Review of Environmental Factors

Cosgroves Creek Wastewater Network Stage 1 (April, 2025)

Sydney WATER

sydneywater.com.au

03/2025

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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 Cosgroves Creek Wastewater Network Stage 1. 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]	[redacted]	[redacted]
Andrea Glass Environmental Scientist Sydney Water Date: 01/04/2025	Ben Groth Principal Env Scientist Sydney Water Date: 01/04/2025	Will Watts Delivery Manager Sydney Water Date:02/04/2025

Decision Statement

The main potential construction environmental impacts of the proposal are typical construction impacts such as erosion and sedimentation, vegetation removal, noise, and traffic impacts. The proposal will also impact Aboriginal heritage which will require an Aboriginal Heritage Impact Permit (AHIP) under the *National Parks and Wildlife Act 1974*. During operation the potential impacts will be minor, relating to air quality and visual amenity typical of this type of infrastructure. 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:	[redacted] Sally Spedding A/ Senior Manager, Environment and Heritage Services Sydney Water	Date: 03/04/25

1 Executive summary

Sydney Water plans to build the Cosgroves Creek Wastewater Network Stage 1 (the proposal), to meet growing demand for servicing in the Western Sydney Aerotropolis. The proposal is in the suburbs of Luddenham and Badgerys Creek, in the Local Government Areas (LGA) of Liverpool City Council (south of Elizabeth Drive) and Penrith City Council (north of Elizabeth Drive). The proposal crosses several development precincts including Northern Gateway, Wianamatta-South Creek, Badgerys Creek and Agribusiness as listed in State Environmental Planning Policy (Western Parkland City) 2021. Construction is expected to start mid 2025 and take approximately two years.

The main components of the proposal assessed under this REF include:

- approximately 3.2 km of dual pressure wastewater mains
- a new wastewater pumping station (SP1246)
- approximately 10.1 km of gravity carrier wastewater mains.

Much of the proposal area has been previously cleared for agricultural purposes or disturbed by road construction. The main potential environmental impacts associated with the proposal are construction impacts such as vegetation clearing, soil erosion, impacts to Aboriginal heritage, noise and traffic. Several options and refinements to the design and construction methodology were made to minimise environmental impact. This includes the adoption of trenchless construction methods to avoid sensitive locations and traffic disruptions where feasible. A Construction Environmental Management Plan (CEMP) will be prepared by the Contractor to mitigate potential environmental impacts during construction. During operation, the main impacts are associated with air quality and visual amenity.

The proposal will provide a reliable wastewater network that facilitates further development of the Western Sydney Aerotropolis and Western Sydney International Airport, aligned with the principles of ecologically sustainable development.

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 Cosgroves Creek Wastewater Network Stage 1 and identifies mitigation measures that avoid or minimise potential impacts.

2.2 Proposal background and need

The proposal is being undertaken to support the development of the Western Sydney Aerotropolis which will contribute towards 200,000 new jobs in the broader Western Parkland City (DPHI, 2025).

The overall catchment area comprising the WSA includes a number of individual sub-catchments discharging to the Upper South Creek Advanced Water Recycling Centre (USC AWRC), one of which is the Cosgroves Creek catchment. The catchment also includes Sydney Science Park which is proposed to include a small sewer mining plant (currently under construction).

This proposal is part of a two-stage approach, which will stagger the delivery of infrastructure based on growth demands within the Cosgroves Creek catchment. The second stage is subject to a separate planning approval and is scheduled for commissioning by 2028.

This REF assesses the priority infrastructure required to service Stage 1 of the Cosgroves Creek wastewater network, which includes:

- approximately 3.2 km of dual pressure wastewater mains
- a new wastewater pumping station (SP1246)
- approximately 10.1 km of gravity carrier wastewater mains.

Table 2-1 summarises the proposal need, objectives and consideration of alternatives.

Table 2-1 Proposal need, objectives and consideration of alternatives

Aspect	Relevance to proposal
Proposal need	The Cosgroves Creek catchment area currently has no reticulated wastewater service. This proposal is needed to provide wastewater servicing for the anticipated growth in this catchment as part of the development of WSA.

Aspect	Relevance to proposal
	The proposed wastewater infrastructure is dependent on the completion of adjacent catchment projects in planning or construction, to service the WSA. All wastewater flows from the proposal will ultimately connect to the USC AWRC and will be operated under the future USC system Environment Protection Licence (EPL). Until the future USC system EPL is in place, a scheduled development work licence under s47 of the *Protection of the Environment Operations Act 1997* (POEO Act) will be required for construction of the proposal. The key driver for the proposal is to ensure there is sufficient wastewater system capacity to service the governments planned development within the WSA. This proposal is required to meet Sydney Water's commitment to service continuing growth in the WSA as stated in the Growth Servicing Plan (2019-2024).
Proposal objectives	The proposal objectives are to provide a reliable wastewater infrastructure and to support development and growth expected in the Cosgroves Creek catchment as part of the WSA.
Consideration of alternatives/options	An options assessment process informed the design of the proposal. The process identified several alignment options. Sydney Water assessed these options to determine their feasibility and ultimately selected the most appropriate option. Options were assessed against their ability to deliver the proposal objectives, technical feasibility, potential environmental impacts and performance, social and community outcomes, and cost. The presented proposal was selected as the preferred option as it will achieve the proposal objectives with an acceptable level of risk at the least cost.

2.3 Consideration of Ecologically Sustainable Development

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

Table 2-2 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 mitigation measures have been designed to reduce scientific uncertainty relating to the proposal. The proposal has been designed to minimise impact to the environment by employing alternative construction methodologies (such as trenchless installation), minimising vegetation removal, and positioning infrastructure in previously disturbed areas (e.g. road corridors) where possible.
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 a reliable wastewater service.
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 has been designed to avoid impacting high conservation value vegetation where possible. Impacts to native vegetation will be offset.
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*	An options assessment was undertaken that included cost considerations for the proposal. The proposal will provide cost efficient use of resources and provide optimum outcomes for the community and environment.

3 Proposal description

3.1 Proposal details

Table 3-1 describes the proposal and Figure 3-1 to Figure 3-5 shows the location and key environmental constraints.

Table 3-1 Description of proposal

Aspect	Detailed description

Proposal description	The proposal comprises of the construction and operation of a new wastewater network including new wastewater mains and a new wastewater pumping station to service Cosgroves Creek catchment. The main components of the proposal assessed under this REF are shown in Figure 3-1 and include:
	• a 3.2 km (approximately) dual pressure wastewater main (CCPM01) to the north of the M12 Motorway
	• constructing a new wastewater pumping station (SP1246) to the south of Luddenham Road
	• about 10.1 km of gravity carrier mains comprising:
	  ○ a 6.6 km main (approximately) along Cosgroves Creek crossing Luddenham Road and Elizabeth Drive (CCGC01-01 and CCGC01-02)
	  ○ a 1.4 km main (approximately) to the north of Elizabeth Drive (CCGC02)
	  ○ a 1 km main (approximately) to the west of the M12 Motorway, north-west of SP1246 (CCG03)
	  ○ a 1.1 km main (approximately) along Luddenham Road to the north-east of SP1246 (CCGC04).
	There will be vent shafts, maintenance holes, scour pits and air valves at various locations along the alignment. The new wastewater infrastructure network will connect into the USC AWRC, the latter which is expected to be operational and ready to receive flows by the completion of this proposal.
	The proposal area includes SP1246 (130 m x 130 m) and a 50 m wide buffer (25 m on each side) of the new wastewater pipelines, SP1246 overflow and access.
	The impact area includes SP1246 (130 m x 130 m) and a 40 m wide buffer (20 m on each side) of the proposed open trenched pipeline, SP1246 overflow and access, and represents areas within the larger “proposal area” where construction activities will result in ground disturbance.

Aspect	Detailed description
Location and land ownership	The proposal is located within the suburbs of Luddenham and Badgerys Creek within the City of Penrith and City of Liverpool Local Government Areas (LGAs). The proposal is located on a mix of private property and developer owned land. SP1246 will be located at 546-640 Luddenham Road (Lot 23 / DP1277418). This site is currently owned by Sarak Pty Ltd, a private business. A portion of this lot will need to be acquired, and an access easement established.
Site establishment and access tracks	Site establishment includes delineating the construction sites, storage and laydown areas, erosion and sediment controls, traffic management and vegetation removal. Site establishment may also include surveys, service location, geotechnical investigations or other investigations required prior to construction. It may also include service relocation where services are identified that may be affected. Access to the alignment and construction sites will generally be via existing roads and along the proposal area. Temporary access tracks may be established where necessary. The location of these will be chosen by the Contractor, in consultation with the landowner(s) and approved by Sydney Water's Project Manager as described in the mitigation measures in Section 6. Temporary access tracks will be removed at the completion of construction. A new permanent access road to the wastewater pumping station (SP1246) will also be constructed.
Ancillary facilities (compounds)	Construction compound(s) will likely be required to house site sheds, construction amenities and materials laydown. The exact location of these will be chosen by the Contractor in consultation with the landowner(s) and approved by Sydney Water's Project Manager as described in the mitigation measures in Section 6.

Methodology	The construction phase of the proposal will include construction of pressure mains, gravity mains and a new pumping station (SP1246). The pumping station will include overflow pipes, associated fittings and vent shafts. An overview of the proposal is shown in Figure 3-1.
	
	Investigation/site establishment
	
	The following activities may be required:
	• investigative works including geotechnical, contamination and survey
	• soil sampling and waste classification.
	• site preparation works including:
	  ○ establishing temporary compounds
	  ○ installing erosion and sediment controls
	  ○ traffic management measures
	  ○ vegetation trimming/removal.

Pipelines

The wastewater mains will be installed underground using a combination of open excavation (trenching) and trenchless construction methods (horizontal directional drilling (HDD), horizontal auger boring (HAB) and microtunnelling). Open trenching will be used in areas that are accessible and have minimal environmental constraints. Trenchless methods will be used for difficult to access locations or environmentally sensitive areas.

Open trenching

Open trenching construction will generally occur progressively where a section will be trenched, a section of pipe will be installed, and that section will then be backfilled and restored to pre-existing conditions. The maximum trench dimension will be up to 15 m deep and 2 m wide. For maintenance holes, the excavation required could be up to 13 m deep. Final depths are subject to change during detailed design.

Methodology for open trenching includes:

- stringing pipes along the proposal area
- excavating trenches, including stockpiling spoil material beside trenches
- benching or shoring up trenches, depending upon trench depths
- spreading granular bedding material such as sand or gravel in the trench
- installing a section of pipe in the trench
- pressure/vacuum testing pipeline
- backfilling trench with compacted bedding material and spoil
- restoring disturbed areas and replacing topsoil
- reinstating any areas where the road surface has been disturbed in accordance with the requirements of local council.

Trenchless construction

Trenchless methods such microtunnelling, HDD and HAB will be used to avoid sensitive areas including key fish habitats (KFH), waterways, heritage and biodiversity where specified, and some road crossings.

Microtunnelling and HAB will involve the excavation of pits approximately 4 m by 6 m at either end of each trenchless section that serve as launch and receival points for the pipeline. HDD generally involves drilling from the surface. Excavation dimensions of HDD pits will about be 4 m by 10 m. Pipes installed using trenchless techniques will be up to about 27 m deep.

An area about 40 m wide by 60 m in length will be required around each proposed pit and/or maintenance hole location, to be used as a site compound and/ or laydown area for equipment, plant, and spoil storage. These locations are indicative and may be adjusted within the assessed impact area to avoid areas of high environmental value, including vegetation and heritage features as long as they:

Aspect	Detailed description
	• remain within the assessed proposal area of the REF and have no net additional environmental impact • are chosen by the Contractor in consultation with the landowner(s) and approved by Sydney Water's Project Manager as described in the mitigation measures in Section 6.2.11. For drilling, a potable water source will be fed to the drill rig, which in turn will be fed to the drill head for lubrication. The drilling fluid will make its way back to the launch site of the drill rig progressively. The bore slurry will be pumped into a recycling unit where it will be agitated to remove clay cuttings and separate solids for off-site disposal to appropriately licensed EPA facility. Following the clay removal, the recycled fluid will be re-used and sent back to the bore head for lubrication. This cycle will continue for the duration of the drilling operation. Construction by HDD will involve: • stringing pipe at the receival pit • positioning directional drilling plant at the launch pit • drilling pilot hole from the surface at the launch pit to the receival pit • back reaming of pilot hole from receival pit to launch pit • pulling pipe back from the receival pit to the launch pit • grouting around the pipe • restoration around launch and receival pits. Construction by microtunnelling and HAB will involve: • excavating launch and receival pits to the depth of the pipeline at either end of the microtunnelling sections (within the impact area) • shoring up pits using sheeting and bracing structures • lowering the drilling plant into the launch pit • lowering sections of pipe into the launch pit • using the plant to push the cutting head, followed by the sections of pipe, to the receival pit • managing waste generated from soil displacement • reinstating road pavement, road verge and vegetation where required. There will be vent shafts, maintenance holes, scour pits and air valves at various locations along the alignment. Vent shafts will be about DN300 and will allow ventilation of odours form the mains into the atmosphere at an indicative height of 18 m and maximum spacing of 400 m, subject to confirmation during detailed design.

Aspect	Detailed description
	Pumping station construction A new wastewater pumping station (SP1246) is proposed. The pumping station will include wet well, emergency storage, odour control unit (OCU), chemical dosing unit (CDU), inlet maintenance hole and valve chamber. Deep excavation is required to construct the pumping station. The required maximum excavation for construction is expected to be up to about 16 m below ground level. The construction of the wastewater pumping station will include: • installation of site boundary fencing and gates • installation of the pumps and equipment • bulk earthworks to establish required levels • piling and shoring works, dependant on excavation depths • installing emergency overflow pipelines, with headwall configuration using open trenching techniques • deep excavation works for the pumping station sub-structure • deep pipework installation via trenchless methods • installation of concrete structures including inlet maintenance hole, wet well and valve chamber • backfill and installation of shallow pipework and discharge maintenance hole • installation of slab foundations for the OCU, switch room and substation and associated services • building and mechanical fit out works • permanent power supply works • site electrical works • access road, hardstand and ancillary works • site restoration and landscaping • testing and commissioning of the station. Construction of the proposal will involve vegetation clearing and excavation. The areas to be disturbed will include construction compounds, trenched areas, an overflow pipe with overflow headwall from SP1246 to Cosgroves Creek, pits for trenchless sections, and the pumping station site. Material from vegetation clearing activities will be temporarily stored within the proposal area and removed from the site if not suitable for reuse during restoration. Excavated material will generally be stockpiled adjacent to excavations and used as backfill. Topsoil will be stockpiled separately and then placed on top of backfilled sub soil.

Aspect	Detailed description
Commissioning	Commissioning involves testing and running the new equipment to ensure it works correctly and is integrated with existing plant operations. The exact commissioning steps depend on the type of the equipment, but typically include: • testing utilities, telemetry and switchboards • inspection and performance testing of equipment, pipes, pumps and fittings • testing of any emergency systems in place.
Restoration	Non-operational areas of the work site will be restored to the pre-existing condition following construction in consultation with landowners and/or local council. The Construction Environmental Management Plan (CEMP) will detail site restoration works to be undertaken once construction works are finished. Native vegetation removal will offset in accordance with the Sydney Water Biodiversity Offset Guideline. Any required revegetation will be carried out in accordance with Sydney Water procedure *SWEMS0025.11 Guideline for native revegetation following construction*. Site restoration activities will include: • backfilling of trenches • dismantling compounds, removal and disposal of waste material and removing construction signage • restoring ground cover and vegetation • restoration of road pavement surfaces and drainage • removing erosion and sediment control, fencing and traffic management measures.
Materials/ equipment	Construction of the proposal will require general construction materials such as concrete, prefabricated sections of pressure main or gravity main, associated conduit and bedding materials, various components of the wastewater pumping station such as pumps, and other materials as required. The 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 material. The management of this and other waste material generated by construction is discussed in Section 6. The construction of the proposal will involve the use of a range of vehicles, equipment and machinery. Indicative plant and equipment to be used for the proposal includes: • Ancillary equipment • Backhoe loaders • Bending machines • Excavator (approx. 35 t) • Pumps and other dewatering equipment

Aspect	Detailed description
	• Bulldozer • Compaction equipment • Compactors • Concrete and shotcrete pump • Concrete saws • Concrete trucks • Cranes • Delivery trucks • Demolition saw • HDD rig • Dozers • Dump truck • Excavator with hammer (approx. 35 t) • Front end loaders • Generators • Grader • Hand tools • Light vehicles • Loaders • Mobile crane • Paver • Piling Rig • Pipe rollers • Pressure testing plugs and gauges • Pumping equipment • Road paving machinery • Roller • Semi-trailers • Shoring equipment • Slurry management equipment • Trenching machines • Trucks and trailers • Vacuum truck • Water trucks • Welding equipment • Wood chipper / shredder.
Work hours	Work and deliveries will be scheduled to occur during standard daytime hours of: • 7 am to 6 pm, Monday to Friday • 8 am to 1 pm, Saturdays. The proposal is expected to require work outside these hours for the following: • HDD machine and the microtunnelling boring machine to avoid risk of collapse in difficult ground conditions. The work area at the entry and exit pits will be required to work outside of standard daytime hours, to support the HDD and microtunnelling works. • Works in roads or delivery of oversize equipment for safety and to reduce traffic impact. • Dewatering equipment such as pumps and generator to manage water ingress into the work area. Impacts associated with construction working hours have been assessed and mitigation measures are provided in Section 6.
Proposal timing	Construction is expected to start mid 2025 and take about 24 months.

Aspect	Detailed description
Operational requirements	Sewage treatment is a scheduled activity. The proposal will be operated under the future sewage treatment system EPL for the USC AWRC. Until the system EPL is established a scheduled development work licence will be required for construction of the proposal. Once operational, the proposed pump station will operate largely without the need for permanent presence at the site. The pumping station will be designed with an overflow pipe to the creek, which would operate in accordance with the EPL requirements. The proposal will be subject to standard and routine maintenance activities such as inspections, testing and repairs as necessary.

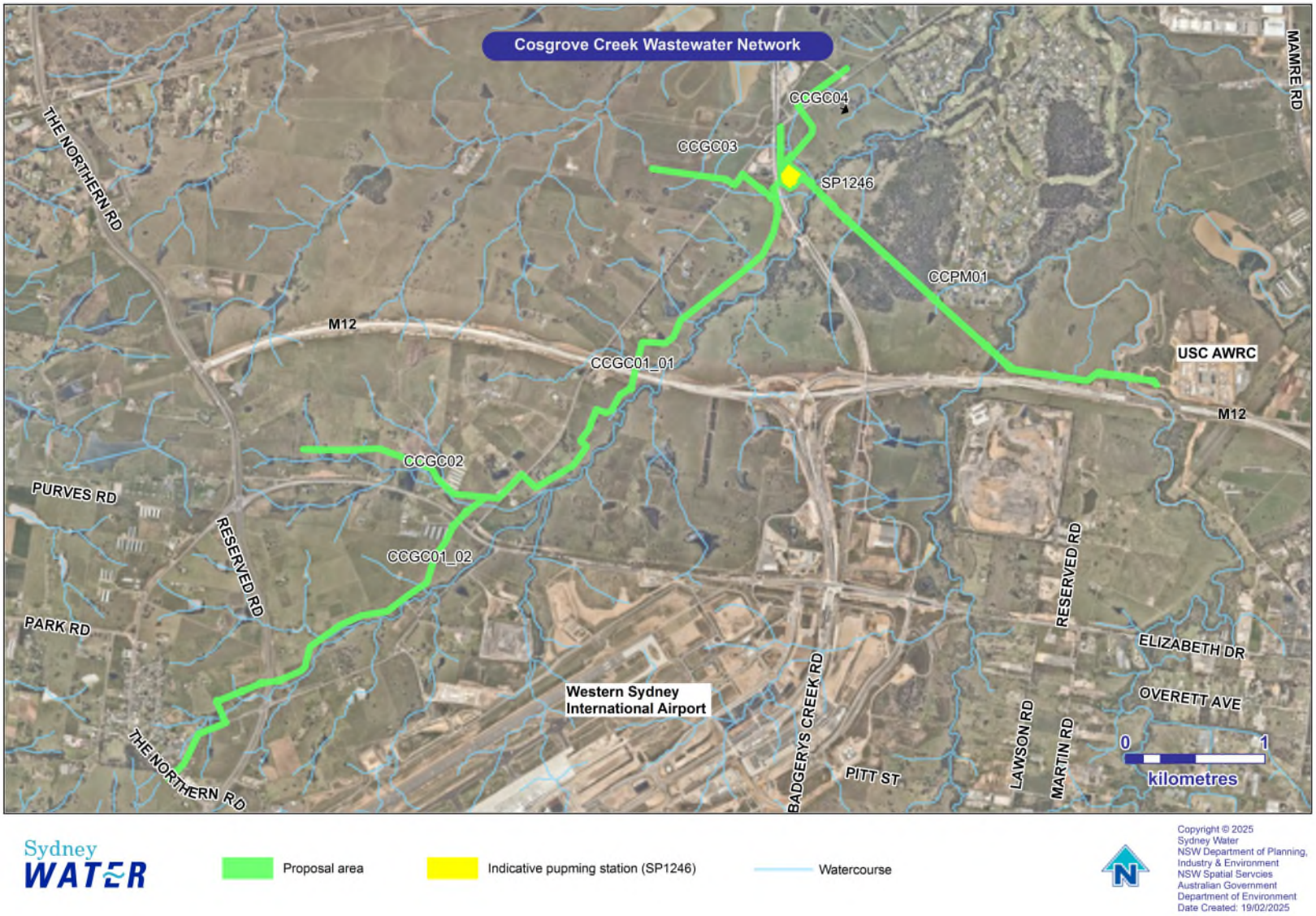

Figure 3-1 Proposal overview

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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 DCCEEW's AHIMS Registrar .

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

Figure 3-2 Key environmental constraints (1 of 4)

Figure removed

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 DCCEEW's AHIMS Registrar .

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Figure 3-3 Key environmental constraints (2 of 4)

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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 DCCEEW's AHIMS Registrar .

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Figure 3-4 Key environmental constraints (3 of 4)

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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 DCCEEW's AHIMS Registrar .

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

Figure 3-5 Key environmental constraints (4 of 4)

3.2 Field assessment area and changes to the scope of work

The proposal area includes the new pumping station (SP1246) and a 25 m buffer either side of the proposed wastewater network (i.e. 50 m corridor). The field assessment area was expanded beyond the proposal area for certain specialist studies around the proposed pumping station location, to allow for design flexibility. The study area is the broader area for proposal context where direct and indirect impacts may occur. The final alignment, including the proposal area and precise location of pits, may change based on further design or construction planning.

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

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

Changes to the proposal outside of the proposal 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 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

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, directly and/or indirectly impacted by 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.

Sydney Water will also provide Liverpool City Council and Penrith City Council with reasonable notice when the work will commence. The councils will be consulted about matters identified in environmental planning instruments (refer Section 4.2 below). This includes public safety issues, temporary work on council land, and full or partial road closures of council managed roads.

Sydney Water has consulted with a range of stakeholders regarding the proposal, this includes:

- briefings with Government and regulatory entities: local councils, Department of Primary Industries and Regional Development (DPIRD Fisheries), Bradfield City Authority (BDA – formerly Western Parkland City Authority)), Transport for NSW (TfNSW) and Local Aboriginal Land Councils
- regular discussions with developers and landowners directly impacted by the proposal
- working with landowners to facilitate access for site investigations
- ongoing phone and emails between Sydney Water and landowners
- landowner meetings and discussions with landowners impacted by partial acquisition for the pumping station location.

Ongoing consultation will be undertaken with councils and property owners regarding construction activities, access and easements required for the proposal. The broader community will also be informed of the proposed infrastructure and construction activities.

4.2 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). Further detail is provided in Appendix B.

Consultation is required under section 2.10 (1f) of the TISEPP as the proposal involves excavation within a council managed road. The Contractor will undertake this consultation with relevant Councils in accordance with the requirements of Chapter 2.2 Division 1 of the TISEPP prior the commencement of relevant work. Feedback received from Council(s) will be considered and adopted for the construction of the work where relevant and appropriate.

For work on Crown Land (underboring of Cosgroves Creek and Badgerys Creek), the Contractor will consult with Department of Planning, Housing and Infrastructure (Crown Lands), Penrith City Council or Liverpool City Council (Crown Land Manager) as part of their standard consultation process.

DPIRD Fisheries was notified on 6 December 2024 under section 199 of the *Fisheries Management Act 1994* during REF preparation, as the work involves reclamation or dredging in a waterway mapped as 'Key Fish Habitat'. DPIRD Fisheries raised no objection to the proposal provided that the mitigation measures in Section 6 are implemented.

Sydney Water has consulted with BDA on 6 December 2024 as the proposal has a capital investment value of over $30 million and is in the Western City operational area. No response was received.

Sydney Water notified the NSW Department of Planning, Housing and Infrastructure (DPHI) on 13 February 2025 in line with section 4.25A of the State Environmental Planning Policy (Precincts – Western Parkland City) 2021 due to the proposed impact on vegetation mapped as High Biodiversity Value. No response was received.

Section 201A of the Environmental Planning and Assessment Regulation 2021 requires that Sydney Water notify DPHI of a 'decision' to carry out an activity (ie proposal) on avoided land mapped under the Cumberland Plain Conservation Plan (DPE, 2022a) (CPCP). A decision is synonymous with the determination of a Review of Environmental Factors. The notification must be made within 30 days of the decision and include a statement identifying whether the proposal is consistent with Part 2 of the CPCP Guidelines.

Sydney Water's Wastewater and Environment (WW&E) Custodians and Major Projects team consulted with the EPA regarding the USC AWRC and network EPL requirements under the POEO Act. The EPA confirmed that a scheduled development work licence will be required for construction of any network, where the works are not connecting to an existing licenced system. This REF must be provided to the EPA as part of the scheduled developed work licence application.

5 Legislative requirements

5.1 Strategic context

5.1.1 Greater Sydney Region Plan

The Greater Sydney Region Plan – A Metropolis of Three Cities (Greater Sydney Commission, 2018) 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: the Western Parkland City, the Central River City, and the 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 following key strategies:

- infrastructure and collaboration – including investing in wastewater infrastructure
- liveability
- productivity
- sustainability.

The proposal directly supports the first key strategy area by State government investment through Sydney Water's delivery of critical wastewater infrastructure in future growth areas. It also supports the other key strategies by improving and expanding wastewater servicing to enhance liveability for current and future populations, enables development and greater productivity opportunities, and improves sustainability of the region by connecting existing wastewater infrastructure to an integrated water cycle.

Specifically, the proposal is located within the Western Parkland City which is discussed further below.

5.1.2 Enabling development, home and job growth in the Western Parkland City

Greater Sydney's population is forecast to reach eight million people over the next 40 years, and about half of those people are expected to be living west of Parramatta. Much of this growth will occur in the Western Parkland City, driven by the new Western Sydney International Airport.

Over the coming years, the region is set to become the economic powerhouse of Greater Sydney. This area will need commercial and industrial developments to host the businesses, residential areas to house the workforce and infrastructure to service their access and utility needs.

The NSW Government's vision for the Western Parkland City is focused on creating jobs, a highly skilled workforce and an innovation economy. However, it also seeks to support a landscape-led approach to new urban communities that will create quality places for the community, keep water

resources in the catchment to protect the local climate from heat island effects, value Aboriginal and non-Aboriginal heritage and support the emerging circular economy. Development of the Western Parkland City presents a significant opportunity to maximise productivity, liveability and sustainability.

The Western Parkland City is expected to be home to up to 650,000 people by 2056. Most of the WSA is not currently serviced by Sydney Water and use on-site systems such as septic tanks. The proposed new urban communities require wastewater services to be established to ensure the anticipated population growth and economic productivity is realised, and to provide equitable servicing across Sydney's metropolitan areas.

New wastewater services also bring considerable opportunity to maintain treated water in the local context, enhance the quality of public spaces, the health of the community and environment, and be a focal point for a new circular economy.

In developing a new wastewater service for the region, the proposal is focused on achieving the best outcome for Western Sydney, and therefore for Greater Sydney more broadly. The proposal will enable growth and development of the region and offer wastewater services that our customers expect.

5.1.3 Greater Sydney Water Strategy

The NSW Government developed the Greater Sydney Water Strategy (DPE, 2022b), which establishes a direction for delivering sustainable and resilient water services to Greater Sydney for the next 20 to 40 years. The strategy sets out priorities and actions for the delivery of water infrastructure into the future to support a sustainable, liveable and productive Greater Sydney.

The Strategy recognises that wastewater management plays a crucial role in achieving a variety of outcomes for the region. Not only does it protect public and environmental health, and help keep our waterways healthy, but it also contains valuable resources that have previously gone unused. Only about 7% of wastewater in Greater Sydney is recycled. Most wastewater is directed to treatment plants and then discharged to the ocean. As Greater Sydney continues to become denser and extend into new areas of growth, the reuse and recycling of wastewater will be essential to support a more productive and sustainable region.

Sydney Water's USC AWRC will contribute to improving wastewater management and resource recovery from wastewater in Greater Sydney. The AWRC will recover high-quality treated water for environmental flows to waterways, organic material known as biosolids for use as an alternative to chemical fertilisers in farming and gardening, use industry-leading technology to harness renewable energy from co-generation processes, and enable other sustainable practices.

The proposal will enable the wastewater collected in the surrounding area to be directed to the AWRC where treatment and resource recovery can take place through an integrated water cycle process.

5.1.4 Local Strategic Planning Statements

The proposal is located within the local government areas of Liverpool City Council and Penrith City Council. Both councils have prepared a Local Strategic Planning Statement (LSPS) in

accordance with section 3.9 of the EP&A Act. The LSPS guides land use planning in the LGA, taking into consideration economic, social, and environmental factors.

Each LSPS outlines a vision for the future of land use for their respective LGA, focusing on sustainability, liveability, and growth. The statements identify key directions, such as promoting sustainable development, enhancing community infrastructure, supporting economic development, and preserving the natural environment. The plans aim to provide a framework for future development and guide decision-making to ensure continued growth and prosperity while preserving the area's unique character and natural assets.

Penrith LSPS acknowledges the significant role Sydney Water has, to ensure that the growth areas within the LGA can be adequately serviced. It also notes that some of the growth areas, such as the Western Sydney Aerotropolis, currently either lack the water-related infrastructure to cater for growth or are limited in their ability to provide additional capacity. Sydney Water is planning wastewater infrastructure throughout the region and is delivering critical assets to support the wider network that will service areas of growth. This includes the AWRC and the proposal that will unlock the potential to service a substantially greater population in Western Sydney.

Liverpool LSPS contains a number of planning priorities that relate to infrastructure and aligning with growth while being sustainable and protecting the natural environment. In particular, planning priority 15 aims for Liverpool to be a green, resilient and water-sensitive city. The proposal will support this priority, by providing a means for wastewater from the surrounding area to be transferred to the AWRC. The wastewater will then be treated to a high-quality that will be suitable for reuse in a range of applications.

Additionally, given most of the proposal will be located below ground, it is unlikely to affect a council's ability to implement any potential future land use plans.

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 (Transport and Infrastructure) 2021 (TISEPP)	Section 2.126(6) of the TISEPP permits development for the purpose of sewage reticulation systems may be carried out without consent on any land in the *prescribed circumstance*.

Environmental Planning Instrument	Relevance to proposal
	Prescribed circumstances are when the work is performed by or on behalf of a public authority. As Sydney Water is a public authority, the proposal is permissible without consent.
State Environmental Planning Policy (Precincts – Western Parkland City) 2021 (Western Parkland City SEPP)	The proposal is located within the LGAs of Liverpool City Council and Penrith City Council, however the land is zoned under the Western Parkland City SEPP. The proposal is on land zoned as: • AGB Agribusiness • ENT Enterprise • ENZ Environment and Recreation • MU Mixed Use • SP2 Infrastructure. **Western Sydney Aerotropolis (Chapter 4)** The proposal is located within land to which Chapter 4 of this SEPP applies. As per section 4.5, the provisions of the TISEPP still apply. Therefore, the proposal can be undertaken without development consent.
State Environmental Planning Policy (Biodiversity and Conservation) 2021 (BCSEPP)	**Vegetation in non-rural areas (Chapter 2)** The proposal is in an area or zone listed in subsection 2.3(1). However, subsection 2.4(1) states: '*This Policy does not affect the provisions of any other SEPP….*', and as the works are permissible under the TISEPP, a council permit to clear vegetation under this SEPP is not required. **Koala habitat protection (2020 and 2021) (Chapters 3 and 4)** Chapter 3 of the BCSEPP applies to the following land use zones, or equivalent land use zones in the Penrith LGA. • RU1 Primary Production, • RU2 Rural Landscape, • Zone RU3 Forestry. As the proposal does not include any activities in any of the above mentioned (or equivalent) land use zones, this Chapter does not apply. *Note: by virtue of section 3.3(1) and Schedule 2 of the BCSEPP, Chapter 4 does not apply to these zones (or equivalent land use zones) within the Liverpool LGA.*

Environmental Planning Instrument	Relevance to proposal
	Chapter 4 of the BCSEPP applies to the local government area of Liverpool, however subsection 4.4(3) provides that the Chapter does not apply to land on which biodiversity certification is in force. As the proposal within the Liverpool local government area is on land to which a biodiversity certification is in force, this Chapter does not apply. **Water catchments (Chapter 6)** Chapter 6 of this SEPP applies as the proposal is on land mapped within the Hawkesbury-Nepean Catchment under section 6.1. Sydney Water has taken into consideration, the requirements of Part 6.2 (see Section 6.2.2 of the REF). **Strategic conservation planning (Chapter 13)** The proposal is within the application area of the Cumberland Plain Conservation Plan (CPCP) area on land mapped as certified – urban capable, certified – major transport corridor, excluded and avoided land. Chapter 13 of this SEPP sets out planning controls to achieve the development and biodiversity outcomes of the CPCP released by the DPE in August 2022. Sydney Water has taken into consideration the requirements of this Chapter. As part of the proposal is on avoided land, the notification and reporting requirements in section 201A of the Environmental Planning and Assessment Regulation 2021 will be carried out within 30 days of the determination of the REF for the proposal. Refer to Section 6.2.3 of the REF for further information.
Cumberland Plain Conservation Plan Guidelines for Infrastructure Development 2022 (CPCP)	The proposal is located on land classified under the CPCP as: • certified urban capable land • certified major transport corridor • excluded land • avoided land. The proposal has been designed to minimise native vegetation impacts on avoided land and meets the objectives listed in section 2.3 and section 3.3 of the CPCP, so no restrictions apply to these activities.

Table 5-2 Consideration of key environmental legislation

Legislation	Relevance to proposal	Permit or approval	Timing and responsibility
Protection of the Environment Operations Act 1997 (POEO Act)	Sewage treatment is a scheduled activity under the POEO Act. The proposal involves construction of a new sewage treatment system which will convey wastewater to the USC AWRC and will be operated under a future sewage treatment system EPL. Until then, the existing scheduled development work licence (EPL 21886 - Upper South Creek Networks) will be varied to include this proposal.	Scheduled development work (s47 licence) System EPL (s48 licence)	Pre-construction, Contractor Pre-operation, Sydney Water
Biodiversity Conservation Act 2016 (BC Act)	The BC Act lists threatened species, populations and ecological communities to be considered in deciding whether there is likely to be a significant impact on threatened biota, or their habitats. If any of these could be impacted by the proposal, an assessment of significance 'Test of Significance' (ToS) that addresses the requirements of section 7.3 of the BC Act must be completed to determine the significance of the impact. The certification of land is governed by Part 8 of this Act. Section 8.4(5) states that a determining authority under Part 5 of the EP&A Act is not required to consider the effect on biodiversity of an activity, to the extent that it is carried out on biodiversity certified land. The proposal is partly located within land certified under the CPCP. The impact of the proposal on threatened species, communities and their habitats in non-certified land is described in Section 6.2.3. Significant impacts to threatened species or communities are unlikely. A Biodiversity Assessment Report (BAR) has been prepared to determine whether threatened species and/or ecological communities listed under the BC Act are considered likely to occur within the	REF and BAR	Pre-construction, Sydney Water

Legislation	Relevance to proposal	Permit or approval	Timing and responsibility
	proposal area, and if so, whether the proposal is likely to result in a significant impact to these values (for activities that will result in biodiversity impacts on non-certified land). Consequently, the BAR determined the proposal will not have a significant impact to biodiversity. Refer to Section 6.2.3 for further information.		
National Parks and Wildlife Act 1974	This Act provides for the establishment, preservation, and management of areas such as national parks, state conservation areas, nature reserves, and Aboriginal areas. This Act also provides for the protection of Aboriginal heritage, including Aboriginal objects and places. The proposal in not within National Parks, State Conservation areas or nature reserves. An Aboriginal Heritage Impact Permit (AHIP) is required for the works as they will disturb known areas of Aboriginal heritage. Aboriginal heritage is described in Section 6.2.4.	AHIP	Post REF, pre-construction, Sydney Water (for AHIP)
Heritage Act 1977	The *Heritage Act 1977* provides protection for those items of environmental heritage (Aboriginal and non-Aboriginal heritage) that are of value to the state of New South Wales. The proposal intersects with the curtilage of one non-Aboriginal heritage item, Fleurs Radio Telescope Site, which is listed as being of local heritage significance under the Western Parkland City SEPP (ID: I5). The proposal will avoid impacts to surveyed archaeological points of this heritage item, refer to Section 6.2.4 for further details.	No permit applicable for this proposal	Pre-construction, Sydney Water
Fisheries Management Act 1994 (FM Act)	The FM Act protects threatened species, populations and communities of fish and marine vegetation, commercial and	Notification	Pre-construction, Sydney Water

Legislation	Relevance to proposal	Permit or approval	Timing and responsibility
	recreational fishing areas, in NSW waters. A permit and/or notification is required under Part 7 of the FM Act for activities that involve dredging and reclamation work, temporarily or permanently obstructing fish passages and or harming marine vegetation. The proposal will require dredging and reclamation of Cosgroves Creek, Badgerys Creek and South Creek, which is mapped KFH. Under section 199 of the FM Act a public authority can carry out dredging or reclamation work without a permit provided that: • the Minister is given written notice of the proposed work • they consider any matters concerning the proposed work that are raised by the Minister within 21 days after the giving of the notice (or such other period as is agreed between the Minister and the public authority) In accordance with s.199 of the FM Act, the proposal was referred to DPIRD Fisheries for comment 6 December 2024. DPIRD Fisheries responded on 16 January 2025 stating no objections to the proposal and recommended adoption of five environmental mitigation measures, which have been included in Section 6.		
Water Act 1912/ Water Management Act 2000	All dewatering activities require an approval under Section 91B of the *Water Management Act 2000*. In accordance with Schedule 4 of Water Management (General) Regulation 2018, a Water Supply Work Approval (WSWA) is required for all activities that involve dewatering (pumping) of groundwater. Section 60A of the *Water Management Act 2000* states that it is an offence to take	WSWA and WAL	Pre-construction, Sydney Water

Legislation	Relevance to proposal	Permit or approval	Timing and responsibility
	water without a licence. A Water Access Licence (WAL) is required under section 61 where groundwater extraction is greater than 3 ML. Groundwater is expected to be encountered during construction and the anticipated volume required to be dewatered is 13.6 ML. A dewatering management plan is being developed, and a WSWA and WAL will be obtained prior to any dewatering.		
Roads Act 1993	This Act regulates works in, on, or over a public road. Approval under Section 138 of this Act is required for carrying out works in, digging up, or disturbing a public road. Much of the alignment passing through open fields or proposes trenchless construction methods. A Road Occupancy Licence (ROL) will be required from the relevant roads authority prior to work on public roads and any temporary road closures during construction of the proposal.	Road Occupancy Licence	Pre-construction, Contractor
Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)	The EPBC Act provides the framework for Commonwealth environmental approvals. This REF finds that the proposal is unlikely to have a significant impact on any matters of national environmental significance.	NA	NA

6 Environmental assessment

This section of the REF 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 Existing environment

The proposal is in the suburbs of Luddenham and Badgerys Creek, in the LGAs of Liverpool City Council (south of Elizabeth Drive) and Penrith City Council (north of Elizabeth Drive). The proposal crosses several development precincts including Northern Gateway, Wianamatta-South Creek, Badgerys Creek and Agribusiness.

The proposed wastewater infrastructure generally runs through rural, vegetated and/or agricultural lots, minimising impacts to environmentally sensitive areas and private property wherever possible. Existing land use is mostly rural residential/agricultural and extensive past clearing of native vegetation and intensive grazing by cattle is evident across the landscape. Environmentally sensitive areas include nearby waterways and associated riparian areas. Much of the remnant native vegetation tends to be accumulated along the waterways and consists of threatened ecological communities.

Aboriginal heritage sites are found throughout south western Sydney, particularly near waterways. Impacts to Aboriginal heritage are expected and will require an Aboriginal Heritage Impact Permit (AHIP). By adopting construction methods and asset designs which are sympathetic to heritage values and known records (e.g. trenchless techniques, alignment adjustments), non-Aboriginal heritage items listed in the vicinity of the proposal will not be directly affected by the work, and impacts to known Aboriginal heritage will be minimised.

The environmental features within and adjacent to the study area are detailed in Section 6.2.

6.2 Environmental aspects, impacts and mitigation measures

6.2.1 Topography, geology and soils

Existing environment

The proposal area is located within the western portion of the Sydney Basin and is mostly underlain by Bringelly Shale of the Wianamatta Group, with alluvial floodplain deposits along the banks of Cosgroves Creek.

The topography of the broader area is relatively flat, with gentle undulations and elevations dipping from about 40 m AHD to 100 m AHD. The elevations decrease towards the watercourses that run through the area.

According to the eSPADE portal (NSW DCCEEW, 2024), the proposal area has a high salinity hazard and extremely low probability of occurrence for acid sulfate soils (ASS).

No known contaminated sites were identified within the proposal area from a search of the EPA Contaminated Land Record undertaken in October 2024, however given the history of agricultural and other landuses within the Cosgroves Creek catchment over several decades, there is potential for contamination to be present within the proposal area. There may be areas of contamination due to previously land uses (agriculture).

The proposal is not located in a mine subsidence area.

Construction impacts

The main potential impact to topography, geology and soils during construction is erosion and sedimentation. Construction activities involve trenching, excavation and temporary stockpiling of excavated material. In the event of rainfall, stockpiled material has the potential to erode and lead to sedimentation on land and within waterways. Excavated material of trenched sections will generally be stockpiled adjacent to the trenches, while material from trenchless sections will be stockpiled within the setup area/compound for the trenchless plant and equipment. The environmental risk will be greatest where trenching, excavating and stockpiling occurs in close proximity to waterways such as Cosgroves Creek, Badgerys Creek and South Creek. In these cases, excavated material will be stockpiled as far as practicable from the waterway including, where feasible, cleared land adjacent to the entry or exit pit.

The excavation works associated with the proposal will occur in areas with high potential for salinity and in known areas of salinity. The disturbance of saline soils has the potential to impact the local environment if not managed appropriately. The erosion and transfer of saline sediments offsite has the potential to alter the water quality of receiving environments which has the potential to impact upon flora and fauna that are sensitive to elevated levels of salinity.

Construction activities, and particularly trenching and stockpiling, will temporarily change the surface topography and drainage conditions. These excavations will be progressively backfilled using stockpiled material and restored to a condition similar to that prior to the disturbance. As such, the potential topography impacts following construction will be negligible.

Operational impacts

Generally, the proposal is not expected to permanently change the surface topography of the area. The installation of the above ground elements at SP1246 will result in a minor change to the runoff from the site during operation. The amount of hardstand within the site will increase, decreasing the extent of permeable surfaces. Sydney Water will maintain the proposal during operation, and this may involve localised excavation to expose assets. Erosion and sedimentation mitigation measures will be implemented to ensure that maintenance activities have minimal impact on soils.

Overflows from the overflow discharge site and stormwater outlet will be directed from SP1246 to Cosgroves Creek. There is a risk that discharge and additional surface water flows could result in scouring and increased erosion during operation. The risk of erosion and turbulence from overflow events would be minimised during detailed design by incorporating erosion protection measures into the structures. In addition, overflow events would only occur during wet weather and

infrequently as per future EPL requirements. No vegetation will be cleared downstream of the overflow discharge sites (see Section 6.2.3), which would also help to dissipate flows and protect from erosion.

Mitigation measures

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

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

Mitigation measures
Prevent sediment moving offsite in accordance with Managing Urban Stormwater, Soils and Construction, Volume 1 and 2A (Landcom 2004 and DECC 2008), including, but not limited to: • develop a Soil and Water Management Plan (SWMP) as part of the CEMP • divert surface runoff away from disturbed soil and stockpiles • install sediment and erosion controls before construction starts • reuse topsoil where possible and stockpile separately • inspect controls at least weekly and immediately after rainfall • rectify damaged controls immediately • remove controls once surfaces have been stabilised, including removing trapped sediment in drainage lines.
Minimise ground disturbance and stabilise disturbed areas progressively.
Contractor to ensure imported material is Virgin Excavated Natural Materials (VENM) or meets a relevant NSW EPA Resource Recovery Order and Resource Recovery Exemption, or is a commercially supplied material that is not waste. If using materials that are subject to a NSW EPA Resource Recovery Order/Exemption the 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 Contamination and Hazardous Materials team) to agree on proposed management approach.
Stop work during heavy rainfall or in waterlogged conditions when there is a risk of sediment loss off site.
Sweep up any sediment/soil transferred off site at least daily, or before rainfall.
Eliminate ponding and erosion by restoring natural landforms to the pre-works condition.

Mitigation measures

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:

- establish salt tolerant species in existing or potential salinity problem areas after construction (where relevant)
- stabilising existing areas of erosion
- minimising water use on site
- avoiding rotation and vertical displacement of the original soil profile
- backfilling excavations deeper than one metre in the same order, or treating or using this material as fill at depths more than one metre from the finished level.

6.2.2 Water and drainage

Existing environment and potential impacts

The main waterways in the proposal area are Cosgroves Creek and its tributaries, which is part of the Hawkesbury-Nepean catchment area. The eastern end of the proposal area also crosses Badgerys Creek and South Creek. Each of these waterways are mapped as KFH. There are also a number of ponds, man-made reservoirs or dams in the vicinity of the impact area. Existing water quality in these waterways is influenced by runoff from nearby roads, development sites (e.g. M12 Motorway) and agricultural land.

The proposal is partially located in flood prone areas (1 in 100 AEP flood extent) adjacent to Cosgroves Creek, Badgerys Creek and South Creek (South Creek Flood Study, 2015). SP1246 is partially located within the 1 in 100 AEP flood extent level (Western Parkland City SEPP, Flood Planning Map— Aerotropolis (2021)).

Groundwater level measurements were undertaken at three locations along the proposal area. The depth to groundwater was measured between approximately 1.26 to 5.59 metres below ground level (mbgl). Groundwater chemical analytical results indicated dissolved heavy metal (copper, nickel and zinc) and inorganics (chloride, sodium and hardness) exceedances for adopted guidelines for freshwater environments.

Construction impacts

Surface water and flooding

Poor site management may lead to potential sedimentation impacts to local waterways including Cosgroves Creek, Badgerys Creek and South Creek. The use of trenchless techniques would mitigate impacts to surface water drainage patterns. To minimise adverse impacts to water quality, creek crossings will be performed using trenchless methods.

Trenchless methods beneath waterways have potential to result in frac outs (drilling intercepting faults and fractures in the rock) or spills where drilling fluid escapes the bore and enters the environment. The micro tunnelling process will include monitoring of the pressure of the drilling fluid to determine if there is a sudden decrease in pressure which indicates that a frac-out has

occurred. The CEMP will include contingency measures to be implemented in response to a frac-out. Geotechnical investigations have been undertaken to understand the potential for frac outs and the proposal has been designed to avoid them.

The proposal requires the disturbance of groundcover, trenching and excavation of soils (including areas with moderate to high potential for salinity), the establishment of temporary soil stockpiles and storage of fuels and chemicals. These activities increase the risk of sediment-laden runoff from erosion of stockpiles and the destabilising of creek banks, which has the potential to enter waterways and cause turbidity and enhanced sedimentation. This could result in decreased light levels for submerged aquatic vegetation and smothering of benthic organisms.

Flood maps for Cosgroves Creek, Badgerys Creek and South Creek show that the proposed alignment and pumping station are generally bordering, or are partially within, the extent of a 1 in 100 AEP flood. The proposal is not likely to adversely affect flood behaviour as the only permanent changes to surface topography and drainage patterns will be the pump station and pump station access road. The pump station and access road has been designed to maintain existing drainage patterns.

During periods of high rainfall, there is the risk that higher water levels in the creeks and surrounding flooding may impact active construction areas. Flooding has the potential to increase soil erosion and siltation from the construction site. Pollutants such as sediment, soil nutrients, construction waste, chemicals and gross pollutants have the potential to enter drainage lines and creek systems, particularly during high rain events, which potentially could result in a reduction in water quality.

Spillage of fuel during refuelling, leakage of hydraulic and lubricating oil from plant and equipment, rinse water from plant washing and concrete slurries will have the potential to enter drainage lines. This could potentially result in a decline of water quality. Control of construction water run-off will therefore be necessary to avoid these potential impacts to surrounding waterways.

Groundwater

Impacts associated with dewatering excavations, such as aquifer supply loss or issues associated with the management of silt-laden construction water, will be temporary and manageable with standard safeguards. Groundwater is expected to be encountered during construction, with an estimated 13.6 ML to be dewatered.

Dewatered groundwater is likely to be sediment laden, and potentially saline, and will be managed to minimise downstream impacts. A Water Supply Work Approval (WSWA) is required for all activities that involve dewatering of groundwater (regardless of volume). The volume of dewatered groundwater will be monitored across the proposal area and a Water Access Licence (WAL) sought as volumes are expected to exceed 3 ML per water year.

The proposed work is in an area that contains terrestrial GDEs and riparian vegetation. As the proposed work only involves minor vegetation clearing (outside banks of the waterways) and dewatering of groundwater will be minimised by using trenchless techniques, the viability of these ecosystems is not considered to be at risk.

Operational impacts

Potential impacts to the hydrology of the proposal area during operation of the proposal may arise from:

- occasional discharge of wastewater during maintenance activities
- repairs to wastewater pipelines and pumping stations, which may involve open trenching to access the pipeline.

Repairs to wastewater infrastructure are anticipated to occur infrequently.

The pumping station (SP1246) is designed to store a quantity of wastewater during wet weather events, preventing wastewater overflows and uncontrolled discharges to Cosgroves Creek for the majority of operations. However, during extreme weather events, the wastewater storage capacity of the network and pumping station may be exceeded, resulting in the discharge of untreated wastewater from overflow points. Wastewater system design requires overflow points as a contingency, so wastewater does not back up into houses and businesses if pipeline capacity is exceeded. This is a standard global approach to wastewater system design and Sydney Water also aligns with relevant Water Services Association of Australia codes and standards.

During these overflow events, wastewater will have the potential to impact Cosgroves Creek, potentially contributing to an increase in background nutrient loads, pathogen levels and trace pollutant loads. The impact of these temporary and infrequent wastewater discharges will be minimised by the large catchment flows that occur during extreme wet weather events. The new wastewater infrastructure has been designed for a maximum of 10 spill events in 10 years with overflow infrastructure only provided at pumping stations and not along the pipeline network.

All flows from the current proposal will ultimately connect to the USC AWRC and will be operated under the future scheduled activity EPL.

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 minor.

Table 6-2 Environmental mitigation measures — water and drainage

Mitigation measures
Minimise the impacts to creeks where creek crossings are required. Prior to construction the methodology will be assessed based on: • geotechnical and constructability issues (e.g. 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) • any issues raised during consultation with DPIRD Fisheries.

Mitigation measures
The decision and reasons for the decision would be documented by the Contractor in consultation with the Sydney Water Environmental Representative.
Bund potential contaminants and store on robust waterproof membrane, away from drainage lines.
Keep a functioning aquatic spill kit on site for clean-up of accidental chemical/fuel spills in mapped Key Fish Habitat. Keep the spill kits stocked and located for easy access.
Locate portable site amenities away from watercourses or drainage lines.
Keep stockpiles to a minimum and ensure adequate contingency measures are in place to prevent sedimentation of waterways in the event of a large flood event.
Sydney Water will obtain a Water Access Licence and Water Supply Works Approval for the extraction of groundwater. The Contractor is responsible for: • preparing a Dewatering Management Plan prior to construction • complying with the conditions of the approvals (such as protecting water quality; minimising aquifer extraction volumes, monitoring extraction with flow meters and recording volumes).
Discharge all water in accordance with Sydney Water's Water Quality Management During Operational Activities Policy (D0001667) including erosion controls, discharge rate, dechlorination, monitoring. Re-use potable / groundwater water where possible.
Dewater excavations in accordance with the Program Delivery Guidance Standard 9.1 Excavation Dewatering (ENV-GS-001).
If discharge to the environment is not possible, seek approval and discharge criteria from the relevant Sydney Water Business Customer Accounts prior to discharge to the wastewater system. Otherwise, tanker by a licensed waste contractor and dispose off-site to an appropriately licensed facility.
Store all chemicals and fuels in accordance with relevant Australian Standards and Safety Data Sheets. Record stored chemicals on site register. Ensure bunded areas have 110% capacity of the largest chemical container, or an additional 25% capacity of the total volume stored within (whichever is greater). Tightly secure chemicals and fuels in vehicles. Clearly label all chemicals.
Conduct refuelling, fuel decanting and vehicle maintenance in compounds where possible. If field refuelling is necessary, designate an area away from waterways and drainage lines with functioning spill kits close by.
Conduct any equipment wash down within a designated washout area.
Ensure equipment is leak free. Repair oil/fuel leaks immediately or remove from site and replace with a leak-free item.
Prepare Drilling Fluid Management Plan, including measures to: • contain and monitor drilling fluids at entry/exit points

Mitigation measures

- identify and manage frac-outs
- re-use and/or dispose of drilling fluids (checking waste classification).

Prior to use at the site, machinery is to be appropriately cleaned, degreased and serviced.

DPIRD Fisheries (1800 043 536) and the Environment Protection Authority (EPA) (131 555) are to be notified immediately if any fish kills occur in the vicinity of the works. In this situation, all works other than emergency response procedures are to cease until the issue is rectified and approval is given by DPIRD Fisheries and/or the EPA for the works to proceed.

On completion of the works all disturbed soil is to be levelled, smoothed and sown with a mixture of sterile/native grass seeds to encourage rapid revegetation and planted out with native endemic riparian vegetation.

The horizontal directional drilling process would include monitoring of the pressure of the drilling fluid to determine if there is a sudden decrease in pressure which indicates that a frac-out has occurred. A CEMP would be prepared and include contingency measures to be implemented to response to a frac-out.

The following measures recommended by DPIRD Fisheries are to be implemented for all dewatering activities:

- pumps used in waterways are to be screened with mesh no greater than 6 mm in diameter
- daily checks of the sediment levels in the dewatering sediment dams are to be conducted to ensure adequate storage capacity
- dewatering operations should retain spoil for a long enough period to allow mobilised sediment to settle out
- a visual inspection of the waterway is to be conducted during dewatering operations to ensure that no visible plumes are generated within the waterway from dewatering operations.

6.2.3 Flora and fauna

A biodiversity assessment report (BAR) was prepared by Aurecon (2025) to evaluate the potential impacts of the proposal on flora and fauna. The biodiversity assessment included a desktop review, a flora and fauna survey, likelihood of occurrence assessment for the identified flora and fauna, and Tests of Significance for those species and communities present or likely to occur, and assessment of impacts. Findings and recommendations outlined in the BAR are summarised below and provided in full in Appendix C.

Existing environment

Ecological values and field assessment findings are shown in Figure 6-1 to Figure 6-6.

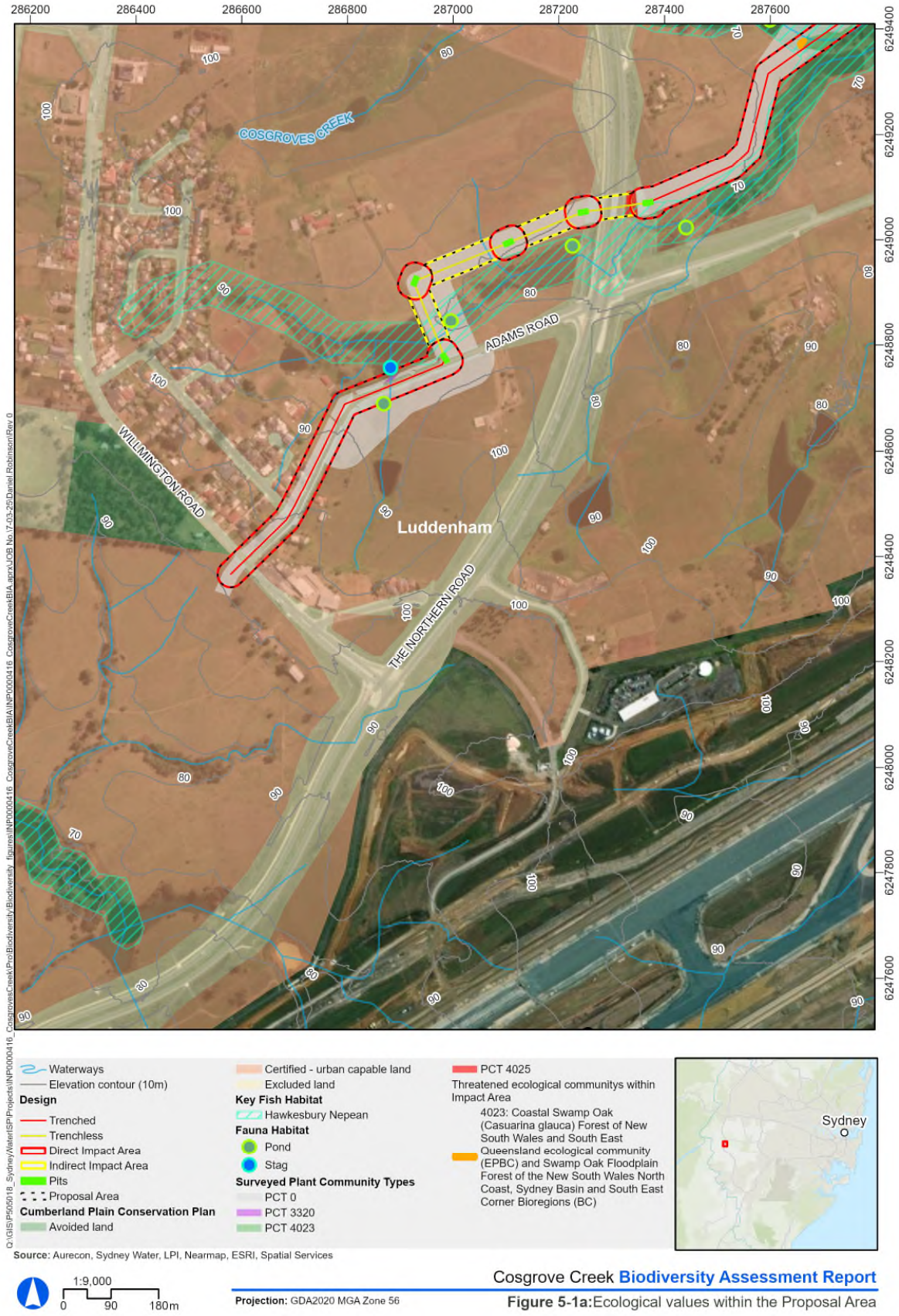

Figure 6-1 Ecological values within the proposal area (1 of 6) (Aurecon, 2025)

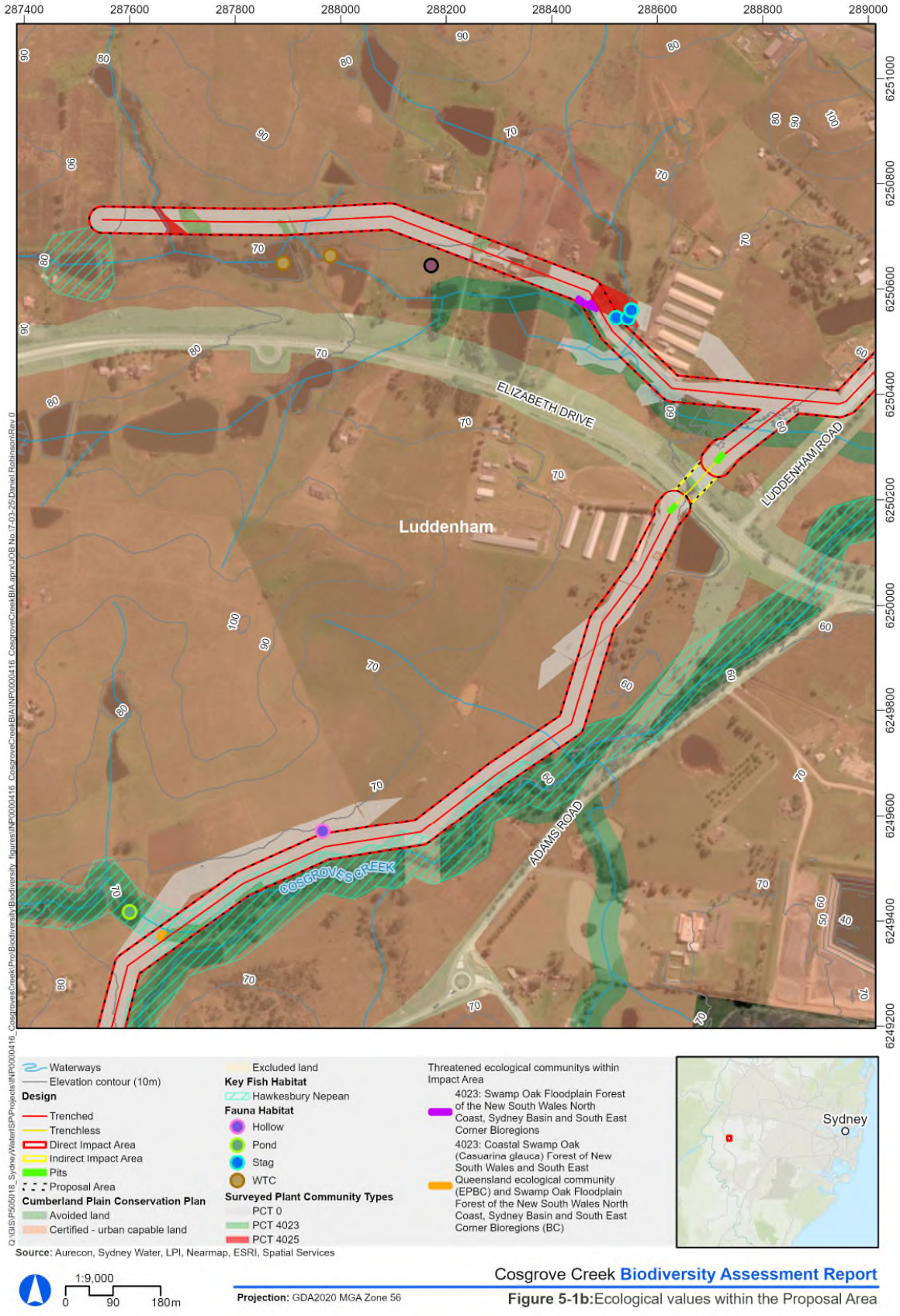

Figure 6-2 Ecological values within the proposal area (2 of 6) (Aurecon, 2025)

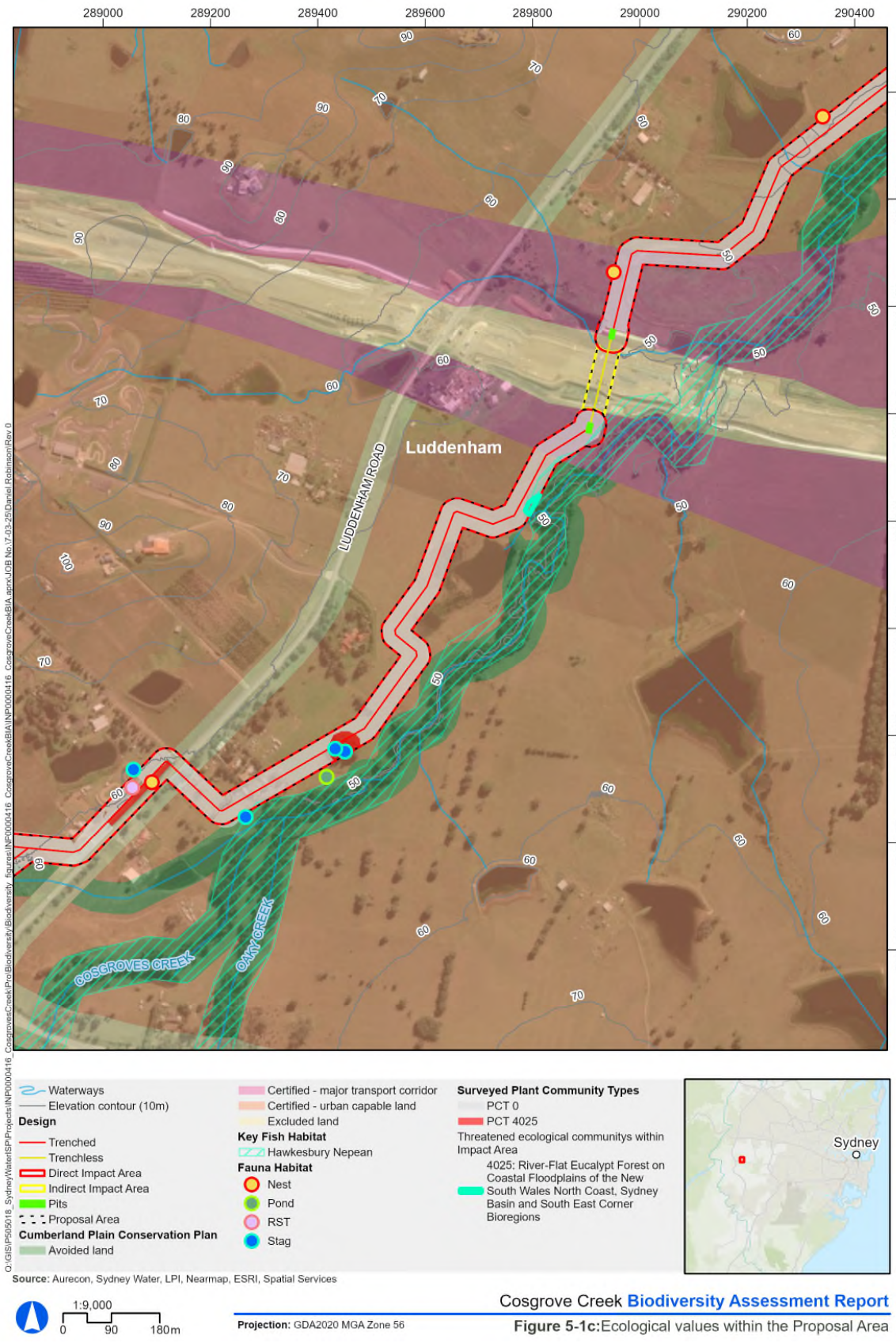

Figure 6-3 Ecological values within the proposal area (3 of 6) (Aurecon, 2025)

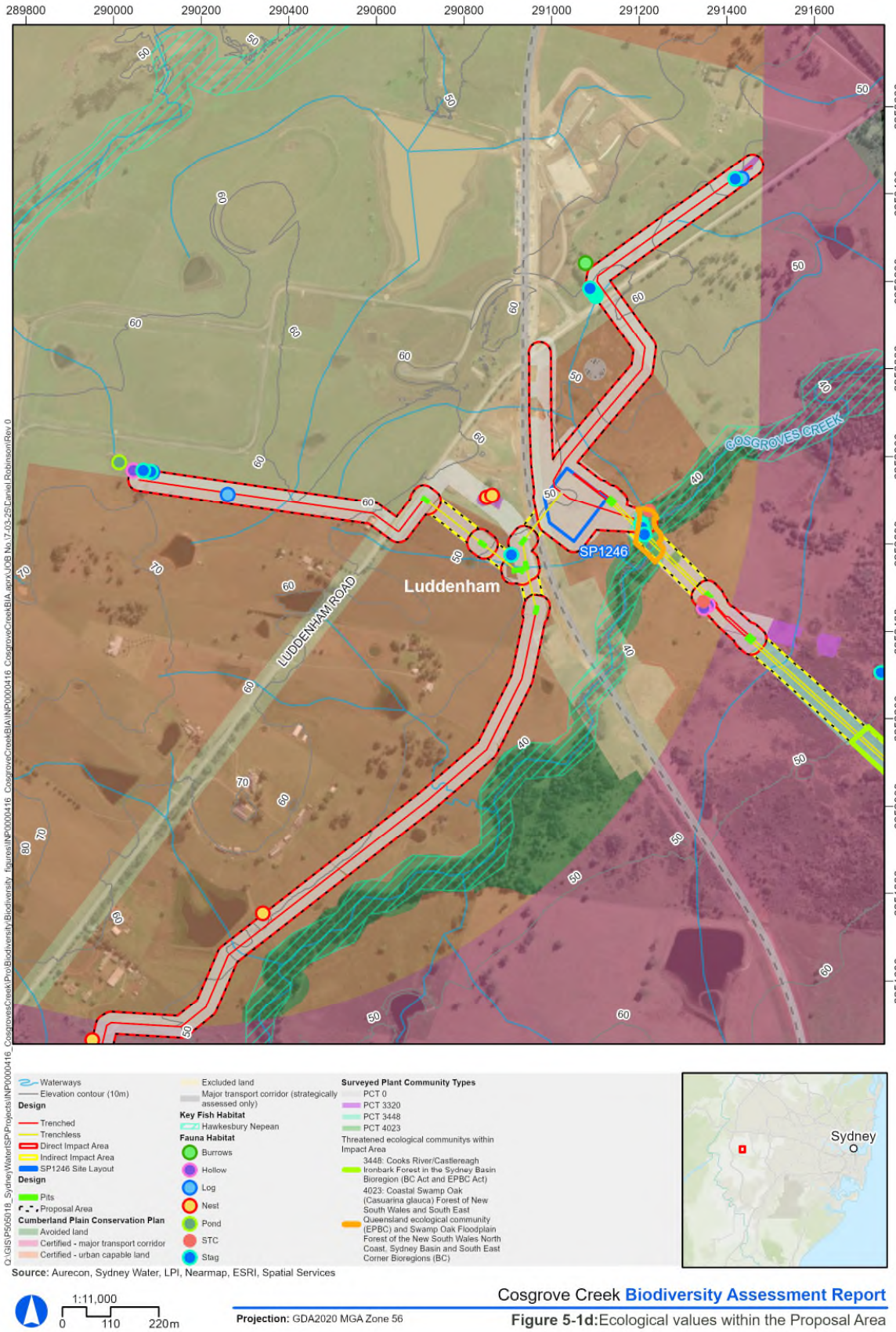

Figure 6-4 Ecological values within the proposal area (4 of 6) (Aurecon, 2025)

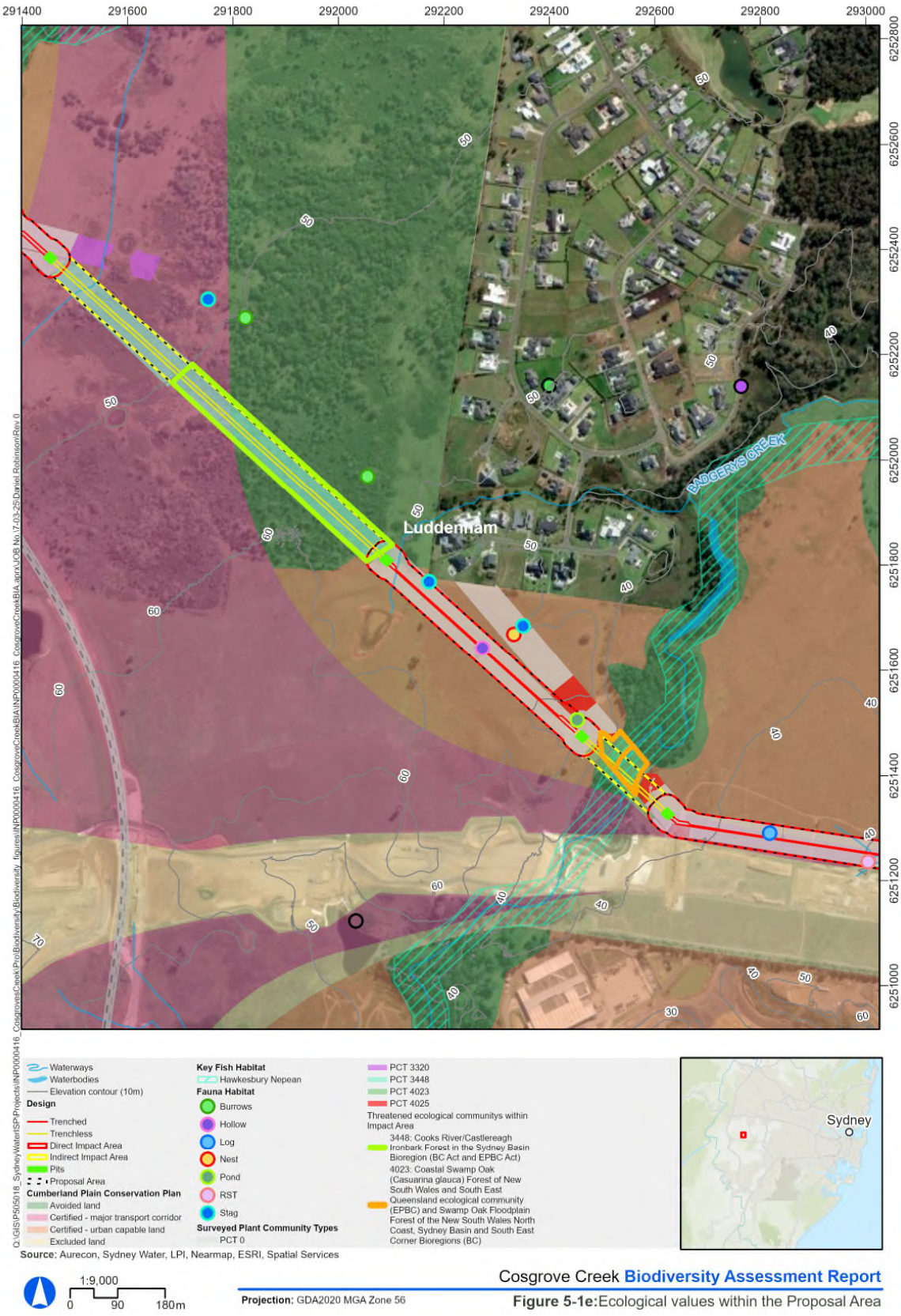

Figure 6-5 Ecological values within the proposal area (5 of 6) (Aurecon, 2025)

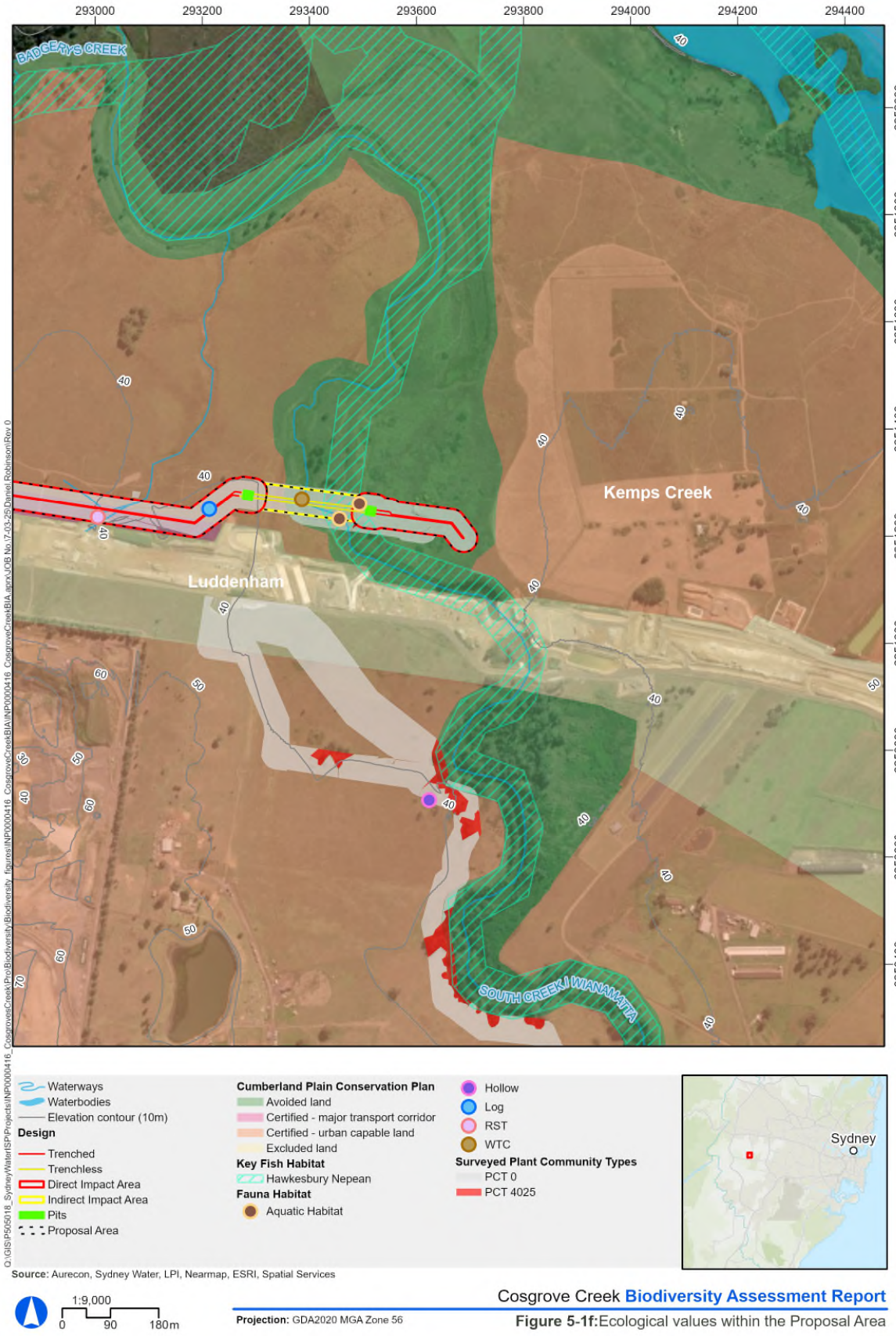

Figure 6-6 Ecological values within the proposal area (6 of 6) (Aurecon, 2025)

Vegetation

The proposal area is comprised of a diversity of native and non-native vegetation zones from exotic open grasslands to remnant Cumberland Red Gum River-flat Forest areas to riparian zones with wetland vegetation along the Cosgroves Creek corridor. The proposal area has been subjected to varying degrees of disturbance from construction to agricultural and industrial uses. Due to this, there is a high coverage of weed incursion, non-native planted vegetation areas, and an abundance of common exotic grasses, forbs and shrubs.

The vegetation observed within the proposal area varied between planted/urban exotic vegetation and native remnant vegetation. Four native plant community types (PCTs) and associated threatened ecological communities (TECs) were identified within the proposal area:

- PCT 3320: Cumberland Shale Plains Woodland
    - BC Act TEC: Cumberland Plain Woodland in the Sydney Basin Bioregion
- PCT 3448: Castlereagh Ironbark Forest
    - BC Act TEC: Cooks River/Castlereagh Ironbark Forest in the Sydney Basin Bioregion
    - EPBC Act TEC: Cooks River/Castlereagh Ironbark Forest in the Sydney Basin Bioregion
- PCT 4023: Coastal Valleys Riparian Forest
    - BC Act TEC: Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and Southeast Corner Bioregions
    - EPBC Act TEC: Coastal Swamp Oak (*Casuarina glauca*) Forest of New South Wales and Southeast Queensland
- PCT 4025: Cumberland Red Gum River-flat Forest
    - BC Act TEC: River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and Southeast Corner Bioregions.

Threatened flora and fauna

A review of BioNet indicated eight listed threatened flora species and 26 listed threatened and/or migratory fauna species recorded within 10km of the proposal area (including 17 birds, seven mammals, one gastropod and one amphibian). No threatened flora or fauna records were located within the proposal area.

No threatened flora was observed during the field assessment, or are considered to have a moderate or higher likelihood of occurrence within the proposal area due to the historic disturbance and modification to the vegetation and ground layer.

No threatened fauna was observed during the field assessment. Two threatened fauna species, the Green and Golden Bell Frog (*Litoria aurea*) and Cumberland Plain Land Snail (*Meridolum corneovirens*), were considered to have a moderate likelihood of occurrence in the proposal area.

Cumberland Plain Conservation Plan and Western Parkland City SEPP

Some sections of the impact area contain native vegetation and are mapped as areas of 'Avoided Land', 'Excluded Land' under the Cumberland Plain Conservation Plan (CPCP).

The proposal area also is located within land mapped as High Biodiversity Value – Existing Native Vegetation (HBV-ENV) under the Western Parkland City SEPP.

Groundwater dependent ecosystems

Groundwater dependent ecosystems (GDEs) of low and high potential have been mapped within the impact area.

Key Fish Habitat

Sections of Cosgroves Creek, Badgerys Creek and South Creek (and many of their tributaries) are mapped as KFH by DPIRD Fisheries. There will be no direct or indirect impacts to these waterways due to trenchless construction methods being used where the proposal alignment crosses mapped KFH areas.

Weeds

Noxious weeds including Lantana (*Lantana camara*) and African Boxthorn (*Lycium ferocissimum*) were identified in the proposal area.

Construction impacts

Vegetation

Both native and exotic vegetation is proposed to be cleared during construction for the proposal. Potential impacts to flora and fauna will primarily be due to this vegetation clearing, including the associated impacts to threatened species' habitat. The proposal, however, has been designed to reduce impacts on ecological values, and to minimise removal of native vegetation and habitat, by applying trenchless construction methods for much of the proposal alignment. Where practicable, it is likely that actual impacts would be further minimised on-site through reductions in the construction footprint and avoiding unnecessary clearing.

The areas that are to be directly impacted will be where trenched construction methods will occur. The indirect impact areas include areas where trenchless construction methods will be used (i.e. HDD and/or microtunnelling).

The proposal area is located wholly within the CPCP area. The direct impacts within the respective land categories of the CPCP area include:

- 7.78ha of excluded land
- 5.32 ha of avoided land
- 4.52 ha of certified major transport corridor
- 40.67 ha of certified urban capable land.

Impacts to vegetation within mapped certified land categories (certified major transport corridor and certified urban capable land) in the CPCP has not been considered further as part of this assessment. Vegetation on certified lands have already been assessed and offsets will be applied by the NSW State Government.

The proposal area includes 8.78 ha of mapped as HBV-ENV under the Western Parkland City SEPP, of which 5.56 ha would be subject to direct impacts. However, it is noted that not all the mapped HBV-ENV area contains native vegetation.

A summary of native vegetation to be removed on CPCP excluded land and avoided land for the PCTs and TECs identified within the proposal area is provided below in Table 6-3. It is noted that many areas of PCT have overlapping areas of associated TECs. To ensure that vegetation impacts for the proposal are not 'double counted', the PCT area calculations contained in Table 6-3 do not include areas where there is an overlap with associated TECs.

Table 6-3 Summary of direct impacts to native vegetation

Vegetation type	Within the proposal area (ha)	Direct impact to avoided land (ha)	Direct impact to excluded land (ha)
PCT 3320: Cumberland Shale Plains Woodland	0.12	0.00	0.00
PCT 3448: Castlereagh Ironbark Forest	1.48	0.00	0.00
PCT 4023: Coastal Valleys Riparian Forest	0.94	0.23	0.00
PCT 4025: Cumberland Red Gum River-flat Forest	1.00	0.00	0.22
PCT sub-total impact		**0.23**	**0.22**
River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin, and Southeast Corner Bioregions (BC Act)	0.03	0.03	0.00
Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and Southeast Queensland (EPBC Act)	0.75	0.20	0.00
Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and Southeast Corner Bioregions (BC Act)	0.02	0.02	0.00
Cooks River/Castlereagh Ironbark Forest of the Sydney Basin Bioregions (EPBC Act and BC Act)	2.45	0.07	0.00
TEC sub-total impact		**0.32**	**0.00**
Total native vegetation direct impact (PCTs and TECs)		**0.55**	**0.22**

Tests of Significance under the BC Act and an Assessments of Significance under the EPBC Act were completed for the identified TECs. The BAR concluded that the loss of the TECs within the impact area will not result in a significant impact as there is minimal loss of each of the TECs and presence within existing highly disturbed areas.

Habitat features and suitability

The proposal will result in the loss of two burrows, six nest-containing trees, five trees containing hollows and 16 stags (dead trees). The loss of these habitat features and vegetation within the impact area is not likely to have a significant impact on habitat suitability for the two threatened fauna with moderate likelihood of occurrence (Green and Golden Bell Frog and Cumberland Plain Land Snail) due to the presence of suitable habitat features in close proximity to the impact area.

Offsets

No statutory offsets are required as impacts to flora and fauna are unlikely to be significant. Nonetheless, the requirements of the Sydney Water Biodiversity Offset Guide (2024) will be implemented to mitigate the loss of vegetation within the impact area.

According to the Guide, native vegetation removal for the proposal is considered to be of moderate impact. Removal of non-threatened native vegetation with a moderate impact requires a 2:1 offset strategy (i.e. non-threatened PCTs), and removal of threatened native vegetation with a moderate impact requires a 3:1 offset strategy (i.e. PCTs with an associated TEC(s)).

The five hollow bearing trees to be impacted will also be offset at a ratio of 2:1.

It is noted that in areas where trenchless construction methods will be used (i.e. HDD and/or microtunnelling), existing vegetation above the pipeline alignments will not be directly impacted. Biodiversity offsets are therefore not required for these areas.

Threatened fauna

The Green and Golden Bell Frog is listed under the BC Act and EPBC Act as ‘Endangered’ and ‘Vulnerable’ respectively. Consequently, a Test of Significance under the BC Act and an Assessment of Significance under the EPBC Act were completed. The assessments concluded that the proposal is not likely to have a significant impact on the threatened fauna.

The Cumberland Plain Land Snail is listed under the BC Act as ‘Endangered’. Consequently, a Test of Significance under the BC Act was completed. The assessment concluded that the proposal is not likely to have a significant impact on the Cumberland Plain Land Snail.

Wildlife connectivity and habitat fragmentation

The proposal area has low levels of wildlife connectivity in urbanised and disturbed areas, especially in agricultural areas truncated by fences and roads. The proposal will not result in further impacts to the connectivity in these areas to a significant extent. Areas of remnant vegetation within the proposal area, including the riparian section of Cosgroves Creek, will only have marginal impacts on vegetation due to the use of a mix of trenched and trenchless construction methods which will reduce connectivity impacts.

Groundwater dependent ecosystems

The proposal will not extract groundwater that is associated with subterranean GDEs. Any potential negative interactions with GDEs are confined to being temporary and localised in nature, there are not expected to be any substantial or significant impacts to GDEs.

Weeds

There is high potential for weed species to be spread through the movement of construction vehicles and machinery, as well as the disturbance and transportation of soil in the area. However the invasion and spread of weeds will be appropriately managed with the implementation of the identified mitigation measures.

Operational impacts

No direct operational impacts are anticipated to flora or fauna. Indirect operational impacts to biodiversity may result from noise disturbance and infrequent wastewater discharge during overflow events associated with flooding. Bushfire risk is considered low as the above ground infrastructure is clear of surrounding vegetation.

Mitigation measures

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

Table 6-4 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 Guideline (SWEMS0019.13).

Mitigation measures
Offset residual impacts to native vegetation and trees in accordance with the Biodiversity Offset Guideline (SWEMS0019.13).
Revegetated areas and trees planted must be monitored so that their survival until establishment is achieved. This will secure long-term offset.
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 and riparian zones. Where possible, limit clearing to trimming rather than the removal of whole plants.
Physically delineate vegetation to be cleared and/or protected on site and install appropriate signage prior to works commencing.
Adjust methodology (e.g. avoid area, hand excavate, implement exclusion fencing) to protect sensitive areas where possible (such as mature trees, known threatened species, populations or ecological communities).
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 absolutely necessary, and engage a qualified arborist where roots >50mm are impacted within the Tree Protection Zone.
Retain dead tree trunks, bush rock or logs in-situ unless they are in the impact area 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 conduct a pre-clearance inspection and undertake fauna relocation.
Inspect vegetation for potential fauna prior to clearing or trimming. If fauna is present, or ecological assessment has determined high likelihood of native fauna presence (including hollow bearing trees), engage WIRES or a licenced ecologist to inspect and relocate fauna before works.
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 recommence once the impact on the species has been assessed and appropriate control measures implemented.
If any damage occurs to vegetation outside of the proposal area (as shown in the CEMP), notify the Sydney Water Project Manager and Environmental Representative so that appropriate remediation strategies can be developed.
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.

Mitigation measures
Record Pesticides and Herbicides use in accordance with SWEMS0017.
To prevent spread of weeds, wrap straw bales in geofabric to prevent seed spread.
Bag all plant parts and excavated topsoil that may be infested with weed propagules and dispose at a licensed waste disposal facility.
If replanting near Sydney Water pipelines refer to '*Which trees can damage wastewater pipes?'* link from Sydney Water website to help identify suitable species.
For maintenance and construction works during TOBAN not 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: CDResilienceProgrames@sydneywater.com.au or CustomerHub.DutyManager@sydneywater.com.au Staff and contractors must not contact local RFS directly to seek their own exemption.
Minimise impacts on native vegetation in non-certified areas and native vegetation retention areas. Options to consider where feasible include: • alternative construction methodologies (under bore vegetation and waterways, compressed impact area) • avoiding impact to hollow bearing and habitat trees.
Vegetation removal must not occur until: • the area to be removed has been physically delineated • the Contractor's Environmental Representative has confirmed consistency with approval documentation • pre-clearing surveys have been completed, if relevant and • Sydney Water Project Manager has provided written authorisation to commence clearing.
Habitat features and connectivity: • Retain large trees that are greater than or equal to 50 cm diameter at breast height (including dead trees but excluding noxious weeds) where possible and apply tree-protection measures for all vegetation to be retained. This is to provide ongoing roosting and foraging opportunities for fauna. • When works are likely to have indirect impacts on Cooks River/Castlereagh Ironbark Forest, undertake mitigation in accordance with best-practice guidelines (for example, Cooks River/Castlereagh Ironbark Forest – NSW DECC, 2008) within and adjacent to the TEC. • Before any disturbance, all structures potentially providing habitat for microbats (bridges, culverts, mine shafts, storm water tunnels, old or derelict buildings) must be inspected by a qualified ecologist at an appropriate time of year. Where microbats are found, the structure providing habitat

must not be affected, or a bat management plan must be prepared by a microbat specialist which allows for:

- exclusion mechanisms to reduce the risk of direct physical harm to the microbats; and/or
- supplementary habitat to compensate for lost habitat: and/or
- regular inspections of structures and briefing of relevant construction staff.

All direct impacts are to be offset as per the Biodiversity Offset Guide (Sydney Water, 2024). Revegetated areas and trees planted must be monitored so that their survival until establishment is achieved. This will secure long-term offset.

If clearing of native vegetation is required outside the proposal area, these areas will require additional assessment by an ecologist for potential impacts to TECs, threatened species and their habitats.

Any native vegetation to be cleared within the proposal area will be clearly identified and marked.

Native vegetation to remain will be clearly delineated as No-Go-Zones to avoid risk of clearing. Clearing and No-Go-Zone maps to be prepared and approved by Sydney Water prior to works commencing. Signing stating No-Go-Zone to be placed in fences. All staff will be made aware of No-Go-Zones during induction and be provided with a map of No-Go-Zones.

Tree removal is to be confirmed by an arborist due to potential to retain these trees if impact to the Tree Protection Zone is minimal. Tree Protection Zone details are provided within the Australian Standard 4970-2009 Protection of trees on development sites.

Weed management plan is to be developed and implemented by the Contractor and approved by Sydney Water prior to works commencing. The plan will be established and implemented to avoid spread and establishment of weeds during construction. Measures will include:

- Identification and implementation of measures to manage weeds during construction and operation of the development, taking into account relevant guidance in the CPCP's Weed Control Implementation Strategy.
- All equipment and plant machinery to be appropriately cleaned before the start of works.
- All priority weeds within the impact area are to be cleared and disposed of at a registered waste management facility.
- If herbicide is to be used, this must be applied by a person trained to do so and that has a certificate of competency, or a statement of attainment issued by a registered training organisation. Herbicide will only be used in accordance with the label/permit.
- Conduct toolbox talks to identify high risk priority weeds and weeds of national significance to on-site staff.
- Weed vegetation requiring clearing and removal should be disposed of at a registered waste management facility.

An unexpected finds protocol to be prepared by Sydney Water and implemented by the Contractor if unexpected threatened flora, or native fauna are found or discovered during works. Works must stop

Mitigation measures
immediately upon an unexpected find occurrence, and the environment/site manager informed. An ecologist should be engaged to determine management action(s).
Preclearance surveys are to be undertaken by a suitably experienced ecologist for the Green and Golden Bell Frog and the Cumberland Plain Land Snail as outlined in Appendix C. In the event that individuals are located within areas to be disturbed, the individuals are to be safely relocated prior to land clearing. The ecologist is also required to be present during construction works involving vegetation clearing and/or the removal of habitat trees (hollow-bearing or large trees) to avoid potential direct impacts to native species including threatened Cumberland Plain Land Snail and Green and Golden Bell Frog.
A hygiene protocol must be prepared by Sydney Water prior to works starting and implemented by the Contractor during works to avoid introduction of pathogens in machinery, tools, PPE or imported soils.

6.2.4 Heritage

Aboriginal heritage

An initial Aboriginal heritage due diligence was undertaken by Kelleher Nightingale Consulting (KNC), followed by an Aboriginal Cultural Heritage Assessment Report (ACHAR). The ACHAR is summarised below. The assessment included a database search for Aboriginal heritage sites, a desktop assessment, field surveys, archaeological test excavations and subsequent assessment of impacts. The complete assessment is provided as Appendix D.

Existing environment and potential impacts

A search of the Aboriginal Heritage Information Management System (AHIMS) and review of prior Aboriginal heritage studies identified several Aboriginal heritage sites in the region. The identified sites in the region within and around the proposal area included a combination of artefacts, potential archaeological deposits (PADs), an area of grinding groves and culturally modified trees.

An archaeological field survey of the impact area was carried out in May 2024. In order to enhance the field survey results, archaeological test excavations were undertaken by KNC in October and December 2024 to characterise the subsurface archaeological deposits within the proposal area.

The archaeological assessment identified 16 Aboriginal archaeological sites (comprising 17 AHIMS registrations) within the impact area, refer to Table 6-5, Figure 6-7 and Figure 6-8. The Aboriginal archaeological sites consisted of two surface artefact scatters with associated subsurface archaeological deposits and 14 subsurface archaeological deposits containing stone artefacts.

The ACHAR confirmed that six of the sites were displaying moderate archaeological (scientific) significance, while the remining 10 sites were assessed as displaying low archaeological (scientific) significance. The proposal will partially impact 13 sites and have a total impact on three sites (Table 6-5). During detailed design, impacts to these sites will be minimised wherever possible through adjustments to the proposal scope (construction methodology/alignment). A land based Aboriginal Heritage Impact Permit (AHIP) will be obtained under section 90 of the *National*

Parks and Wildlife Act 1974 for the proposed impact area, including the Aboriginal sites and objects listed in Table 6-4, for all areas not already covered under an existing approval/AHIP.

The consequence of harm includes total and partial loss, with the significance of harm ranging from low to moderate (Table 6-5). Depending on the existing archaeological value and proposed impact, salvage excavation and/or surface collection has been recommended as part of mitigation measures.

The archaeological value of the sites is linked to the information that they contain. Recovery of this information through archaeological salvage excavation will help to mitigate the impact of the proposal, offering an opportunity to better understand the activities which were undertaken at these sites and the effect of land use disturbance and natural processes on subsurface archaeological deposits in the vicinity of Cosgroves Creek. As conservation is the primary goal of all Aboriginal heritage management, all archaeological excavation undertaken will be restricted to the actual impact area and approved AHIP areas. All other areas will be appropriately demarcated and protected as no-go zones that will be identified in the CEMP.

The proposal overlaps several areas that have been previously assessed for Aboriginal cultural heritage values under existing State Significant Infrastructure (SSI) approvals and AHIPs. The relevant existing approvals/AHIPs for major infrastructure projects, include: the M12 Motorway ([redacted]), USC AWRC ([redacted]), Sydney Metro Western Sydney Airport ([redacted]), Western Sydney International (Nancy-Bird Walton) Airport (Commonwealth approval under the EPBC Act) and Sydney Science Park AHIP ([redacted]). These approvals/AHIPs are active/current where they intersect the current proposed works, and include conditions related to Aboriginal heritage considerations within their boundaries. These areas are therefore excluded from impact assessment for the current project and Sydney Water must ensure that any works for the current project undertaken within these existing approvals/AHIP comply with all relevant conditions. Before commencing work, Sydney Water will seek AHIP holder/ proponent agreement to perform our activities under their AHIP/ SSI approval conditions.

Table 6-5 Summary of Aboriginal archaeological sites along the proposed impact area, including site significance and consequence of harm

Site ID	AHIMS	Site feature	Archaeological significance	Consequence of harm
[redacted]	[redacted]	Surface artefacts and subsurface archaeological deposit	Moderate	Partial loss of value
[redacted]	[redacted]	Surface artefacts and subsurface archaeological deposit	Low	Partial loss of value
[redacted]	[redacted]	Subsurface archaeological deposit	Moderate	Partial loss of value

Site ID	AHIMS	Site feature	Archaeological significance	Consequence of harm
[redacted]	[redacted]	Subsurface archaeological deposit	Low	Total loss of value
[redacted]	[redacted]	Subsurface archaeological deposit	Low	Partial loss of value
[redacted]	[redacted]	Subsurface archaeological deposit	Low	Partial loss of value
[redacted]	[redacted]	Subsurface archaeological deposit	Moderate	Partial loss of value
[redacted]	[redacted]	Subsurface archaeological deposit	Moderate	Partial loss of value
[redacted]	[redacted]	Subsurface archaeological deposit	Moderate	Partial loss of value
[redacted]	[redacted]	Subsurface artefact	Low	Total loss of value
[redacted]	[redacted]	Subsurface artefact	Low	Total loss of value
[redacted]	[redacted]	Subsurface archaeological deposit	Low (within impact area)	Partial loss of value
[redacted]	[redacted]	Subsurface archaeological deposit	Low	Partial loss of value
[redacted]	[redacted]	Subsurface archaeological deposit	Low	Partial loss of value
[redacted]	[redacted]	Subsurface archaeological deposit	Low (within impact area)	Partial loss of value
[redacted]	[redacted]	Subsurface archaeological deposit	Moderate	Partial loss of value

Figure removed

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 DCCEEW's AHIMS Registrar .

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

Figure 6-7 Proposed impacts to Aboriginal heritage – north (KNC, 2024)

Figure removed

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 DCCEEW's AHIMS Registrar .

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

Figure 6-8 Proposed impacts to Aboriginal heritage – south (KNC, 2024)

Non-Aboriginal heritage

The proposal area only intersects with one non-Aboriginal heritage item; The Fleurs Radio Telescope Site, a local heritage item listed in Western Parkland City SEPP (ID: I5).

Existing environment

The Fleurs Radio Telescope Site was highly significant for its role in the development and innovation of radio astronomy in Australia. The landscape of Fleurs Radio Telescope Site has endured several programs of removal and demolition throughout the 1990s and early 2000s. The existing landscape is highly fragmented with little integrity for the original site configuration across the site, but particularly east of South Creek due to recent construction of the USC AWRC (Extent Heritage, 2021; Cultural Resources Management, 2019).

In 2019, the University of Sydney (owners of the Fleurs Radio Telescope Site) commissioned Cultural Resources Management (CRM) to complete a heritage assessment to identify the cultural resources that remain within the site and determine the heritage significance of the site (CRM, 2019). This included completion of a site survey to identify and map areas of high archaeological potential, including physical remnants scattered throughout the site (refer Figure 3-5).

In a later heritage impact assessment, for the development of the USC AWRC, it was determined that the construction of the facility will *"… see the last remaining evidence of the sites' use removed"* (Extent Heritage, 2021, p. 170). In agreement with the 2019 report, the 2021 report identified two localised areas with high potential for archaeology (i.e. two collapsed timber bridges on South Creek, having potential state significance). Additional potential archaeology reported included subsurface cables, machinery foundations, service pits, remnants of staff accommodation, and structural evidence of the former telescopic array. It was determined that the latter was *"… likely highly fragmentary, truncated and of generally poor intactness and integrity as a result of site clearing and remediation in the early twenty-first century"*, and that *"…the archaeological resource associated with Fleurs Radio Telescope Site is unlikely to meet the threshold for local significance"* (Extent Heritage, 2021, section 5.4).

The extensive remnants identified on site were also found to have *"…limited potential to provide new insight into the operations of the telescope installations, particularly as they are highly truncated and fragmentary…[and] they would also be considered 'works', as defined by the Heritage Act, and not afforded protection under the 'relics provision' of the Heritage Act"* (Extent Heritage, 2021, p. 95).

Construction impacts

The current proposal falls within the curtilage of heritage item I5 Fleurs Radio Telescope Site (local significance), and survey areas 7 and 9 as defined in the 2019 CRM study. The proposed construction activities within the Fleurs Radio Telescope Site will be at a localised scale and low intensity and will not adversely affect the significance of the heritage item. The proposed alignment has been designed to minimise ground disturbance, including impact to known heritage features identified by CRM (2019), through less destructive construction methods (trenchless technology), whilst positioning of the alignment and site access is designed to avoid known heritage features (i.e. no known heritage relics are located within the impact area).

Construction activities closest to items with known or potential heritage value as identified by CRM (2019), include:

- horizontal directional drilling (HDD), including excavation for entry and exit pits
- setup and laydown of equipment compounds, with the exact location to be selected during detailed design and positioned away from known heritage features
- site traversal (vehicles and equipment, and personnel), to be confirmed and designed to avoid known heritage features.

The potential for the proposed construction activities to impact the heritage significance and values of the Fleurs Radio Telescope Site, or unknown relics is expected to be minor when considering:

- recent impacts to the broader site from ongoing construction within the region (e.g. USC AWRC and M12 Motorway developments), which have removed many key heritage values/features of the site
- some of the proposed construction method will utilise trenchless technology – within the heritage site will minimise aboveground surface disturbance by reducing the area of excavation required
- the small footprint of the proposed construction, relative to the area of the site
- prior assessment that *"…the archaeological resource associated with Fleurs Radio Telescope Site is unlikely to meet the threshold for local significance"* (Extent Heritage, 2021, section 5.4)
- prior assessment that the remaining fragments and remnants of unknown structures above and beneath the ground *"…would also be considered 'works', as defined by the Heritage Act"* (Extent Heritage, 2021, p. 95)
- the implementation of the mitigation measures including an unexpected finds protocol.

Operational impacts

The potential for the assets to impact the heritage significance and values of Fleurs Radio Telescope Site during operation is expected to be inconsequential as the proposal:

- will avoid items listed as part of the heritage listing
- the impact area is to be returned to pre-existing conditions post construction work, including areas where ground disturbance is required for drill work. Therefore, the proposal's potential impact to the aesthetic values associated with the existing open rural landscape will be temporary.

The current proposal will avoid impacts to surveyed archaeological points of this potential heritage item. The potential impact of the proposal on this item of potential heritage significance is therefore considered negligible.

Mitigation measures

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

Table 6-6 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.
An application for an Aboriginal Heritage Impact Permit (AHIP) should be made under section 90A of the *National Parks and Wildlife Act 1974* for the land and associated objects within the boundaries of the proposed impacted area. The AHIP should also be sought for the specified Aboriginal sites and Aboriginal objects contained within the sites listed in Table 6-5.
Harm to any Aboriginal objects and declared Aboriginal places is only permitted once an Aboriginal Heritage Impact Permit (AHIP) has been granted.
Working within the curtilage of the AHIP must be undertaken in accordance with the conditions of the AHIP. Comply with all AHIP conditions during construction.
If any Aboriginal object is found outside the AHIP area or before the AHIP is granted, cease all excavation or disturbance in the area and notify Sydney Water Project Manager in accordance with SWEMS0009.
The boundary of the AHIP area adjacent to the non-impacted parts of the sites should be demarcated with protective fencing and listed in the CEMP. These areas should be identified as “no-go zones” on the CEMP maps and workers inducted as to appropriate protection measures and requirements to comply with conditions in the AHIP.
The AHIP will include provision for impact mitigation through archaeological salvage excavation. Salvage excavation will be required at sites [redacted]. Salvage excavation must be completed prior to any activities (including pre-construction activities) which may harm Aboriginal objects at these locations. Salvage excavation activities will be undertaken in accordance with the methodology attached as Appendix C of the ACHAR.
The AHIP should include provision for impact mitigation through surface collection at the impacted Aboriginal archaeological sites within the AHIP area. The surface collections must be completed prior to any activities (including pre-construction activities) which may harm Aboriginal objects at the sites. Surface collection will be undertaken in accordance with the methodology outlined below: • Surface artefact collection within the sites will be restricted to the approved AHIP area. • The collection of surface artefacts will be undertaken with Aboriginal site officers. • Photographs and the details of each artefact collected, including attributes and location/context will be recorded during the surface collection. • The AHIMS site records will be updated to include the details of the collected surface artefacts.

Mitigation measures

The short term management of collected Aboriginal objects will be as follows:

- Any Aboriginal objects that are removed from the land by actions authorised by an AHIP, must be moved as soon as practicable to the temporary storage location (see below) pending any agreement reached about the long term management of the Aboriginal objects.
- The temporary storage location: Kelleher Nightingale Consulting Pty Ltd, Suite 505-507, 155 King Street, Sydney NSW 2000.
- Any Aboriginal objects stored at the temporary storage location must not be further harmed, except in accordance with the conditions of the AHIP.

The long term management of collected Aboriginal objects will be determined in consultation with the project's registered Aboriginal stakeholders and in accordance with the conditions of the AHIP.

- If objects are to be transferred under a Care and Control Agreement to an Aboriginal person or organisation representing Aboriginal people in accordance with Section 85A(1)(c) of the *National Parks and Wildlife Act 1974*, an application for a Care Agreement must be completed.
- If reburial is to be undertaken of objects, Requirement 26 "Stone artefact deposition and storage" in the Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW must be complied with, unless the registered Aboriginal stakeholders agree to an alternative deposition method.
- If reburial is to take place, registered Aboriginal stakeholders will be notified and given the opportunity to at-tend, and the reburial recorded on AHIMS

Surface collection of Aboriginal objects is to be completed prior to commencing construction works within the impacted portion of the following Aboriginal archaeological sites; [redacted]

All site personnel must be inducted by a heritage specialist (or delegate) before starting work on site. The induction should include clear explanation of heritage constraints, go and no-go areas, processes and measures to avoid impacts, stop work procedures, and contact details to obtain further heritage guidance if needed.

At Fleurs Radio Telescope Site access to, and equipment laydown/compound areas to remain outside areas where known sites are located as per Figure 3-5. This includes remnants of buildings, rubbish piles, brambles, timber bridge footings, power poles, parabolic antennae, and other structures on site.

No-go areas, including location of known heritage features, are to be delineated prior to works beginning on site.

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

Chance discovery of relics must be notified to the Heritage Council of NSW by means of an s146 notification.

6.2.5 Noise and vibration

Existing environment

The proposal is in a predominantly rural residential/agricultural setting. Existing noise levels in the proposal area are primarily influenced by traffic on surrounding local roads, noise from nearby construction activities within the growth area, combined with noise from the mixed rural residential environment. With future planned development and growth throughout the region, the proposal area will provide land for a range of uses predominantly related to employment, industry, and environmental uses.

Sensitive receivers in proximity to the impact area include residents, a place of worship (St James Anglican Church) and an educational facility (Luddenham Public School).

Proposed activities/ equipment and timing of works

The proposal will generate noise and vibration during construction from plant and associated construction activities. Table 6-7 outlines the key stages of works and the indicative duration. Table 6-8 highlights the noisier equipment that will be used during the different stages of the proposal and the frequency of their use.

Table 6-7 Proposed scope of work and approximate duration of activities

Scope	Activities	Duration
Site establishment and mobilisation	• Install compounds and access road • Delineate impact area • Install environmental controls • Remove vegetation.	1-2 months
Compound use	Ongoing use of amenities, storage, laydown and parking areas	24 months
CCPM01 (open trench)	Open trenching and pipe installation	6 months
CCPM01 (trenchless)	HDD and pipe installation	11 months
CCGC01-01 (open trench)	Open trenching and pipe installation	5 months
CCGC01-01 (trenchless)	Microtunneling and pipe installation	11 months
CCGC01-02 (open trench)	Open trenching and pipe installation	5 months
CCGC01-02 (trenchless)	Microtunneling and pipe installation	11 months
CCGC02 (open trench)	Open trenching and pipe installation	5 months
CCGC03 (open trench)	Open trenching and pipe installation	5 months

Scope	Activities	Duration
CCGC04 (open trench)	Open trenching and pipe installation	5 months
SP1246	• Establish temporary site drainage and soil and water management controls • Excavate for underground structure • Excavation dewatering • Waste disposal • Construct buildings, pumping station structures and other associated units • Constructing overflow pipe.	14 months
Site demobilisation	Remove compounds and restore disturbed areas	5 months

Table 6-8 Use of noisier equipment

Activity	Noisier equipment	Task requiring the noisier equipment	Frequency of use
Site establishment and mobilisation	• Concrete saw • Demolition saw • Excavator (approx. 35 tonne (t)) • Wood chipper/ shredder	• Installation of temporary access • Installation of fence and footpaths	Daily
Compound use	• Concrete saw • Demolition saw	• Cutting pipes	Daily
Open trench	• Demolition saw • Excavator (approx. 35 t) • Excavator with hammer (approx. 35 t)	• Excavation • Cutting pipes and reinforcement • Rock breaking as required	Daily
Trenchless (HDD)	• Demolition saw • Excavator (approx. 35 t)	• Excavations for entry/exit pits • Cutting pipes and reinforcement	Daily
Trenchless (microtunnelling)	• Demolition saw • Excavator (approx. 35 t)	• Excavations for entry/exit pits • Cutting pipes	Daily

Activity	Noisier equipment	Task requiring the noisier equipment	Frequency of use
SP1246	• Concrete saws • Demolition saw • Excavator (approx. 35 t) • Excavator with hammer (approx. 35 t) • Piling rig	• Excavation for underground structures • Construction of buildings, pumping station structures and other associated units • Construction of the overflow pipe	Daily
Site demobilisation	• Excavator (approx. 35 t)	• Removal of construction compound	Daily

Based on the above details, the noisiest activity will be the use of 35 t excavator with hammer during excavation activities with direct line of sight to sensitive noise receivers. A quantitative noise assessment was completed based on the following worst case (noisiest) activities:

- Activity 1: Use of 35 t excavator with hammer at night with line of sight to receptors. This activity may occur at the underbore crossing of Elizabeth Drive, M12 Motorway and The Northern Road.
- Activity 2: Use 35 t excavator with hammer during standard daytime construction hours with line of sight to receptors. This activity may occur at all above ground construction locations of the proposal, excluding access tracks.

It is noted that the worst case activities are short-lived and 'rare' in the context of the total duration of the construction period as they will occur for short periods of time.

Most work and deliveries will be scheduled to occur during standard daytime construction hours during the working week, however some activities will occur during the night, refer to Table 3-1.

The proposal is expected to take up to two years to construct, with much of the work set back from potential residential receivers or businesses or in low density rural settings, and therefore, only a limited number will be affected for extended periods of time.

For construction of the pipelines, some of the work will be completed using trenchless methods which require less ground disturbance, with noise impacts buffered by depth below ground. Where open trenching methods are applied, the works at any one location are of short duration and will progress along the alignment. Although they still have the the potential to temporarily impact on noise sensitive receivers, a receiver will not be exposed to noise impact for every shift during construction. The closest noise sensitive receiver to trenched sections of the proposal is located directly adjacent to the impact area on Adams Road, Luddenham.

For the construction of the pumping station, the noisiest activities will be associated with earth works, including excavation and potential rock breaking or grinding. These works are static and include a mix of noisier activities (grinders, excavator with hammer) and less noisy (light vehicle

movement, excavator without hammer) activities. The closest sensitive receiver to SP1246 is located about 980 metres east from the proposal area and potential noise impacts are considered minimal for this site.

Due to the potential for noise impacts, a noise impact assessment was completed and is presented below. The noise impact assessment considered impacts from stationary activities at the pumping station and transient activities that will move along the proposed pipeline alignment.

Construction impacts

A noise impact assessment was completed using the TfNSW Construction and Maintenance noise estimator tool (TfNSW, 2022). The likelihood of noise impact during transient and stationary construction activities was assessed using Table 2 of the Draft Construction Noise Guideline (EPA 2020). The review indicated that the likelihood of noise impact will be medium risk, and a quantitative noise impact assessment has been undertaken. This 'medium' risk level was selected for the following reasons:

- construction outside of standard construction hours is unlikely to be regular or often
- semi-rural setting with few sensitive receivers in proximity
- noisy works will occur only intermittently throughout the construction program.

Noise area category

The TfNSW Construction and Maintenance noise estimator tool can be used to perform a basic noise assessment to capture predicted noise impacts at different distances for different types of receivers. The noise area category is chosen from the noise estimator tool to define an approximate background noise level for the environment surrounding the proposal (Table 6-9). The noise area category is chosen based on several factors, including:

- surrounding land use and receiver types
- traffic volumes on nearby roads
- other transport infrastructure e.g. trains, airports/flight paths.

The noise area category R1 was chosen for both day and night work, because:

- background noise is influenced by road traffic noise and low volumes of traffic from local roads and,
- the surrounding area is predominantly a rural residential/agricultural setting.

Table 6-9 Background noise levels and noise management levels applied for assessment of stationary and transient construction activities

	Noise area category	R1
RBL or L_{A90}[1] Background level (dB(A))	Day	40
	Evening	35
	Night	30
$L_{Aeq(15minute)}$ Noise Management Level[2] (dB(A))	Day	50
	Day (OOHW)	45
	Evening	40
	Night	35

[1]*L_{A90} = Background noise level.*
[2]*Noise Management Level (NML) for works during standard hours = Background level plus 10dB(A). NML for out of hours works (OOHW) = Background level plus 5dB(A).*

Worst case noise impact scenario

The purpose of the noise assessment is to assess the predicted worst-case noise impacts. This will identify recommended additional mitigation measures for impacted receivers at different distances from the works, which will guide community engagement.

For construction activities, the noisiest plant was chosen, the 35 t excavator with hammer (the largest size able to be selected in the tool). As a conservative, worst-case approach, the noisiest plant for day work (excavator with hammer/ bulk earthworks) was also assessed as part of night work, even though the use of this equipment outside of standard construction hours is unlikely to be regular or often.

These assessments are sufficient to predict and assess worst-case noise impacts as:

- the noisiest equipment will not be used all shift, every shift, during both day and night work, and is therefore a conservative estimate
- multiple pieces of equipment may be used at any one time for different activities at different locations. Assessing use of the noisiest plant across the impact area, is a representation of the cumulative noise impacts that may be experienced
- for transient construction activities, no individual receiver will be impacted by noise every shift from these activities over the proposed two year construction period.

A receiver may have line of sight, or no line of sight, to the construction works. Line of sight is the straight line between the noise source and the receiver. Receivers with line of sight will typically include those in front of the work, who do not have their view blocked by barriers such as terrain, permanent noise walls or other buildings. Receivers with no line of sight (all other factors being

equal, such as distance to the work and type of equipment) will experience less noise than receivers with line of sight. Typically, these include the receivers who have their view blocked from the works by barriers including those listed above.

Noise impact summary

In summary, two scenarios were considered:

- Activity 1: night works – line of sight – 35 t excavator with hammer distance based (noisiest plant)
- Activity 2: standard construction hours (day work) – line of sight – 35 t excavator with hammer distance based (noisiest plant).

Based on the above scenarios, the predicted worst case noise impacts for residential receivers associated with transient and stationary activities during day and night work is shown in Table 6-10, Figure 6-9 and Figure 6-10. Table 6-10 includes recommended mitigation measures at different distances from sensitive receivers, as identified by the noise estimator tool. These are to be considered by the community team and offered where appropriate.

All reasonable and feasible measures will be implemented to reduce noise impacts during construction. Overall due to the relatively limited number of sensitive receivers, together with the implementation of mitigation measures, potential noise impacts are considered minor.

Table 6-10 Affected distance (metres) for residential receivers during Activity 1 and Activity 2 and recommended mitigation measures

Activity	$L_{Aeq(15minute)}$ noise level above background (L_{A90})		
	20 to 30 dB(A) Moderately intrusive	**> 30 dB(A) Highly intrusive**	**$L_{Aeq(15minute)}$ 75dB ≥ Highly affected**
Activity 1: night works – line of sight – 35 t excavator with hammer	455 m Mitigation measures: N[1], PC[2], SN[3], R2[4], DR[5]	215 m Mitigation measures: N, PC, SN, R2, DR, AA[6]	60 m Mitigation measures: N, PC, RO[7]
Activity 2: standard construction hours – line of sight – 35 t excavator with hammer	215 m Mitigation measures: N	105 m Mitigation measures: N	60 m Mitigation measures: N, PC, RO

[1]N = Notification, [2]PC = Phone call, [3]SN = Specific notification, [4]R2 = Respite period 2, [5]DR = Duration respite, [6]AA = Alternate accommodation, [7]RO = Respite offer.

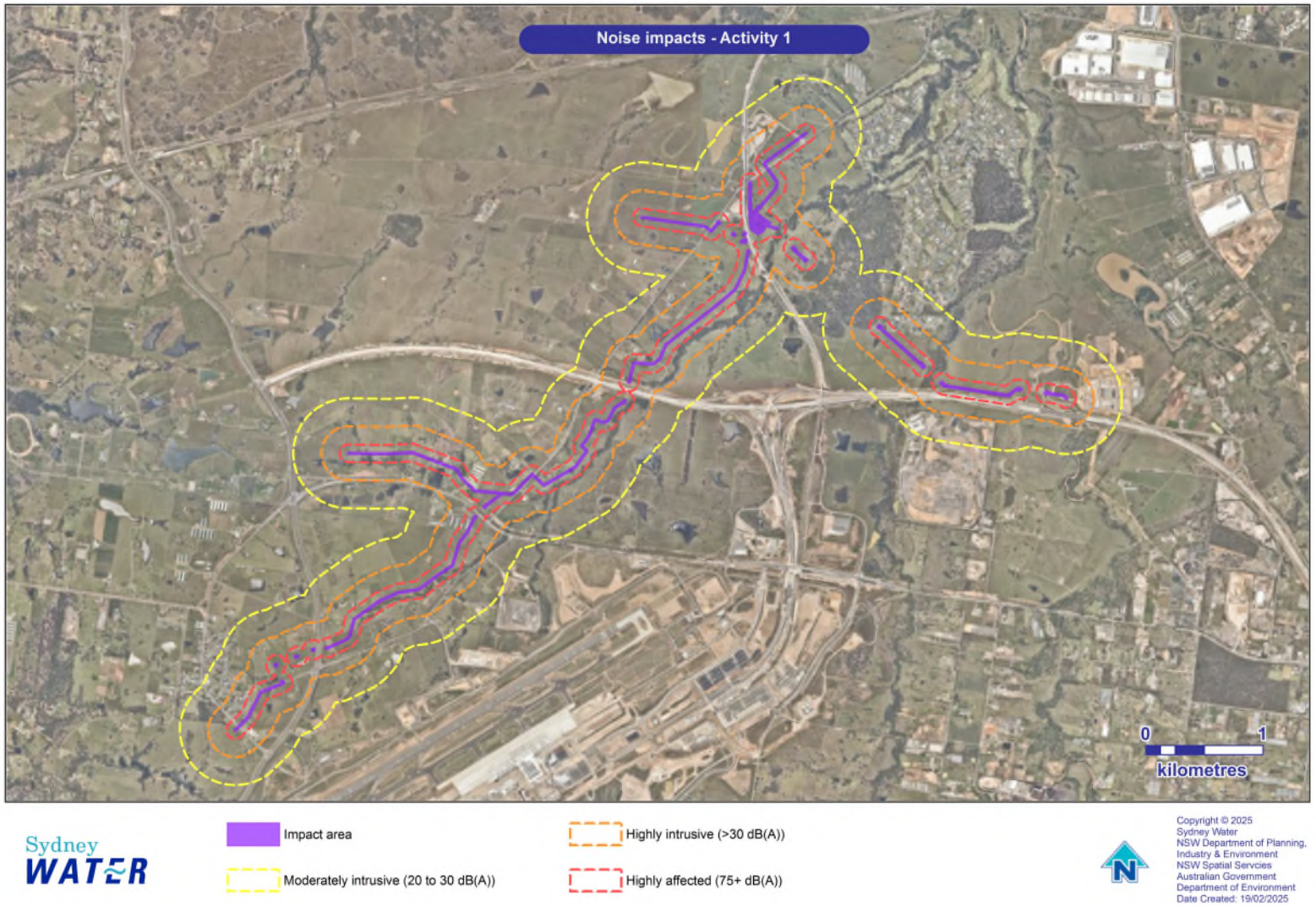

Figure 6-9 Noise impact distances of Activity 1 (night works – line of sight – 35 t excavator with hammer)

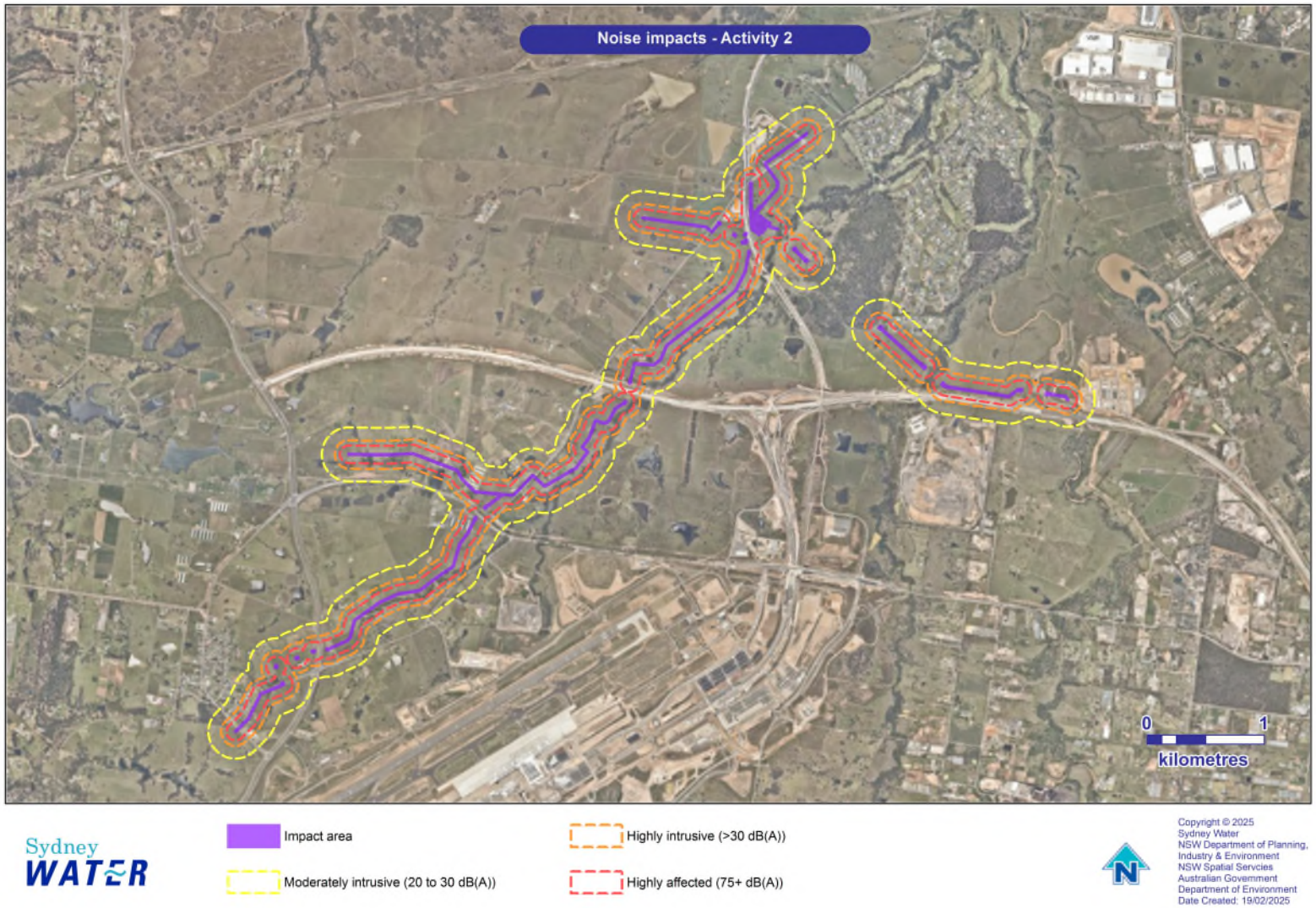

Figure 6-10 Noise impact distances of Activity 2 (standard construction hours – line of sight – 35 t excavator with hammer)

Vibration

The noise estimator includes some indicative minimum working distances for different vibratory plant and equipment. These distances will vary depending on the item of plant, local geotechnical conditions, and the frequency of vibration. However, where works are performed within the minimum working distances of a structure, structural damage may occur, and additional mitigation measures are recommended.

Based on the plant and equipment list anticipated for this proposal, the following vibratory plant and equipment may be used:

- small (5 to 12 t) hydraulic hammer – minimum working distance of 2 metres
- medium (12 to 18 t) hydraulic hammer – minimum working distance of 7 metres
- large (18 to 34 t) hydraulic hammer – minimum working distance of 22 metres
- mechanised bored tunnelling works (HDD, mircrotunnelling) – minimum working distance of 5 to 21 metres.

There is potential that some nearby residential buildings may be impacted by vibration when using the excavator with hammer. During vibratory works, the minimum working distance will be maintained, if structures are within the minimum working distance, less vibratory equipment will be used. Dilapidation surveys for applicable structures will also be completed before and after construction.

Operational impacts

During operation, the alignment will be beneath the ground and no noise impacts are anticipated. Operational noise from the pumping station is likely to be minimal and will not result in a detectable noise increase perceptible to existing nearby residents. The pumping station is not expected to be intrusive to potential future receivers that will be in closer proximity as it consists of underground, submersible pumps and will be designed to comply with the EPA Noise Policy for Industry (2017). Operational noise levels will be assessed during detailed design and any noise attenuation measures identified and implemented to ensure compliance with the Noise Policy for Industry (EPA, 2017).

Noise may be generated during operational maintenance activities; however, these will generally be of short duration and mitigated.

No vibration impacts during operation are anticipated.

Mitigation measures

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

Table 6-11 Environmental mitigation measures — noise and vibration

Mitigation measures
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 1pm Saturday. No work to be scheduled on Sundays or public holidaysAny proposed work outside of these hours must be justified. The Proposal will also be carried out in accordance with: • Sydney Water's Noise Management Procedure SWEMS0056 • Noise Policy for Industry (EPA, 2017). All reasonable and feasible noise mitigation measures should be justified, documented and implemented on-site to mitigate noise impacts.
Where considered appropriate by the Sydney Water communications representative, implement the noise mitigation measures identified in Table 6-10 of this REF.

Incorporate standard daytime hours noise management safeguards into the CEMP, including but not limited to:
• Identify and consult with the potentially affected residents prior to commencement of works. This should:
  ○ 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 (e.g. 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.
• Do not warm-up plant or machinery near residential dwellings before the nominated working hours.
• Select appropriate plant for each task, to minimise the noise impact (e.g. all stationary and mobile plant will be fitted with residential type silencers).
• Do not use engine brakes when entering or leaving the work site(s) or within work areas.
• Regularly inspect and maintain equipment in good working order.
• Arrange work sites where possible to minimise noise (e.g. generators away from sensitive receivers, 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).

Mitigation measures

As works beyond standard daytime hours are needed, the Contractor will:

- consider potential noise impacts and implement the relevant standard daytime hours safeguards, follow 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 communications representatives.

As night works are needed, the Contractor will:

- consider potential noise impacts and implement the relevant standard daytime and out of hours safeguards 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 prior to commencing night work
- seek approval from the Sydney Water Project Manager in consultation with the environment and communications representatives.

If works on Sundays or public holidays are required, the Contractor will:

- justify why all other times are not feasible
- consider potential noise impacts and implement relevant standard daytime, out of hours and night-time safeguards 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 communications representatives.

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

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

Where vibration inducing works in proximity to a residential or other relevant vibration sensitive structures, plant and equipment of suitable size must be selected to ensure compliance with the identified safe working distances specified in this REF.

6.2.6 Air and energy

Existing environment

The proposal is in a rural residential/agricultural area that will be transformed from lower density and less intensive land uses, buildings and structures to employment, industry, and residential

growth uses. The main existing sources of air pollutants within the study area include emissions from motor vehicles and dust from nearby development. A search of the National Pollutant Inventory, maintained by the Department of Environment and Energy, was conducted for the study area on 17 October 2024. The search identified one pollutant emitting facility within 1 km of the proposal area; Cleanaway PTY LTD (waste treatment and disposal service).

Potential sensitive receivers include:

- residents, pedestrians and road users
- industrial warehouse and development sites
- primary production properties.

Construction impacts

During construction, the following activities will potentially generate air emissions and dust which could impact air quality:

- emissions from machinery, equipment and vehicles used during construction
- dust generated by construction vehicles travelling on disturbed/unsealed access routes, prior to installation of the sealed access road
- excavation and stockpiling.

During construction, dust and exhaust gases (air emissions) could impact the air quality and amenity of nearby sensitive receivers. Construction work and restoration of disturbed areas will be undertaken progressively. This will minimise potential air quality impacts and reduce the exposure of any one sensitive receiver to air emissions. These potential air quality impacts will be localised and short-term in nature, and unlikely to have a significant impact with the application of environmental mitigation measures.

Operational impacts

The proposal has been designed with appropriate ventilation and odour management systems to avoid any operational odour impacts being experienced by sensitive receivers. The locations of vent shafts will be determined during detailed design. Space has been allocated within the pumping station footprint for an odour control unit (OCU).

Ventilation of the sewer is required, and maintenance holes will be equipped with educt and induct vents along the alignment. Vent shafts are designed to be close to existing or future open spaces where possible to reduce visual and odour impacts.

During operation, wastewater maintenance holes and the pumping station may be opened when maintenance or repair works are required. This may result in odour impacts to nearby receivers which will largely be dependent on wind direction and strength. These impacts will be temporary in nature and appropriate safeguards will be implemented to minimise the potential for adverse impacts wherever possible.

Sydney Water will manage odour in accordance with the requirements of the POEO Act and Sydney Water's existing procedures. Sydney Water would register and investigate odour complaints. Sydney Water will implement engineering, operational or other odour reduction

measures where verified complaints are received about odour releases from the wastewater system. Significant odour impacts from the proposal are considered unlikely.

The pumping station will require energy usage during operation and will marginally increase Sydney Water's total energy use. The proposal will be operated in accordance with energy use procedures that apply to Sydney Water's existing network.

Mitigation measures

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

Table 6-12 Environmental mitigation measures — air and energy

Mitigation measures
Use alternatives to fossil fuels where practical and cost-effective.
Track energy use as per SWEMS0015.28 Contractor NGER template.
Maintain equipment in good working order, comply with the clean air regulations of the *Protection of the Environment Operations Act 1997*, have appropriate exhaust pollution controls, and meet Australian Standards for exhaust emissions.
Switch off vehicles/machinery when not in use.
Implement measures to prevent offsite dust impacts, for example: • water exposed areas (using non-potable water source where possible such as water from excavation pits) • cover exposed areas with tarpaulins or geotextile fabric • modify or cease work in windy conditions • modify site layout (place stockpiles away from sensitive receivers) • vegetate exposed areas using appropriate seeding.
Cover all transported waste.

6.2.7 Waste and hazardous materials

Existing environment and potential environmental impacts

One of Sydney Water's corporate objectives is to increase resource recovery 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 has the potential to generate the following waste streams:

- general construction waste such as excess concrete, redundant pieces of pipe/fittings
- broken bricks, timber, paper, plastic and metal

- green waste from clearing vegetation including weeds
- domestic waste generated by site construction personnel
- wastewater and grey water from temporary amenities
- spoil that is not suitable for backfilling, from trenching and other excavations
- groundwater dewatered from excavations
- wastewater and drilling fluid.

The largest volume of waste generated by construction will be excess spoil from excavations. Wherever possible, suitable excavated spoil will be re-used on site for backfilling, landscaping and other uses. Should any material be found to be unsuitable, it will be disposed of as detailed in the mitigation measures below. If spoil is unable to be re-used on-site, opportunities for off-site re-use will be investigated.

If re-use opportunities are unable to be identified, or the spoil is unsuitable for re-use due to its geotechnical or contamination characteristics (including asbestos), spoil will be tested and classified according to the Waste Classification Guidelines (EPA, 2014) and disposed of at an appropriately licensed facility.

Construction by trenchless methods will involve the use of drilling fluids. The drilling fluids that will be used will be an environmentally benign substance such as bentonite. The drilling fluids will be circulated through the trenchless section and then screened to remove drill cuttings. Any waste drill cuttings and drilling fluid will be tested, classified, treated and disposed of appropriately.

General workforce waste including food packaging will be generated in minor quantities and will be classified as putrescible or non-putrescible general solid waste.

No hazardous wastes are expected to be generated. It is not expected that the proposal will involve managing hazardous waste or hazardous building materials (HBM). Should the works uncover asbestos or any other hazardous or contaminated material, it will be managed through an unexpected finds procedure.

Opportunities to reduce, recycle and reuse during this proposal will be sought with the Contractor and documented in the Waste Management Plan or CEMP.

Operation of the proposal may generate minor volumes of waste during maintenance activities. Any wastewater discharged will be in accordance with Sydney Water's Discharge Protocols Standard Operating Procedure and applicable EPL. Any operational wastes generated during maintenance will be managed and disposed of in accordance with Sydney Water's standard operating procedures and disposed of at an appropriately licensed waste disposal or recycling facility.

Mitigation measures

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

Table 6-13 Environmental mitigation measures — waste and hazardous materials

Mitigation measures
Manage waste in accordance with relevant legislation and maintain records to show compliance e.g. 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 and sort waste streams to maximise reuse/recycling in accordance with the legislative requirements.
Manage waste and excess spoil in accordance with the NSW EPA Resource Recovery Orders and Exemptions (if applicable) and / or Waste Classification Guidelines. Where materials are not suitable or cannot be reused onsite or offsite, recycle where appropriate. Recycle soils at a licensed soil recycling facility or dispose at an appropriately licenced landfill facility.
Prevent pollutants from escaping including by covering skip bins.
Dispose excess vegetation (non-weed) that cannot be used for site stabilisation at an appropriate green waste disposal facility.
If fibro or other asbestos containing material is identified, restrict access and follow Sydney Water's Asbestos Management – Minor Works procedure, Document Number 746607 and SafeWork NSW requirements. Contact Sydney Water Project Manager (who will consult with Contamination and Hazardous Materials team).

6.2.8 Traffic and access

Existing environment and potential impacts

The majority of the proposal is on private property, with some crossings beneath or running adjacent to several local and classified roadways, including the M12 Motorway (currently under construction), Elizabeth Drive (State), Adams Road (Local) and Luddenham Road (Regional). Partial and temporary road closures may be required during construction where open trenching and/or excavation for pits is required within the roadway. Sydney Water will consult with council as required by the TISEPP for any impacts on roads where council is the roads authority. The Contractor will obtain any road occupancy licences required from council and/ or TfNSW.

The proposal will require a construction workforce of up to 60 people with up to 20 heavy vehicles and 27 light vehicles on site at any given time. There will be extremely few vehicle movements during operation. The proposal is predominantly accessed via existing local roads and informal access tracks through paddocks. The availability of street parking may be temporarily impacted during the works.

New access tracks will be required for the pumping station. The proposed access to SP1246 will be from Luddenham Road. Permanent access to the pumping station will include a dual lane all-

weather sealed access road (minimum 8 m wide), with kerb and gutter plus surface and subsurface drainage systems (as required) to the nearest public road. A vehicle turning area designed to fit a 19 m semi-trailer will be provided at the pumping station site. A minimum of four spaces for vehicle parking will be implemented. Bollards shall be placed, where required, to protect the wet well, valve chamber, and above ground structures from vehicles.

Access to private property may be temporarily affected during construction of the pipelines. Properties will only be affected for a relatively short period of time. Some fence lines may need to be temporarily removed for access. Property owners will be informed of any potential loss of access and appropriate measures will be negotiated to either provide an alternative access or reinstate access at the end of a work shift. Any access ways or fences affected by construction will be reinstated to their original condition.

Mitigation measures

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

Table 6-14 Environmental mitigation measures — traffic and access

Mitigation measures
Prepare a Traffic Management Plan (TMP) in consultation with the relevant traffic authority.
Meet NSW Roads and Maritime Service's Traffic Control at Worksites Manual v5 requirements for Transport for NSW roads. The Contractor will obtain a Road Occupancy Licence (ROL) from Transport for NSW, including if works are within 100 m of traffic signals when construction commences.
Develop management measure to minimise traffic impacts near residential properties, schools and businesses by consulting with them (e.g. no major materials deliveries at school drop off or pick up times etc).
Manage sites to allow people to move safely past the works, including alternative pedestrian, bicycle, pram and wheelchair access.
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 proposed works and any temporary road 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.
The Contractor must consult with the M12 constructor about traffic management in and around the M12 construction corridor.

6.2.9 Social and visual

Existing environment

The existing visual environment includes a rural residential/agricultural area, road construction and upgrades, and the Western Sydney International Airport. Residential properties are predominantly single or double story detached dwellings on acreage lots. The proposal is currently within a rural residential/agricultural area, however future changes anticipated for the area include employment, industry, and higher density residential growth.

The proposed wastewater infrastructure is located within 300 m of the following potential sensitive receivers; residents, Gemma-Lee's Café, grocery store, Luddenham Lodge Horse Riding, Wilmington Reserve, St James Anglican Church, Sydney Society of Model Engineers, Workers Hubertus (Country Club) and several light industrial or agricultural businesses. The proposal area is also surrounded by rural residential/agricultural lots, including lots undergoing earthworks for future growth, and the development of the USC AWRC.

The proposal could potentially impact on social amenity in a variety of ways, some of which have been assessed in other sections of this REF:

- Noise and vibration (Section 6.2.5)
- Air quality (Section 6.2.6)
- Traffic and access (Section 6.2.8).

Construction impacts

During construction, there will be temporary impacts on visual amenity from presence of site crew, equipment, generation of waste and construction activities such as earthworks within the proposal area. There will also be some temporary visual impacts associated with the establishment of site compounds and worksites during construction. These temporary visual impacts will be mitigated in consultation with stakeholders, such as council and residents, and the mitigation measures listed below.

Following the completion of the works, all items associated with construction will be removed and the site will be remediated. Disturbed areas will be rehabilitated to pre-existing condition or better, as far as practicable; however, restoration, such as revegetation, may take a longer period to become established. Restoration of work areas will ensure that the potential for long term adverse visual impacts is minimised. Overall, potential impacts on social and visual amenity are considered minor as the works will be temporary.

Operational impacts

The works will involve the construction of new, permanent above ground structures, including the pumping station and vent stacks. Considering the future use and growth of the precincts, these new above ground structures are not expected to significantly impact the visual character of the environment. Rather, once operational, the proposal will have significant social benefits, enabling the development of the region by providing a wastewater network that supports planned growth in Western Sydney.

Vent shafts will be placed at maximum spacings of 400 m along the alignment. Vent shafts are designed to be close to existing or future open spaces where possible to reduce visual and odour impacts. Vent shafts are nominally sized with a DN300 shaft and height of 18 m, subject to confirmation by Sydney Water during detailed design.

The pumping station will be landscaped to minimise any permanent visual impacts. The pipelines will be entirely underground and will not be visible.

Mitigation measures

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

Table 6-15 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.
Minimise visual impacts (e.g. 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.
Site restoration including roads, verges and vegetation is to be performed in consultation with private property owners and council.
Continue to consult with key stakeholders that are constructing infrastructure in the area with a view to coordinate works where practicable.
Regular engagement with the local community and relevant stakeholders will be performed in accordance with the project Community and Stakeholder Engagement Plan to manage any impacts and ensure the scope of works performed by Sydney Water is communicated accurately.

6.2.10 Cumulative and future trends

Potential environmental impacts

The proposal is located in an area that is subject to ongoing development associated with the precinct and growth planning in Western Sydney. Cumulative impacts are anticipated to be minimal given the small scale of the proposal relative to the overall works planned within the growth centre.

A search of the Department of Planning, Infrastructure and Environment Major Projects Planning Portal was undertaken in December 2024 and identified several urban release and transport projects planned for the area.

Cumulative impacts with other local development occurring in the area may include:

- cumulative noise and air quality impacts from works being undertaken concurrently
- potential traffic management issues during construction
- increased waste production
- community construction fatigue resulting from works being undertaken concurrently or sequentially.

The proposal is required to support the future population growth in the south west and as such facilitates the progression of residential developments in the locality. Implementing mitigation measures will reduce the scale and extent of any potential cumulative impacts.

During operation, minimal increases in noise and traffic are anticipated due to maintenance activities of proposed infrastructure. However, with the rapid development of the broader region, these additions to the greater environment are considered negligible.

Future trends such as climate change were considered including factors such as bushfires, flooding, extreme heat, and extreme storm events that could impact the proposal. The proposal is unlikely to be impacted by future trends because most infrastructure is proposed to be located below ground or will be situated predominantly outside the 1% AEP flood level.

Mitigation measures

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

Table 6-16 Environmental mitigation measures — cumulative and future trends

Mitigation measures
Coordination of works with other ongoing or proposed developments will be required to minimise negative impacts or conflicts with construction scheduling.

6.2.11 General environmental management

Table 6-17 Environmental mitigation measures — general environmental management

Mitigation measures
Sydney Water's Project Manager (after consultation with Sydney Water's environmental and community representatives and affected landowners) can approve temporary ancillary construction facilities (such as compounds and access tracks), without additional environmental assessment or approval if the facilities 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
- no disturbance to waterways
- potential environmental impacts can be managed using the safeguards in the EIA
- no disturbance of contaminated land or acid sulfate soils
- 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 a CEMP addressing the requirements of this environmental assessment. The CEMP should identify licence, approval and notification requirements. Prior to the start of work, all project staff and contractors will be inducted in the CEMP.

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

- go/ no go areas and boundaries of the work area
- 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.

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

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

All site personnel must be inducted into the IMP.

Prior to construction, Sydney Water will seek a variation to the existing Scheduled Development Work EPL 21886. This REF will support the EPL variation application.

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

Mitigation measures

Works within the M12 construction boundary and/or within the area subject to the M12 – Central Environment Protection Licence (EPL no. 21596) must not affect the ability of Transport for NSW and its contractors to comply with conditions of the EPL.

Where there is doubt, the Contractor is to contact the Sydney Water Project Manager and Environment Representative for further advice. If an impact occurs to any control or monitoring instrument associated with EPL no. 21596, Transport for NSW and its principal construction contractor (or relevant site contact) must be notified. The EPA must be notified immediately (or as soon as it is safe to do so) on 131 555 if any such impact has or will cause material harm to the environment.

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

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

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

7 Conclusion

Sydney Water has prepared this REF to assess the potential environmental impacts of the Cosgroves Creek Wastewater Network proposal. The proposal is required to ensure Sydney Water is acting in accordance with the *Sydney Water Act 1994* and providing the community with access to wastewater service options in compliance with its Operating Licence. The proposal will facilitate further development of the WSA.

The main potential environmental impacts of the proposal are typical construction impacts such as erosion and sedimentation, noise, and traffic. Impacts to Aboriginal heritage and vegetation are expected and specialist assessments have been undertaken. Vegetation impacts will include the loss of PCTs, TECs and habitat features. Offsets will be implemented to mitigate the loss of vegetation. An Aboriginal Heritage Impact Permit (AHIP) will be obtained prior to construction activities commencing. During operation, the main potential impacts are minor, associated with air quality and visual amenity at the new pumping station.

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 short-term impacts on the community from construction impacts such as noise, traffic, visual and vegetation loss. There will be environmental improvements by providing a reliable wastewater service to the local community.
Any transformation of a locality	The proposal will result in a minor and temporary transformation of the locality. However, following construction completion, work areas would be generally restored to pre-construction condition. New above ground infrastructure would include a wastewater pumping station and vent stacks along the alignment.
Any environmental impact on the ecosystems of the locality	The proposal may result in minor environmental impacts to ecosystems of the locality due to the impacts to vegetation. The proposal will lead to environmental improvements by ensuring a reliable wastewater service to collect and treat wastewater, minimising any impacts on the ecosystem.
Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of the locality	The potential impacts to Aboriginal heritage may reduce the scientific value of the locality. However, consultation with relevant stakeholders has taken place and no impact to Aboriginal heritage will take place without an AHIP. Salvage will be undertaken as required by the AHIP to ensure knowledge of the Aboriginal heritage sites is collected prior to construction.
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 potential impacts to Aboriginal heritage may result in impacts to cultural, historical, scientific or anthropological value for present or future generations. However, consultation with relevant stakeholders has taken place and no impact to Aboriginal heritage will take place without an AHIP.
Any impact on the habitat of any protected animals (within the meaning of the *Biodiversity Conservation Act 2016*)	The proposal has potential for minor impacts on the habitat of protected animals. Two protected species were considered to have a moderate likelihood of occurrence within the proposal area. Tests of Significance under the BC Act were completed and concluded that the proposal is not likely to have a significant impact on the threatened fauna.
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 be endangering any species of animal, plant or other form of life, whether living on land, in water or in the air.
Any long-term effects on the environment	The proposal may have a long-term impact on Aboriginal heritage, however the proposal will have a long-term benefit by providing a reliable and modern wastewater service for the area.

Section 171 checklist	REF finding
Any degradation of the quality of the environment	The proposal will not cause the degradation of the quality of the environment.
Any risk to the safety of the environment	The proposal will not increase risk to the safety of the environment.
Any reduction in the range of beneficial uses of the environment	The proposal will not reduce the range of beneficial uses of the environment.
Any pollution of the environment	During construction, the proposal has the potential to cause minor localised, noise and air pollution. These impacts will be temporary along the alignment. Impacts will be managed through the implementation of the mitigation measures outlined in Section 6. Operational impacts of pumping stations will be minor as these facilities are designed to operate within set standards. During operation, when ultimate servicing is achieved, the proposal will operate in accordance with the conditions of the future USC EPL, or in accordance with the conditions of Sydney Water's existing EPL (i.e. interim servicing measures).
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 increase demand on resources, that are, or are likely to become, in short supply.
Any cumulative environmental effect with other existing or likely future activities	The proposal will not have a significant cumulative environmental effect with other existing or likely future activities.
Any impact on coastal processes and coastal hazards, including those under projected climate change conditions	The proposal will not have any impact on coastal processes or hazards, and coastal processes and coastal hazards will not have any impact on the proposal.
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		
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 Transport for NSW.*		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 (i.e. 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 – Biodiversity Assessment Report

Appendix D – Aboriginal Cultural Heritage Assessment Report

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 DCCEEW's AHIMS Registrar *.*

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