permit under the *Fisheries Management Act 1994*

The proposal will require clearing of some riparian vegetation during construction of the headwall structure on a tributary of Stringybark Creek. The riparian corridor is narrow at this location, likely due to previous clearing by the landowners and impacts will be minor. Sydney Water is exempt from the need to obtain a controlled activity approval under the *Water Management Act 2000*. A permit under the FM Act is not required for the proposal.

- (a) whether the development will minimise or avoid:
- (i) the erosion of land abutting a natural waterbody, or
 - (ii) the sedimentation of a natural waterbody

Headwall design features aimed at minimising erosion are discussed in Section 3.1.2. Mitigation measures to minimise the potential for erosion and sedimentation impacts to areas adjacent to and within the tributaries of Stringybark Creek are included in Section 6.1.2 and 6.1.3.

- (b) whether the development will have an adverse impact on wetlands that are not in the coastal wetlands and littoral rainforests area

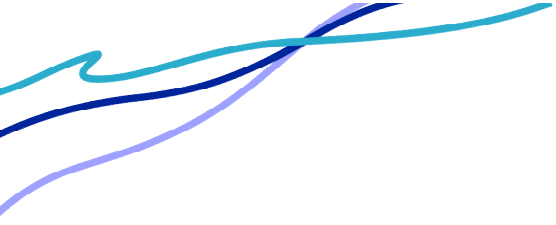
There are no wetlands in proximity to the proposal.

- (c) whether the development includes adequate safeguards and rehabilitation measures to protect aquatic ecology

Mitigation measures to protect aquatic ecology are included in Section 6.1.2, 6.1.3 and 6.1.4.

- (d) if the development site adjoins a natural waterbody, whether additional measures

Appropriate mitigation measures are included in Section 6.1.2 and 6.1.3 to ensure that the proposal



are required to ensure a neutral or beneficial effect on the water quality of the waterbody

will have a neutral or beneficial effect on the water quality of the Stringybark Creek tributaries.

BCSEPP – Section 6.7(2) - Aquatic Ecology

Development consent must not be granted to development on land in a regulated catchment unless the consent authority is satisfied of the following:

(a) the direct, indirect or cumulative adverse impact on terrestrial, aquatic or migratory animals or vegetation will be kept to the minimum necessary for the carrying out of the development

Appropriate mitigation measures are included in Section 6.1.4 and 6.1.5 to ensure that the cumulative impacts of the proposal on terrestrial, aquatic or migratory animals or vegetation are limited to the minimum extent necessary.

(b) the development will not have a direct, indirect or cumulative adverse impact on aquatic reserves

There are no aquatic reserves in proximity to the proposal.

(c) if a controlled activity approval under the *Water Management Act 2000* or a permit under the *Fisheries Management Act 1994* is required in relation to the clearing of riparian vegetation—the approval or permit has been obtained

Sydney Water is exempt from the need to obtain a controlled activity approval under the *Water Management Act 2000*.

A permit under the FM Act is not required for the proposal.

(d) the erosion of land abutting a natural waterbody or the sedimentation of a natural waterbody will be minimised

Headwall design features aimed at minimising erosion are discussed in Section 3.1.2. Mitigation measures to minimise the potential for erosion and sedimentation impacts to areas adjacent to and within the tributaries of Stringybark Creek are included in Section 6.1.2 and 6.1.3.

(e) the adverse impact on wetlands that are not in the coastal wetlands and littoral rainforests area will be minimised

There are no wetlands in proximity to the proposal.

BCSEPP – Section 6.8(1) – Flooding

In deciding whether to grant development consent to development on land in a regulated catchment, the consent authority must consider the likely impact of the development on periodic flooding that benefits wetlands and other riverine ecosystems

The proposal is unlikely to impact on periodic flooding that benefits wetlands and other riverine ecosystems.

BCSEPP – Section 6.8(2) – Flooding

Development consent must not be granted to development on flood liable land in a regulated catchment unless the consent authority is satisfied the development will not:

- (a) if there is a flood, result in a release of pollutants that may have an adverse impact on the water quality of a natural waterbody, or

Mitigation measures to minimise the potential for erosion and sedimentation impacts to areas adjacent to and within the tributaries of Stringybark Creek are included in Section 6.1.2 and 6.1.3.

- (b) have an adverse impact on the natural recession of floodwaters into wetlands and other riverine ecosystems

The proposal will not alter the overland flow paths of floodwaters.

BCSEPP – Section 6.9(1) - Recreation and public access

In deciding whether to grant development consent to development on land in a regulated catchment, the consent authority must consider:

- (a) the likely impact of the development on recreational land uses in the regulated catchment

The proposal will occupy private land and the local road reserve. There will be no impacts to recreational land uses.

- (b) whether the development will maintain or improve public access to and around foreshores without adverse impact on natural waterbodies, watercourses, wetlands or riparian vegetation

The proposal will occupy private land and the local road reserve. There will be no impact to public access to and around foreshores.

BCSEPP – Section 6.9(2) - Recreation and public access

Development consent must not be granted to development on land in a regulated catchment unless the consent authority is satisfied of the following:

- (a) the development will maintain or improve public access to and from natural waterbodies for recreational purposes, including fishing, swimming and boating, without adverse impact on natural waterbodies, watercourses, wetlands or riparian vegetation

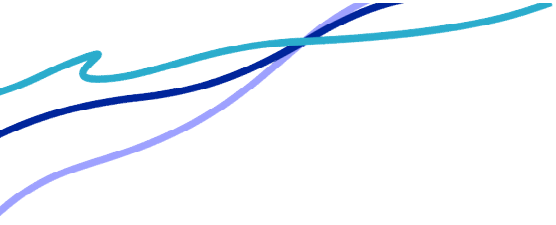
The proposal will occupy private land and the local road reserve. There will be no impact to public access to and from natural waterbodies.

- (b) new or existing points of public access between natural waterbodies and the site of the development will be stable and safe

The proposal will occupy private land and the local road reserve. There will be no impact to public access to and from natural waterbodies.

- (c) if land forming part of the foreshore of a natural waterbody will be made available for public access as a result of the development but is not in public ownership—public access to and use of the land will be safeguarded

Not applicable



Appendix B – Indicative WRRF upgrade and AWTS layout

Appendix C – Consideration of TISEPP consultation

TISEPP section	Yes	No
Section 2.10 Council related infrastructure or services – consultation with council		
Will the work:		
Potentially have a substantial impact on stormwater management services provided by council?		X
Be likely to generate traffic that will strain the capacity of the road system in the LGA?	X	
Connect to, and have a substantial impact on, the capacity of a council owned sewerage system?		X
Connect to, and use a substantial volume of water from a council owned water supply system?		X
Require temporary structures on, or enclose, a public space under council's control that will disrupt pedestrian or vehicular traffic that is not minor or inconsequential?	X	
Excavate a road, or a footpath adjacent to a road, for which the council is the roads authority, that is not minor or inconsequential?	X	
Section 2.11 Local heritage - consultation with council		
Is the work likely to affect the heritage significance of a local heritage item, or of a heritage conservation area (not also a State heritage item) more than a minor or inconsequential amount?		X
Section 2.12 Flood liable land - consultation with council		
Will the work be on flood liable land (land that is susceptible to flooding by the probable maximum flood event) and will works alter flood patterns other than to a minor extent?		X
Section 2.13 Flood liable land - consultation with State Emergency services		
Will the work be on flood liable land (land that is susceptible to flooding by the probable maximum flood event) and undertaken under a relevant provision*, but not the carrying out of minor alterations or additions to, or the demolition of, a building, emergency works or routine maintenance?		X
* (e) Div.14 (Public admin buildings), (g) Div.16 (Research/ monitoring stations), (i) Div.20 (Stormwater systems)?		
Section 2.14 Development with impacts on certain land within the coastal zone – council consultation		
Is the work on land mapped as coastal vulnerability area and inconsistent with a certified coastal management program?		X

TISEPP section

Yes

No

Section 2.15 Consultation with public authorities other than councils

Will the proposal be on land adjacent to land reserved under the *National Parks and Wildlife Act 1974* or land acquired under Part 11 of that Act? If so, consult with DPE (NPWS).

X

Will the proposal be on land in Zone C1 National Parks and Nature Reserves or on a land use zone that is equivalent to that zone? If so, consult with DPE (NPWS).

X

Will the proposal include a fixed or floating structure in or over navigable waters? If so, consult TfNSW.

X

Will the proposal be on land in a mine subsidence district within the meaning of the *Coal Mine Subsidence Compensation Act 2017*? If so, consult with *Subsidence Advisory NSW*.

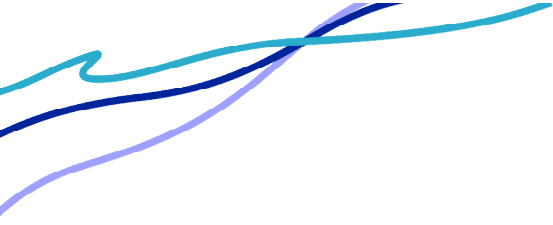
X

Will the proposal be on land in a Western City operational area specified in the *Western Parkland City Authority Act 2018*, Schedule 2 and have a capital investment value of \$30 million or more? If so, consult the Western Parkland City Authority.

X

Will the proposal clear native vegetation on land that is not subject land (ie non-certified land)? If so, notify DPE at least 21 days prior to work commencing. (Requirement under s3.24 Chapter 3 Sydney Region Growth Centres - of the SEPP (Precincts – Central River City) 2021).

X



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