Review of Environmental Factors

Wilton Growth Area – Wilton Road drinking water pipeline (September, 2025)

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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.

Sydney Water recognises the physical and cultural connection of local Aboriginal communities to waters and the land.

Determination

This Review of Environmental Factors (REF) assesses potential environmental impacts of constructing and operating a drinking water pipeline on Wilton Road to service the Wilton Growth Area. 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:
[redacted] Andi Stokan Sydney Water Date: 28/08/2025	[redacted] Jonathan Dowling Environment Representative Sydney Water Date: 18/09/2025	[redacted] Leila Ekraminaghsh Senior Project Manager Sydney Water Date: 19/08/2025

Decision Statement

The main potential construction environmental impacts of the proposal include impacts vegetation clearing, noise and traffic. Operational impacts are not expected. 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:		Date:
	[redacted] Murray Johnson, Senior Manager Environment and Heritage, Sydney Water	22/09/2025

1. Executive summary

The Wilton Growth Area is expected to have 15,000 new dwellings by 2047. Sydney Water must provide additional infrastructure to service this growth. The new infrastructure will be delivered in stages to provide services as development progresses.

We propose to construct and operate about two kilometres of drinking water pipeline on Wilton Road in Wilton and Appin to service the initial stages of development. The proposed DN600 (600 mm diameter) pipe will be constructed in two sections using both open trenching and trenchless methods (horizontal directional drilling (HDD)). The pipe will increase the capacity of the system and supply drinking water from the Macarthur Water Filtration Plant (WFP) to the growth area.

This Review of Environmental Factors (REF) assesses the potential impacts of the proposal on the surrounding environment. Our assessment concludes that the proposal is unlikely to have a significant impact on the environment and an Environmental Impact Statement (EIS) is not required.

Sydney Water considered all feasible alignment and construction options to minimise environmental and community impacts. Trenchless construction was adopted to construct about 1.1 km of pipe to avoid threatened vegetation and koala habitat. The proposal will clear about 0.29 ha of threatened vegetation communities. However, only about six trees will be removed, and the clearing is exclusively road-side vegetation.

Temporary construction impacts include noise and traffic. Mitigation measures will be implemented to reduce these impacts. There will be some nighttime disruptions to the drinking water supply for a short period of time when the new pipe is connected to the existing system. All affected customers will be notified of disruptions to supply.

A Construction Environmental Management Plan (CEMP), including Soil and Water Management Plan, Construction Noise and Vibration Management Plan and Traffic Management Plan, will be prepared by the delivery contractor to mitigate potential environmental impacts.

Sydney Water is engaging with key stakeholders including Wollondilly Shire Council, landowners and residents of adjacent properties.

We plan to start construction in late 2025 and construction will take about 12 months to complete.

2. Introduction

2.1 Context

Sydney Water provides water, wastewater, recycled water and some stormwater services to over five million people. We operate under the *Sydney Water Act 1994* and have three 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 constructing and operating a drinking water pipeline on Wilton Road and identifies mitigation measures that avoid or minimise potential impacts.

2.2 Proposal background and need

Proposal background

The Western Parkland City is predicted to increase in population from 740,000 in 2016 to 1.1 million in 2036. Several priority growth corridors were identified in south-west Sydney and Greater Macarthur to support development to cater for this growth. This includes land releases at priority growth centres south of Campbelltown, including Mount Gilead, Menangle Park, and Wilton (Greater Sydney Commission, 2018).

The town of Wilton is in the Wollondilly Shire Local Government Area (LGA). It is about 80 km south-west of the Sydney Central Business District (Sydney CBD) and 30 km west of Wollongong. The development precincts within the Wilton Growth Area are (Figure 2-1):

- Wilton Town Centre
- North Wilton
- South East Wilton
- West Wilton
- Bingara Gorge
- Maldon.

The Wilton area is expected to have 15,000 new dwellings by 2047. The Macarthur Water Filtration Plant (WFP) currently provides drinking water to Wilton.

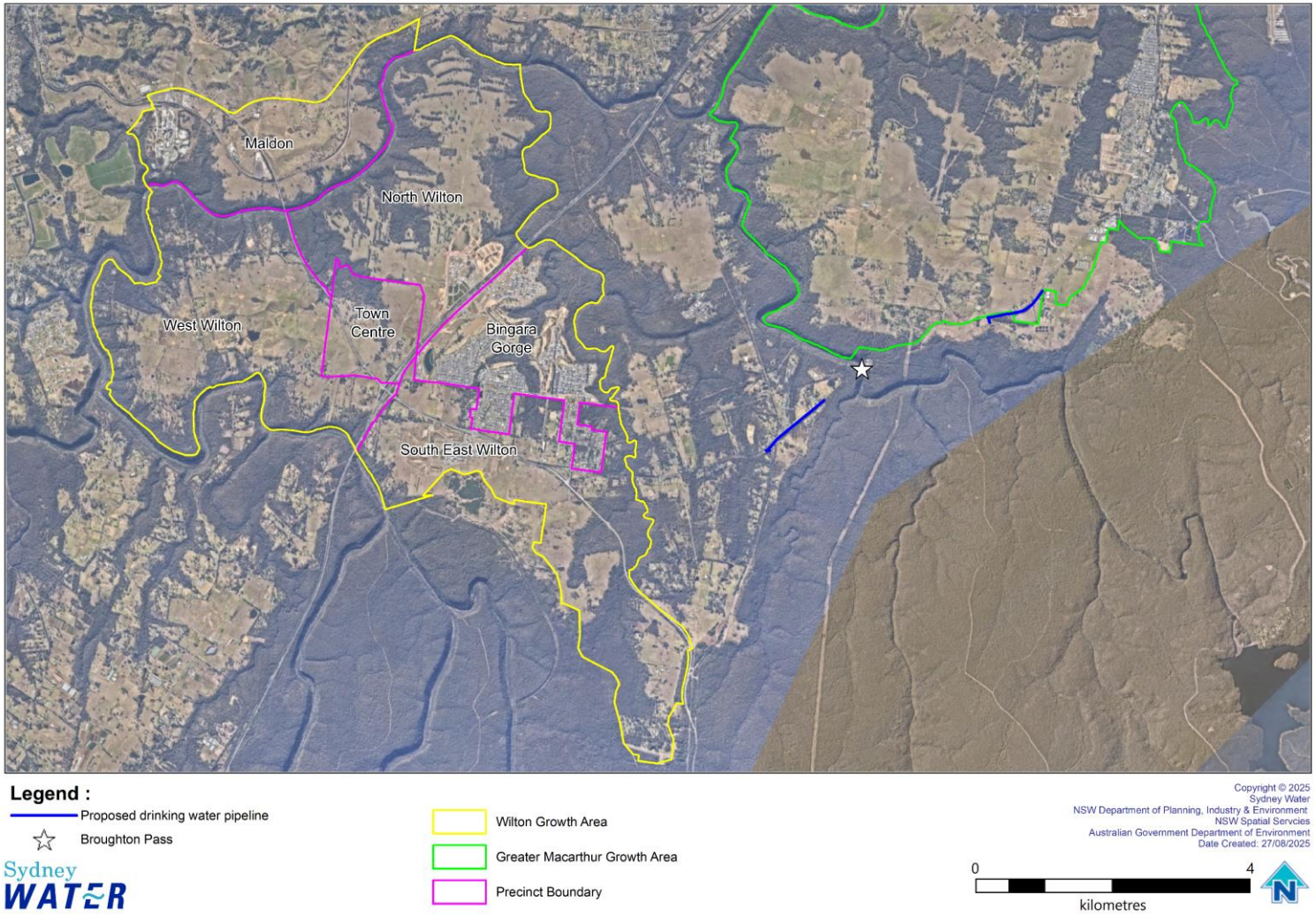

Figure 2-1 Wilton Growth Area Precincts and Greater Macarthur Growth Area

Proposal need

Over the next 20 years, the Wilton Growth Area is anticipated to be redeveloped, including 15,000 new homes, schools, community facilities, open space, as well as new essential and community infrastructure.

This proposal is required to supply drinking water from the Macarthur WFP to new development in the Wilton Growth Area (Figure 2-2). The proposed drinking water pipeline is part of Stage 1 infrastructure that will service the first 4,800 homes and future Stage 2 infrastructure will service the ultimate 15,000 new homes.

Proposal objectives

The main objective for the proposal is to provide essential drinking water infrastructure to support the growth within the Wilton Growth Area, while minimising environmental and community impacts.

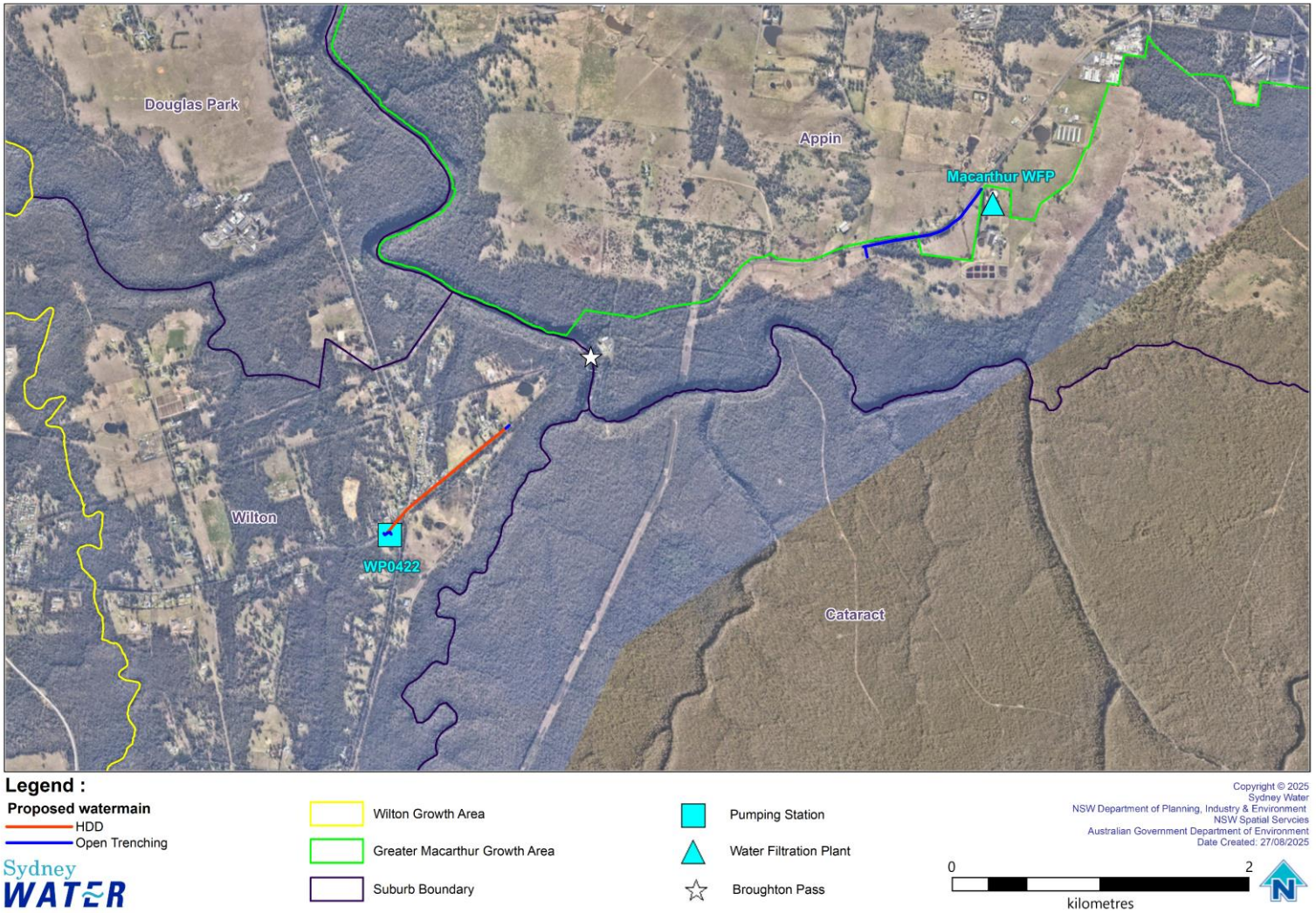

Figure 2-2 Overview of proposal

2.3 Consideration of alternatives/options

Wilton New Town Sub-Regional Plan

Sydney Water prepared the Wilton New Town Sub-Regional Plan (Sydney Water, 2019) to identify water and wastewater servicing requirements to support growth in the Wilton Growth Area. The plan identified three potential options for drinking water supply:

- supply from Macarthur WFP
- supply from Nepean WFP
- supply from the Nepean River, potentially at Maldon Weir or Pheasants Nest Weir.

A summary of the options assessment is provided in Table 2-1. The supply from Macarthur WFP was the preferred option.

Table 2-1 Assessment of drinking water supply options

Drinking water supply option	Summary of assessment
Supply from Macarthur WFP	This option makes use of existing infrastructure and aligns with future upgrades at Macarthur WFP. There is an existing drinking water pipeline supplying water to Wilton from Macarthur WFP. This pipeline can be upgraded in stages to supply development as it happens. Wilton Road offers the best corridor for future infrastructure: • the area to the south is densely vegetated and is WaterNSW Special Area • infrastructure to the north would impact vegetation along the Cataract River and be located in private property. Due to the proximity of the Macarthur WFP to Wilton this option requires less new infrastructure compared to the other options. This option also allows a staged delivery of infrastructure.
Supply from Nepean WFP	This option makes use of existing infrastructure. However, it would require extensive pipeline upgrades between the Nepean WFP and Wilton, would double the demand on the WFP and would require a Nepean River crossing. Upgrades to the pipeline network would be required in the Upper Nepean State Conservation Area and WaterNSW Special Area. This would have potential to require extensive vegetation clearing and have a high environmental impact.
Supply from Nepean River, potentially Maldon Weir or Pheasants Nest Weir	This option would require construction of a new water filtration plant and need a water extraction licence to extract water from the Nepean River. This would be a single point source supply, with water quality and volume influenced by upstream catchments.

Drinking water supply option	Summary of assessment
	There is extensive riparian vegetation along the Nepean River at Pheasants Nest and Maldon. While a location for a plant was not specified, extensive vegetation clearing for a new plant and associated intake and outlet pipelines would be required. A new plant would be likely to have a high environmental impact.

The option to supply the Wilton Growth Area from the Macarthur WFP is the preferred option. The sub-regional plan adopts a staged approach to delivering drinking water infrastructure to support growth in Wilton. Stage 1 (subject of this REF) requires about 2 km of drinking water pipeline along Wilton Road.

Stage 2 (subject of a future REF) is not yet planned. This stage will provide the remaining connections between the Macarthur WFP and future reservoirs in South East Wilton and will supply the ultimate development of the Wilton Growth Area.

Options – concept design

The 'do nothing' option was considered during the initial planning phase. However, the 'do nothing' option is not consistent with the proposal needs and objectives, as the existing drinking water infrastructure does not have capacity to supply new development in the Wilton Growth Area. Therefore, this option was not considered further.

Concept design was developed for a DN600 (600 mm diameter pipe) pipeline on Wilton Road:

- about 1.4 km of DN600 on the western side of Broughton Pass (western section)
- about 0.6 km of DN600 on the eastern side of Broughton Pass (eastern section).

The two sections of pipeline are sufficient to increase the capacity of the system to supply drinking water for the initial stages of development. Stage 2 will include a connection between the two pipeline sections.

Three alignment options were considered as part of concept design for the western section and are described in Table 2-2. The eastern section can be located in the road verge. Therefore, an options assessment for the eastern section was not required.

Table 2-2 Concept design options – western section

Alignment options	Description of option
Option 1 - Alignment in Wilton Road verge	Locate the pipe in the road verge. The pipe would be constructed mainly using open trenching.
Option 2 - Alignment in Wilton Road	Locate the pipe under the traffic lanes of Wilton Road. The pipe would be constructed using open trenching.
Option 3 - Alignment in Wilton Road verge and in a cleared area with overhead electricity cables	Locate pipe in an area cleared for overhead electricity cables on the northern side of Wilton Road, directly in front of properties (near Douglas Park Road) and in a section of overtaking lane on Wilton Road. The pipe would be constructed using open trenching and micro-tunnelling.

An alignment along the southern side Wilton Road was not considered due to the extensive vegetation clearing (> 1 ha) that would be required.

The options were assessed against three aspects:

- environment
- community
- constructability.

The assessment of potential environmental impacts was informed by a biodiversity field survey by Arcadis (2025) and an arboriculture assessment by Truth About Trees (2022).

Table 2-3 provides the assessment of the options against the three aspects.

Table 2-3 Assessment of options

Alignment options	Environment	Community	Constructability
Option 1	Clearing more than 0.7 ha of threatened ecological communities and koala habitat. Visual impact due to removal of vegetation from one side of Wilton Road.	Traffic impact due to full or partial road closure. A long detour (about 50 mins) would be required if a full road closure is implemented.	This option can be constructed.
Option 2	Highly likely that more than 50 roadside trees, including large mature trees, would be cleared due to encroachment into tree protection zones (TPZs). Constructing the pipe in the middle of the road would not avoid this impact as the trees are located on the edge of the traffic lanes. Visual impact due to removal of vegetation from one side of Wilton Road.	Traffic impact due to full road closure. A long detour (about 50 mins) would be required if a full road closure is implemented. The road closure would last for about 12 months.	This option can be constructed.
Option 3	Clearing about 0.2 ha of threatened ecological communities and koala habitat would be required for trenching near Douglas Park Road and at micro-tunnelling launch/receival pits.	Localised, partial road closures would be required around the micro-tunnelling pits. Potential impact to private property access.	This option was assessed as constructable based on information available during concept design.

Option 3 was chosen as the preferred option due to the reduced impact to threatened vegetation communities and koala habitat compared to Options 1 and 2. This option also avoids a full road closure.

Options – detailed design

During detailed design further service location investigations and constructability assessments were carried out. The key outcome of the investigations/assessments were:

- open trenching on the north side of Wilton Road was likely to result in the clearing of around 80 trees
- the Eastern Gas Pipeline was found to be shallower than initially identified. This would result in a deeper pipe to achieve the required clearance from the gas main. Therefore, larger micro-tunnelling pits and increased vegetation clearing would be required.

The design team proposed to shorten the western section of the alignment to avoid the gas main and to increase the length of the eastern section by the corresponding amount. This reduced vegetation clearing while still meeting the servicing requirements of the proposal. This change was adopted.

The design team carried out a detailed assessment to identify a constructable option that met the proposal objectives and the required pipeline standards and specifications. The pipe material and construction method were key considerations. Pipe material considerations were:

- suitability of the pipe material for mine subsidence areas. The pipe material and joints must be able to withstand potential future ground subsidence
- design pressure. The pipes must be able to carry water from Macarthur WFP to WP0422 at the pressure required
- Australian Standards, Sydney Water specifications and requirements for construction in roads.

Construction methods considered were:

- open trenching – versatile construction method. All pipe material considerations can be satisfied. However, this construction method would result in a large impact area
- horizontal directional drilling (HDD) – can be used to bore long distances and has minimal impact area. However, this method uses a limited range of pipe material and may not meet all standards.

Three pipe materials (ductile iron, polyethylene and steel) were identified. Ductile iron and steel must be open trenched and polyethylene can be constructed using open trenching or HDD.

Two construction methods were identified:

- combination of open trenching and HDD
- open trenching.

HDD alone was not feasible because trenching is required to install valves and other fixtures on the pipeline to allow connection to the existing pipeline. Both options are assessed in Table 2-4.

Table 2-4 Assessment of construction options – western section

Construction method	Environment	Community	Pipe material requirements	Cost
HDD and open trenching	Clearing about 50 trees would be required for the launch and receival pits.	Noise impacts for residents particularly near the HDD launch pit. No traffic impact.	Meets most of the requirements.	Lowest cost option.
Open trenching	Extensive vegetation clearing of threatened vegetation communities, along the entire length of the alignment.	Noise impacts for residents from trenching. However, this impact would reduce as trenching progresses. No traffic impact.	Meets requirements.	Depending on the material and pipe joints required this option is moderate to high cost.

Open trenching will result in high environment and community impacts. HDD using polyethylene pipe was identified as the preferred option due to reduced environmental impact and community impact. This option is also the lowest cost option. The HDD can be constructed to carry water at the required pressure and be a reliable, durable asset.

Refining the preferred option

The preferred option for the western section would clear about 50 trees in koala habitat. Due to the importance of the koala population in the area Sydney Water refined the preferred option:

- relocated the HDD launch pit to a cleared area beside WP0422 and increased the length of the HDD
- reduced the size of the HDD receival pit footprint and reduced the trenching required to connect the proposed pipe to the existing pipe.

The refinement of the preferred option reduced tree clearing from 50 trees to about six trees. The refined option was adopted and is the subject of this REF.

2.4 Consideration of Ecologically Sustainable Development

Table 2-5 considers how the proposal aligns with the principles of ecologically sustainable development (ESD).

Table 2-5 Consideration of principles of ecologically sustainable development (ESD)

Principle	Proposal alignment
Precautionary principle – *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.*	The proposal will not result in serious or irreversible environmental damage and environmental mitigation measures have been designed to reduce scientific uncertainty relating to the proposal. The proposal is essential for the supply of drinking water to the Wilton Growth Area. HDD was adopted to minimise the impact to koala habitat. Construction footprints were chosen to avoid impacting areas of intact native vegetation. Roadside vegetation that will be impacted by the proposal is low quality habitat and the impact is not expected to impact the lifecycle or occurrence of fauna.
Inter-generational equity – *the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations.*	The proposal will help to meet the needs of future generations by providing reliable drinking water services.
Conservation of biological diversity and ecological integrity – *conservation of the biological diversity and ecological integrity should be a fundamental consideration in environmental planning and decision-making processes.*	The proposal will not significantly impact on biological diversity or impact ecological integrity. The proposal will require clearing of native vegetation. However, the proposal was designed to be constructed using HDD to minimise impact to threatened vegetation communities and koala habitat.
Improved valuation, pricing and incentive mechanisms–- *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*	The proposal will not result in serious or irreversible environmental damage and environmental mitigation measures have been designed to reduce scientific uncertainty relating to the proposal. The proposal is essential for the supply of drinking water to the Wilton Growth Area. HDD was adopted to minimise the impact to koala habitat. Construction footprints were chosen to avoid impacting areas of intact native vegetation. Roadside vegetation that will be impacted by the proposal is low quality habitat and the impact is not expected to impact the lifecycle or occurrence of fauna.

3. Proposal description

3.1 Proposal details

Table 3-1 describes the proposal and Figure 3-1and Figure 3-2 show the location.

Table 3-1 Description of proposal

Aspect	Detailed description
Proposal description	The proposal is to construct about 2 km of DN600 drinking water pipeline along Wilton Road in Wilton and Appin. The new pipeline will increase the capacity of the drinking water supply system between Macarthur WFP and an existing booster pumping station (WP0422) on Wilton Road. Key elements of the proposal include: • about 1.1 km of pipeline constructed using HDD on the western side of Broughton Pass (western section). A total of about 90 m of trenching is needed to connect each end of the new pipe to the existing network • about 900 m of pipeline constructed using open trenching on the eastern side of Broughton Pass (eastern section) • scours and isolation valves on the pipeline to allow for dewatering, maintenance and repair work • air valves • temporary works including ancillary facilities, such as the site compound and laydown areas. The new sections of pipeline will be mainly located in the road reserve.
Location and land ownership	The proposal is located on land owned by Sydney Water, WaterNSW, Transport for New South Wales (TfNSW) and on private land.
Site establishment and access tracks	Site establishment will include the installation of structures such as erosion and sedimentation controls, traffic controls, erection of signage and demarcation of no-go areas. Site establishment may also include surveys, service location, geotechnical investigations or other investigations required prior to construction. It may also include service relocation. Access to the alignment and construction sites will generally be via existing roads and along the pipeline construction footprint. Temporary access tracks may be established where necessary. The location of these 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

Aspect	Detailed description
	in Section 6. Temporary access tracks will be removed at the completion of construction.
Ancillary facilities (compounds)	Construction compound(s) will likely be required to house site sheds, construction amenities and materials laydown. Compound sites will be located at WP0422 (Figure 3-1) and beside the Macarthur WFP (Figure 3-2). Additional compound/laydown sites may be required to store materials and spoil. The exact location of these will be chosen by the delivery contractor and remain within the field assessment area, in consultation with the landowner(s) and approved by Sydney Water's Project Manager as described in the mitigation measures in Section 6.
Methodology	**Open trenching for pipe installation** About 1 km of the proposed water pipeline will be constructed by open trenching. The construction corridor is typically about 10-15 m wide. The construction corridor width may be restricted in certain areas to minimise environmental impacts or in road reserves to avoid private property impact. Pipes will generally be installed in a trench with a standard cover of 0.75 m. Trenches will be up to 2 m wide and between 1.5-3 m deep. Trenching activities 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 driveways • excavate trenches to required depth and width • stockpile spoil material on the upslope side of trenches, or at temporary site compounds • shore and dewater trenches, depending upon trench depth and groundwater levels • spread granular material such as sand or gravel along the bottom of the trench before pipe laying • lift pipe into the trench using crane or similar • backfill the trench with bedding material and excavated soil • compact trench fill material and restore areas disturbed by the construction works • test and commission the pipeline. The estimated time to complete trenching is 7 months.

Aspect	Detailed description
	The construction durations can vary based on a range of factors including ground conditions and impacts of inclement weather. **Trenchless construction** About 1.1 km of the new pipeline will be constructed using HDD. HDD involves drilling from the surface and only requires excavation of shallow pits at either end of the HDD. Pipes installed using HDD will be up to about 6 m deep. Construction by HDD will involve (Figure 3-3): • positioning directional drilling plant at the launch pit • install 180 mm pipe (return line) to return drilling fluids from the receival pit to the launch pit. The return line will be above ground and located in the road verge. The return line will be protected when crossing driveways by installing the pipe in a small trench or covering the pipe with asphalt. The return line will be removed on completion of the HDD and the driveways restored • drilling pilot hole from the surface at the launch pit to the receival pit • stringing pipe at the receival pit • pulling pipe back from the receival pit to the launch pit • grouting around the pipe. The HDD will take about seven months to complete.
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 equipment, but typically include: • test pressure leaks • check all equipment and safety devices • performance testing including sampling where required. The new pipeline will be connected to existing water pipelines. This will require shutdown of the existing water pipeline for about seven hours. Shutdowns will only occur at night during periods of low demand.
Restoration	Disturbed areas will be restored to a condition similar to that prior to the disturbance occurring. This will include backfilling and reinstatement of topsoil, restoration of groundcover, reuse of cleared vegetation as mulch, reinstatement of removed habitat such as hollow logs, and more substantial revegetation activities where appropriate.

Aspect	Detailed description
	Revegetation will be carried out in accordance with Sydney Water procedure *SWEMS0025.11 Managing Native Re-vegetation for Construction Projects*. Restoration of roads and road surfaces will be in accordance with local council requirements. Restoration of driveways will be as agreed with the property owner.
Materials/ equipment	The materials required for the construction of the proposal will include general construction materials such as concrete, prefabricated sections of pipe, valves and other fittings, associated bedding materials, road restoration materials, and other materials as required. Construction of the proposal will involve the use of a range of vehicles, equipment and machinery, such as: • 20-30 tonne excavators • light and heavy vehicles • bobcats • compactors • cranes • dump trucks • dumpers • front end loaders • vacuum trucks • delivery trucks • concrete pump • generators • HDD rig • mud pump • recycler • portable pumps • rock breakers • rollers • semi-trailers • water carts • skip bins. Construction of the proposal will involve excavation, and while excavated material will generally be used as backfill, it is likely that there will be excess materials, including material generated from trenchless construction. The management of this and other waste material generated by construction is discussed in Section 6.1.7.
Work hours	It is expected that the proposal will require a construction workforce of about 30 people at any given time across the alignment.
Proposal timing	Work and deliveries will be scheduled to occur during standard daytime hours of: • 7 am to 6 pm, Monday to Friday

Aspect	Detailed description
	• 8 am to 1 pm, Saturdays. Some out of hours work may be necessary for certain activities such as work in roads, connecting the new pipe to the existing system or delivery of oversized equipment. Sydney Water's Project Manager can approve work outside of standard daytime hours, following the approval process described in Section 6. Construction is expected to start in late 2025 and take about 12 months.
Operational requirements	There will be some nighttime disruptions to the drinking water supply for a short period of time when the new pipe is connected to the existing system. All affected customers will be notified of disruptions to supply.

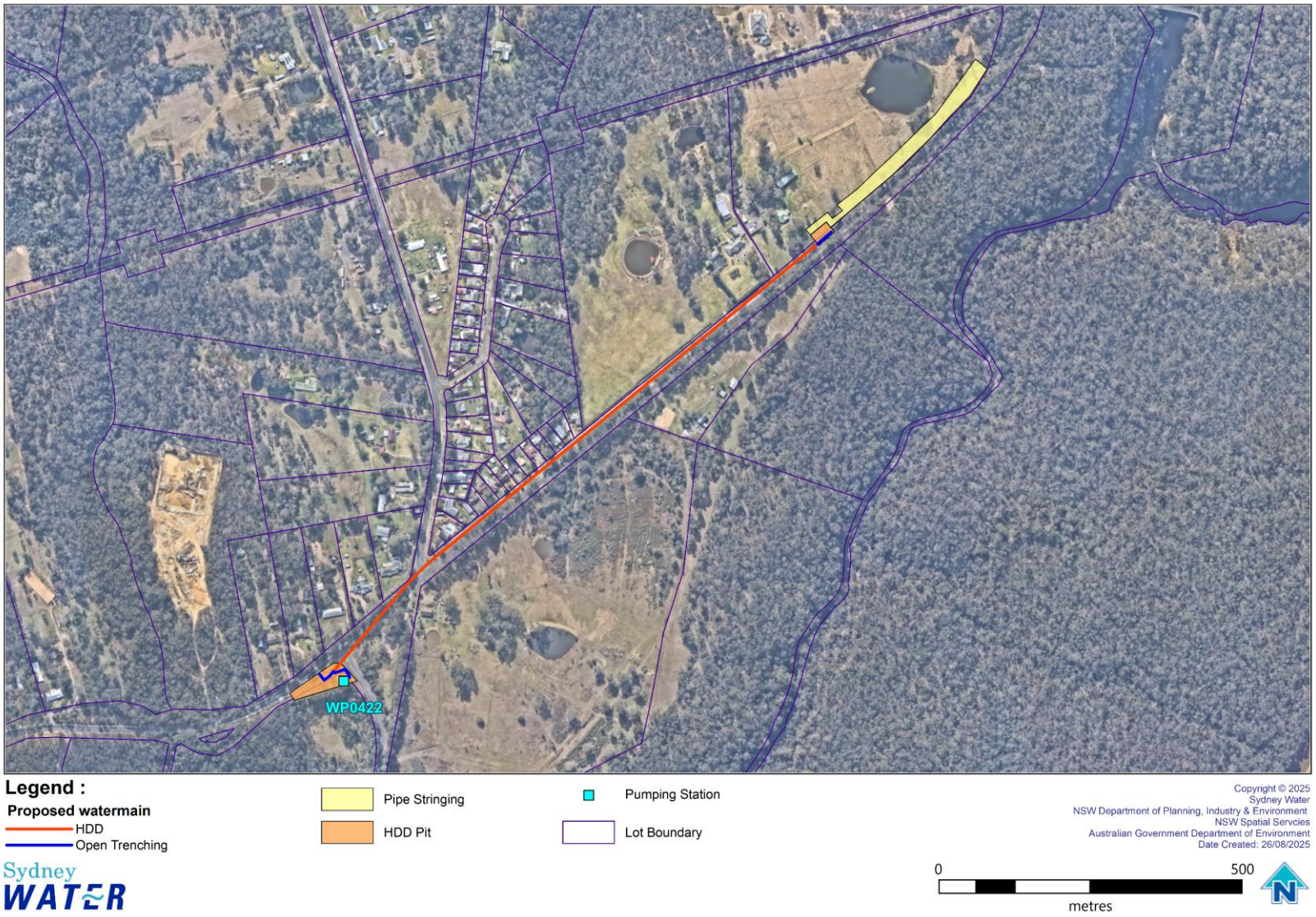

Figure 3-1 Wilton Road water pipeline – western section

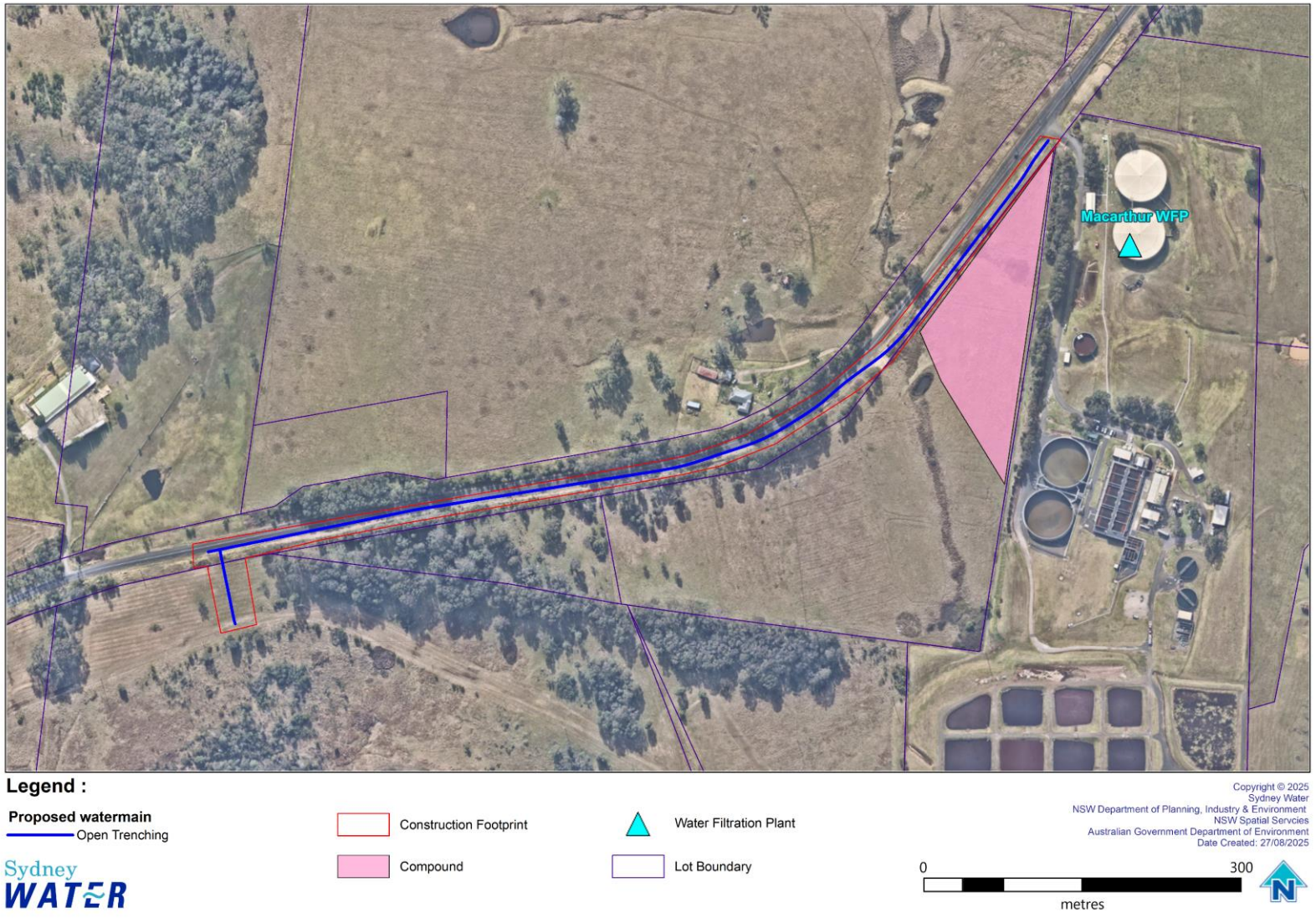

Figure 3-2 Wilton Road water pipeline – eastern section

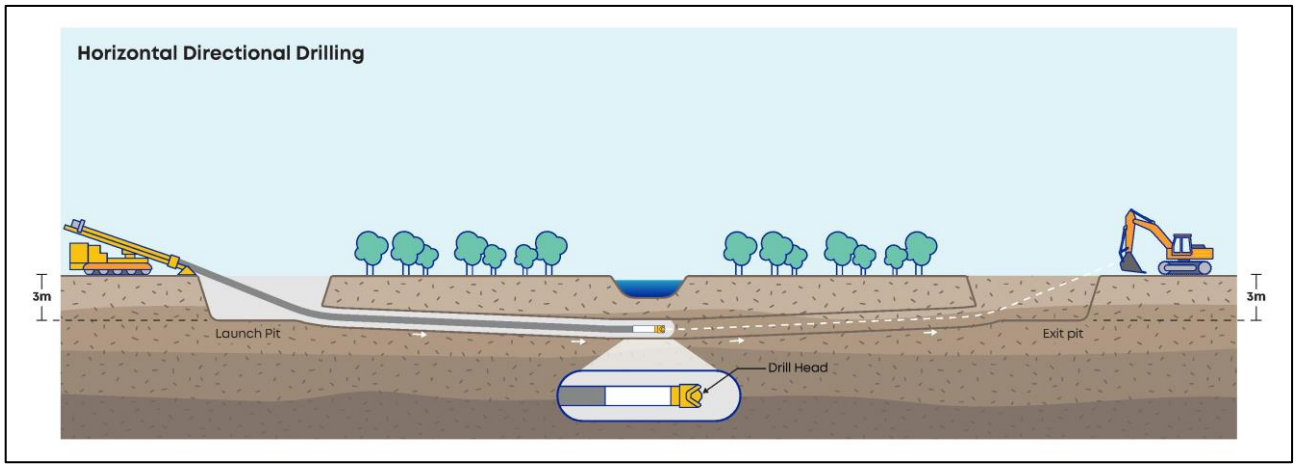

Figure 3-3 Example of HDD methodology

3.2 Field assessment area and changes to the scope of work

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 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 field assessment area of the REF or the study area of specialist studies and has no net additional environmental impact; or
- is outside the field assessment area of the REF but reduces the overall environmental impact of the proposal (subsection 5.4(a) of the Act).

The field assessment area of the REF is the construction footprint shown in in Figure 3-1 and Figure 3-2. Each specialist report has defined their own study area or survey area (different to the field assessment area of the REF) based on 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 of the REF.

Changes to the proposal outside the field assessment area can only occur:

- to reduce impacts to biodiversity, heritage or human amenity; or
- to avoid engineering (for example, geological, topographical) constraints; and
- after consultation with any potentially affected landowners and relevant agencies.

The delivery contractor/s will demonstrate in writing how the changes meet these requirements, for approval by Sydney Water's Project Manager, in consultation with the environmental and community engagement representatives.

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 guidelines.

Stakeholder and community engagement is a planned process of initiating and maintaining relationships with external parties who have an interest in our activities. Community and stakeholder engagement:

- enables us to explain strategy, policy, proposals, proposal or programs
- gives the community and stakeholders the opportunity to share their knowledge, issues and concerns
- enables us to 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 the broader community and stakeholders during plan or strategy development or before making key decisions.

We will also provide local councils with reasonable notice when we would like to commence works. Local council(s) will be consulted about matters identified in environmental planning instruments such as public safety issues, temporary works on council land, and full or partial road closures of council managed roads (refer below).

4.2 Community and stakeholder consultation – proposal

A Community and Stakeholder Engagement Plan (CSEP) has been prepared for the proposal and will evolve with the proposal. The plan helps us to provide the community and key stakeholders with clear, accurate and timely information.

Consultation with key stakeholders will continue throughout detailed design, construction and commissioning of the proposal. We will consult with community members where the proposal directly impacts them.

During construction, the delivery contractor responsible for delivering the proposal will do the consultation and, as representatives of Sydney Water, will adhere to our community relations policies and procedures. We will continually monitor the delivery contractor's performance during proposal delivery.

The CSEP will identify stakeholders with an interest in the proposal, and ensure they are informed during proposal delivery. The CSEP also:

- identifies the directly and indirectly affected landowners and other stakeholders, including government agencies and interest groups
- identifies issues likely to be of high community / stakeholder concern and determine the level of risk to the proposal's development

- identifies ways to raise the level of community satisfaction and ensure that Sydney Water's reputation is protected and enhanced
- incorporates stakeholder views into the proposal planning and delivery.

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).

Wollondilly Council were consulted during the design process and on an ongoing basis. The delivery contractor is required to consult with council for work in council-controlled roads.

As the proposal lies with land mapped as Wilton and Appin Mine Subsidence Zones, and in accordance with Section 2.15 (2)(f) of the TISEPP and as per Part 3 of the *Coal Mine Subsidence Compensation Act 2017*, Sydney Water consulted with Subsidence Advisory NSW. A response was received from Subsidence Advisory NSW in relation to design parameters and this feedback will be incorporated into the design.

About 350 m of the eastern section of the proposed pipeline is in the WaterNSW Special Area and about 310 m of that is in the Sydney Drinking Water Catchment. Sydney Water consulted with WaterNSW and provided this REF to WaterNSW for review on 16 October 2024 in accordance with the D0000755 Sydney Water and WaterNSW – Joint Access Protocol. WaterNSW provided feedback on the REF on 24 October 2024 and additional mitigation measures were included in the REF.

Sydney Water briefed the Biodiversity and Conservation Team, Department of Climate Change, Energy, the Environment and Water (DCCEEW) on the proposal on 23 October 2024 about the potential impact to koala habitat. DCCEEW advised that Sydney Water must be able to demonstrate that all options to avoid impact to koala habitat were considered. Since this meeting Sydney Water refined the construction method to reduce the impact to koala habitat.

Sydney Water notified the Bradfield Development Authority (formerly the Western Parkland City Authority) of the proposal on 3 November 2023 as the proposal has a capital investment value of over $30 million and is in the Western City operational area.

Consultation required under other legislation for groundwater dewatering and road occupancy licences are discussed in Section 5.2.

5. Legislative requirements

5.1 Strategic context

The following strategies have been considered in relation to the proposal.

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 focuses on developing a more liveable, productive, and sustainable city by dividing the metropolitan area into three interconnected cities:

- Western Parkland City
- Central River City
- 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 strategy area by state government investment through Sydney Water's delivery of critical drinking water infrastructure in future growth areas. It also supports other key strategies by improving and expanding drinking water servicing to enhance liveability for current and future populations, enables development and greater productivity opportunities.

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 four 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.

Wilton 2040 – A plan for the Wilton Growth Area (DPE, 2018a)

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

- Create healthy, liveable places, and respond to climate change, for example by promoting cooling effects.
- Incorporate development that protects, maintains or restores waterway health and the community's environmental values and uses of waterways 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 service the Wilton Growth Area and is consistent with the plan.

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

The planning statement is the vision for Wollondilly 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, after public consultation in late 2019. The proposal is consistent with the below planning priorities:

- Planning priority 1 in this document is 'aligning infrastructure provision with community needs.' This includes partnering with Sydney Water to identify and build major infrastructure. Sydney Water is building major water and wastewater infrastructure to support long-term servicing of the area.
- Planning priority 3 in this document is 'establishing a framework for sustainable managed growth.' This includes partnering with Sydney Water to find long-term servicing solutions for drinking water supply. Sydney Water is building major water infrastructure to support long-term servicing of the area.
- Planning priority 4 in this document is '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 the initial stages of development in Wilton.
- Planning priority 13 in this document is '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.

Wollondilly Rural Lands Strategy (Wollondilly Shire Council, 2021)

The 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 Local Environmental Plan 2011 amendments and potential re-zonings.

Under Action 3.4.2 of this draft strategy, there is a commitment for council to continue working with Sydney Water to provide secure, sustainable and long-term water supply solutions.

Our proposal is consistent with this study as it is supporting long-term water supply within the LGA.

Greater Sydney Water Strategy (DPE, 2022a)

The Greater Sydney Water Strategy has a strong focus on a resilient and reliable water supply and strong environmental performance. The proposal will provide a resilient and reliable water supply to a growing population.

5.2 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
State Environmental Planning Policy (SEPP) (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 Greater Macarthur Growth Area. Part of the eastern section of proposed pipeline is in the Greater Macarthur Growth Area. However, this land is not zoned under the SEPP. The proposal will not impact any lands zoned for biodiversity conservation under the SEPP. The Greater Macarthur Growth Area was not subject to biodiversity certification as part of the Sydney Growth Centres SEPP. Therefore, any impacts to biodiversity are subject to environmental and ecological assessment under the EP&A Act, BC Act and EPBC Act (refer Section 6.1.3 of the REF).
Wollondilly Local Environment Plan 2011	The proposal is located on land zoned:

Environmental Planning Instrument	Relevance to proposal
	• SP2 Infrastructure • RU2 Rural landscape • C2 Environmental conservation.
SEPP (Transport and Infrastructure) 2021 (TISEPP)	Section 2.159 of TISEPP permits developments by or on behalf of a public authority for water reticulation systems without consent on any land. The proposal is development of a water reticulation system. As Sydney Water is a public authority, the proposal is permissible without consent.
SEPP (Biodiversity and Conservation) 2021 (BC SEPP)	**Koala habitat protection (2020 and 2021) (Chapters 3 & 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 Shire LGA, which is in the Central Coast and Central/Southern Tablelands Koala management areas. The SEPP outlines that development consent cannot be granted unless there is a plan of management prepared for the LGA in question. Development being carried out under the TISEPP is not subject to the planning provisions of the BC SEPP. Nevertheless, where possible the aims, objectives and management actions should be considered. The proposal is close to the South East Wilton precinct. A Koala Plan of Management (KMP) for Wilton has previously been prepared for the South East Wilton precinct (EMM, 2020). The Plan outlines management actions and recommendations to minimise impacts on koalas and their habitats. Relevant mitigation measures from this KMP have been incorporated into mitigation measures in Section 6.1.3 of this REF. **Water catchments (Chapter 6)** Chapter 6 of the BC SEPP applies, as the proposal is within the Hawkesbury-Nepean Catchment, a regulated catchment area. Section 6.1.2 of this REF assessed potential environmental impacts on water quality and quantity, aquatic ecology, flooding, access, cultural heritage, flora and fauna, and scenic quality. The assessment confirmed that potential impacts are minimal and meet the requirements of section 6.2 of the SEPP. The works are partly in the Sydney Drinking Water Catchment area. In accordance with section 6.61 of the BC SEPP, an assessment of neutral or beneficial effect on water quality was undertaken. The assessment confirmed that potential impacts are neutral, refer Appendix C.

Environmental Planning Instrument	Relevance to proposal
	Strategic conservation planning (Chapter 13) Chapter 13 of this SEPP contains development controls for areas mapped under the Cumberland Plain Conservation Plan (CPCP) (DPE, 2022b). The eastern section of the proposal is on urban capable and excluded land. Urban capable land is land where future development is likely to occur. Excluded land is land that is not included in the CPCP, typically due to development approvals or other relevant processes already existing on the land. The western section of the proposal is located beside land mapped as strategic conservation area. Measures to mitigate impact to urban capable land, excluded land and strategic conservation area are included in Section 6.1.3 of the REF.

Table 5-2 Consideration of key environmental legislation

Legislation	Relevance to proposal	Permit or approval	Timing and responsibility
Biodiversity Conservation Act 2016 (BC Act)	Protection of listed species and ecological communities in NSW falls under the BC Act. Threatened species and communities are listed in the Schedules of the Act. Tests of Significance (ToS) were performed under section 7.3 of this Act to determine whether the project is likely to significantly impact any threatened entities, refer to Appendix D (Arcadis, 2025). The impact of the proposal on threatened species, communities and their habitats is described in Section 6.1.3. No BC Act threatened entities are likely to be significantly impacted by the project.	REF	Pre-construction, Sydney Water
Heritage Act 1977	There are four non-Aboriginal heritage items within 200m of the proposal, including two items listed on the State Heritage Register. The closest non-Aboriginal heritage item is about 30m from the proposal. These items will not be impacted, and no heritage approvals are required.	REF	Pre-construction, Sydney Water
Fisheries Management Act 1994 (FM Act)	No threatened species habitat, threatened species, or critical habitat listed under the FM Act is mapped or described within the proposal area. The proposal will cross one mapped watercourse. Ousedale Creek is not mapped as Key Fish Habitat (KFH). DPI Fisheries notification is not required.	REF	Pre-construction, Sydney Water

Legislation	Relevance to proposal	Permit or approval	Timing and responsibility
Water Act 1912/ Water Management Act 2000	Groundwater dewatering will be required during ground disturbance. The delivery contractors will prepare estimates of the volume of groundwater to be dewatered during construction. A Water Supply Works Approval (WSWA) will likely be required. A WSWA is required before any groundwater dewatering can start.	WSWA	Pre-construction, Sydney Water
Roads Act 1993	Wilton Road is a regional road classified under the *Roads Act 1993* and managed by Wollondilly Shire Council. Any road opening or lane closures will require approval from Wollondilly Shire Council.	Road Occupancy Licence	Pre-construction, delivery contractor
Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)	Under the EPBC Act, actions that have, or are likely to have, a significant impact on Matters of National Environmental Significance (MNES) require Commonwealth approval. Significant Impact Criteria (SIC) assessments were performed to determine whether the project is likely to significantly impact any threatened entities, refer to (Appendix D, (Arcadis, 2025)). The proposal is not anticipated to have a significant impact on listed threatened species, ecological communities, or migratory species (Section 6.1.3 of the REF).	NA	NA
Water NSW Act 2014	Part of the eastern section of the proposal will be on WaterNSW land. The work will be in accordance with *Joint Access Protocol (D0000755)*.	Landowner access	Pre-construction, delivery contractor

6. Environmental assessment

Section 6.1 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

Existing environment

The topography of the land around the proposal is undulating and largely follows natural contours, sloping downhill toward creeks and major waterways, such as the Cataract River.

Underground mining has occurred in the vicinity of the proposal. These mines include Appin, Tower and West Cliff Collieries (Illawarra Coal), and Tahmoor Colliery (Tahmoor Coal). The proposal is located within lands mapped as Mine Subsidence, and consultation has been undertaken with the Mine Subsidence Authority.

A desktop study was undertaken to identify the geology and soil types. Geology within the proposal is a mix of Ashfield Shale and Hawkesbury Sandstone. Soil types include a mix of Blacktown residual, Luddenham erosional, and Picton colluvial. There are no acid sulfate soils mapped within the proposal area.

The western section is on land mapped as having low-moderate salinity and the eastern section is mapped as moderate-high salinity (DIPNR, 2002).

The current land use around the proposal is mostly rural/residential, vacant land and environmental conservation. A search of the NSW EPA contaminated land record and list of notified sites on 27 August 2025 did not identify any areas of contamination within one kilometre of the proposal.

Potential impacts

The proposed construction activities, including ground disturbance, removal of vegetation and excavation of depths up to 3 m will temporarily expose soils to erosion risks. About 6,000m^3 of spoil material is expected to be stockpiled over the course of construction. It will be placed within the construction footprint or in compound or laydown areas to be determined by the delivery contractor. Erosion can lead to the degradation of soil substrates and reduction in soil stability.

Construction activities will be staged to minimise the extent of soil disturbance at any time and disturbed areas will be stabilised and reinstated as soon as practical. Erosion impacts from the proposal are considered to be minor and temporary. These impacts are expected to be readily managed with implementation of the mitigation measures in Table 6-1.

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

As some areas are mapped as having moderate to high salinity potential, there is potential for the proposed infrastructure to be affected by corrosion. However, polyethylene pipe is resistant to the effects of salinity and impacts on infrastructure are not anticipated. Mitigation measures will be implemented to ensure that potential impacts from salinity on the environment are minimised.

A preliminary contamination and waste classification assessment was carried out for the proposal (Douglas Partners, 2024). Soil samples were taken from three boreholes near the Macarthur WFP and one location near WP0422. The assessment found that fill material in these areas will be General Solid Waste and natural soil and rock will be classified as Virgin Excavated Natural Material (VENM). Contamination was not found in either area. While no significant contamination is expected, there remains the potential for contamination to be encountered during construction. Mitigation measures are provided below to avoid, mitigate and manage potential contamination impacts should any be encountered.

Construction activities, particularly trenching and stockpiling, will temporarily alter surface topography and drainage conditions. These excavations will be progressively backfilled using stockpiled material and imported fill (where necessary) and restored to a condition similar to that prior to disturbance. As such, the potential impacts of the proposal on topography following construction will be negligible.

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 ‘the Blue Book’ 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, including sediment fencing around laydown areas • 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.
Minimise ground disturbance and stabilise disturbed areas progressively.
All temporary access tracks will be removed following completion of construction and pre-existing ground levels restored.

Mitigation measures

Contractor/s 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 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 & Hazardous Material 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.

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

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

Adopt appropriate soil salinity mitigation measures in accordance with Western Sydney Salinity Code of Practice (Western Sydney Regional Organisation of Councils, 2003). This may include:

- (if relevant) treat existing salinity with gypsum
- (if relevant) establish salt tolerant species in existing or potential salinity problem areas after construction
- stabilise existing areas of erosion
- minimise water use on site
- avoid rotation and vertical displacement of the original soil profile
- backfill excavations deeper than one metre in the same order or treat or use this material as fill at depths more than one metre from the finished level.

6.1.2 Water and drainage

Existing environment

The Cataract River flows between the eastern and western sections of the proposal (Figure 6-1). Ousedale Creek is an ephemeral water course that crosses the eastern section near Macarthur WFP (Figure 6-2). Several water retention ponds / farm dams are located near the proposal.

During site investigations undertaken by Sydney Water, groundwater was detected about 3 m below ground level along Wilton Road. No potential groundwater dependent ecosystems (GDEs) were mapped around the construction footprint (Bureau of Meteorology, 2023).

About 350 m of the eastern section of the proposed pipeline is in the WaterNSW Special Area and about 310 m of that is in the Sydney Drinking Water Catchment (Figure 6-2).

Most of the construction is not on flood prone land. About 200 m of the eastern section of pipeline around Ousedale Creek is on flood prone land (Wollondilly Shire Council mapping, 2024). The depth of flood water during a 10% Annual Exceedance Probability (AEP) event would mostly be up to about 0.3 m, with some small areas up to 1-2 m deep.

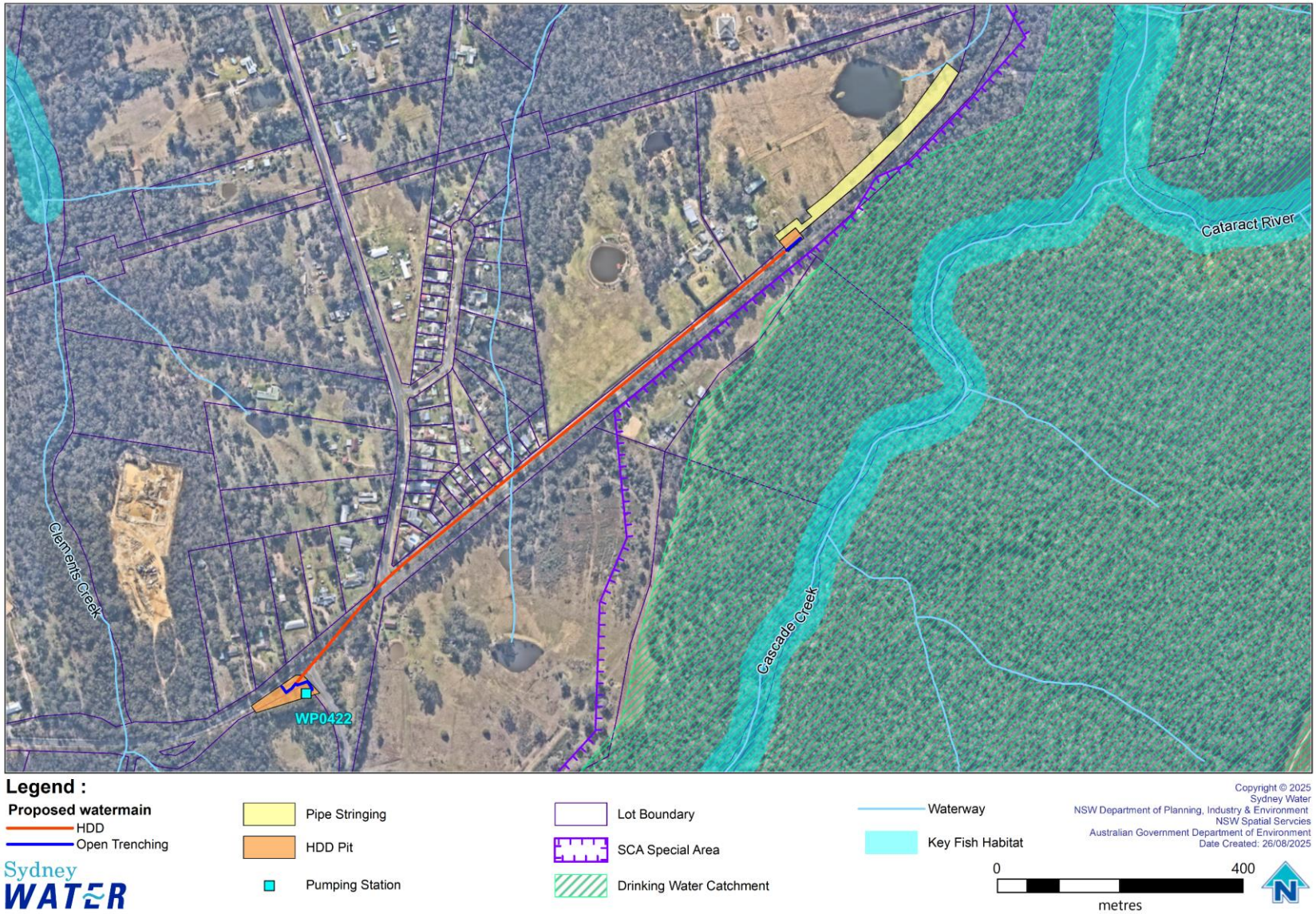

Figure 6-1 Waterways - western section

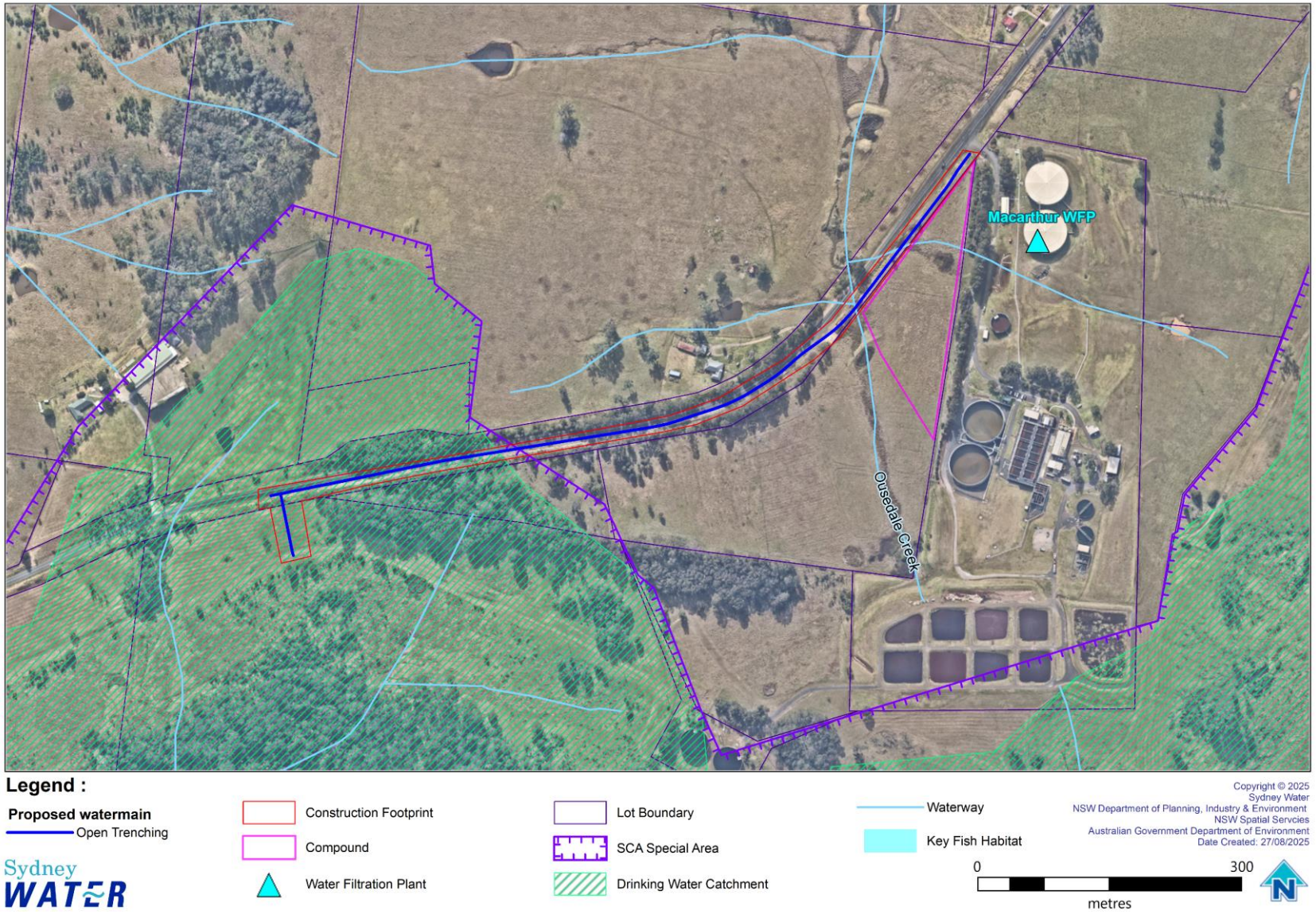

Figure 6-2 Waterways - eastern section

Potential impacts

The main construction impacts on water and drainage include erosion and sedimentation and/or accidental spills and leaks. Material may travel off site into waterways from displacement of soil, waste, and other materials during flooding, strong wind or heavy rain. The potential impacts to waterways from erosion and sedimentation are highest where excavation and temporary stockpiling occurs near waterways, which are also the areas within the construction footprint most likely to flood. No compounds or laydown areas are proposed within flood-prone areas.

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 1-in-100-year flood mapping. Additional mitigation measures to avoid and manage potential impacts in the event of a flood are provided below. Erosion and sedimentation impacts under normal (non-flood) conditions are discussed separately in Section 6.1.1.

Construction will involve the use of equipment and machinery that use hydrocarbon-based fuels and other chemicals that, could pollute water if an accidental leak or spill occurs. Small quantities of fuels and other chemicals will be appropriately stored in the compounds and laydown areas, which will minimise the risk of off-site pollution. An assessment of water quality impacts to the Sydney Drinking Water Catchment has identified the potential impact as neutral (Appendix C). Mitigation measures to minimise impact to Sydney Drinking Water Catchment land and WaterNSW land are included in this REF.

Ousedale Creek is ephemeral and is not mapped as key fish habitat. To mitigate impacts, any excavation within waterways will occur during dry conditions and the landforms will be restored to their former condition following construction.

Trenchless construction has a potential risk of drilling fluid escaping the bore and entering the environment from a spill or frac-out (drilling intercepting faults and fractures in the rock). If not adequately managed, construction in or near waterways has the potential to cause sedimentation and impact water quality. The drilling contractor will be required to manage the drilling to minimise the risk of frac-out.

As excavation depths may be lower than the identified groundwater levels, it is likely that groundwater dewatering will be required. Groundwater dewatering can have adverse impacts on groundwater quality and change groundwater levels. Further assessment is required to determine groundwater dewatering volumes at each location within the construction footprint. A Water Supply Works Approval will be obtained before any groundwater dewatering occurs.

During commissioning, cleaning of pipes and discharge of drinking water to a receiving body or into the Sydney Water network is required. Any groundwater, water captured in excavations, or water from commissioning that requires dewatering will be managed in accordance with Sydney Water Discharge Protocols.

Mitigation measures

With the implementation of the mitigation measures below, impacts to water and drainage can be adequately managed, and residual impacts are expected to be low. No impacts are anticipated during operation.

Table 6-2 Environmental mitigation measures — water and drainage

Mitigation measures
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 approval conditions (such as protecting water quality; minimising aquifer extraction volumes, monitoring extraction with flow meters and recording volumes).
Prepare Drilling Fluid Management Plan to avoid impacts, including: • contain and monitor drilling fluids at entry/exit points • identify and manage frac-outs • re-use and/or disposal of drilling fluids (checking waste classification).
The delivery contractor must notify WaterNSW before starting work in the WaterNSW Special Area or in the Drinking Water Catchment. WaterNSW must be engaged throughout construction and notified on completion of work.
Comply with the Sydney Water and WaterNSW Access Protocol including when working on WaterNSW land. Access must be in accordance with the 'Conditions of Access into Special and Controlled Areas' of the protocol.
Minimise the impacts to creeks where creek crossings are required. Before construction the methodology will be assessed based on: • geotechnical and constructability issues (eg depth of cover, potential for future scouring) • construction footprint and duration • ease of reinstatement • environmental issues (flora and fauna, geomorphology, contamination, heritage, water quality and hydrology). The decision and reasons for the decision will be documented by the contractor in consultation with the Environmental Representative.
Use appropriate controls to avoid potential sedimentation to waterbodies. Where possible, any excavation within waterways will occur during dry conditions and the landforms will be restored to their former condition following construction.
Bund potential contaminants and store on robust waterproof membrane, away from drainage lines.
Keep functioning spill kit on site for clean-up of accidental chemical/fuel spills. Keep the spill kits stocked and located for easy access.
Store all chemicals and fuels in accordance with relevant Australian Standards and Safety Data Sheets. Record stored chemicals on site register. Bunded areas to have 110% capacity of stored liquid volume. Chemicals and fuels in vehicles must be tightly secured. All chemicals to be clearly labelled.

Mitigation measures
Conduct refuelling, fuel decanting and vehicle maintenance in compounds where possible. If field refuelling is necessary, designate an area away from waterways and drainage lines with functioning spill kits close by.
Conduct any equipment wash down within a designated washout area.
Locate portable site amenities, chemical storage and stockpiles of erodible materials away from watercourses, drainage lines and flood prone areas.
Ensure equipment is leak free. Repair oil/fuel leaks immediately or remove from site and replace with a leak-free item.
Discharge all water in accordance with Sydney Water's Water Quality Management During Operational Activities Policy (D0001667) including erosion controls, discharge rate, dichlorination, monitoring. Re-use potable water/ groundwater where possible.
If discharge to the environment is not possible, seek approval and discharge criteria from the relevant Sydney Water Network Area Manager before discharge to the wastewater system. Otherwise, tanker by a licensed waste contractor and dispose off-site to an appropriately licensed facility.
Shift compounds and laydown areas outside the Sydney Drinking Water Catchment boundary as a preference. Where this is not possible: • Do not dam, divert or take any water located in a special or drinking water catchment. • No chemicals/fuels/pollutants/stockpiles are permitted in a special or drinking water catchment.

6.1.3 Flora and fauna

A flora and fauna assessment was carried out by Arcadis (Arcadis, 2025) and is summarised in this section. The complete assessment report is provided as Appendix D. The flora and fauna assessment included:

- a desktop review including database searches for flora and fauna previously recorded
- a flora and fauna field survey
- likelihood of occurrence assessment for the identified and predicted flora and fauna
- assessments of significance for those species that were found to be likely to occur
- consideration of the relevant biodiversity certification orders in force for the study area
- discussion of the potential impacts of the proposal
- identification of site-specific mitigation measures to minimise and mitigate potential impacts of the proposal.

The study area for the flora and fauna assessment was created by applying a 10 m buffer corridor centred on the construction footprint (Figure 6-3).

Existing environment

The study area is comprised of residential dwellings and large areas of mixed native and exotic vegetation, with areas of pasture beside Wilton Road. Vegetated areas include semi open pasture bordering old growth vegetation.

A flora and fauna field survey was carried out to confirm desktop findings and/or identify vegetation communities as well as identify any threatened species or their habitat in the study area.

Vegetation communities

Three different plant community types (PCTs) were confirmed to be present in the study area during the field survey (Table 6-3).

Table 6-3 PCTs within the study area and construction footprint

Plant Community Type (PCT)	Listing – BC Act and EPBC Act	Area assessed	
		Within the study area (hectares)	Within the construction footprint (hectares)
3320 – Cumberland Shale Plains Woodland	Critically endangered – BC Act and EPBC Act	1.35 ha (BC Act listed) EPBC Act – not present	0.2 ha
3321 – Cumberland Shale-Sandstone Ironbark Forest	Critically endangered – BC Act and EPBC Act	1.93 ha (BC Act listed) 0.26 ha (EPBC Act listed)	0.04 ha (BC Act listed)
3448 – Castlereagh Ironbark Forest	Endangered – BC Act Critically endangered – EPBC Act	0.47 ha (BC Act) EPBC Act – not present	0.05 ha
Sub-total		**3.75 ha**	**0.29 ha**

Note: There is no impact TECs meeting the criteria for listing under the EPBC Act.

The study area is within the Cumberland Plain Conservation Plan (CPCP) boundary. However, only parts of the proposal are located on land zoned under the CPCP (Figure 6-3). A description of these land zonings and their applicability to the proposal is shown below (Table 6-4).

Table 6-4 Land zonings under the CPCP - PCTs within construction footprint

Land category	Description	Applicability to the proposal
Excluded land	Areas that have been excluded from the CPCP and biodiversity certification does not apply.	0.09 ha of PCT 3320 is on excluded land.
Certified-urban capable land	Areas where future urban development is likely to occur and does not require further biodiversity assessment, if consistent with the CPCP.	No impact to a PCT on this land.

Land category	Description	Applicability to the proposal
Avoided land	Areas with high biodiversity values that are to be protected and are not certified for future urban development.	No impact to a PCT on this land.
Strategic conservation area	Areas that have strategic biodiversity value including important landscape connectivity and ecological restoration potential.	The construction footprint is adjacent to land mapped as strategic conservation.
Unzoned	Land within the CPCP not categorised under any of the 4 categories listed above. This land is non-certified land requiring assessment.	0.2 ha of PCT is on unzoned land including: • 0.11 ha of PCT 3320 • 0.04 ha of PCT 3321 • 0.05 ha of PCT 3448.

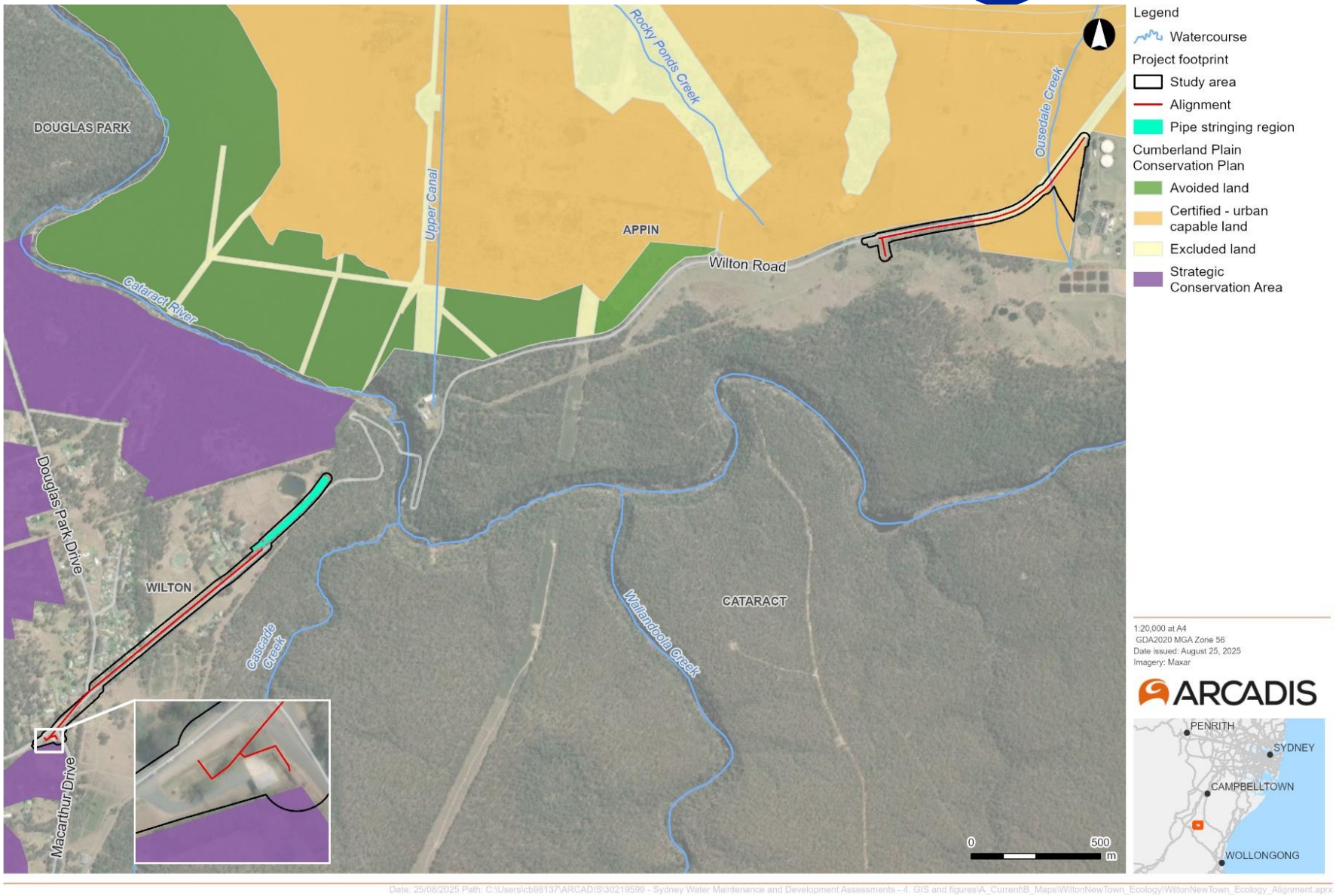

Figure 6-3 Flora and fauna study area and CPCP land zoning

Threatened flora and fauna

Desktop searches identified 27 threatened flora species as recorded or predicted to occur within 10 km of the study area. Of these, seven were considered to have a moderate or higher likelihood of occurring within the study area (Table 6-5). No threatened flora species were identified during field surveys.

Desktop searches identified 63 threatened fauna species as recorded or predicted to occur within 10 km of the study area. Following field survey and threatened fauna habitat assessment, 23 species were considered to have a moderate to high likelihood of occurrence within the study area (Table 6-5). No threatened fauna species were identified during field surveys. During the previous survey conducted by Arcadis in 2022 in the Wilton area, two threatened species were observed:

- Dusky Woodswallow (*Artamus cyanopterus cyanopterus*)
- Glossy Black Cockatoos (*Calyptorhynchus lathami*).

Both were observed less than 5 km from the current study area. Although no koalas were observed, scats have been previously recorded within the study area during the 2022 Arcadis site survey.

All the threatened flora and fauna species in Table 6-5 are listed under the BC Act. Species also listed under the EPBC Act are also identified in the table. Important fauna habitat features present within the study area are also shown in Table 6-5.

Surveyed vegetation within the construction footprint, including fauna habitat, recorded during the field survey is shown in Figure 6-4 to Figure 6-7.

Table 6-5 Threatened flora and fauna (moderate or higher likelihood of occurrence within the study area) including habitat features

Species type	Species names	Habitat features within study area
Flora	**Acacia bynoeana* (Bynoe's Wattle) *Epacris purpurascens* var. *purpurascens* **Grevillea parviflora* subsp. *Parviflora* (Small-flowered Grevillea) **Persoonia bargoensis* (Bargo Geebung)	Potential presence within PCT 3321 and PCT 3448.
	**Leucopogon exolasius* **Melaleuca deanei* (Deane's paperbark)	Potential presence within PCT 3321
	**Pomaderris brunnea* (Brown's Pomaderris)	Potential presence within PCT 3320, PCT 3321 and PCT 3448.
Arboreal mammals	Squirrel Glider (*Petaurus norfolcensis*) *Greater Glider (*Petauroides volans*) *Koala (*Phascolarctos cinereus*): Koala (*Phascolarctos cinereus*) scats were found in 2022 within the study area in PCT 3321.	Koala feed trees including one eucalyptus species identified for the Southern Sydney koala population. Eight hollow bearing trees (HBTs) were identified. These

Species type	Species names	Habitat features within study area
		provide nesting and breeding habitat.
Hollow-roosting microbats	Greater Broad-nosed Bat (*Scoteanax rueppellii*) Eastern Coastal Free-tailed Bat (*Micronomus norfolkensis*) Eastern False Pipistrelle (*Falsistrellus tasmaniensis*) Southern Myotis (*Myotis Macropus*)	Decorticating bark on eucalypts and HBTs provide potential habitat for microbat species.
Culvert-roosting microbats	*Large-eared Pied Bat (*Chalinolobus dwyeri*) Little Bent-winged Bat (*Miniopterus australis*) Large Bent-winged Bat (*Miniopterus orianae oceanensis)*	Several culverts on Wilton Road may provide potential roosting habitat. However, no signs of occupation were observed during field surveys.
Tree-nesting woodland and nectivorous birds	Varied Sittella (*Daphoenositta chrysoptera*) Scarlet Robin (*Petroica boodang*) *Diamond Firetail (*Stagonopleura guttata*) Dusky Woodswallow (*Artamus cyanopterus cyanopterus*) (*Lathamus discolor*)	Eight HBTs were identified. These provide nesting and breeding habitat for hollow dependent birds.
Hollow-nesting woodland birds and cockatoos	Little Lorikeet (*Glossopsitta pusilla*) *Glossy Black-cockatoo (*Calyptorhynchus lathami)* *Gang-gang Cockatoo (*Callocephalon fimbriatum*)	Eight HBTs were identified. These provide nesting and breeding habitat for hollow dependent birds.
Raptor and owl species	Powerful Owl (*Ninox strenua*) Square-tailed Kite (*Lophoictinia isura*) Little Eagle (*Hieraaetus morphnoides*)	Eight HBTs were identified. These provide nesting and breeding habitat for owl species.
Other	Cumberland Plain Land Snail (*Meridolum corneovirens*)	Woody debris in PCT 3320, PCT 3321 and PCT 3448.

Species type	Species names	Habitat features within study area
	*Grey-headed flying-fox (*Pteropus poliocephalus*)	Foraging habitat in PCT 3320, PCT 3321 and PCT 3448.
	Broad-headed Snake (*Holocephalus bungaroides*)	Suitable habitat in PCT 3321

* also listed under the EPBC Act

Koalas

The koala population in NSW declined by about 20% between 1996 and 2016. The decline has been more pronounced in locations where urban development has cleared habitat and increased threats such as vehicle strikes and dog attacks (CPCP, DPE 2022b). Significant areas of koala habitat were lost during the 2019-2020 bushfires. This loss has made koala habitat in the CPCP area more important as no habitat around the Wilton and Greater Macarthur Growth Areas was burnt. Koalas in and around the Wilton and Greater Macarthur Growth Areas are known as the Southern Sydney koala population and are the focus of Sub Plan B of the CPCP. About 600 to 1,000 koalas make up the population.

Koalas need large, connected areas of habitat. These areas allow koalas to move away from threats and provide a variety of feed trees as koalas change their preferences throughout the year. Maintaining large, connected areas of habitat is vital to the survival of koalas and to buffer against the threats of increasing human activity.

The CPCP focuses on the protection, restoration and management of corridors that meet the requirements for corridors. The Office of the NSW Chief Scientist outlined requirements for koala corridors with average minimum widths of 390 m to 425 m. Corridors identified for protection by the CPCP include the Georges River and Nepean River as primary koala corridors, and Ousedale Creek as the most important east–west movement corridor in the Greater Macarthur Growth Area.

Aquatic habitat

Ousedale Creek intersects the study area. However, no aquatic habitat was observed during the field survey. The Cataract River runs between the two portions (eastern and western) of the study area along Wilton Road, although this does not overlap with the study area.

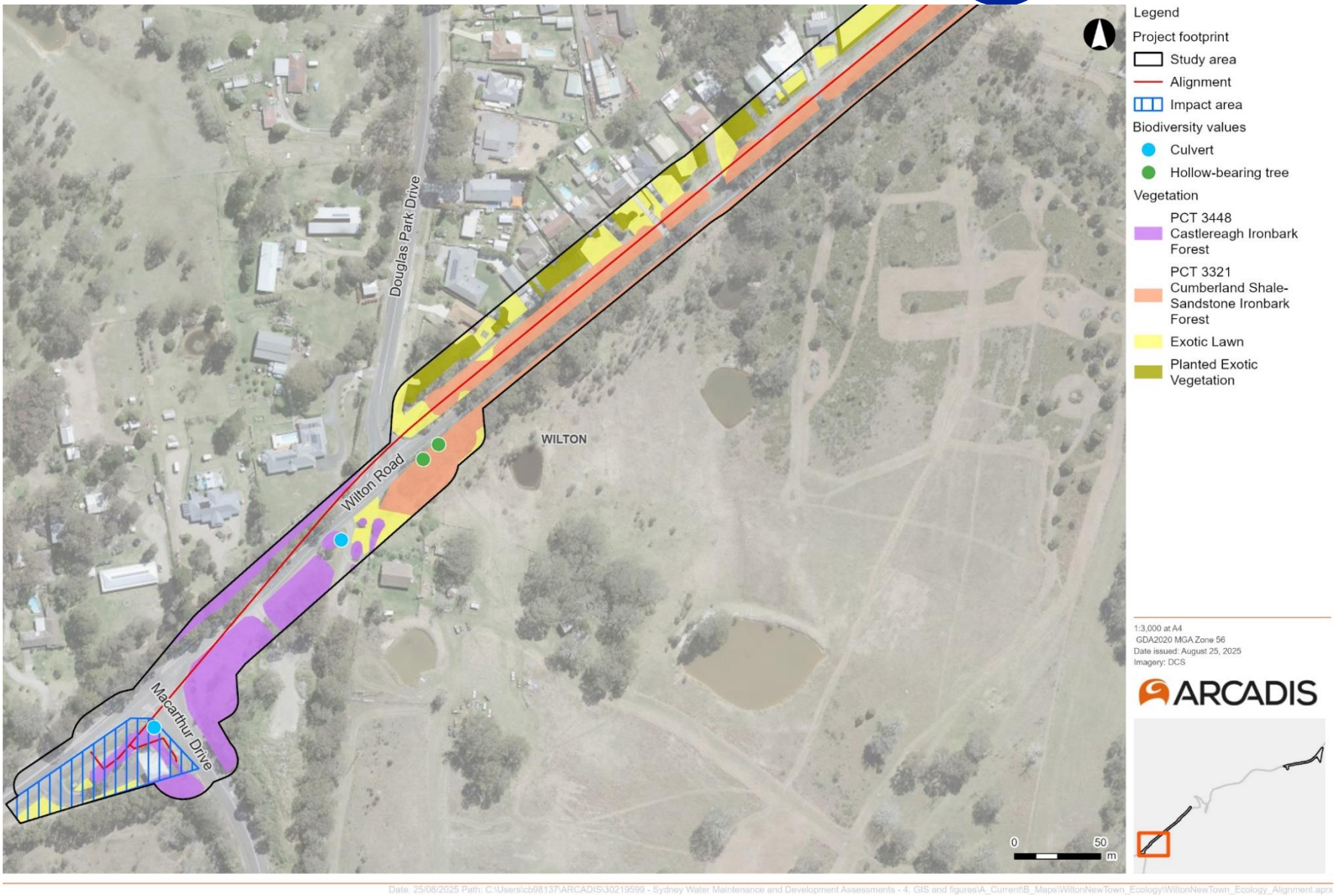

Figure 6-4 Flora and fauna features – western section (1 of 3)

Figure 6-5 Flora and fauna features – western section (2 of 3)

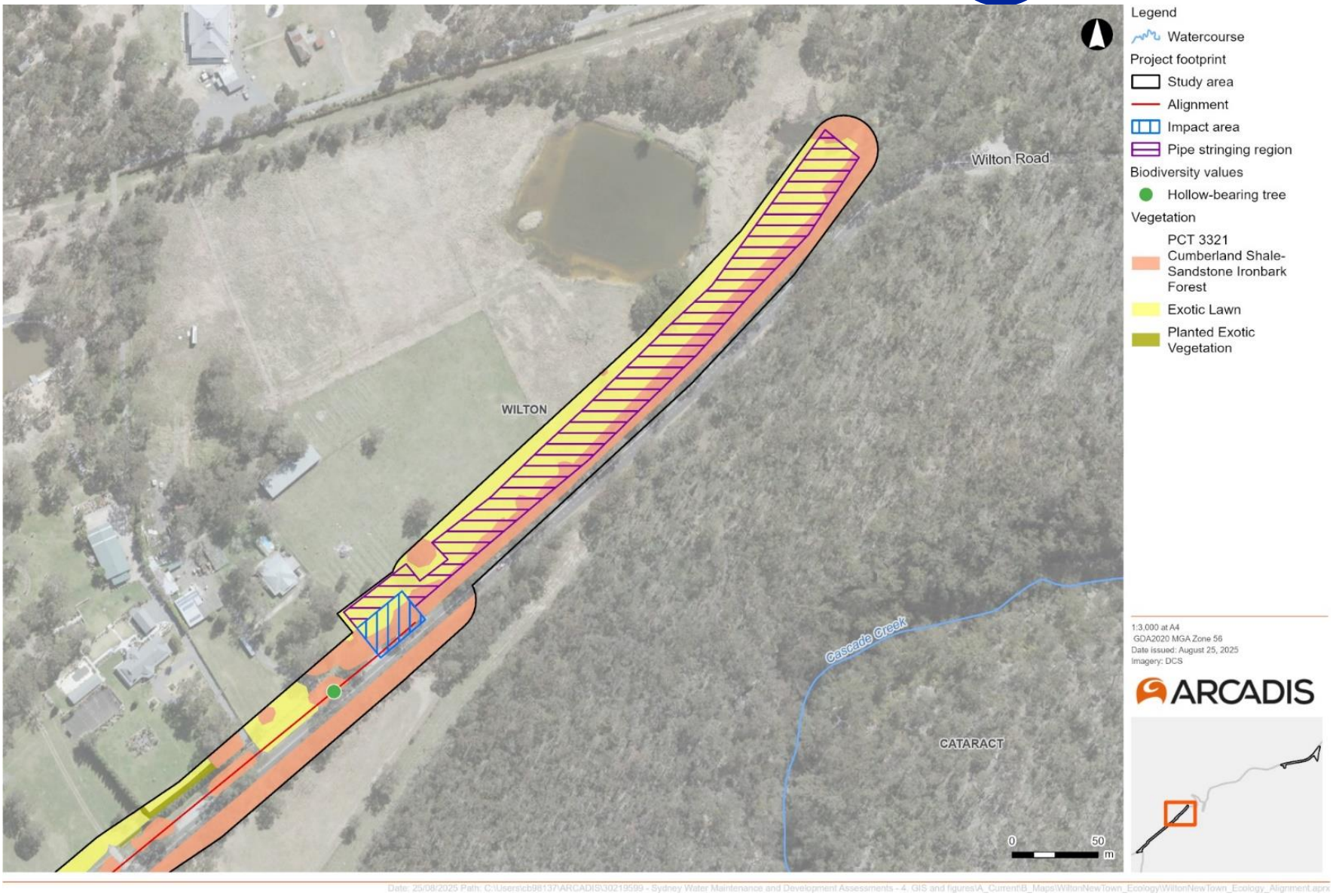

Figure 6-6 Flora and fauna features – western section (3 of 3)

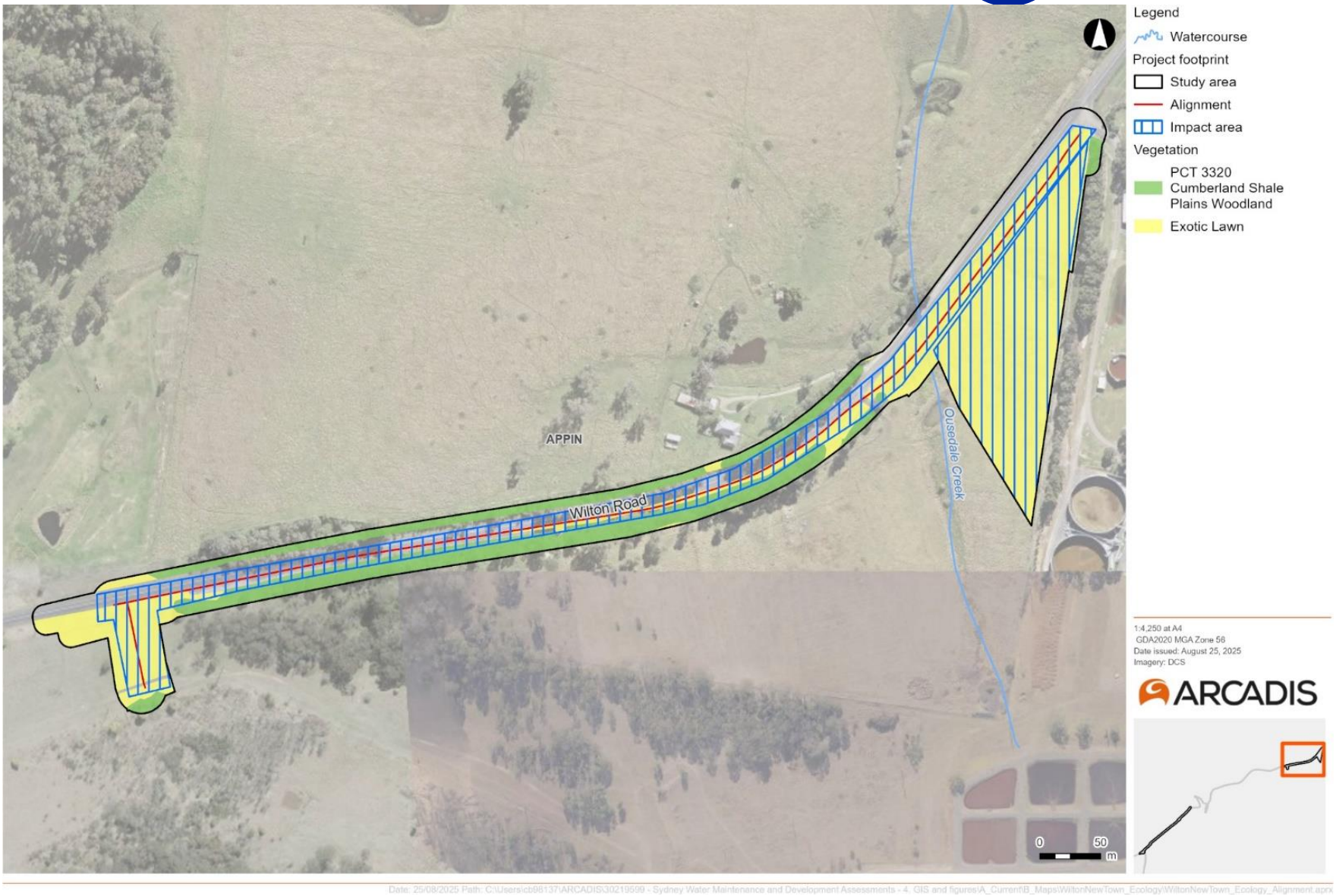

Figure 6-7 Flora and fauna features – eastern section

Priority weeds

Eighteen exotic species were recorded in the study area. Of these, four are listed as 'priority weeds' under the Biosecurity Act 2015 for the Greater Sydney Local Land Services region, which includes the Wollondilly Shire LGA. These weeds are listed in with their associated biosecurity duty in Table 6-6.

Table 6-6 Priority weeds in the study area

Scientific name	Common name	Weed of national significance/priority	Biosecurity duty*
Asparagus asparagoides	Bridal creeper	✓	Prohibition on dealings. Must not be imported into the State or sold.
Asparagus aethiopicus	Asparagus Fern	✓	
Senecio madagascariensis	Fireweed	✓	
Opuntia spp.	Prickly pears	✓	Prohibition on certain dealings. Must not be imported into the state, sold, bartered, exchanged or offered for sale.

Potential impacts

Construction impacts to flora and fauna have been minimised during planning and design (section 2.3). The residual potential construction impacts are discussed below.

Potential impacts – vegetation

The potential impacts of the proposal on flora and fauna will primarily be due to vegetation clearing, with associated impacts on habitat for threatened flora and fauna species.

The proposal will require clearing of 0.29 ha of native vegetation (Table 6-7). Of that, 0.09 ha of PCT 3320 is on land zoned as excluded land under the CPCP. The remaining 0.20 ha is unzoned under the CPCP. Flora and fauna impacts in excluded land and unzoned land under the CPCP require assessment. Impacts in these areas will also be subject to offsetting in accordance with Sydney Water's Biodiversity Offset Guide (Sydney Water, 2024).

Table 6-7 Proposed impacts to PCTs

Plant Community Type (PCT)	Area to be impacted (hectares)			
	Certified-urban capable land	Excluded land	Not zoned under CPCP	Total
	Certified lands	Non-certified lands requiring assessment		
3320 – Cumberland Shale Plains Woodland	0	0.09	0.11	0.2
3321 – Cumberland Shale-Sandstone Ironbark Forest	0	0	0.04	0.04
3448 – Castlereagh Ironbark Forest	0	0	0.05	0.05
Total	**0**	**0.09**	**0.20**	**0.29**

PCT 3320 and PCT 3321 are listed as critically endangered under the BC Act and PCT 3448 is listed as endangered. Tests of Significance were performed to determine the significance of impacts to the PCTs.

The patches of PCT 3320 and PCT 3448 did not meet the criteria for listing under the EPBC Act and a Significant Impact Criteria (SIC) assessment is not required. A patch of PCT 3321 (0.26 ha) meets the criteria for listing under the EPBC Act. However, this vegetation will be avoided by using HDD and a SIC assessment is not required.

It was determined that the proposal is unlikely to have a significant impact on any of these TECs for the following reasons:

- the proposal will not result in or increase the likelihood of extinction of the local occurrence of these communities
- the proposal will remove a minor fraction of the total extent of these communities
- the proposal will not fragment an existing patch of these communities
- the proposal is unlikely to impact adjoining patches of these communities or suitable habitat such that they substantially reduce in quality or integrity.

The vegetation in the study area is already experiencing edge effects where it interacts with adjacent urban areas, degraded urban waterways, and roads. The clearing of areas of native vegetation on the edge of natural bushland may create some new edges. These new edges could be subject to degradation by the establishment and spread of weeds.

The mapped strategic conservation area overlaps with the study area by 0.02 hectare at the west end of the study area. However, the construction footprint is in not within strategic conservation area. Therefore, it is unlikely the proposal will impact on the conservation area. Mitigation measures for potential edge effects on the strategic conservation area are provided in Table 6-11.

Weed species will be disturbed during clearing of exotic pasture; 2.67 ha of exotic pasture requires clearing.

Potential impacts – threatened flora and fauna

Vegetation disturbance will impact potential foraging, shelter, and/or breeding habitat for multiple threatened fauna species with a moderate or higher likelihood of occurring within the construction footprint. Fauna injury or mortality may occur during vegetation clearing activities, collisions with work vehicles or plant, accidental entrapment in plant or equipment, or entrapment in open trenches. Most of the fauna species which could occur in the construction footprint are highly mobile bird and mammal species likely to be able to move away from vegetation clearing activities.

Koalas have the potential to occur within the study area. They are less mobile and more likely to be impacted by vegetation clearing activities and work vehicle strikes than other animals. Koala scats have been found within the study area, and multiple records dating to 2021 are within 2 km of the study area. The proposed pipeline alignment and construction method were chosen to minimise the impact to koala habitat. The vegetation to be removed is exclusively road-side vegetation, which limits the availability of this vegetation to koalas. While PCTs 3320, 3321 and 3448 are considered to have high suitability for koalas, the proposed tree removal is scattered, patchy and minor across the proposal. As such, it is considered unlikely to adversely affect the occurrence or lifecycle of koalas in the locality. Large areas of high-quality native vegetation have been avoided and where native vegetation requires removal impacts have been minimised by refining the construction method.

Specific pre-clearing surveys for koala and Cumberland Plain Land Snail are required, to ensure individuals are not impacted as both species are less mobile than other threatened species.

Tests of Significance (BC Act) and/or Significant Impact Criteria assessments (EPBC Act) were performed to determine if the proposal is likely to significantly impact threatened species with a moderate or higher likelihood of occurrence. The Tests of Significance assessed the significance of removing 0.29 ha of habitat. The tests/assessments determined that the proposal is unlikely to have a significant impact upon any of these threatened species for the following reasons:

- a small area of potential habitat mostly comprising roadside vegetation and scattered paddock trees will be removed
- the area of native vegetation to be removed constitutes general habitat (i.e. browsing, hunting, aerial foraging habitat) to most of the threatened species known from the locality. These habitat resources are widespread in the landscape and will remain in areas adjacent to the proposal
- impacts to important habitat features are restricted to a small area containing koala habitat and general habitat for woodland birds and other arboreal mammals. The quantity of these specific habitat features to be impacted is low and is unlikely to adversely affect the occurrence or lifecycle of these species in the locality. Koala specific mitigation measures are detailed in Table 6-11
- the proposal is unlikely to cause adjacent areas of potential habitat to become unsuitable to these threatened species into the future.

Offset requirements

Residual impacts to flora and fauna from the proposal that could not be avoided will be offset in accordance with Sydney Water's Biodiversity Offset Guide (Sydney Water 2024).

Under Part 5 of the *Environmental Planning and Assessment Act 1979*, Sydney Water must assess the environmental impact of all its activities. Sydney Water developed a Biodiversity Offset Guide to consider possible offset options for Sydney Water activities that fall outside statutory requirements. The guide facilitates appropriate levels of native vegetation offsets and/or tree offsets on Sydney Water projects.

Under section 4.2 of the guide, the impacts to native vegetation from the proposal are classified as a Moderate Impact. The Moderate Impact category includes larger scale impacts (≥ 100 m2), but that are not considered to be significant.

Under this framework, offset multipliers are required for TECs, non-threatened native vegetation, and habitat area of threatened flora and/or fauna are given in Table 6-8. Vegetation and habitat impacts of the proposal will be offset in accordance with this framework.

Table 6-8 Offset multipliers for biota as described in the guide

Residual loss of biodiversity values resulting from works	Offset multiplier (Moderate Impacts)
Threatened Ecological Communities	3
Non-threatened native vegetation (eg native remnant vegetation, riparian vegetation, planted native vegetation)	2
Tree removal (locally native species)	3
Tree hollows	2 nest boxes or salvaged hollows (for each removed)
Tree Removal (Non-locally native or exotic tree or street tree)	1

Table 6-9 outlines the restoration requirements for the TECs within the construction footprint. Considering each TEC on site will have an impact of ≥ 100 m2, an offset multiplier of 3:1 will apply to each TEC. To satisfy the requirements of the Guide, each restoration areas is required to be like-for-like and must restore the same TEC that is being impacted.

No hollow-bearing trees will be removed.

The vegetation mapped as 'other veg types not conforming to PCT' contains mostly exotic grasslands and therefore offsets are not required.

Table 6-9 A summary of offsets obligation for proposal impacts

TEC	Area of impact (ha)	Required restoration area (ha)
Cumberland Plain Woodland (BC Act)	0.20	0.60
Shale Sandstone Transition Forest (BC Act)	0.04	0.12
Castlereagh Ironbark Forest (BC Act)	0.05	0.15
TOTAL	**0.29**	**0.87**

Table 6-10 outlines the offsetting options available to Sydney Water, ranked in order of 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.

Table 6-10 Offsetting options available to Sydney Water

Residual loss of biodiversity values resulting from works	Offset Options	
	Minor Impacts	**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: revegetation or bushland restoration.	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.	
Hollow removal	On site: nest boxes, salvaged hollows onto trees or on posts OR Nearby site: nest boxes or salvaged hollows onto trees or on posts.	

Mitigation measures

With the implementation of the mitigation measures below, impacts to flora and fauna can be minimised. No impacts are anticipated during operation.

Table 6-11 Environmental mitigation measures — flora and fauna

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 vegetation where 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 (eg a different area of vegetation is removed but the total area is the same or less than assessed in the EIA). 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 Guide (SWEMS0019.13).
Physically delineate vegetation to be cleared and/or protected on site and install appropriate signage before works start.
Protect trees in accordance with the requirements of Australian Standard 4970-2009 for the Protection of Trees on Development Sites. Do not damage tree roots unless necessary and engage a qualified arborist where roots >50mm are impacted within the Tree Protection Zone. Protect trees in accordance with the Program Delivery Guidance Standard 9.3 Biodiversity Management (ENV-GS-003). • TPZ must be marked out for trees to be retained within the works area. The TPZ must be marked out prior to works commencing and be maintained for the duration of construction. No plant or materials should be parked or stored in the TPZ at any time. No encroachment into the TPZ should occur unless under the guidance of the Proposal Arborist. • All exclusion and No-Go zones should be established and physically delineated around patches of native vegetation within 10 metres of the works area, including access tracks, laydown areas and site compounds. Exclusion zones should be delineated with temporary fencing where plant or vehicles are operating or bunting where there is foot traffic to prevent accidental impacts to Threatened Ecological Communities, threatened species and their habitats.
Ecological pre-clearance surveys: • A suitably qualified ecologist will accompany the contractor to complete an ecological pre-clearing assessment of the construction footprint before starting works. Any unexpected

Mitigation measures

threatened species or ecological communities identified during the pre-clearing survey should be appropriately assessed through a supplementary impact assessment (i.e. Test of Significance).

- Pre-clearance surveys will include targeted surveys for the Cumberland Plain Land Snail. If any individuals are located, they will be moved outside of the construction footprint into suitable habitat within adjacent vegetation.
- Perform targeted pre-clearing surveys for koala. If any individuals are identified no works should start until the koala has self-relocated outside of the construction footprint.
- Pre-clearance surveys will identify and inspect any breeding or nesting habitat (hollow-bearing trees, bird nest) and as far as practical no breeding sites will be disrupted.
- Any HBTs not previously identified will be marked by an ecologist so they are retained and avoided by contractors.
- Where fauna species are identified in vegetation to be cleared, animals will be removed and relocated to adjacent bushland before felling.

Stop work procedures must be developed to guide contractors in the case of an unexpected flora or fauna find, particularly for threatened species sightings.

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.

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

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.

Removal of native vegetation including potential fauna habitat:

- If potential fauna habitat is identified in vegetation to be removed the habitat features will be sectionally dismantled or soft felled using an excavator with a rotating bucket or tree climbers. Any habitat removal will only be conducted under the supervision of an ecologist or fauna-spotter catcher trained in animal handling.
- Mitigate possible edge effects from native vegetation clearing by removing weed species appropriately, and minimising removal of trees and large shrubs where possible.

Tree removal to be done by a suitably qualified, experienced, and insured arboricultural contractor with minimum AQF level 3 qualification in arboriculture.

No clearing or disturbance of any vegetation within a mapped Strategic Conservation Area or Avoided Land.

If replanting near Sydney Water pipelines refer to '*Which trees can damage wastewater pipes?*' link from Sydney Water website.

Mitigation measures

Retain dead tree trunks, bush rock or logs in-situ unless they are in the disturbance corridor and moving is unavoidable. Reposition material elsewhere on the site or approved adjacent sites. If native fauna is likely to be present, a licenced ecologist should inspect the removal and undertake fauna relocation.

If native fauna is encountered on site, stop work and allow the fauna to move away unharassed. Engage WIRES or a licenced ecologist if assistance is required to move fauna.

If any threatened species (flora or fauna) is discovered during the works, stop work immediately and notify the Sydney Water Project Manager. Work will only restart once the impact on the species has been assessed and appropriate control measures provided.

Manage biosecurity in accordance with:

- Biosecurity Act 2015 (see NSW Weedwise), including reporting new weed infestations or invasive pests
- contemporary bush regeneration practices, including disposal of sealed bagged weeds to a licenced waste disposal facility.

Record Pesticides and Herbicides use in accordance with SWEMS0017.

Bag all plant parts and excavated topsoil that may be infested with weed propagules and dispose at a licensed waste disposal facility.

Vehicles, equipment, materials and footwear are to be clean on entry (free of soil, mud and/or seeds) to minimise the risk of introduction or spread of *Phytophthora cinnamomia*. The 'arrive clean, leave clean' principle should be adopted for all personnel, requirements and tools on site which involves:

- Inspecting and disinfecting plant material from clothing, boots, vehicles, machinery and tools
- Schedule weeding for dry conditions
- Use techniques and tools that minimise soil disturbance
- Ensure that transportation of plant material does not introduce weeds to new areas.

In TOBAN:

For maintenance and construction activities that are not essential/emergency works, the use of fire in the open, including for general purpose hot works must not proceed without an exemption being approved.

Contact to submit an exemption request:

CDResilienceProgramsmailto:@sydneywater.com.au or CustomerHub.DutyManagermailto:@sydneywater.com.au

Staff and contractors must not contact local RFS directly to seek their own exemption.

All Hot Work (work that involves high temperatures or ignition sources that pose a fire or explosion risk) and work using machinery in bush and grass land environments must have adequate controls in place to prevent a fire from starting or spreading.

Entry into the drinking water catchment or WaterNSW Special Area is not permitted during a Total Fire Ban.

Construction should occur during standard daylight hours to avoid potential indirect impacts on nocturnal fauna such as owls, amphibians, and mammals. If construction is to occur at night, then light mitigation

Mitigation measures
measures outlined in the National Light Pollution Guidelines for Wildlife should be applied to mitigate impacts to native fauna (DEE, 2020).
Stop work procedures should be in place if a koala is found during construction. All works should cease within 50 m of the koala and should not re-start until the koala has self-relocated. If a koala enters the construction footprint and is at risk of injury a qualified wildlife carer/handler should be called, and the koala safely removed from site.
If existing koala exclusion fencing within the CPCP area is encountered during construction, the integrity of the fencing must be retained.

6.1.4 Heritage

Existing environment and potential impacts

Aboriginal heritage

An Aboriginal Heritage Due Diligence assessment (KNC, 2025) (Appendix E) was carried out by Kelleher Nightingale Consulting to identify if Aboriginal objects were located within the construction footprint (equivalent to the construction footprint assessed in this REF) and if so, whether harm was likely to those objects.

Background research including Aboriginal Heritage Information Management System (AHIMS) and other database searches did not identify any Aboriginal archaeological sites in the vicinity of the construction footprint (Figure 6-8). A field survey confirmed that the construction footprint has been disturbed by existing road construction and ongoing land use practices. Aboriginal archaeological potential of the construction footprint was assessed as very low.

No Aboriginal objects or sites are expected to be affected by the proposed activities. Based on the results of this assessment there are no 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 (DECCW, 2010), works may proceed with caution.

Non-Aboriginal heritage

The proposal is located within 200 m of non-Aboriginal heritage-listed items:

- The western end of the proposal is about 150 m south of two heritage items (Figure 6-9):
    - Upper Nepean Scheme – Upper Canal, Item I16 in the Wollondilly LEP 2011, State Significance
    - Upper Canal System – Pheasants Nest Weir to Prospect Reservoir – ID 01373 on the State Heritage Register
- The eastern end of the proposal is located near two heritage items (Figure 6-10):
    - 100 m south of the Appin Massacre Cultural Landscape – ID 02067 on the State Heritage Register
    - 30 m west of Windmill Hill Group, including Brennan's Farm, Larkin's Farm, Wilton's Farm, Item I17 in the Wollondilly LEP 2011, local significance (Figure 6-10):

The construction footprint does not overlap with these heritage items. Construction will not encroach on the heritage curtilage of these items. Therefore, no impact to these known heritage items is expected.

It is unlikely that any unknown non-Aboriginal heritage items will be encountered.

Figure 6-8 Aboriginal heritage – location of AHIMS sites

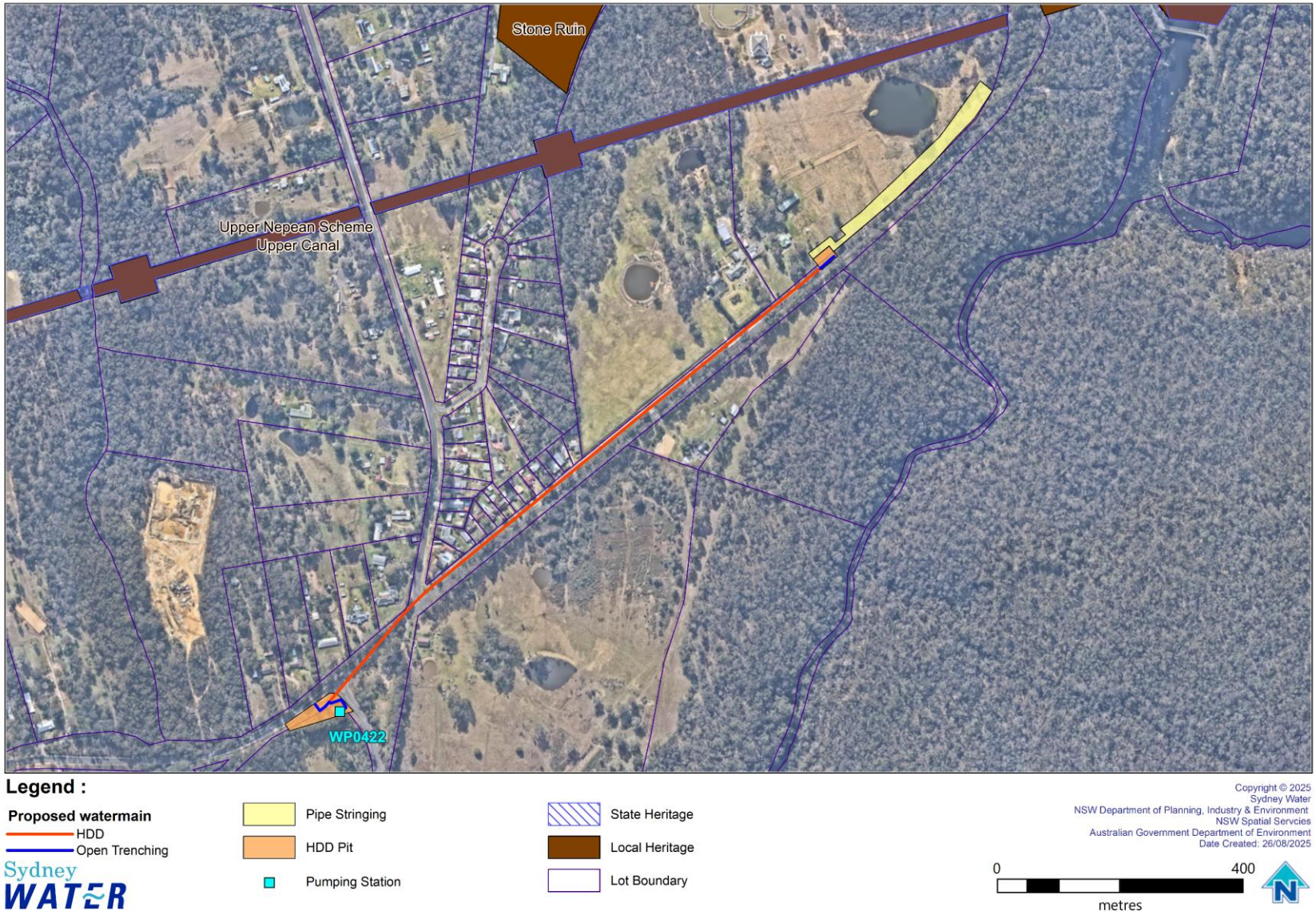

Figure 6-9 Non-Aboriginal heritage – western section

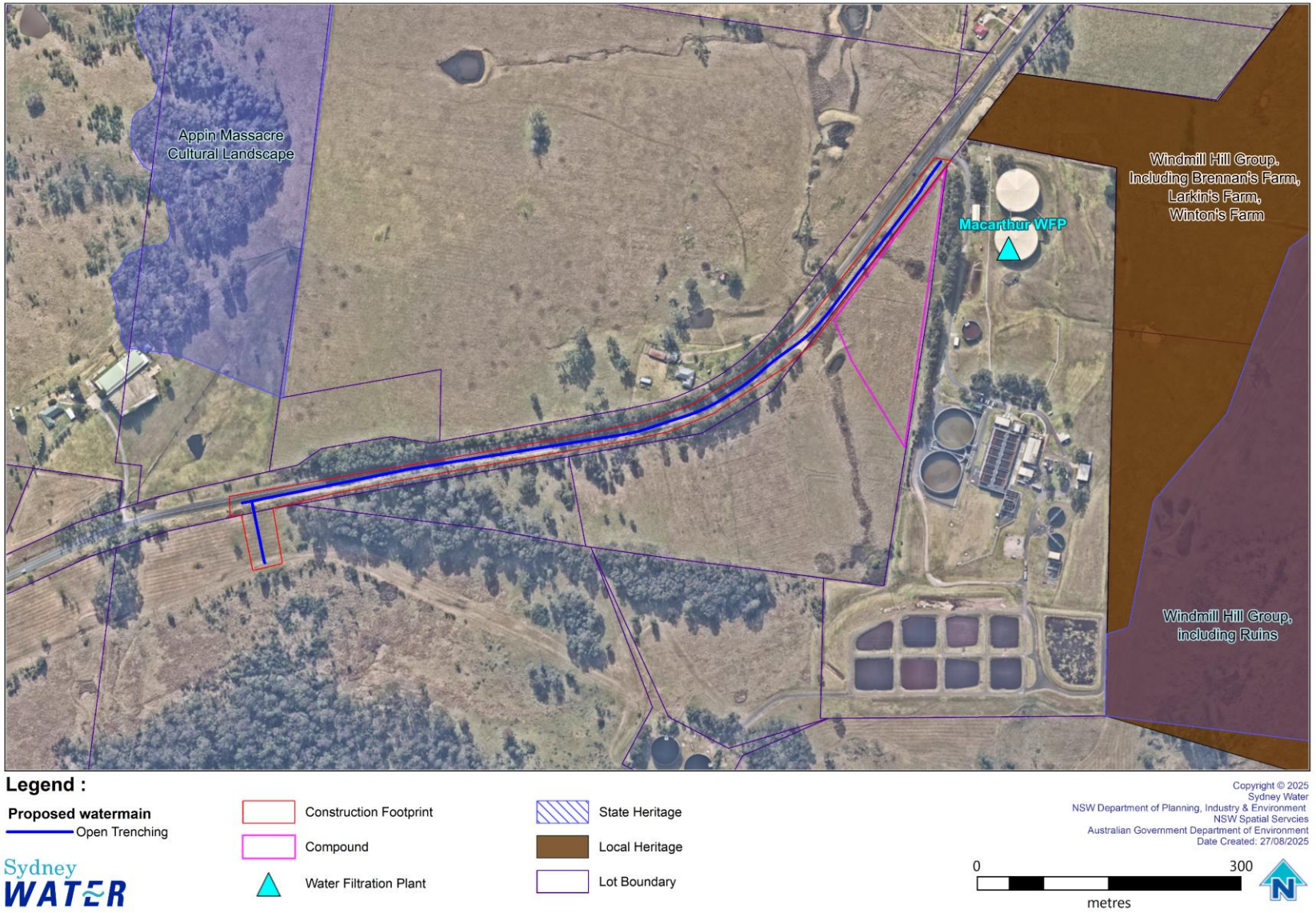

Figure 6-10 Non-Aboriginal heritage – eastern section

Mitigation measures

With the implementation of the mitigation measures below, impacts to Aboriginal and non-Aboriginal heritage can be adequately managed. No impacts are anticipated during operation.

Table 6-12 Environmental mitigation measures — heritage

Mitigation measures
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 the Sydney Water Project Manager in accordance with SWEMS0009.

6.1.5 Noise and vibration

A specialist noise and vibration assessment was carried out for the proposal (Arup, 2025). The report is summarised in this chapter and full report provided in Appendix F.

Existing environment – noise and vibration

Noise sensitive receivers within one kilometre of the proposal were identified as mostly residential properties. Some commercial and industrial properties, as well as a school and place of worship, are also present within one kilometre of the proposal.

Unattended noise monitoring from nearby projects where background data was available was used to determine the noise management levels (NMLs) for residential receivers impacted by the proposal (Table 6-13). Criteria from the Interim Construction Noise Guideline (ICNG) (DECC NSW, 2009) were used to determine NMLs for non-residential receivers. NMLs represent a threshold for noise impacts to sensitive receivers. Where noise impacts are predicted to be above NMLs, additional reasonable and feasible mitigation measures to reduce noise impacts should be considered.

Table 6-13 NMLs for noise sensitive receivers – external noise levels

Type of receiver	Time period[1]	Highly noise affected	Standard Hours[2] dB $L_{Aeq(15\ min)}$
Residential[4]	Day	75[3]	45
Commercial	When in use	NA	65
Educational	When in use	NA	55
Place of Worship	When in use	NA	55

Type of receiver	Time period[1]	Highly noise affected	Standard Hours[2] dB $L_{Aeq(15\ min)}$
Child Care	When in use	NA	55
Industrial	When in use	NA	70
Active recreation	When in use	NA	65

Notes:

1. The Noise Policy for Industry (EPA, 2017) defines day, evening and night-time periods as:
    - Day: the period from 7am to 6pm Monday to Saturday; or 8am to 6pm on Sundays and Public Holidays.
    - Evening: the period from 6pm to 10pm.
    - Night: the remaining period.
2. The ICNG defines Standard hours as Monday to Friday 7am to 6pm and Saturday from 8am to 1pm.
3. In accordance with the ICNG the highly noise affected applies to residential properties only.
4. Results of noise logger L1 were conservatively used to determine the NMLs to all residential receivers.

Potential impacts – construction noise

An acoustic model was prepared based on the likely construction scenarios, and equipment to be used during each scenario. The scenarios are:

- Scenario 1 – open trenching
- Scenario 1b – backfilling and restoration
- Scenario 2 – HDD launch and receival pits and pipe stringing
- Scenario 3 – site compounds and vehicle movements.

The model predicted construction noise levels at each receiver for each scenario. Table 6-14 summarises the noise assessment results, including the predicted sound power levels during construction. For the purpose of the assessment, all plant and equipment for each scenario were presumed to be operating concurrently.

Twenty-two receivers (all receivers highly impacted by HDD are also impacted by trenching) are predicted to be highly noise affected (>75 dBA) during construction. Construction work is planned to occur during the day and out of hours impacts are not anticipated. Plant and equipment associated with trenching will move as construction progresses, changing noise impacts in relation to the nearby individual sensitive receivers. This movement will mean that the times when the noise is >75 dBA will increase as the equipment moves closer to a property, peak when construction occurs in front of a property and decrease as the equipment moves further away. The noise levels experienced at any one location will rise and fall relative to:

- the varying offset distance of the works
- the intensity and location of construction activities
- the intervening terrain and structure
- the type of equipment used.

However, receivers close to the HDD launch and receival pits will experience noise for the duration of the HDD, which is expected to be up to seven months.

It is unlikely that all construction equipment will be operating at their maximum sound levels simultaneously. In any given period, construction equipment will typically be used with maximum sound levels for only a brief amount of time. At other times, the equipment may emit lower sound levels. The works are also scheduled to occur during the day which reduces potential impacts.

Noise modelling results are also presented in Figure 6-11 to Figure 6-18. Figures displayed in this REF include those receivers predicted to be highly affected by noise >75 dBA, or otherwise the receivers most noise impacted for each scenario.

Table 6-14 Construction scenarios, sound power levels, and results.

Scenario	Location	Description of works	Hours of operation/ Duration	Sound power levels (dBA)	Number of receivers impacted at different noise levels				
					Below or equal to NML – noticeable	0-10 dB above NML – clearly audible	10-20 dB above NML – moderately intrusive	More than 20 dB above NML – highly intrusive	75 dB or higher – highly noise affected
1a (Figure 6-11 to Figure 6-14)	Wilton Road	Trenching	Daytime standard hours/ about 24 m/day (1.5 m depth)	126	702	237	134	27	22
1b (Figure 6-11 to Figure 6-14)	Same as Scenario 1a	Backfilling and restoration	Same as Scenario 1a	125	Refer outcomes for Scenario 1a				
2 (Figure 6-15 to Figure 6-16)	Wilton Road (launch pit at corner of Douglas Park Road and Wilton Road and receival pit near 281 Wilton Road	HDD launch pit and receival pit	Daytime standard hours/ about 4 to 6 weeks per 100 m	Launch pit: 123 Receival pit: 115 Pipe stringing: 118	876	188	34	8	4

Scenario	Location	Description of works	Hours of operation/ Duration	Sound power levels (dBA)	Number of receivers impacted at different noise levels				
					Below or equal to NML – noticeable	0-10 dB above NML – clearly audible	10-20 dB above NML – moderately intrusive	More than 20 dB above NML – highly intrusive	75 dB or higher – highly noise affected
3 (Figure 6-17 and Figure 6-18)	Two locations beside Wilton Road	Site compound and vehicle movements	Daytime hours	119	1,087	17	4	0	0

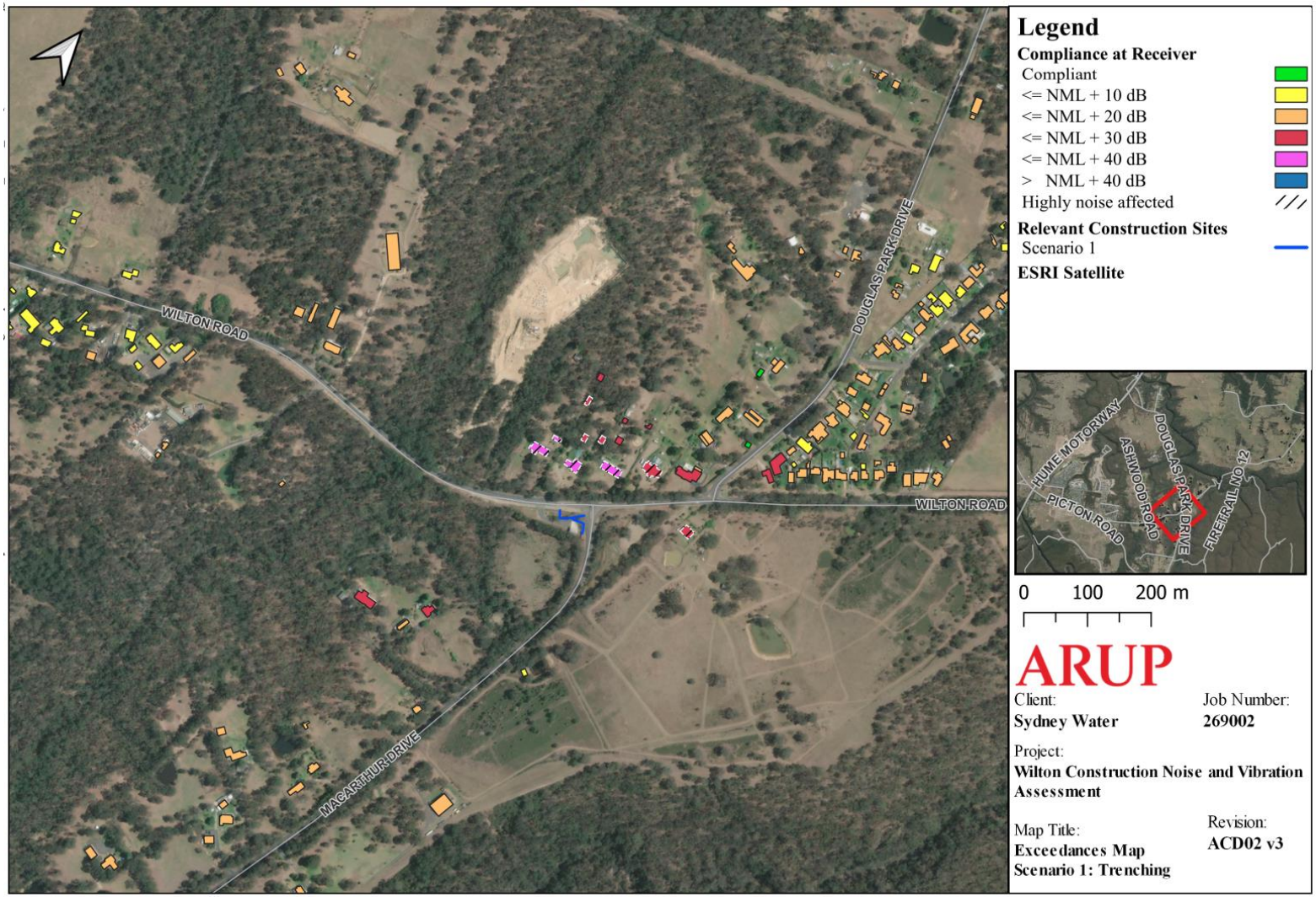

Figure 6-11 Predicted noise impacts, Scenario 1a and 1b – map 1 of 4 (Arup, 2025)

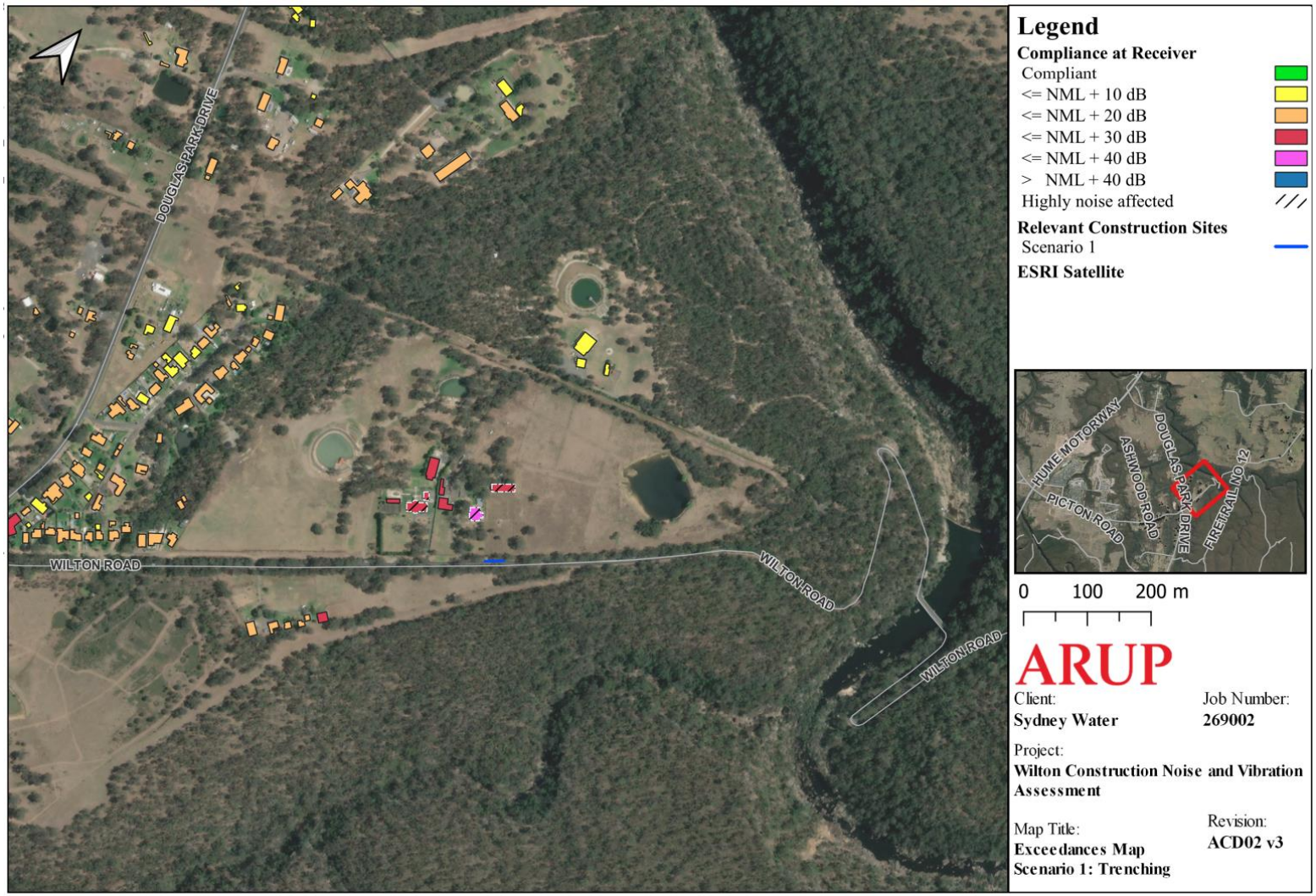

Figure 6-12 Predicted noise impacts, Scenario 1a and 1b – map 2 of 4 (Arup, 2025)

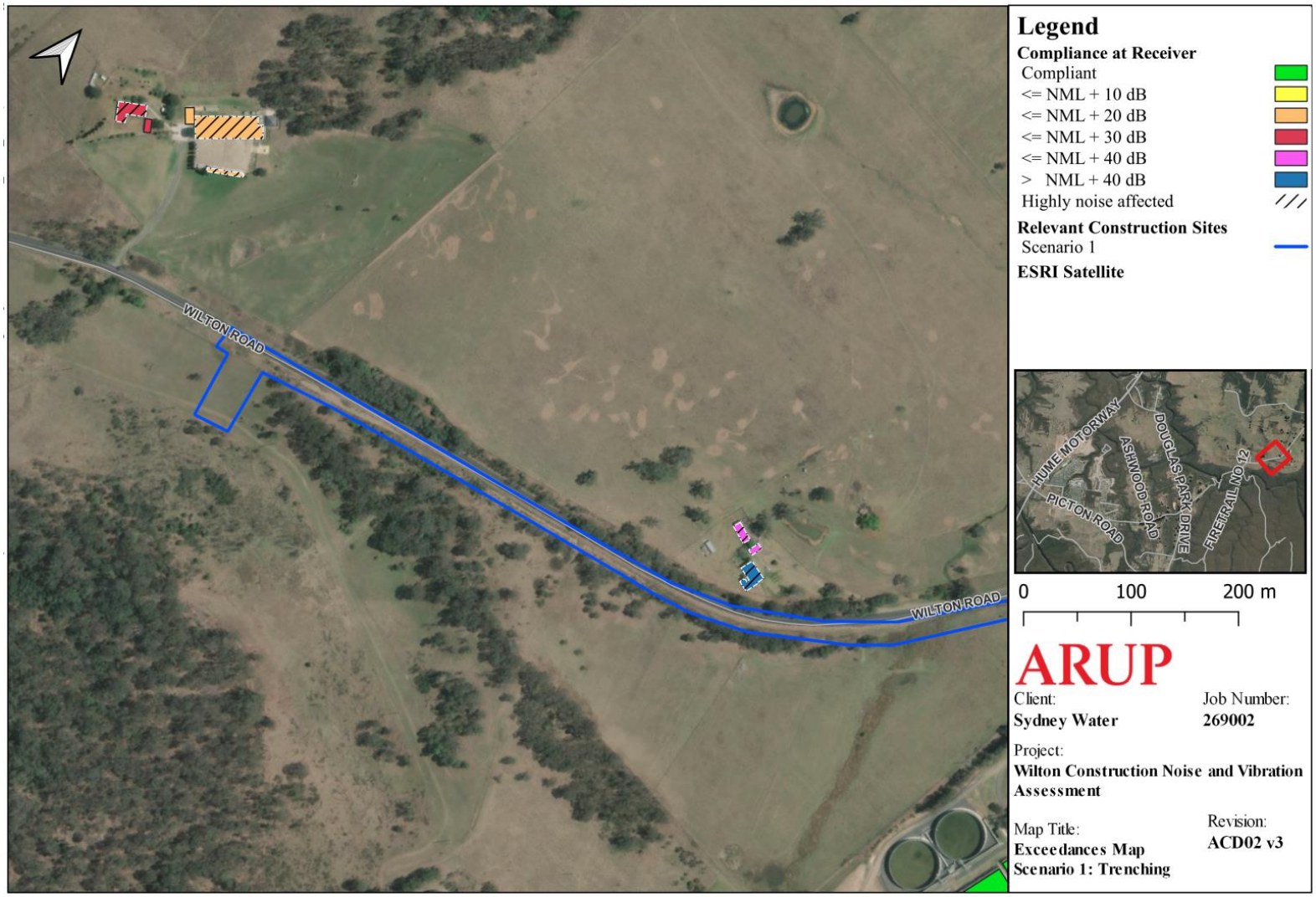

Figure 6-13 Predicted noise impacts, Scenario 1a and 1b – map 3 of 4 (Arup, 2025)

Figure 6-14 Predicted noise impacts, Scenario 1a and 1b – map 4 of 4 (Arup,2025)

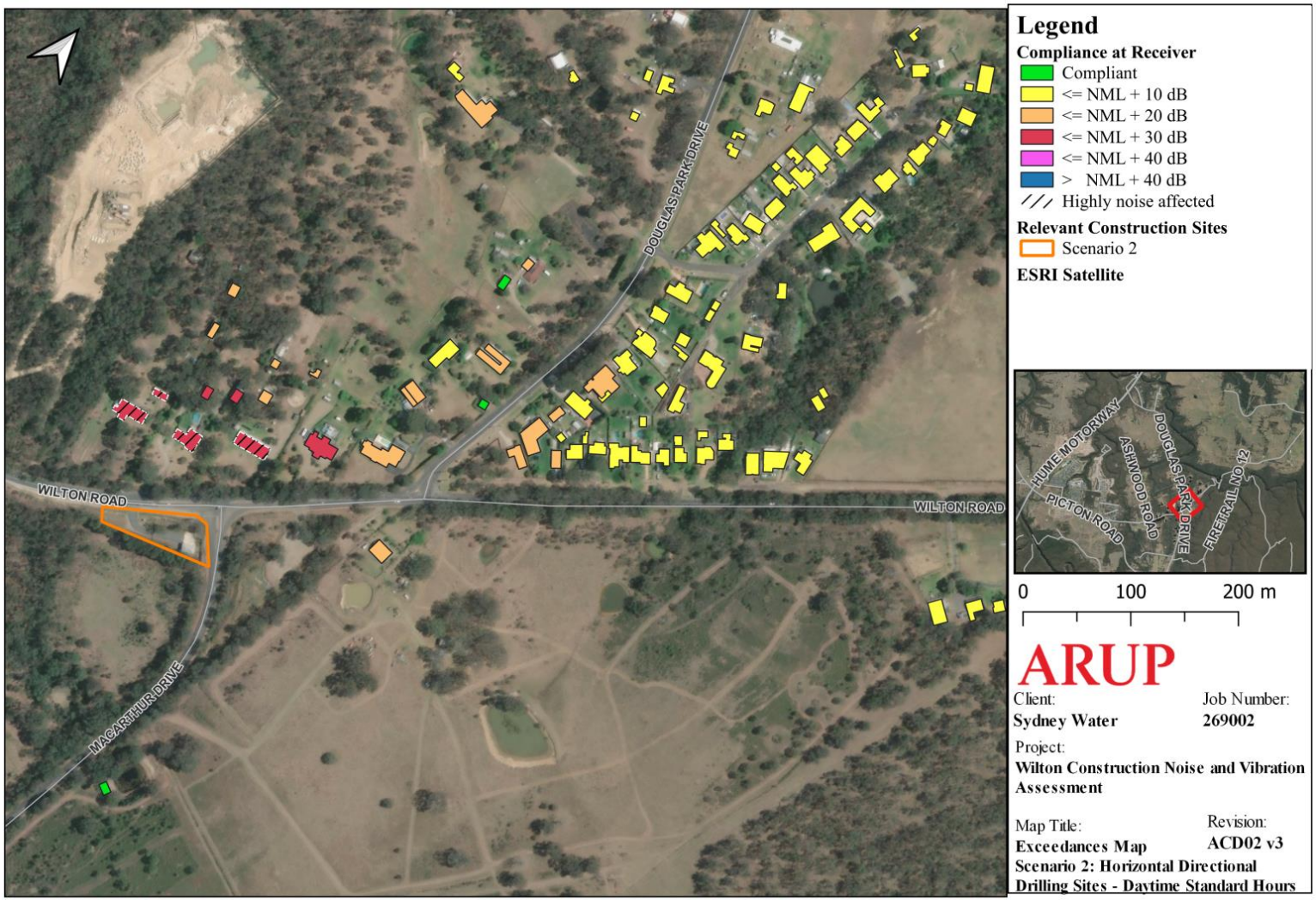

Figure 6-15 Predicted noise impacts, Scenario 2 – map 1 of 2 (Arup, 2025)

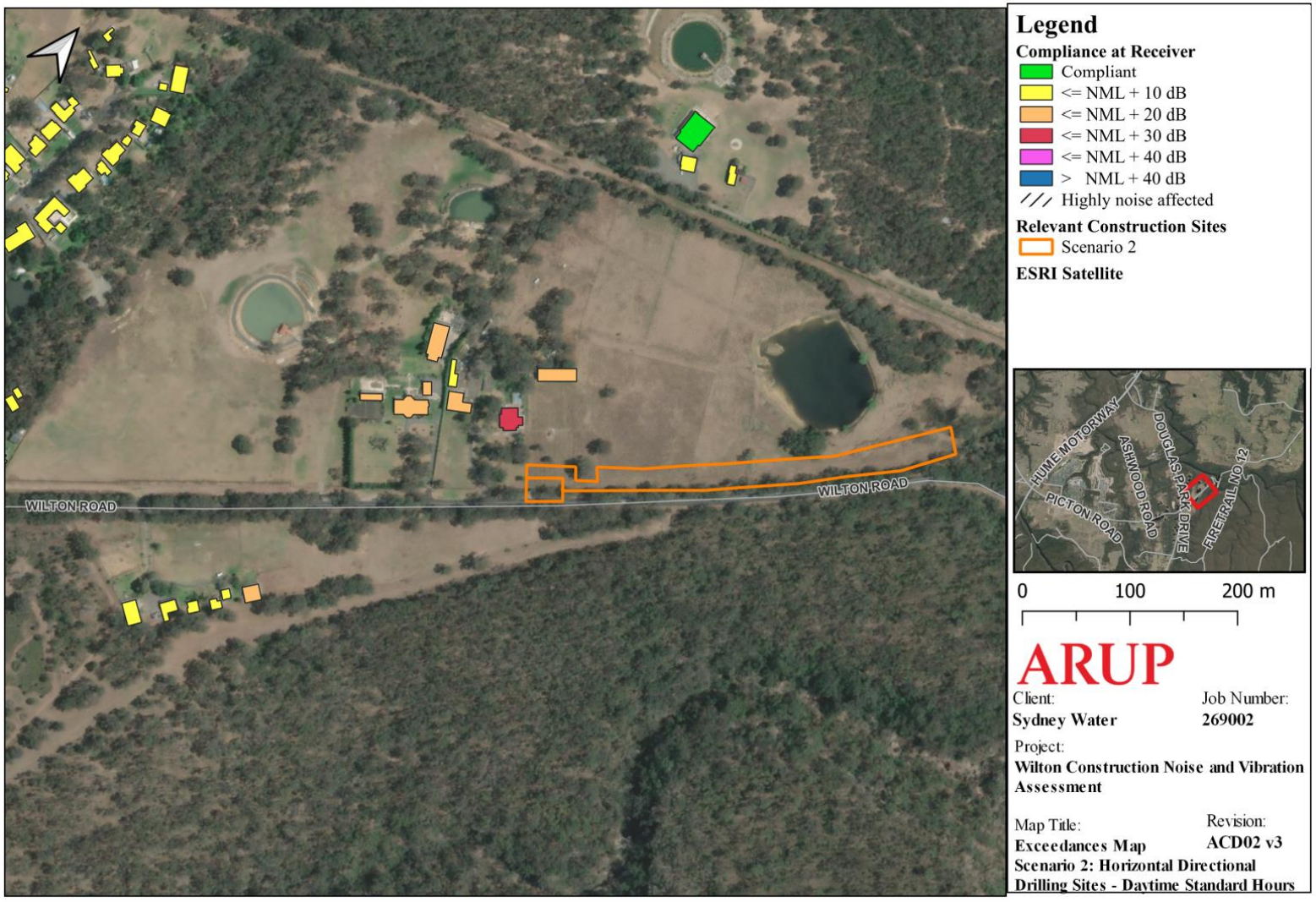

Figure 6-16 Predicted noise impacts, Scenario 2 – map 2 of 2 (Arup, 2025)

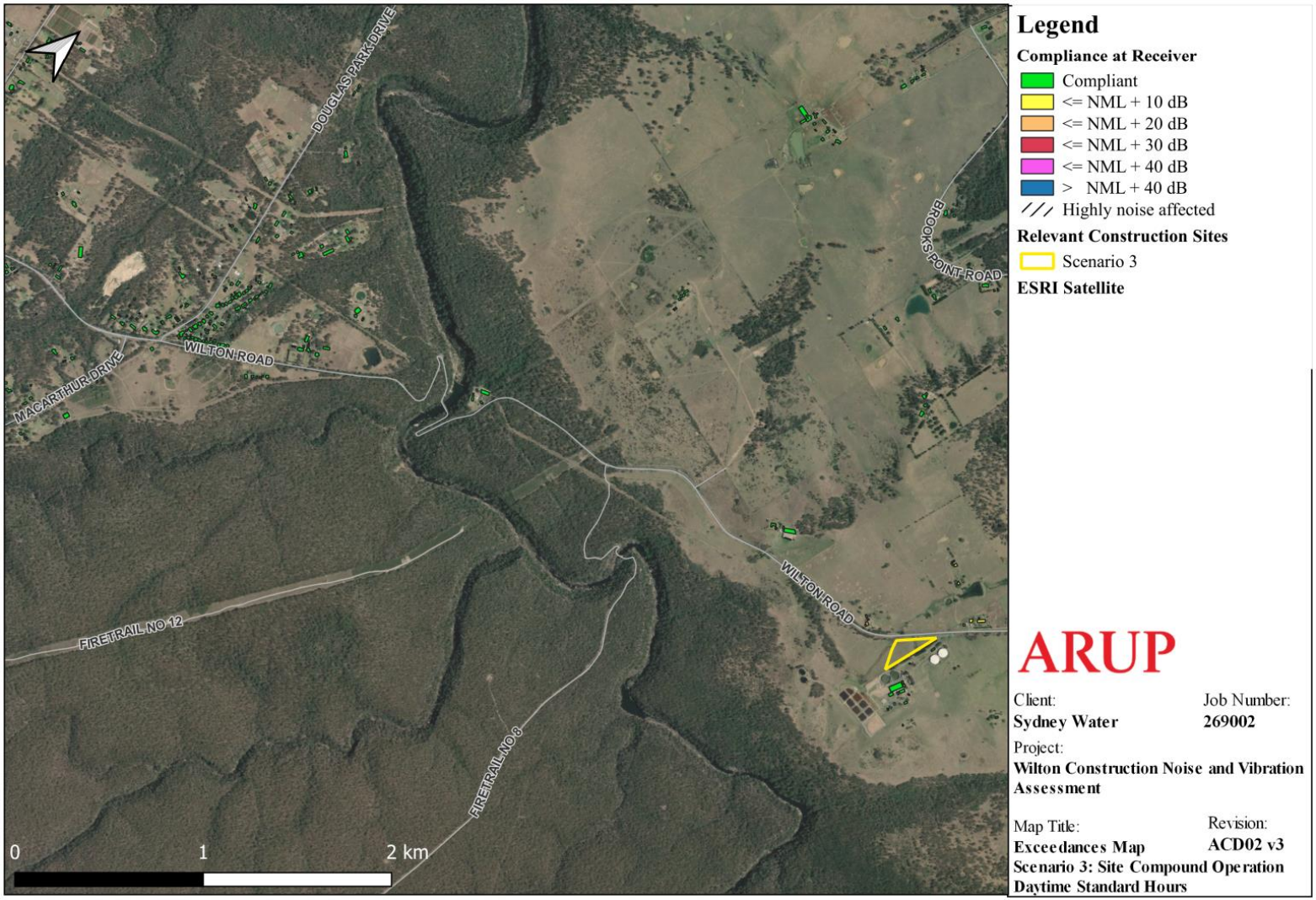

Figure 6-17 Predicted noise impacts, Scenario 3 – map 1 of 2 (Arup, 2025)

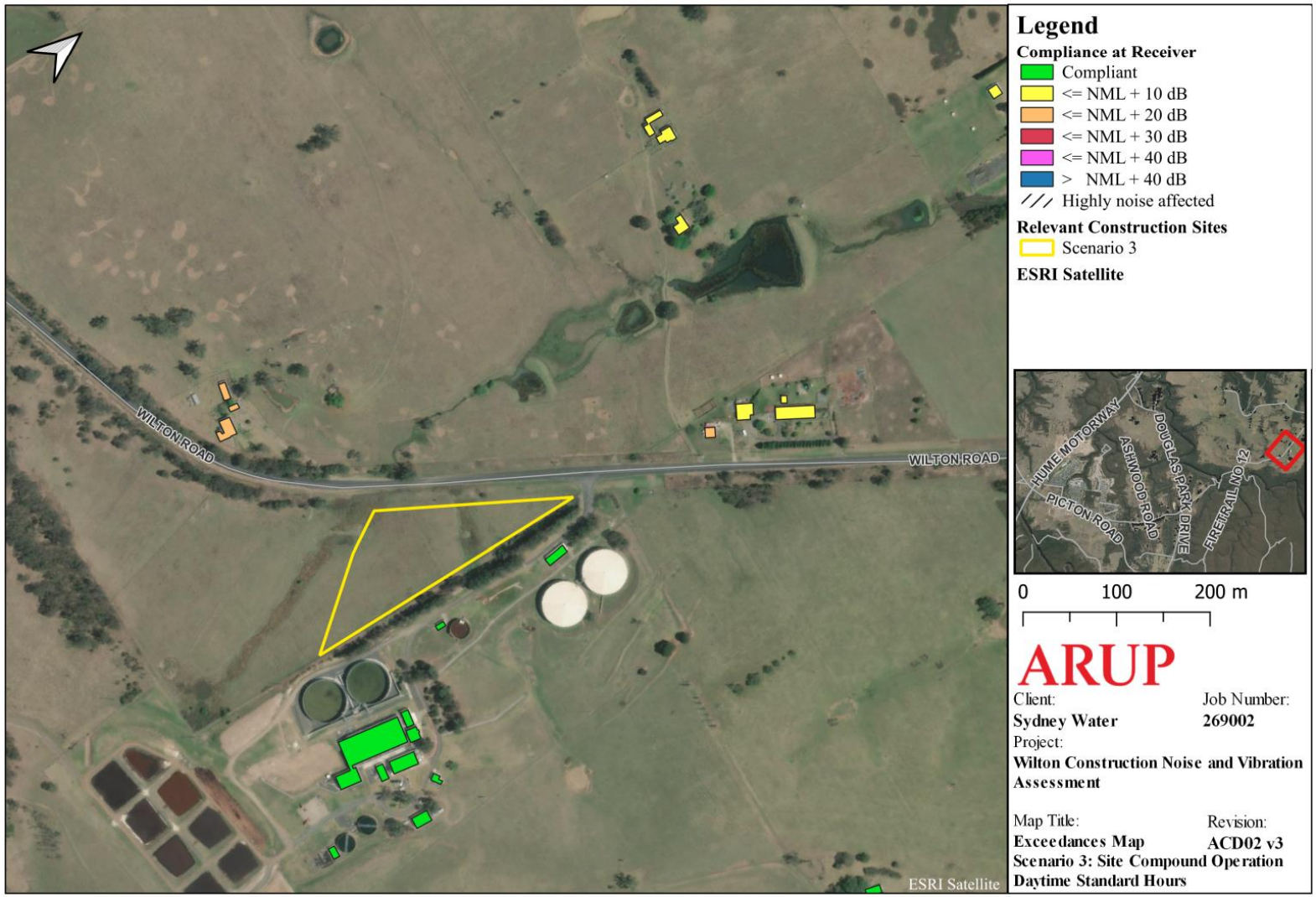

Figure 6-18 Predicted noise impacts, Scenario 3 – map 2 of 2 (Arup, 2025)

Potential impacts – construction vibration

The minimum working distances in Table 6-15 provide the distances from vibrating plant where cosmetic building damage and disturbance to people occupying buildings occur. The minimum working distances are indicative only and will vary depending on the item of plant and local geotechnical conditions. However, mitigation measures will be implemented where receivers are within the recommended minimum distance for cosmetic damage.

Review of the sites, receiver locations and proposed equipment to be operating within the sites indicates that some receivers located close to the sites could fall within the minimum working distance depending on the type of equipment used such as:

- receivers along Wilton Road when the roller is used for scenario 1b (properties up to 25 m away, depending on the size of the roller)
- receivers along Wilton Road near the HDD operation.

The proposed alignment indicates that HDD will not be conducted within 12 m of a sensitive receiver, which represents a conservatively high safe working distance for tunnelling or directional drilling. The likelihood of cosmetic damage for structures 12 m away is considered acceptably low, however should works be required within these distances, a review of potential risks should be conducted. The likelihood of impacts on human comfort from HDD is considered low due to the relatively small scale of tunnelling works. Compactor works may generate some minor disturbances to building occupants within 55 m of works. However, exposure to vibration is anticipated to be for limited durations due to the progressive nature of backfill activities along the length of the trench.

Table 6-15 Minimum working distances for vibration intensive equipment.

Plant Item	Rating / Description	Minimum working distance			Human response – Disturbance to building occupants[6]
		Cosmetic damage			
		BS 7385 – Line 1[1]	BS 7385 – Line 2[2]	DIN 41503	
Compactor[4]	Jumping Jack and plate compactor	3 m	5 m	9 m	55 m
Mechanised bored tunnelling works	Tunnel Boring Machine, Horizontal Directional Drilling, Micro-tunnelling[5]	1-5 m	2-12 m	4-24 m	6-35 m

1. Minimum working distance-based screening criterion of 25 mm/s. Type of structure: Reinforced or framed structures, Industrial and heavy commercial buildings.
2. Minimum working distance-based screening criterion of 7.5 mm/s. Type of structure: Un-reinforced of light framed structures, residential or light commercial type buildings.
3. Minimum working distance based on screening criterion of 3 mm/s. Type of structure: Structures that because of their particular sensitivity to vibration, cannot be classified under:
   - buildings used for commercial purposes, industrial buildings and buildings of similar design or
   - residential buildings and buildings of similar design and/or occupancy
   - and are of great intrinsic value (eg listed buildings under a preservation order)
4. Based on data for previous project.

Plant Item	Rating / Description	Minimum working distance			Human response – Disturbance to building occupants[6]
		Cosmetic damage			
		BS 7385 – Line 1[1]	BS 7385 – Line 2[2]	DIN 41503	

5. Based on TRL document (Crabb, 2000) using Godio et al formula, equation 24

No operational vibration impacts are expected.

Construction noise and vibration impacts will be managed through the below mitigation measures.

Mitigation measures

With the implementation of the mitigation measures below, impacts to noise and vibration can be adequately managed, and residual impacts are expected to be low. No impacts are anticipated during operation.

Table 6-16 Environmental mitigation measures — noise and vibration

Mitigation measures
A Construction Noise and Vibration Management Plan (CNVMP) shall be prepared. This will specify the actual plant to be used and will include updated estimates of the likely levels of noise and the scheduling of activities. The CNVMP should include but not be limited to the following: • roles and responsibilities • noise and vibration sensitive receiver locations and structures • identify works that have the potential to cause impact, accompanied by an appropriate assessment (predictive assessment or risk evaluation) • mitigation and management strategy • monitoring methodology (as relevant) • community engagement strategy.
All employees, contractors, and subcontractors to receive an environmental induction which should include: • standard noise and vibration mitigation measures • permissible hours of work • limitations on high noise and vibration generating activities • location of nearest sensitive receivers.
Regularly train workers and contractors (such as at toolbox talks) to use equipment in ways to minimise noise.
Works must comply with the Interim Construction Noise Guideline (DECC, 2009), including scheduling work and deliveries during standard daytime working hours of 7am to 6pm Monday to Friday and 8am to

Mitigation measures

1pm Saturday. No work to be scheduled on Sunday nights or public holidays. Any work proposed to be performed outside of these hours must be justified.
The proposal will also be carried out in accordance with:

- Sydney Water's Noise Management Procedure SWEMS0056 which outlines the behaviours required to minimise noise impacts on the community when working outside standard hours and on public holidays.

All reasonable and feasible noise mitigation measures should be justified, documented and implemented on-site to mitigate noise impacts.
Work may sometimes need to be scheduled outside of standard hours in certain situations, including:

- delivery of oversized equipment/ structures
- where an ROL is required for an activity impacting on traffic flow
- emergency work to protect human health or avoid loss of life or damage to property
- maintenance and repair of public infrastructure where disruption to essential services (such as water/ sewer) require work out of hours
- any other work which can be justified (work schedule, convenience or cost are not considered sufficient justification).

If justified, the following hierarchy should be implemented for out of (standard) hours works (OOHW) (from most to least preferable, in accordance with the ICNG:

- Saturday afternoons (1pm to 5pm)
- Sunday daytime (8am to 6pm)
- weekday evening periods (6pm to 10pm)
- weekday nights (10pm to 7am)
- all other times (eg Sunday night).

Incorporate **standard daytime hours noise management mitigation measures** into the CEMP/CNVMP, including but not limited to:

- identify and consult with the potentially affected residents before the start of work:
    - 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 (eg times identified by the community that are less sensitive to noise such as mid-morning or mid-afternoon for works near residences)
- implement a noise complaints handling procedure
- 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 (eg 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

Mitigation measures

- regularly inspect and maintain equipment in good working order
- arrange work sites where possible to minimise noise (eg generators away from sensitive receivers, site set up to minimise use of vehicle reversing alarms, site amenities and/ or entrances away from noise sensitive receivers)
- use natural landforms/ mounds or site sheds as noise barriers
- schedule noisy activities around times of surrounding high background noise (local road traffic or when other noise sources are active).

If works **beyond standard daytime hours are needed**, the contractor would:

- justify the need for out of hours work (OOHW) and why it is not possible to carry out the works during standard daytime hours
- consider potential noise impacts and: implement the relevant standard daytime hours mitigation measures; Sydney Water's Noise Management Code of Behaviour (SWEMS0056.01) and document all reasonable and feasible management measures to be implemented
- identify additional community notification requirements and outcomes of targeted community consultation
- seek approval from the Sydney Water Project Manager in consultation with the environment and community engagement representatives.

If **night works are needed,** the contractor would:

- justify the need for night works
- consider potential noise impacts and implement the relevant standard daytime and out of hours mitigation measures and document consideration of all reasonable and feasible management measures
- identify community notification requirements (i.e. for scheduled night work (not emergency works))
- notify all potentially impacted residents and sensitive noise receivers not less than one week before starting night work
- seek approval from the Sydney Water Project Manager in consultation with the environment and community engagement representatives.

If works on **Sundays or public holidays are required**, the contractor would:

- justify why all other times are not feasible
- consider potential noise impacts and implement relevant standard daytime, out of hours and night-time mitigation measures and other reasonable and feasible management measures
- identify community notification requirements
- seek approval from the Sydney Water Project Manager in consultation with the environment and community engagement representatives.

Community consultation should occur before, and during works as follows:

Mitigation measures

- Notify affected stakeholders (through methods such as letterbox drops, individual briefings or phone calls) of upcoming works with details of what the works will entail (such as the works purpose, duration, expected impacts and mitigation measures, complaints procedure, who is responsible for undertaking the works).
- Notification should be as specific as practicable regarding nature and timing of works and any scheduled respite periods.
- Discuss with affected receivers about any atypical sensitivities and review how scheduling of activities and other mitigation measures may aid to minimise impacts
    - (affected receivers = receivers mapped as experiencing non-compliant noise impacts or vibration impacts due to compactor use during backfilling, ie within 55 m of trenching).
- Establish long-term personnel or processes (eg project email, phone number) to centralise project enquiries.
- Complaints to be managed in accordance with Sydney Water's Complaints Procedure and relevant Community and Stakeholder Engagement Plan.

Project-specific mitigation measures will be determined based on a reasonable and feasible assessment performed by suitably qualified project representatives (eg community and stakeholder, project management, environment) and refined through community feedback, before construction starts, and documented in the project CNVMP. This reasonable and feasible assessment can be based off the assessment in this REF and is recommended to be performed during pre-construction.

Mitigation measures may include but not be limited to:

- Respite periods when scheduling work
- Noisy works cut-off times
- At-source controls eg shielding equipment.

The anticipated project-specific community mitigation measures are summarised below:

- moderately intrusive (20 dBA or more above NML) or higher noise – notification such as letter box drops
- highly noise affected (75 dBA or more) – specific notifications such as individual briefings or phone calls.

These measures should be reviewed and refined closer to construction and then documented in the project-specific CNVMP.

Short-term attended measurements will be conducted in response of a complaint, to confirm alignment with predicted noise levels in the impact assessment and management measures.

Where possible reduce noise from mobile plant through additional fittings including:

- residential grade mufflers
- damped hammers such as "City" Model Rammer Hammers.

Mitigation measures
The noise levels of plant and equipment items are to be considered when sourcing plant and equipment.
All plant and equipment used on site must be: • maintained in a proper and efficient condition • operated in a proper and efficient manner.
Turn off all plant and equipment when not in use.
Check the conditions of the powered equipment used on site daily to ensure plant is properly maintained and that noise is kept as low as practicable.
Non-tonal reversing beepers (or an equivalent mechanism) must be fitted and used on all construction vehicles and mobile plant regularly used on site and for any out of hours work. Consider the use of ambient sensitive alarms that adjust output relative to the ambient noise level.
Ensure good work practices are adopted to avoid issues such as noise from dropped items, and noise from communication radios is kept as low as is practicable. Avoid the use of radios or stereos outdoors and avoid shouting and minimise talking loudly and slamming vehicle doors.
Plan traffic flow, parking and loading/unloading areas to minimise reversing movements and idling traffic within the site and before entering site.
Route heavy vehicle movements away from noise sensitive areas where possible.
Vibration generating activities that are proposed within the Cosmetic Damage minimum working distances, identified in Table 6-15 require review of impacts and may warrant vibration monitoring or structural surveys.
Property surveys (or dilapidation surveys) will be conducted before start of construction works where it has been established that the property, structure or utility is at risk of damage (such as a property which is located within the minimum working distance (Table 6-15Table 6-15)) during the construction work.
Consider less vibration intensive methodologies where practicable and use only the necessary sized and powered equipment.
Monitor compliance with the recommended vibration levels in DIN 4150-3 1999: Structural Vibration – Part 3; Effects of vibration on structures for heritage buildings and other potentially at-risk structures following confirmation by the contractor(s) prior to start of any works of the sensitivity of those buildings/structures.

6.1.6 Air and energy

Existing environment and potential impacts

Current land use around the proposal includes rural/residential, vacant land, environmental conservation and above-ground drinking water infrastructure (eg Macarthur WFP). Potential sensitive receivers include

existing residential properties along Wilton Road, as well as a child care centre and place of worship within one kilometre of the proposal.

The following National Pollution Inventory (NPI) sites within one kilometre of the proposal may contribute to background air quality for sensitive receivers near the construction footprint:

- about one kilometre north of the western section:
    - Wilton Meter Station, Ashwood Road, total volatile organic compounds emitted (2,200 kg in 2020/2021)
    - Wilton Meter Station, 99 Ashwood Road, multiple air emissions including gases and particulate matter (about 1,099 kg total in 2020/2021)
- about 500 m east of the western section:
    - Broughton Pass Chlorinator, Broughton Pass, air emissions of chlorine and compounds (4,900 kg in 2020/2021)
- adjacent to the eastern section:
    - Macarthur WFP, 647 Wilton Road, no emissions data recorded.

The proposal will potentially result in minor and temporary air quality impacts from:

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

Operational air quality impacts are not anticipated.

The proposal will require increased energy for the construction and operation of the proposal and this will marginally increase Sydney Water's total energy use.

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 low.

Table 6-17 Environmental mitigation measures — air and energy

Mitigation measures
Use alternatives to fossil fuels where practical and cost-effective during construction and operation.
Track energy use as per SWEMS0015.28 Contractor NGER template.
Maintain equipment in good working order, comply with the clean air regulations of the *Protection of the Environment Operations Act 1997 (NSW)*, 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:

Mitigation measures

- 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
- sweep up dirt transferred to the road at least daily.

Cover all transported waste.

6.1.7 Waste and hazardous materials

Existing environment and potential environmental impacts

Our 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 our suppliers to minimise waste.

The proposal will require the disturbance and/or disposal of spoil and vegetation as well as other general construction waste. The construction footprint includes removal of up to 0.29 ha of native vegetation. 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. Mixing of soil of different waste classes during stockpiling may minimise the opportunity for soil reuse.

Approximate spoil waste volumes from HDD and open trenching will be about 6,000 m^3. These quantities do not consider that material may be reused on site (eg as backfill), and actual waste volumes are likely to be lower.

Sydney Water maintains a Material Stockpile and Material Receiver Dashboard and Register. This provides a centralised location for Sydney Water and its contractors to share real-time information regarding excess or wanted bulk civil material. The register aims to increase reuse and reduce the disposal of otherwise suitable material for use by projects. All waste material will be classified in accordance with the EPA Waste Classification Guidelines (NSW EPA, 2014).

While the proposal is not expected to involve the transportation of asbestos waste (including soil containing asbestos)/sheeting, unexpected contamination, such as asbestos, may be identified during construction.

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. No impacts are anticipated during operation.

Table 6-18 Environmental mitigation measures — waste and hazardous materials

Mitigation measures
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.
Minimise the generation of waste, sort waste streams to maximise reuse/recycling in accordance with the *Waste Avoidance and Resource Recovery Act 2001*.
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 soils at a licensed soil recycling facility or dispose at an appropriately licenced landfill facility.
Prevent pollutants from escaping including 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).
The contractor should use the Sydney Water Material Stockpile and Material Receiver Dashboard and Register to identify potential opportunities for spoil reuse between projects. The Material Receiver Dashboard can also be used to identify suitable waste facilities for material that cannot be reused. It can be accessed directly here, or via the SWDelivery Portal.

6.1.8 Traffic and access

Existing environment

The proposal is predominantly on Wilton Road (a Regional Road), running in a roughly west/north-east direction. Wilton Road can be accessed via several connecting roads including Appin Road (a State Road) from the east, and MacArthur Drive (local road) or Picton Road (a State Road) from the west. The most recent traffic volumes from traffic counters closest to the proposal are (TfNSW, 2023):

- Wilton Road near Broughton Pass (traffic counter ID 07742) – about 2,000 vehicles per day in both directions (data from 2008)
- Picton Road 250 m east of Janderra Lane (traffic counter 07406) – about 8,000 vehicles per day westbound and 4,000 eastbound (data from 2013)
- Picton Road 400 m south of MacArthur Drive (traffic counter 6179) – about 22,000 vehicles per day in both directions (data from 2024).

Current traffic volumes at traffic counter ID 07742 and 07406 are likely higher than those listed here, due to population growth within surrounding suburbs and LGAs since this data was collected.

At Broughton Pass on Wilton Road, vehicles over 15 m long or over 12 tonnes gross vehicle mass (GVM) are prohibited.

The proposal is not currently within one kilometre of any public transport, including bus routes and railway lines. The closest train station is at Douglas Park, on the Main Southern Railway, about 7 km north of the proposal. There are bus stops at Camden Street about 2.7 km west of the proposal west of Broughton Pass and on Appin Road about 2.3 km north east of the proposal east of Broughton Pass. However, there are no bus routes that currently pass through the proposed construction footprint.

Potential impacts

The following peak vehicle movements are anticipated for the proposal:

- at site compounds: about 10 trucks per hour
- at HDD site: up to about 2-4 trucks per hour
- at trenching sites: about 5-10 trucks per hour.

Although these vehicles will use the existing road network, they are not expected to contribute to any significant increases in traffic volumes. The above numbers are a conservative estimate and it is unlikely that all vehicle movements will be required every day for the duration of construction.

While most of the construction of the proposal will aim to be within the road verge, there will be some sections where partial road closures are required along Wilton Road. Lane closures may impact local traffic by reducing speed limits and causing minor temporary travel delays. However, as discussed in Section 2.3, the proposal design and construction methodology has been chosen to avoid the need for a full road closure and significant detours. The delivery contractor will need to consult with the road authority and obtain approval for these lane closures. Impacts to traffic will be managed through a Traffic Management Plan developed in consultation with the road authority.

Temporary access tracks may be established where necessary to avoid impacts to private property access. The location of these will be chosen by the delivery contractor, in consultation with the landowner(s), and will be restored following construction.

The HDD drilling fluid return line will be above ground and will cross driveways. The delivery contractor will consult with property owners about the type of pipe protection to be used to maintain access to the property during the HDD work. All driveways impacted will be restored on completion of the HDD work.

Construction worker vehicles will be parked within the site compounds. Plant and machinery will operate on Wilton Road during construction and parked within the site compounds or at the work site at the end of each shift. As such, impacts to available parking along Wilton Road are not anticipated. Vehicle movements will be managed to minimise impact to property access and traffic movement.

Mitigation measures

With the implementation of the mitigation measures below, impacts to traffic, transport, and access can be adequately managed, and residual impacts are expected to be low. Impacts to traffic and access during operation are not anticipated.

Table 6-19 Environmental mitigation measures — traffic and access

Mitigation measures
Obtain approvals and prepare a Traffic Management Plan (TMP) in consultation with the relevant traffic authority.
Minimise traffic impacts near residential properties, schools and businesses by consulting with them (eg no major materials deliveries at school drop off or pick up times etc.).
Manage sites to allow people to move safely past the works, including alternative pedestrian, bicycles, pram and wheelchair access.
The delivery contractor will consult with property owners to agree the pipe protection method to be used where the HDD return line crosses driveways. Impacted driveways will be restored on completion of the HDD work.
Consult with the relevant traffic authority about managing impacts to pedestrian traffic, signposting, meters, parking, line-marking or if traffic control or pavement restoration is required.
Erect signs to inform road users of the proposal and any temporary road or lane closures.
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.
Construction vehicle access routes must follow Broughton Pass weight and length restrictions.

6.1.9 Social and visual

Existing environment and potential impacts

The existing environment and some amenity impacts have been considered in earlier sections of this REF. Construction noise, traffic, and air quality changes will directly and indirectly impact surrounding receivers. The proposal is within and adjacent to land zoned for current and future residential development. Development within the Wilton Growth Area is ongoing as it transitions from a semi-rural area to a residential community including a town centre and other amenities. The amenity of the general area is changing as the land use changes, and the additional infrastructure associated with this proposal will support these changes.

There will be temporary visual impacts during construction associated with the establishment of site compounds and worksites, earthworks, stockpiling and plant and machinery. Construction activities from the proposal will be visible to road users, and nearby residential properties.

Site compounds may be installed on private property, where permission is received from the landowner. These temporary visual impacts will be mitigated in consultation with stakeholders, such as council (rehabilitation in council managed road corridors) and residents and the mitigation measures listed below including site restoration. Apart from the site compounds, construction will move progressively along the alignment with short term visual impacts for adjacent receivers.

Mitigation measures

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

Table 6-20 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 • personnel treat community enquiries appropriately.
Work sites will be restored to pre-existing condition or better, where practicable.
Minimise visual impacts (eg retain existing vegetation where possible).
Direct artificial light away from sensitive receivers where possible (i.e. residents, fauna or roadways).
Maintain work areas in a clean and tidy condition.

6.1.10 Cumulative and future trends

Potential environmental impacts

New residential development within the Wilton Growth Area is proposed to occur. The infrastructure proposed in this REF will support this residential development.

Construction by developers, including earthworks and access roads, may result in a cumulative impact with this proposal. The delivery contractors will work with local developers, council, and existing residential property owners to reduce impacts as required. Constructing the water pipeline in accordance with the mitigation measures in this REF (including avoidance of impacts through design and construction methodology) will minimise cumulative impacts from this scope of works.

Climate change is predicted to cause the following changes to the area:

- higher temperatures
- decreased annual rainfall (which will decrease stream flows and water storage)
- longer dry periods and more extreme weather events such as high-intensity storms and bushfires.

The changes to weather patterns may impact water supply and water flows. Bushfires will also impact surface water quality (Wollondilly Shire Council, 2020).

The proposal has considered these future trends and is unlikely to be impacted by, or contribute to, future trends, since:

- it is largely within Category 3 (medium risk) bushfire prone land; however, the amount of vegetation removal is unlikely to change bushfire risk

- it is largely outside of flood prone land, and is not expected to cause any changes to existing flood patterns
- it has been sized to meet planned future water supply needs based on predicted future population size.

Mitigation measures

With the implementation of the mitigation measures below, cumulative impacts can be adequately managed, and residual impacts are expected to be minor. No impacts are anticipated during operation.

Table 6-21 Environmental mitigation measures — cumulative and future trends

Mitigation measures
Continue engagement with key stakeholders eg developers, council, existing residents, during planning and construction to minimise cumulative impacts.

Recommendations for sustainable procurement outcomes in construction, and future design outcomes include:

- consider impacts of climate change eg increase in risk from flooding, landslide and erosion, larger range in groundwater levels, and soil moisture conditions exacerbating reactive soil risk
- sustainability measures, for example sustainability assessment including embodied carbon calculation in option assessments and opportunities for using recycled material.

6.1.11 General environmental management

Table 6-22 Environmental mitigation measures — general environmental management

Mitigation measures
Prepare a CEMP addressing the requirements of this environmental assessment. The CEMP should identify licence, approval and notification requirements. Before 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 • location of environmental controls (including erosion and sediment controls, any fences or other measures to protect vegetation or fauna, spill kits, stockpile areas) • location and full extent of any vegetation disturbance • access arrangements for WaterNSW around the construction footprint where work is on WaterNSW land.

Sydney Water's Project Manager (after consultation with the project's environment and community engagement 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 meet the following principles:

- limit proximity to sensitive receivers

Mitigation measures

- no disruption to property access
- no impact to known items of non-Aboriginal and Aboriginal heritage
- outside high-risk areas for Aboriginal heritage
- use existing cleared areas and existing access tracks
- no impacts to remnant native vegetation or key habitat features
- potential environmental impacts can be managed using the mitigation measures in this REF
- no disturbance of contaminated land acid sulfate soils or waterways
- will be rehabilitated at the end of construction.

The 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.

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

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

To ensure compliance with legislative requirements for incident notification (eg *Protection of the Environment Operations Act 1997*), Sydney Water's employees and contractors will follow SWEMS0009 Responding to incidents with an environmental impact procedure.

All site personnel should be inducted into the IMP.

Manage complaints in accordance with standard Sydney Water Complaints Procedure and the project-specific Community and Stakeholder 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.

Should the proposal 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 contractor/s 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 engagement

Mitigation measures
representatives.
All affected customers will be notified of the timing of disruptions to the drinking water supply.

7. Conclusion

Sydney Water has prepared this REF to assess the potential environmental impacts of construction and operation of a drinking water pipeline on Wilton Road. The proposal is required to service initial residential development in the Wilton Growth Area.

The main potential construction environmental impacts of the proposal include clearing vegetation, noise and traffic. During operation, no impacts are expected. 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 result in positive long-term environmental improvements. 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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Appendices

Appendix A – Section 171 checklist

Section 171 checklist	REF finding
Any environmental impact on a community	There may be noise and traffic impacts on the community. There will be environmental improvements by providing a reliable water service to the local community.
Any transformation of a locality	The proposal aligns with the Wilton Growth Area development strategies which are designed to transform the locality.
Any environmental impact on the ecosystems of the locality	The proposal will not result in environmental impacts to ecosystems of the locality.
Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of the locality	The removal of about six trees on Wilton Road will have a minor aesthetic impact. The wider area is currently undergoing development, and the pipelines during operation will be underground and not impact the locality during operation.
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 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.
Any impact on the habitat of any protected animals (within the meaning of the *Biodiversity Conservation Act 2016*)	The proposal will remove 0.29 ha of habitat for several threatened species. This is not expected to be a significant impact on any species. Native vegetation clearing will be offset in accordance with our Biodiversity Offset Guide.
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. Tests of significance (BC Act) and significant impact assessments (EPBC Act) found that the proposed vegetation clearing will not have a significant impact on any species.
Any long-term effects on the environment	The proposal will not have any long-term adverse impacts on the environment but will have a long-term benefit by providing a reliable and modern water service for the 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.

Section 171 checklist	REF finding
Any pollution of the environment	Environmental mitigation measures will mitigate the potential for the proposal to pollute the environment. No pollution of the environment is expected.
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 occur at the same time as other developments in the area. Mitigation measures will be implemented to minimise cumulative environmental 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.

Appendix B – 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? * (e) Div.14 (Public admin buildings), (g) Div.16 (Research/ monitoring stations), (i) Div.20 (Stormwater systems)?		X
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
Section 2.15, consultation with public authorities other than councils		

TISEPP section	Yes	No
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

Appendix C – NorBE

NorBE Assessment for proposed activities by public authorities that will be assessed under Part 5 of the EP&A Act, 1979, as specified in Section 171(A) of Environment and Planning and Assessment Amendment (Water Catchments) Regulation 2022.

NorBE assessment – is there likely to be a neutral or beneficial effect on water quality?	
1. Are there any identifiable potential impacts on **water quality**? What **pollutants** are likely? *(Major potential pollutants are sediments (fine and coarse), nitrogen, phosphorus, pathogens, and hazardous chemicals and contaminants such as oil/fuel.* At what stage do the impacts occur?	Major potential pollutants are sediments (fine and coarse), discharge of drinking water, hazardous chemicals, and contaminants such as oil/fuel. These pollutants may impact water bodies through disturbance of soil during works, and storage of fuels and chemicals on site as part of works. Mitigation measures to manage impacts during construction are discussed in Section 6 of this REF.
2. For each pollutant, list the **mitigation measures** needed to prevent or mitigate potential impacts on water quality? *These may be WaterNSW endorsed current recommended practices (CRPs) and/or equally effective other practices*	The mitigation measures used to manage sedimentation into nearby waterways, the storage of fuels and chemicals on site and waste management are found in Section 6 of this REF.
3. Will the mitigation measures be adequate for the time required? How will they need to be maintained?	The mitigation measures will be managed by the delivery contractor through the implementation of a CEMP, and any associated sub-plans and/or work method statements reviewed by Sydney Water.
4. Will all **impacts** on water quality be effectively **contained on the site** by the identified **mitigation measures** (above) and not reach any watercourse, waterbody or drainage depression? Or will **impacts** on water quality be **transferred outside the site** for treatment? How? Why?	The mitigation measures outlined above in this REF are considered to effectively contain any impacts to water quality on site. No transfer of water is required for offsite treatment.
5. Is it likely that a **neutral or beneficial effect** on water quality will occur? Why?	The proposal is likely to have a neutral effect on water quality as the implementation of mitigation measures will minimise any potential impacts.

Appendix D – Flora and fauna assessment

Appendix E – Aboriginal heritage due diligence assessment

Aboriginal heritage information must not be made publicly available or be published in any form or by any means by Sydney Water or our contractors / joint ventures, unless written approval has been provided to Sydney Water from DPE's AHIMS Registrar .

For publicly displayed REFs, all Aboriginal heritage information that identifies individual sites must be removed.

Appendix F – Noise and vibration assessment