Review of Environmental Factors

Mamre Road Precinct – Wastewater Network
(November 2021)

Sydney WATER

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Determination

This Review of Environmental Factors (REF) assesses the potential environmental impacts of the Mamre Road Precinct Wastewater Network project and 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 State Environmental Planning Policy (Infrastructure) 2007 allows the proposal to be carried out without development consent. The proposal has also been considered against the matters listed in clause 228 of the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation) (Appendix A).

During construction, the main potential environmental impacts of the proposal are typical construction impacts such as vegetation clearing, soil erosion, noise and visual amenity. During operation, the main impacts are associated with air quality and visual amenity. The assessment shows that if we adopt the measures identified in this REF, the proposal would not have a significant environmental impact. Accordingly, we do not require an Environmental Impact Statement (EIS).

The Sydney Water Project Manager will make sure the proposal is carried out as described in this REF. If the scope of work or work methods described in this REF change significantly following determination, additional environmental impact assessment may be required.

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1 Executive summary

Sydney Water plans to build a new wastewater network in Kemps Creek, Penrith to meet the growing demand for servicing in the Mamre Road Precinct.

Construction is expected to start in mid to late 2022 and take approximately 14 to 18 months. It is anticipated that this infrastructure will be commissioned for ultimate servicing by early to mid 2024. Most assets will be constructed in road corridors and private property.

The majority of the work area has been previously disturbed by road and utilities construction or cleared for agricultural purposes. The main construction environmental impacts associated with the proposal are typical construction impacts such as vegetation clearing, soil erosion, noise and visual amenity. During operation, the main impacts are associated with air quality and visual amenity. A Construction Environmental Management Plan will be prepared by the contractor to mitigate potential environmental impacts.

The proposal will provide a reliable wastewater network that facilitates further development of the Mamre Road Precinct, aligned with the principles of ecologically sustainable development.

2 Introduction

2.1 Context

We provide water, wastewater, recycled water and some stormwater services to almost 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 proposed work under Division 5.1 of the EP& A Act. This REF assesses the potential environmental impacts associated with the Mamre Road Precinct Wastewater Network project and identifies safeguards that avoid or minimise potential impacts.

2.2 Proposal background and need

The Mamre Road Precinct (**Figure 2-1**) is one of ten precincts within the Western Sydney Aerotropolis Growth Area (WSAGA). The precinct was rezoned in June 2020 for industrial purposes and will create almost 17,000 new jobs when fully developed. There are no wastewater services currently available in the Precinct.

Sydney Water proposes to construct a wastewater network which includes gravity mains, pressure mains and two pumping stations to service the growing precinct. The northern pump station (SP1221) will be located at 771 Mamre Road, Kemps Creek (Lot 23, DP258414). The southern pump station (SP1222) will be located at 258 Clifton Avenue, Kemps Creek (Lot 9, DP8122484). The pressure mains will be located within the road corridor and the gravity mains are planned to be constructed within private properties. This set back in private properties, allows for the future Mamre Road widening by Transport for NSW (TfNSW).

The proposed wastewater servicing strategy is split into two major stages. During Stage 1, the network will operate by pumping wastewater north from SP1222 to SP1221, and then to St Marys Wastewater Treatment Plant (WWTP) via the Ropes Creek Carrier. During Stage 2, the flows will be reversed and wastewater will be pumped south from SP1221 to SP1222 and then into the Upper South Creek Advanced Water Recycling Centre (AWRC). The rising main between both pump stations will be reused in both stages. The main from SP1221 to the Ropes Creek carrier, however, will be decommissioned in stage 2 (expected after 2026). The rising main from SP1222 to the AWRC was not designed as part of this project.

A summary of the proposal need, objectives and consideration of alternatives are provided in **Table 2-1**.

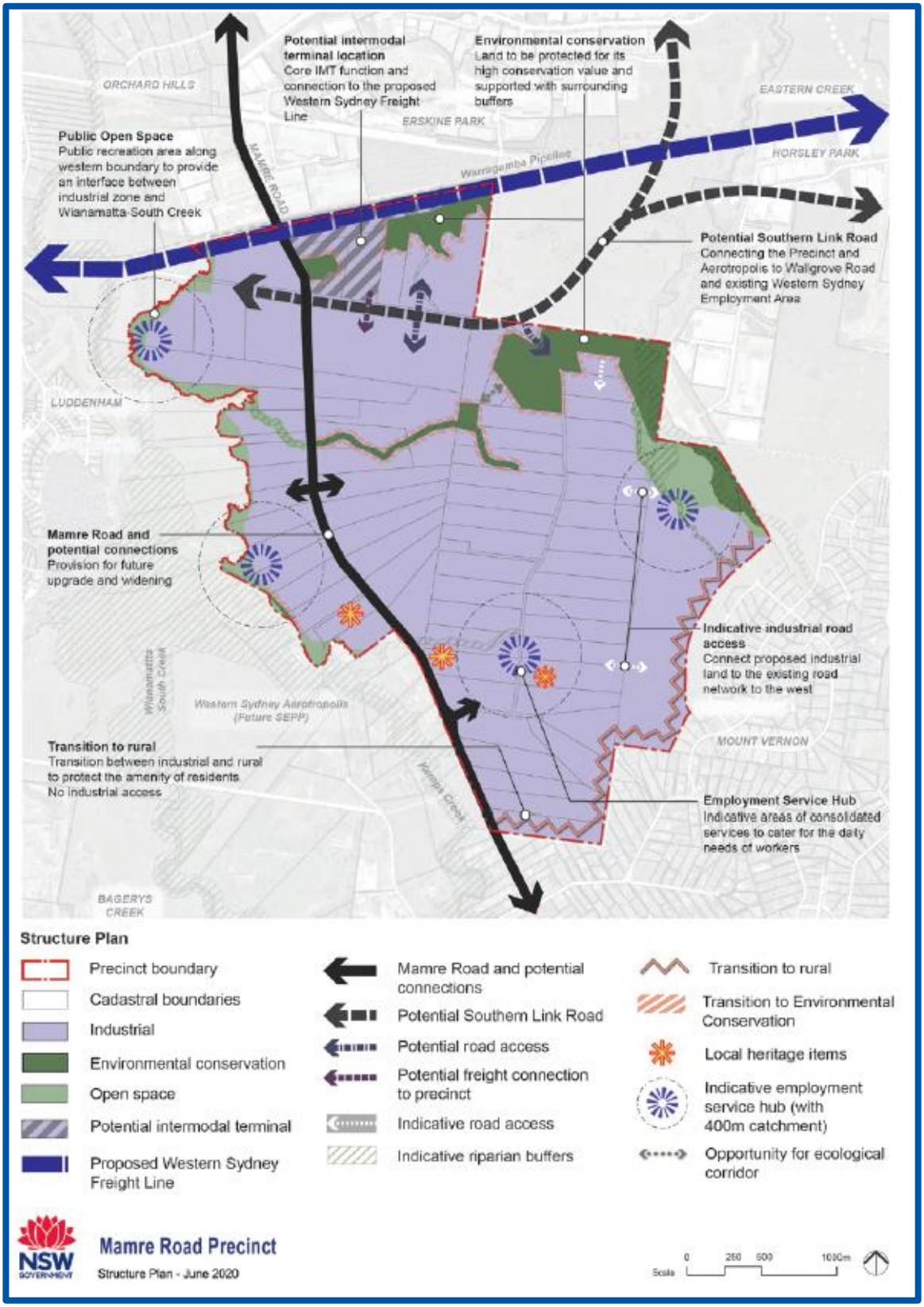


Figure 2-1 Mamre Road Precinct Structure Plan (NSW DPIE 2020)

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

Aspect	Relevance to proposal
Proposal need	The Mamre Road Precinct is one of ten precincts within the Western Sydney Aerotropolis Growth Area and does not have wastewater services available. The precinct was rezoned in June 2020 for industrial development and needs immediate servicing to support planned growth and development in the area expected from 2021. The new infrastructure will connect to the St Marys wastewater network operated under Environment Protection Licence (EPL) 1729.
Proposal objectives	The proposal objectives are to: • provide appropriate wastewater infrastructure to support industrial development and growth in the Mamre Road Precinct, and • ensure compliance with Sydney Water's operating licence and meet commitments in the Customer Contract by providing new network wastewater services for 17,000 new jobs by 2046.
Consideration of alternatives/options	Four servicing options were considered for the precinct. The eastern catchment drains to the St Mary's wastewater network in all options. Options for the western catchment draining to the proposed AWRC included: • Option A –one pumping station to drain western catchment, all catchments serviced by gravity mains • Option B –one pumping station to drain western catchment, all catchments serviced by gravity mains except area north of Bakers Lane which will be serviced by a pressure sewer system • Option C -two pumping stations to drain western catchment, all catchments serviced by gravity mains except area north of Bakers Lane which will be serviced by a pressure system • Option D –two pumping stations (alternative locations to Option C) to drain western catchment, all catchments serviced by gravity mains. The preferred option was agreed with Sydney Water stakeholders in the Preferred Options Workshop held on 28th May 2021. Costs and key risks including environmental, community and technical aspects were assessed. The proposal (Option C) was generally selected as the preferred option as it would achieve the proposal objectives with an acceptable level of risk at the least cost.

2.3 Consideration of Ecologically Sustainable Development

The proposal has been considered against the principles of ecologically sustainable development (ESD) (refer to **Table 2-2** below)

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

Principle	Consideration in proposal
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 underbore waterways and areas of threatened vegetation to minimise impact to these ecosystems.
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 significant vegetation in the Precinct. Any 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*	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 identifies the scope of work for the proposal and **Figure 3-1** shows the location. An overview of the proposed works is provided in **Figure 3-1** and **Figure 3-2** to **Figure 3-9** highlight the site specific environmental constraints.

Table 3-1 Description of proposal

Scope of work	Detailed description of work/ activity
Land ownership and location	The proposal is located within the Mamre Road Precinct in the Penrith City Council Local Government Area (LGA). The majority of the wastewater network is located along Mamre Road, Bakers Lane and adjacent private properties in Kemps Creek, NSW. SP1221 is located within 771 Mamre Road (Lot 23, DP 258414), whilst SP1222 is located within 258 Clifton Avenue (Lot 9, DP812284) (adjacent to Mamre Road). Mamre Road is classified as a state road managed by TfNSW. Bakers Lane is a local road managed by Penrith City Council.
Proposal description	The proposal will involve the construction and operation of a new wastewater network to service the Mamre Road Precinct in Kemps Creek, NSW. The network will consist of the following key assets: • two new wastewater pumping stations (SP1221 and SP1222) located off Mamre Road • about 3km of pressure pipeline between SP1221 and SP1222 - 1.6km of DN315 PE pipe - 1.4km of DN355 PE pipe • about 3.6km of gravity pipelines that connect the local precinct reticulation to the pumping stations - 1.2km of DN225 PP - 2km of DN300 PP - 0.4km of DN375 PP • about 3.5km of DN355 PE pressure pipeline between SP1221 and Ropes Creek carrier
Site establishment and access tracks	Site establishment includes delineating the construction sites, storage and laydown areas, erosion and sediment controls, traffic management and

Scope of work	Detailed description of work/ activity
	vegetation removal. The majority of the work areas can be accessed via existing roads. New access roads will be required for the two pumping stations.
Ancillary facilities (compounds)	Construction compound(s) will likely be required to house site sheds, construction amenities and materials laydown. During the design phase, the location of compounds and access tracks could not be confirmed. The exact location of these will be chosen by the Delivery Contractor, in consultation with the landowner(s) and approved by Sydney Water's Project Manager as described in the safeguards in **Section 5**.
Scope of work	The scope of work is outlined below and shown in **Figure 3-1**. **Investigation/site establishment** • Investigative works including geotechnical, contamination and survey works • Site preparation works including: - establishing temporary compounds - installing erosion and sediment controls - traffic management measures - vegetation trimming/removal - removal of pavement, footpath and/or road surfaces. **Pipelines** Construction of the wastewater pipelines along Mamre Road and Bakers Lane will be primarily open trenched with trenchless technology used for road and major creek crossings. Horizontal Directional Drilling (HDD) will be used east of Bakers Lane to avoid impacts to environmentally sensitive areas. Typical trench dimensions will be up to 1.5m wide and 4.5m, with deeper trenches required in some areas. The maximum trenchless depth for creek crossings is expected to be 10m. Final depths are subject to change during detailed design and will depend on the location of existing services. **Open trench construction** • site establishment • excavating trenches, including stockpiling of spoil material on the upslope side of trenches, or at temporary site compounds • shoring and dewatering trenches or benching the trench profile, depending on trench depth and groundwater levels

Scope of work	Detailed description of work/ activity

- spreading granular bedding material such as sand or gravel along the base of the trench before pipe laying
- installing pipelines
- backfilling the trench with compacted bedding material and excavated soil
- constructing maintenance holes and ventilation shafts
- installing ancillary structures including stop valves and pits
- restoring and stabilising areas disturbed by the construction works
- testing and commissioning of the wastewater pipes.

Trenchless construction

- establishing the drill launch and reception site and pipe laydown area*
- civil works to level and stabilise the site
- installing fencing and safety measures
- excavating the entry and exit pits, likely 5m by 10m
- installing measures to manage drilling fluids and cuttings
- installing measures to manage groundwater, if required
- drilling the borehole, using bentonite-based (or similar) drilling fluid to lubricate the drilling head and flush the drilled hole
- removing spoil, cuttings and slurry and disposing excess spoil, cuttings and slurry that cannot be used in site restoration at a licensed facility
- installing the pipelines and grouting the annulus if required
- restoring affected areas, including backfilling the bore shafts
- testing and commissioning of the wastewater pipes.

*These areas would contain the drilling rig and associated equipment and vehicles, site sheds, and materials storage. Each of these areas would be about 20 m by 20 m. The drill reception site would also require an area the length of the drill run to string the pipe before it is installed.

Wastewater pumping stations

Both pumping stations have been designed with a similar orientation and layout. They feature a loop road with a single entry and exit. The majority of structures are located within the loop road, with the emergency storage and gas check chambers located outside the loop road. The stations will consist of an in ground wet well, with two submersible, single speed pumps in a duty/standby arrangement, a valve chamber and inlet maintenance hole, emergency storage and relief system, odour control unit, chemical dosing unit, vent shafts and

Scope of work	Detailed description of work/ activity
	supporting infrastructure and amenities. SP1221 will have an above ground electrical kiosk and SP1222 will have an above ground switchroom building. The ultimate pumping capacity is 111L/s for SP1221 and 176L/s for SP1222. **SP1221 and SP1222 construction** • earthworks to establish required levels • excavations and concrete work for the wet wells, emergency storage structures, valve chambers and inlet maintenance holes • shoring or benching the excavations, depending on the excavation depths • installing maintenance / access chambers • installing pumps and equipment • installing inflow/outflow pipelines using open trenching techniques • installing an emergency overflow pipe to discharge into the drainage channel to South Creek (SP1221) and Kemps Creek (SP1222) • installing covers and access hatches on the wet well and chambers • ancillary site works such as installing permanent roads, utilities and fencing • installing electrical kiosk and switchroom • installing chemical dosing unit and odour control unit • electrical and mechanical fit out • site restoration and landscaping • testing and commissioning of the stations.
Commissioning	Commissioning involves testing and running the new equipment to ensure the equipment is working correctly and 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 will be replaced in consultation with Council and offset in

Scope of work	Detailed description of work/ activity
	accordance with the Sydney Water Biodiversity Offset Guideline. Site restoration activities will include: • backfilling of trenches as soon as works are finished • dismantling compounds, removal and disposal of waste material and removing construction signage • restoring ground cover and native vegetation • restoration of road pavement surfaces and drainage where pipework is trenched into place • removing erosion and sediment controls, fencing and traffic management measures.
Equipment	Typical equipment likely to be used includes but is not limited to: • excavators • rock breakers / jackhammers • compactors • concrete truck and pump • concrete saws • drill rig • backhoe • tipper trucks • bogie / truck and dog • light vehicle • street sweeper • water truck • cranes • generators • air compressors • skip bins • portable pumps and sediment tank • welding equipment and power tools (various) • confined spaces safety equipment (e.g. gantry/davit) • site facilities and amenities • storage containers
Materials	Typical materials likely to be used include but is not limited to: • Polyethylene (PE) pipe for the pressure pipelines • Polypropylene (PP) pipe for the gravity pipelines • pumps and other equipment • building materials, steel and timber • fuel for minor plant and equipment • topsoil, bitumen and concrete

Scope of work	Detailed description of work/ activity
	• valves and other fixtures • concrete for encasement • granular materials • reused excavated material for pipe trench fill.
Work hours	Work and deliveries will be scheduled to occur during standard daytime hours: • 7am to 6pm, Monday to Friday • 8am to 1pm, Saturdays The proposal is expected to require work outside these hours. Some nightwork may be required to install pipelines in road reserves. The need for nightwork will be determined during detailed design in consultation with the road authority and in accordance with any Road Occupancy Licences (ROLs). Sydney Water's Project Manager can approve work outside of standard daytime hours, following the approval process described in the safeguards in **Section 5**.
Proposal timing	Construction is expected to start in mid to late 2022 and take approximately 14 to 18 months. It is anticipated that this infrastructure will be commissioned for ultimate servicing by early to mid 2024.
Operational requirements	The two pump stations will operate largely automatically without the need for a permanent presence at each site. The stations will be operated in accordance with Sydney Water's existing environment protection licence (EPL 1729) under the *Protection of the Environment Operations Act* 1997. Routine and emergency maintenance would occur as required.

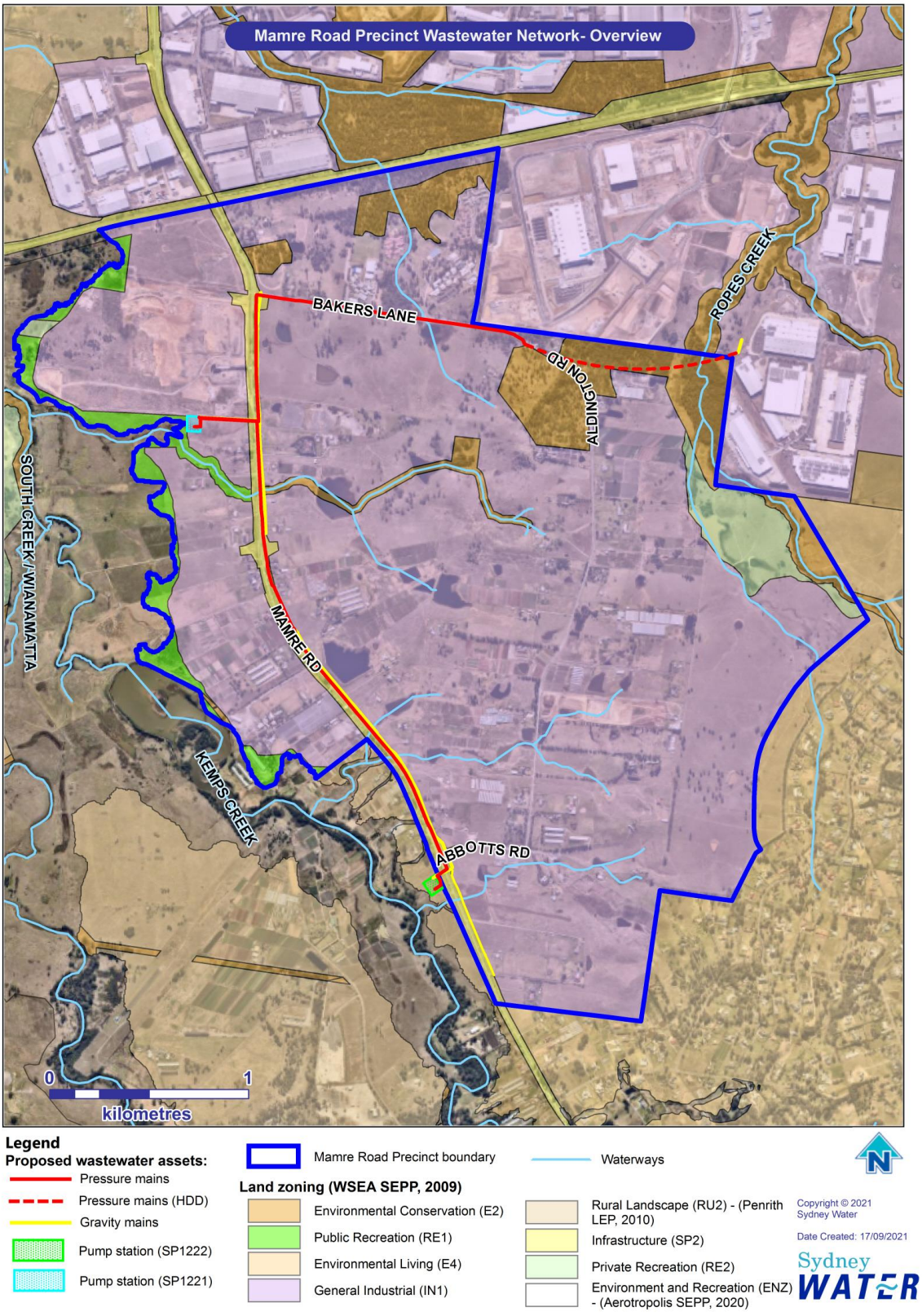


Figure 3-1 Proposal overview and zoning

Figure 3-2 Bakers Lane (Map 1)

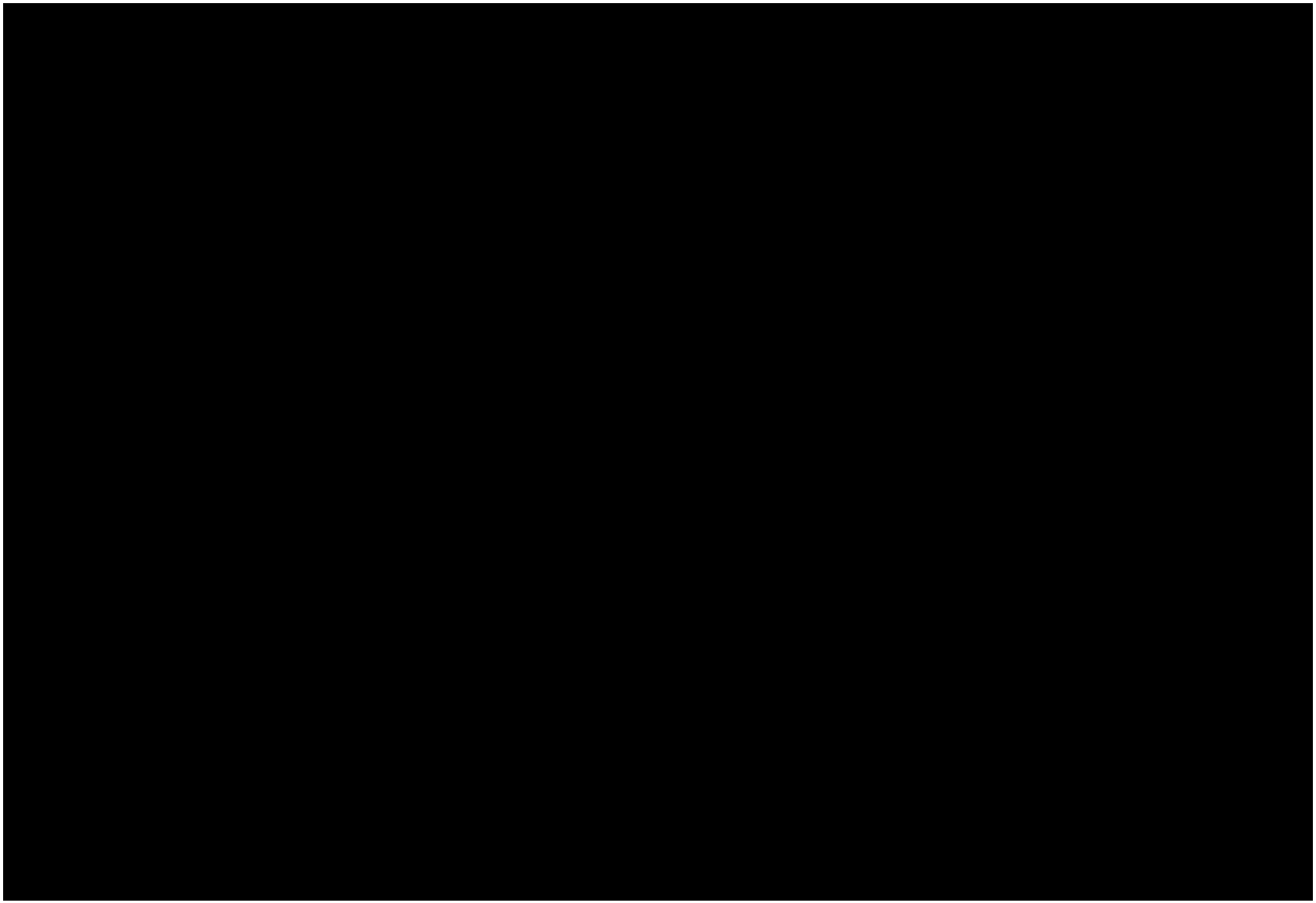


Figure 3-3 Bakers Lane (Map 2)

Figure 3-4 Bakers Lane (Map 3)

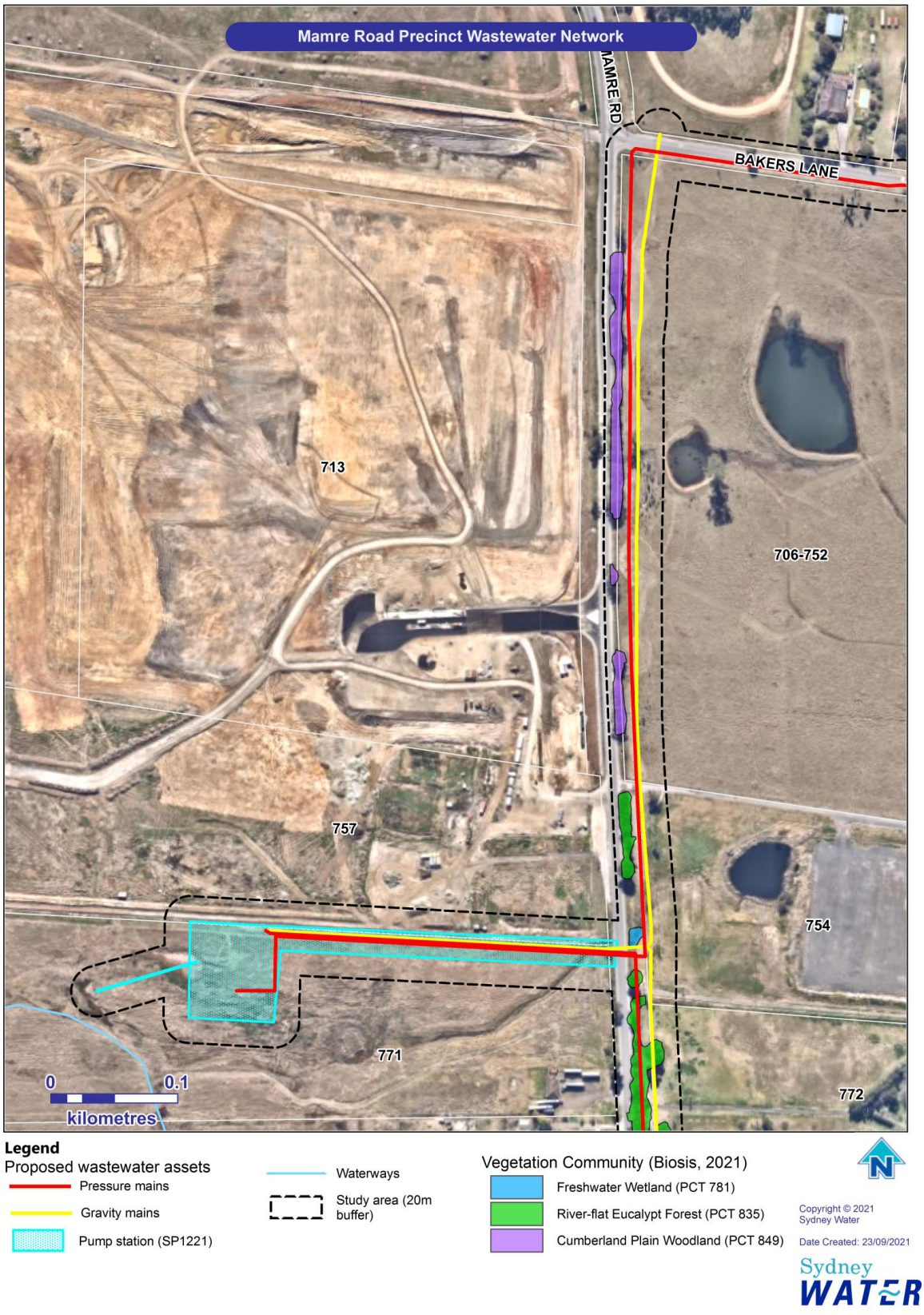


Figure 3-5 Mamre Road (Map 1)

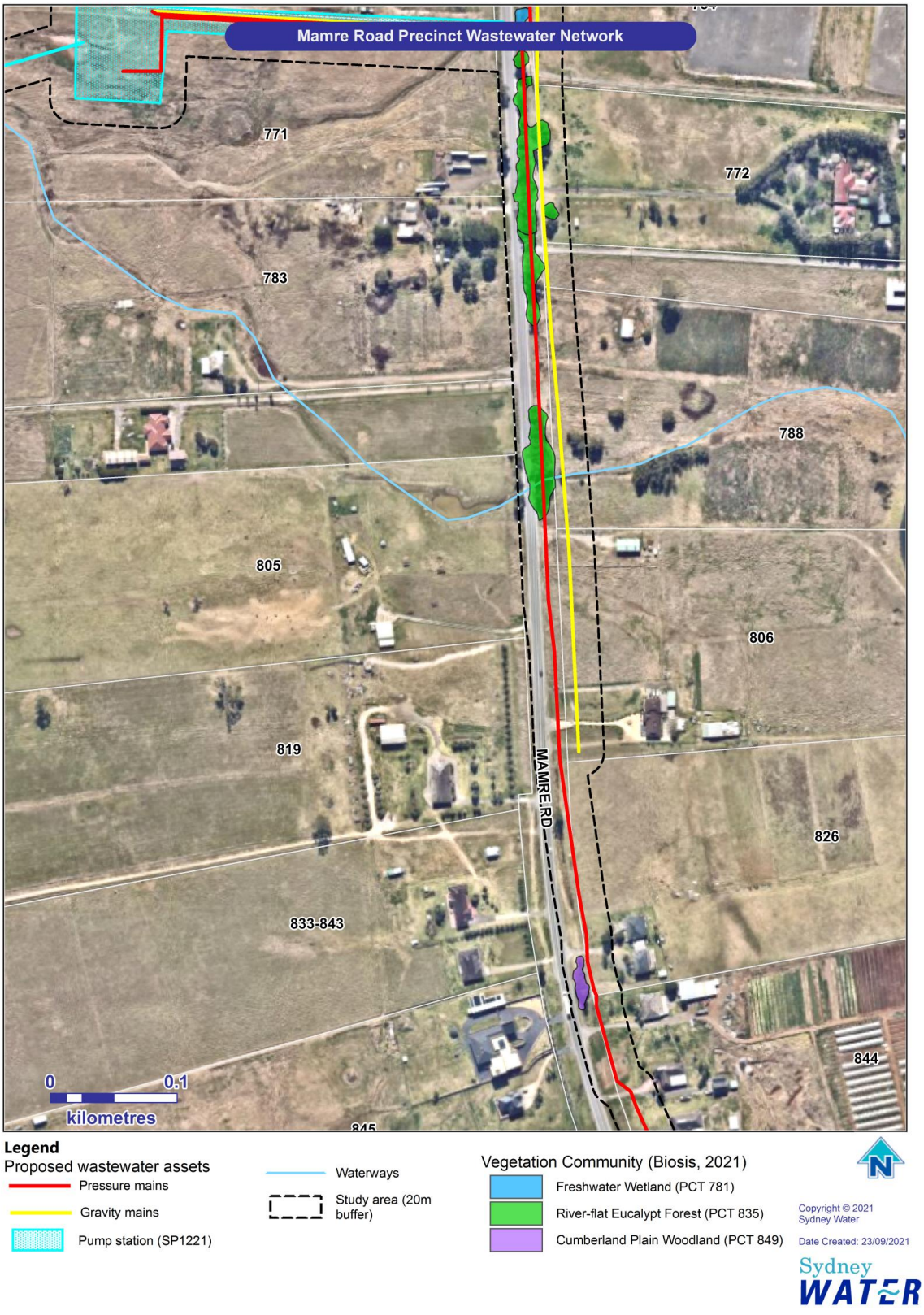


Figure 3-6 Mamre Road (Map 2)

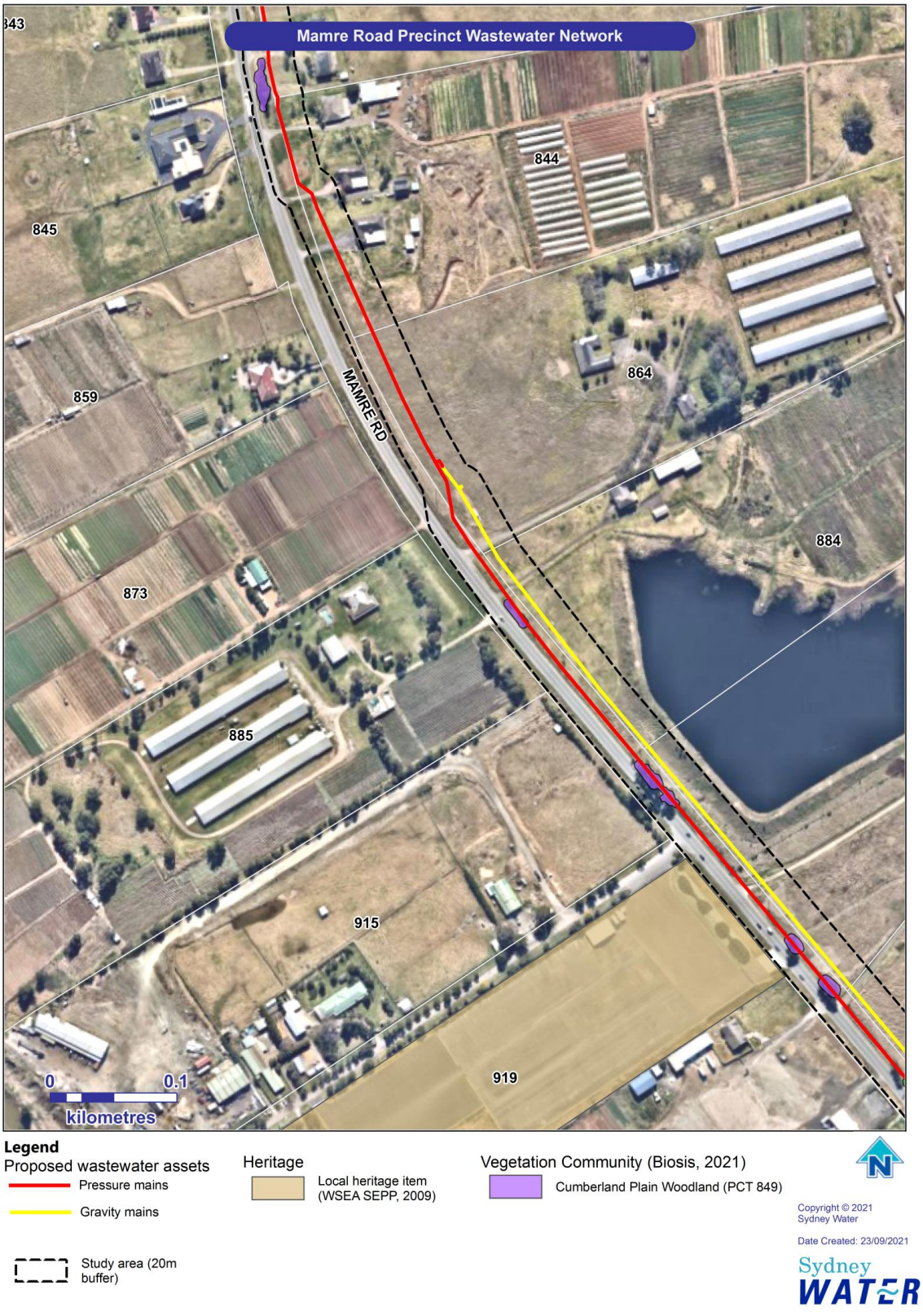


Figure 3-7 Mamre Road (Map 3)

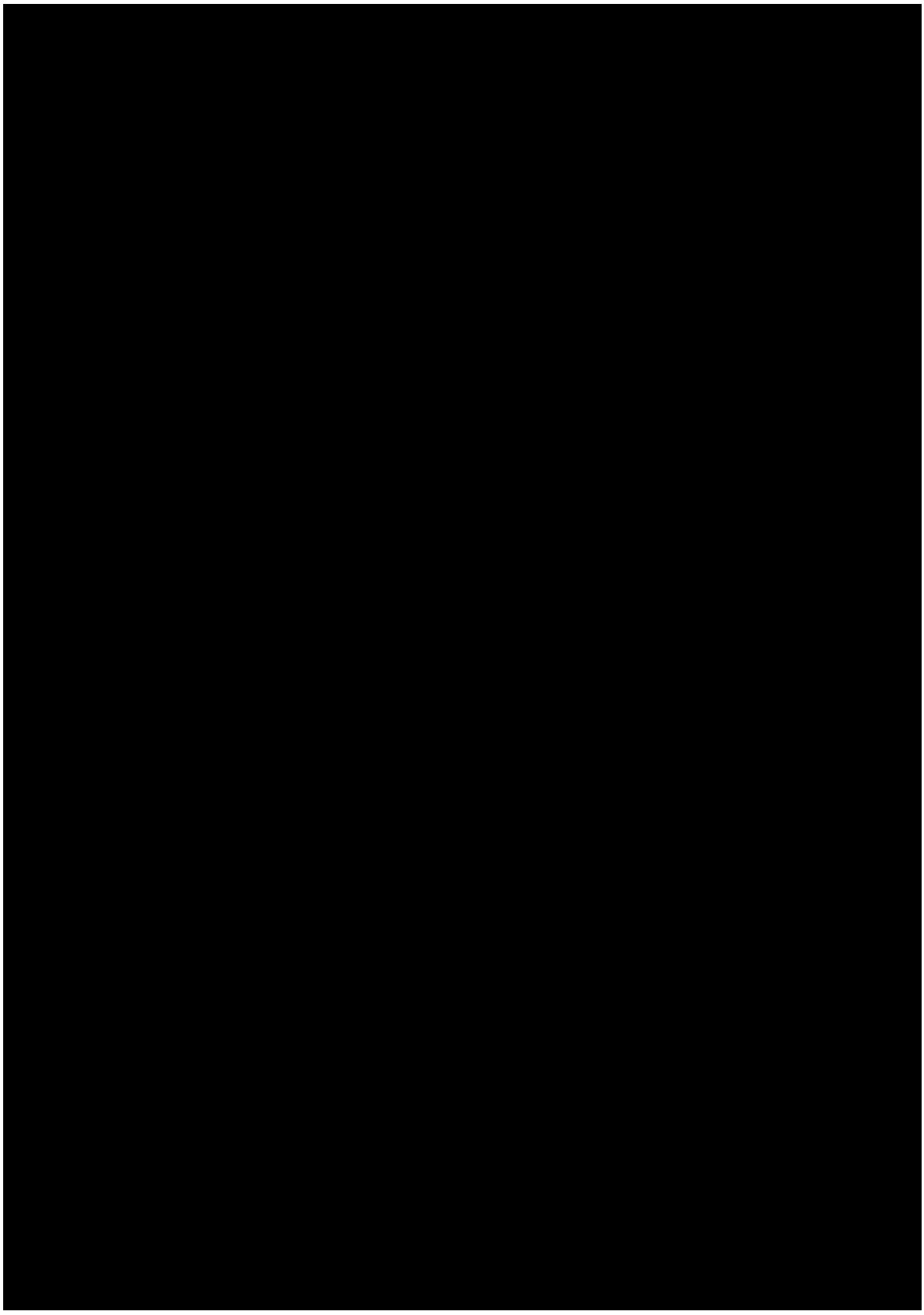
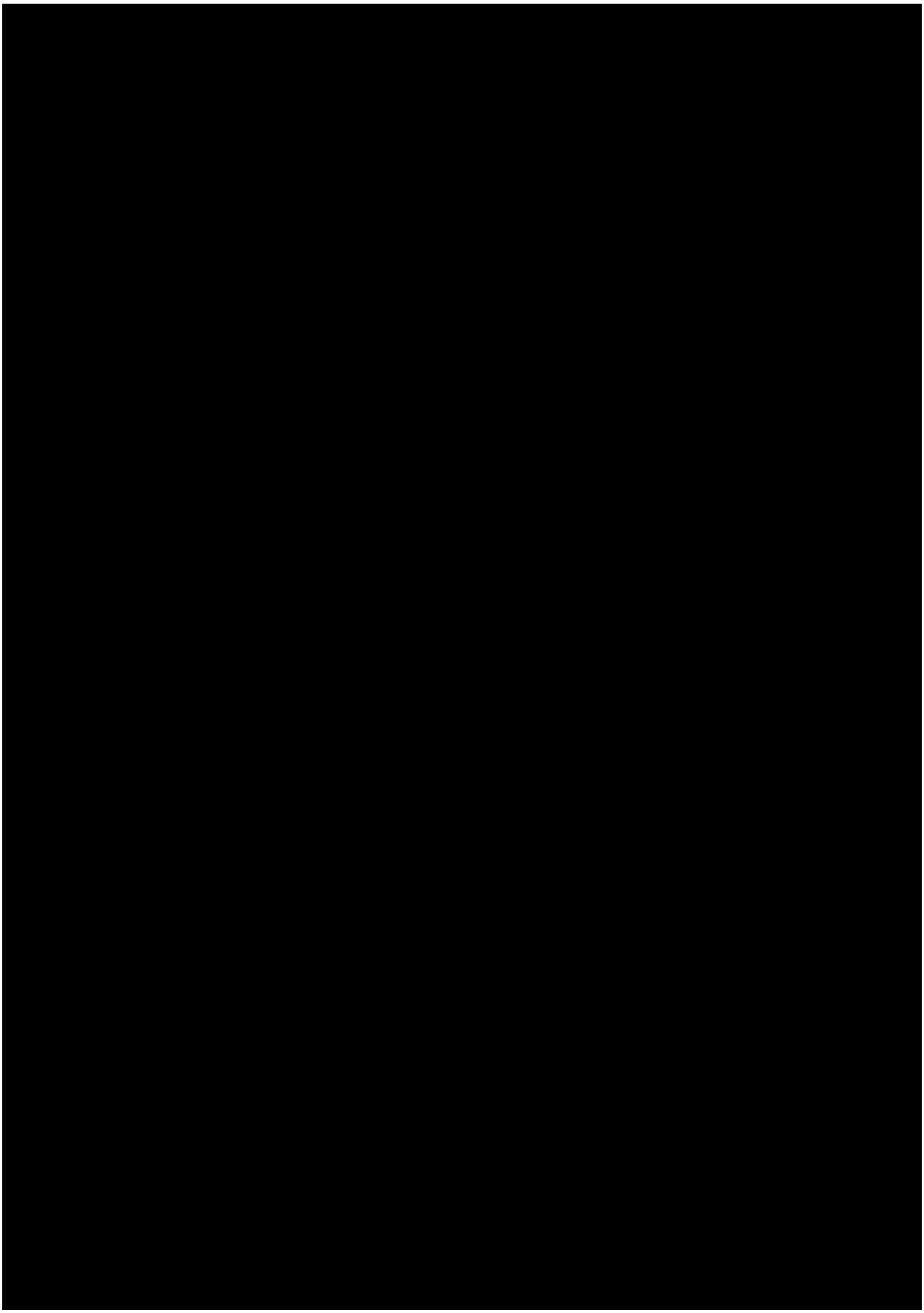


Figure 3-8 Mamre Road (Map 4)



3.2 Field assessment area and changes to the scope of work

The field assessment area was defined as a 20m buffer either side of the of the proposed wastewater network. The direct impact area comprises a 10m wide corridor along pipeline alignments and the footprint of each pump station.

The scope of this REF is indicative and based on the latest concept design at the time of REF preparation. The final design may change based on detailed design and/ or construction planning. If the design/scope of work or construction methods described in this document change significantly, supplementary environmental impact assessment must be prepared for the amended components in accordance with SWEMS0019.

An addendum is not required provided the change:

- remains within the field assessment area (20m buffer zone) of the REF and has no net additional environmental impact; or
- is outside the field assessment area of the REF but reduces the overall environmental impact of the proposal (s.5.4(a) of the Act).

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

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

The Delivery Contractor 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 representatives.

4 Consultation

4.1 Community and stakeholder consultation

Our approach to community and stakeholder consultation is guided by the Policy and Guidelines for Community and Stakeholder Engagement (Sydney Water,2019).

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

- enables us to explain strategy, policy, proposals, projects 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.

If our work will impact the community in some way, we will consult with affected groups through a variety of ways and through different stages of a project. This includes engaging the broader community and stakeholders during plan or strategy development or before making key decisions.

We will also provide local councils with reasonable notice when we would like to commence works, regardless of the need for development consent. Local council(s) will be consulted about matters identified in environmental planning instruments (refer **Section 4.2** below), including public safety issues, the placement of any temporary site sheds or laydown areas on council land, or full or partial road closures of council managed roadways.

The Consultation Outcomes report, 2021 provides a summary of the stakeholder engagement activities completed during concept design. Community and stakeholder engagement activities included:

- 47 Notice of Entries sent
- meetings with Penrith City Council and TfNSW
- 14 meetings with directly affected private landowners and developers
- emails and phone calls with internal and external stakeholders.

We shared our plans, explained the impacts of the project and requested feedback on our design. We will continue to work with the local community and other stakeholders during the detailed design and delivery of the project to minimise impacts where possible.

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 (specified in Part 2 Division 1 of the State Environmental Planning Policy (SEPP) Infrastructure 2007.

Consultation is required under clause 13(1) if the Infrastructure SEPP as the proposal involves excavation of a council managed road. The delivery contractor is required to consult with Penrith City Council in accordance with this clause. Further detail is provided in **Appendix B**.

Consultation with Fisheries is also required under s 199 of the *Fisheries Management Act 1994* as the works involve dredging and reclamation of a waterway classified as 'Key Fish Habitat'. Fisheries were consulted on the 21st October 2021. DPI Fisheries reviewed the proposal and had no objections to the proposed works, provided that the environmental safeguards in **Section 6.2** are followed.

5 Legislative requirements

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, timing and responsibility for obtaining them.

Table 5-1 Consideration of environmental planning instruments relevant to the proposal

Environmental Planning Instrument	Relevance to proposal
State Environmental Planning Policy (Infrastructure) 2007 (ISEPP)	Clause 106 (3B) of the Infrastructure SEPP permits development by or on behalf of a public authority for sewerage reticulation systems, including pumping stations, without consent on any land in the prescribed circumstances. The proposal involves development of a sewerage reticulation system. This type of development is carried out in the prescribed circumstances if it is carried out by or on behalf of a public authority. As Sydney Water is a public authority, the proposal is permissible without consent.
SEPP (Western Sydney Employment Area) 2009 (WSEA SEPP)	The proposal is located on land to which this policy applies, zoned as E2 Environmental Conservation, IN2 General Industrial, SP2 Infrastructure and RE1 Public Recreation. However, clause 33(1) states: 'this Policy does not restrict or prohibit, or enable the restriction or prohibition of, the carrying out of any development, by or on behalf of a public authority, that is permitted to be carried out without consent, or that is exempt development, under the *State Environmental Planning Policy (Infrastructure) 2007*." As the works are permissible under the ISEPP, development consent is not required.
State Environmental Planning Policy (Western Sydney Aerotropolis) 2020 (Aerotropolis SEPP)	The proposal is partly located within land to which the Aerotropolis SEPP applies. The overflow pipes for each pump station intersect land zoned ENZ Environment and Recreation. As per Clause 7(1) of the Aerotropolis SEPP, the provisions of the ISEPP still apply.
Penrith Local Environmental Plan 2010	The proposal is located on land within the Penrith LGA to which this LEP applies, however the majority of the land is zoned under the WSEA SEPP and Aerotropolis SEPP. SP1222 is on land zoned RU2 Rural Landscape under the Penrith LEP.
SEPP (Vegetation in Non-Rural Areas) 2017	This SEPP applies as the proposal is in an area listed in Clause 5.1a (City of Penrith) and on land within the zones listed in Clause 5.1b. However,

	section 6.1 states: '*This Policy does not affect the provisions of any other SEPP….*' As the works are permissible under the ISEPP a Council permit to clear vegetation under this SEPP is not required.

Table 5-2 Consideration of key environmental legislation

Legislation	Relevance to proposal	Permit or approval	Timing and responsibility
Environmental Planning and Assessment (EP&A) Act 1979	Sydney Water is the proponent and determining authority under this 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.	REF	Pre-construction, Sydney Water
Protection of the Environment Operations (POEO) Act 1997	The POEO Act aims to, among other things, protect, restore and enhance the quality of the environment in NSW. It includes offences for polluting the environment and establishes a regime of environment protection licences. The proposal must adhere to any requirements under Sydney Water's existing environment protection licence for the St Mary's wastewater system including St Mary's WWTP (EPL 1729).	Existing EPL 1729	During operation, Sydney Water
Biodiversity Conservation (BC) Act 2016	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. While the proposal would require the removal of native vegetation, the implementation of the safeguards and management measures provided in **Section 6.2.3** would minimise the potential for impacts on threatened species, populations or ecological communities listed under the BC Act. Further information is provided in **Appendix E**.	ToS	Pre-construction, Sydney Water

National Parks and Wildlife (NPW) 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 Due Diligence assessment (**Appendix D**) confirmed that provided the safeguards are implemented, impacts to Aboriginal Heritage would be avoided and an Aboriginal Heritage Impact Permit (AHIP) under the Act, would not be required.	N/A	N/A
Heritage Act 1977	The Heritage Act provides for the conservation of environmental heritage in NSW. The proposal is partly located within the curtilage of 'Gateposts to Colesbrook' which is an item of local heritage significance listed on the Penrith LEP and WSEA SEPP. The proposal is not expected to impact this heritage item (see **Section 6.2.6**).	N/A	N/A
Fisheries Management (FM) Act 1994	The FM Act protects threatened species, populations and communities of fish and marine vegetation, as well as commercial and 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 Key Fish Habitat (Kemps Creek). Fisheries will be notified in accordance with s 199 of the FM Act.	S 199 notification	Pre-construction, Sydney Water
Water Act 1912/ Water Management Act 2000	Section 60A of the Water Management Act states that it is an offence to take water without a licence. A Water Access Licence is required under section 61 where groundwater extraction will be greater than 3 ML. A Water Supply Work (WSW) approval is required under Section 90(2) for all activities that involve dewatering groundwater (e.g. dewatering an excavation such as a trench, or HDD), irrespective of volume. We do not expect to dewater >3ML during construction however some	WSW Approval	Pre-construction, Sydney Water with dewatering information from the Contractor

	dewatering will be conducted, as such a WSW approval is required.		
Roads Act 1993	This act regulates works in, on or over a public road. Approval under Section 138(1) of this Act is required for carrying out works in, digging up, or disturbing a public road. Traffic control or partial closures may be required for work on these roads. The proposal will impact state and local roads. A road occupancy licence will be required.	Road Occupancy Licence	Pre-construction, Contractor
Environment Protection and Biodiversity Conservation (EPBC) Act 1999	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.	N/A	N/A

6 Environmental assessment

The potential environmental aspects and impacts associated with construction and operation of the proposal are identified in **Section 6.2** as well as safeguards to minimise these. These safeguards will be incorporated into contract documents and a Construction Environmental Management Plan (or similar) to be developed by the Contractor prior to commencement of work.

A risk assessment will be undertaken by the Project Manager following Sydney Water's Risk Management Standard.

6.1 Existing environment

The Mamre Road Precinct is located about 40 km west of the Sydney CBD and 12 km southeast of the Penrith CBD. It is located entirely within the suburb of Kemps Creek, in the Penrith City Council LGA. It is bordered by the WaterNSW Warragamba Pipeline to the north, Wianamatta South Creek and Kemps Creek to the west, Ropes Creek to the east and Mount Vernon to the south. The precinct has an approximate gross site area of 1002 ha. Whilst the precinct is currently zoned for industrial use, at the time of preparing this REF the existing environment within the precinct is mostly pasture, minor roads, sheds, out buildings and farm dams with pockets of intensive farming and industrial development. The northern portion of the site includes Mamre Anglican School, Emmaus Catholic College, Trinity Primary School and several retirement villages. The environmental features within and adjacent to the study area are detailed in **Section 6.2.**

6.2 Environmental aspects, impacts and safeguards

6.2.1 Topography, geology and soils

Existing environment and potential impacts

The topography of the study area is relatively flat along Mamre Road and highly undulating along Bakers Lane. The study area is underlain by two geological units; alluvial floodplain deposits, comprising the surface material near creeks, and Bringelly Shale bedrock. The soil landscapes within the study area are predominantly comprised of Blacktown soils, with South Creek soils present along local creek banks. Luddenham soils are present to the east of Mamre Road and along Bakers Lane. These soil landscapes have moderate to high erodibility.

According to the Map of Salinity Potential in Western Sydney (2002) the majority of the site is within an area of moderate salinity potential with areas of high salinity potential present along the banks of Ropes Creek. Areas of known salinity are present in localised areas to the west of Ropes Creek. Conductivity testing of soil and groundwater samples undertaken as part of the Geotechnical Site Investigation (Arup, 2021) indicate a non-saline environment with soil conductivity values less than 4dS/m.

During construction, we will need to disturb ground, remove vegetation, excavate and stockpile soil which could result in potential offsite erosion and sedimentation of surrounding land and waterways. Typical trench dimensions will be up to 4.5m deep and 1.5m wide. Deeper excavations will be required in some areas. Finals depths are subject to change during detailed design and will depend on the location of existing services. The maximum trenchless depth is expected to be 10 metres, beneath Ropes Creek. Deep excavations are required to construct each pump station. Both wet wells would be about 11.1m deep x 3.6m diameter. The total volume of excavation required for the project is predicted to be 63,658m^3 (see **Table 6-1** for details).

Table 6-1 Mamre Road wastewater network project estimated spoil volumes

Asset	Volume of excavation (m^3)
SP1221	1290
SP1222	1080
Pipelines	61288

Inappropriate management of saline soils has the potential to impact surrounding land and waterways from off-site leaching of saline soils. The works will not permanently change the surface topography and drainage patterns of the area. The area will be returned to its original topography and drainage pattern following construction.

Safeguards
Prevent sediment moving offsite in accordance with Managing Urban Stormwater, Soils and Construction, Volume 1 and 2A (Landcom 2004 and DECC 2008), including: • 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 certified for intended use and is free from contamination including asbestos.
Stop work in the immediate vicinity of suspected contamination. Indicators of contamination include discoloured soil, anthropogenic fill material, asbestos, strong 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. Sydney Water Project Manager to contact Property Environmental Services for advice regarding management options.
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.
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: • treat existing salinity with gypsum • establish salt tolerant species in existing or potential salinity problem areas after construction • stabilise existing areas of erosion • minimise water use on site • avoid rotation and vertical displacement of the original soil profile • backfill excavations deeper than one metre in the same order, or treat or use this material as fill at depths more than one metre from the finished level.

6.2.2 Water and drainage

Existing environment and potential impacts

Several creeks and farm dams exist within 100m of the proposal (**Table 6-2**). Kemps Creek and Wianamatta-South Creek are present to the west of Mamre Road and Ropes Creek to the east of Bakers Lane. Each of these waterways are classified as Key Fish Habitat. Aquatic habitats in the study area are in poor condition (**Appendix E**). Peri-urban agriculture in the study area and diffuse pollution inputs (e.g. runoff from roads and development) are local water quality stressors.

The proposal crosses multiple unnamed drainage lines that are tributaries of Kemps Creek and Wianamatta-South Creek that intersect with Mamre Road. The eastern section of the Bakers Lane alignment will be underbored beneath Ropes Creek. The Mamre Road alignment will also be underbored beneath an existing farm (Lot 1, DP 250002).

The emergency relief outlet pipe from SP1221 discharges to an unnamed drainage channel that flows into Wianamatta-South Creek. The emergency relief outlet pipe from SP1222 will discharge to Kemps Creek and requires excavation and installation of an emergency relief structure (ERS) within the creek bank. Water quality sampling was conducted at this site and found that the water quality in Kemps Creek was poor and did not meet the relevant ANZECC Water Quality Guidelines for the protection of aquatic systems in South-East Australia.

Poor site management may lead to potential sedimentation impacts to these local watercourses. Trenchless crossing techniques such as micro-tunnelling or HDD would be used to cross Ropes Creek and the farm dam. Use of trenchless techniques would mitigate impacts to surface water drainage patterns and would not require the diversion of surface water flows in these waterways. An environmentally sensitive design will be adopted for the ERS construction at Kemps Creek to emulate a more natural bank frontage and reduce the potential for bank erosion at the overflow point.

During extreme weather events, the wastewater storage capacity at SP1221 and SP1222 may be exceeded and untreated wastewater could flow from the overflow points. This is necessary to avoid internal surcharges in the wastewater system. During these overflow events, wastewater would have the potential to impact Kemps Creek and Wianamatta-South Creek, contributing to an increase in background nutrient loads, pathogen levels and trace pollutant loads. The impact of these temporary and infrequent wastewater discharges would be minimised by the large catchment flows that occur during extreme wet weather events. The new infrastructure will be designed and operated to comply with Sydney Water's existing environment protection licence for the St Mary's wastewater system (EPL 1729).

Table 6-2 Waterways within 100m of the proposal

Location	Waterway	Distance from works
Bakers Lane	Ropes Creek	HDD alignment passes 10m beneath this creek
Mamre Road	Ephemeral drainage channels and chain of ponds	Alignment follows this road which intersects multiple unnamed drainage channels
Mamre Road (Lot 1, DP 250002)	Farm dam	Alignment will be underbored beneath dam
SP1221	Wianamatta-South Creek	About 73m west of SP1221
SP1222	Kemps Creek	Overflow point intersects creek bank

The proposal will require:

- Excavation up to an average depth of 4.5m for pipelines and 10m for pump stations that will intercept groundwater. Geotechnical investigations found that groundwater levels across the study area range between 0.5m and 3m below ground level. The works can be classified as 'minimal impact activity', as per the Aquifer Interference Policy.
- Dewatering from trenches and pits. Dewatered groundwater is likely to be sediment laden and will be managed to minimise downstream impacts. We do not anticipate the volume of dewatered groundwater to exceed 3 ML/year. A Water Supply Work Approval is required for all activities that involve dewatering of groundwater. The volume of dewatered groundwater would be monitored across the proposal area and a Water Access Licence sought if the dewatering volume will exceed 3ML.
- Works within flood prone areas. The pump stations and pipelines are located outside of the 1% AEP flood extent however, the overflow points of each pump station will be on flood

prone land. The proposal is not likely to adversely affect flood behaviour given the works will not permanently change surface topography and drainage patterns.

- Storage of fuels and chemicals on site.

Safeguards
Use appropriate controls to avoid potential sedimentation to waterbodies. Silt curtains or a coffer dam should be deployed around in-stream work sites where required.
DPI Fisheries (1800 043 536) and the Environment Protection Authority (131 555) is to be notified immediately if any fish kills occur in the vicinity of the works. In such cases, all works other than emergency response procedures are to cease until the issue is rectified and approval is given by DPI Fisheries and/or the Environment Protection authority for the works to proceed.
In-stream works at Kemps Creek should be limited to calm weather conditions and should be undertaken during low flow periods wherever possible. Any large woody debris required to be moved to facilitate the works should be relocated once works are complete rather than removed.
Where natural banks exist, these banks should be reformed or remediated to resemble the preworks condition and form to the fullest extent practicable following the completion of works.
Any plant or equipment used in-stream should be washed down and cleaned prior to use to reduce the translocation risk of aquatic weed species.
Consider the design principles and management measures outlined in the *Guidelines for outlet structures on waterfront land, Laying pipes and cables in watercourses on waterfront land* and *Instream works on waterfront land* (Office of Water, 2021) for works within 40m of Kemps Creek to protect waterfront land.
Sediment stockpiles should be located as far away from existing waterways as possible and managed so that it is secure against flooding. Any runoff from stockpiled sediment must be managed to prevent sediment entering waterways.
Bund potential contaminants and store on robust waterproof membrane, away from drainage lines.
Keep functioning spill kits (including an aquatic spill kit for works in key fish habitat) on site for clean-up of accidental chemical/fuel spills. Keep the spill kits stocked and located for easy access.
Locate portable site amenities away from watercourses or drainage lines.
Sydney Water will obtain a groundwater Water Supply Approval and where dewatering is >3ML per water year (from 1 July) a Water Access Licence from NRAR will also be obtained. The Delivery Contractor is responsible for: • preparing a Dewatering Management Plan • complying with the approval conditions (such as protecting water quality; minimising aquifer extraction volumes, monitoring extraction with flow meters and recording volumes).

Dewater excavations in accordance with the Program Delivery Guidance Standard 9.1 Excavation Dewatering (ENV-GS-001).
Store all chemicals and fuels in accordance with relevant Australian Standards and Safety Data Sheets. Record stored chemicals on site register. Bunded areas to have 110% capacity of stored liquid volume. Chemicals and fuels in vehicles must be tightly secured. All chemicals to be clearly labelled.
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.
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 to avoid impacts, including: • contain and monitor drilling fluids at entry/exit points • identify and manage frac-outs • re-use and/or disposal of drilling fluids (checking waste classification).

6.2.3 Flora and fauna

A Flora and Fauna assessment of the area was conducted by Biosis in May 2021 and has been summarised here. The Flora and Fauna assessment included a desktop review, a flora and fauna survey, likelihood of occurrence assessment for the identified flora and fauna, and Tests of Significance (ToS) for those species and communities present or likely to occur. [redacted]

Existing environment

The study area supports a range of ecological values including areas of native vegetation, Threatened Ecological Communities (TEC), hollow-bearing trees, scattered trees and waterways. The native vegetation communities along with their conservation status under the BC Act and EPBC Act are outlined in **Table 6-3**.

Table 6-3 Vegetation communities

Vegetation community	Plant Community Type	BC Act	EPBC Act
Cumberland Plain Woodland	Grey Box-Forest Red Gum Grassy Woodland on Flats of the Cumberland Plain, Sydney Basin (849)	Critically endangered ecological community	Does not meet criteria
Cumberland Plain Woodland	Grey Box- Forest Red Gum Grassy Woodland on Shale of the Southern Cumberland Plain, Sydney Basin Bioregion (850)	Critically endangered ecological community	Does not meet criteria

River Flat Eucalypt Forest	Forest Red Gum-Rough-barked Apple Grassy Woodland on Alluvial Flats of the Cumberland Plain, Sydney Basin (835)	Endangered ecological community	Does not meet criteria
Swamp Oak Floodplain	Swamp Oak Open Forest on Riverflats of the Cumberland Plain and Hunter Valley (1800)	Critically endangered ecological community	Does not meet criteria
Freshwater Wetland	*Phragmites australis* and *Typha orientalis* coastal freshwater wetlands of the Sydney Basin Bioregion (1071)	Not listed	Not listed

One hollow bearing tree was recorded during field investigations. It is unlikely this will need to be removed during construction. Eight priority weeds for the Greater Sydney Region have been recorded within the study area including Bridal Creeper, Ground Asparagus, Alligator Weed, African Olive, Lantana, African Boxhorn, Blackberry and Fireweed. Seven threatened fauna species and three threatened flora species were identified as having a medium or higher likelihood of occurrence in the study area. Aquatic habitats within the study area, including Kemps and Ropes Creek, are in poor condition and do not contain suitable habitat for threatened aquatic species, populations or communities.

Potential impacts

The proposal has been designed to reduce impacts on ecological values and to minimise removal of native vegetation and habitat. Some sections of the alignment will be constructed using trenchless technology to minimise impacts on riparian vegetation and connectivity and avoid impacts on key fish habitat.

Construction of the pipelines and pumping stations will result in the removal of up to 0.54ha of native vegetation, including:

- 0.11ha of Cumberland Plain Woodland (PCT 849)
- 0.41ha of River-flat Eucalypt Forest (PCT 835)
- 0.007ha of Swamp Oak Floodplain Forest (PCT 1800)
- 0.007ha Freshwater Wetlands (PCT 1071).

A ToS was prepared for three TECs (Cumberland Plain Woodland, River-flat Eucalypt Forest and Swamp Oak Floodplain Forest) and two threatened fauna species (Cumberland Plain Land Snail and hollow-dependent Microchopteran Bats) identified within the study area. It was concluded that the project will not have a significant impact on the ecological communities or threatened species, therefore a Biodiversity Development Assessment Report is not required.

Given the potential for removal of native vegetation, the focus of the environmental safeguards is to minimise disturbance to any surrounding native vegetation, fauna habitat and riparian areas.

Offsets to native vegetation impacts will be in line with Sydney Water's Biodiversity Offset Guide (the Guide). Indicative offset requirements calculated in accordance with the Guide are summarised in **Table 6-4** and would be confirmed once native vegetation clearance is verified in construction. The Contractor will consult with Penrith City Council to identify appropriate offset areas with a focus on improving the existing riparian zones.

Table 6-4 Non-statutory offset requirement

Vegetation Community	Impact area (Ha)	Offset Multiplier	Offset requirement (Ha)
Cumberland Plain Woodland	0.11	3	0.33
River Flat Eucalypt Forest	0.41	3	1.23
Swamp Oak Floodplain Forest	0.007	2	0.014
Freshwater Wetlands	0.007	2	0.014

Safeguards
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 Sydney Water's 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).
Residual impacts to native vegetation and trees will be offset in accordance with the Biodiversity Offset Guideline (SWEMS0019.13). See **Table 6-4** for offset requirements.

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 aquatic 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 (eg. 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 Program Delivery Guidance Standard 9.3 Biodiversity Management (ENV-GS-003).
Potentially affected residents will be notified of any tree removal.
Retain dead tree trunks, bush rock or logs in-situ unless they are in the study 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 inspect the removal 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 removal of hollow bearing trees, engage a licenced ecologist to inspect and relocate fauna before works.
If native fauna is encountered on site, stop work and allow the fauna to move away unharassed. Engage a licenced ecologist if assistance is required to move fauna.
Avoid impeding/blocking fish passage. Retain snags and natural obstructions in waterways where possible.
If dewatering farm dams, engage a licensed ecologist to undertake fauna relocation (eg turtles, frogs, etc.) into an appropriate nearby habitat.
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 provided.
If any damage occurs to vegetation outside of the field assessment 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. Record Pesticides and Herbicides use in accordance with SWEMS00017.
To prevent spread of weeds: • clean all equipment including PPE prior to entering or leaving the work sites • 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.
In TOBAN period: 1. Check specific TOBAN notice to confirm whether the work can be carried out under standard exemptions (Govt Gazette No18 Feb 2018) 2. If not, apply to RFS for specific exemption.
A preclearance assessment by a qualified ecologist should be undertaken no more than 7 days prior to impact within areas of PCT 850, PCT 849 and PCT 835 for Cumberland Plain Land Snail.
If stag or hollow-bearing trees are unable to be retained, they should be removed under supervision of an ecologist during a two stage clearing process. – Stage 1: All surrounding vegetation to be cleared and grubbed – Stage 2: 24 to 48 hours later hollow-bearing trees to be inspected by an ecologist. If resident fauna is observed, the hollow section is to be lowered to the ground and the animal allowed to move on of its own volition. If injured, the fauna should be taken to a WIRES carer or appropriate veterinarian for care.
An environmentally sensitive design for the SP1222 overflow main discharge headwall should be considered as practical, to emulate a more natural bank frontage and reduce the potential of the outlet to contribute to bank erosion at the overflow point.

6.2.4 Air and energy

Existing environment and potential impacts

The proposal is in a rural-residential area that has been rezoned for industrial purposes. The main existing sources of air pollutants within the study area include emissions from motor vehicles and dust from nearby developments.

The nearest sensitive receivers include:

- residents, pedestrians and road users
- schools (Emmaus Catholic College, Mamre Anglican School and Little Smarties Early Learning Centre)
- industrial warehouses and development sites
- primary production properties

The proposal will potentially result in odour, dust and pollution from:

- dust generated during excavation, stockpiling and exposed soils
- dust generated by construction vehicles travelling on disturbed/ unsealed access routes
- emissions from machinery, equipment and vehicles used during construction
- odour generated during construction activities including works to connect to the existing sewer
- odour generated during operation of the pumping stations and emissions from new vent stacks.

A preliminary odour assessment (2021) has been undertaken to evaluate the chemical dosing required to minimise the odour and corrosion risks within the proposed wastewater network. As part of this odour assessment, Sydney Water iCODSS modelling was used to determine the recommended chemicals and their dosage requirement. The assessment found that a chemical dosing unit (CDU) will be required at SP1222 during stage 1, which can be moved to SP12221 in stage 2. Both stations will include an odour control unit to further minimise any nuisance operational odour.

Dust, emissions and odour have the potential to impact on air quality and amenity of nearby sensitive receivers. The construction activities and restoration of disturbed areas would be undertaken progressively. This will minimise potential air quality impacts and reduce the exposure of any one sensitive receiver to air pollution. The proposal would incorporate odour control as necessary to minimise potential odour impacts. Potential air quality impacts would be localised, short term in nature, and unlikely to have a major impact with the application of the safeguards below.

Safeguards
Use alternatives to fossil fuels where practical and cost-effective.
Track energy use as per SWEMS0015.28 Contractor NGER template.
Minimise the potential for odours by incorporating appropriate controls (eg minimise the number of open access chambers, close maintenance holes overnight.)
Ensure odour control measures are available and ready to use during the works.

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.

6.2.5 Waste and hazardous materials

Existing environment and potential environmental impacts

A Detailed Site Investigation (DSI, 2021) was conducted to assess the contamination risks for the project. No major illegal dumping was observed during site visits. Only small amounts of littering was noted. There are no known contaminated sites notified to the EPA or records of contaminated land within 200m of the proposal.

Waste

Waste generated during construction would be predominantly non-hazardous and relatively minor volumes. The following waste sources are likely to be generated during construction:

- domestic refuse (litter) generated on site
- surplus construction and process waste comprising pipes, concrete, gravel, sands, fencing, off-cut materials and barricades
- green waste from vegetation removal
- excavated material (eg. spoil) which is unsuitable and/or not required for reuse.

A preliminary waste classification was conducted as part of the DSI (2021). Excavated spoil within the project area was classified as General Solid Waste (non putrescible). Opportunities to reduce, recycle and reuse on this project would be sought with the Delivery Contractor and documented in a Waste Management Plan (SWEMS0026.08) or CEMP.

Hazardous materials

The following contamination hazards are present within the study area (DSI, 2021):

- roads and associated emissions from vehicle exhausts and runoff sediments
- land salinity
- herbicide/pesticide use, incidental renovations and filling within rural living and primary production lots
- historical filling, stockpiling, leaching and earthworks.

The following Contaminants of Potential Concern (CoPCs) are present within the study area (DSI, 2021):

- heavy metals
- asbestos containing materials (ACM)
- organochlorine (OCPs) and organophosphorus (OPPs) pesticides
- petroleum hydrocarbons (TPH/TRH, BTEXN)
- nutrients.

The concentrations of CoPCs in soil samples across the study area were below the adopted human health investigation levels. Nickel and zinc concentrations marginally exceeded ecological investigation levels in two soil samples. This was attributed to natural occurrences rather than contamination. These results indicate that the risk to human and ecological health posed by CoPCs in fill, subsurface and deeper natural materials is low.

Waste and hazardous materials can be adequately managed by the safeguards below.

Safeguards
Manage waste in accordance with relevant legislation and maintain records to show compliance eg waste register, transport and disposal records. Record and submit SWEMS0015.27 Contractor Waste Report.
Provide adequate bins for general waste, hazardous waste and recyclable materials.
Minimise the generation of waste, sort waste streams to maximise reuse/recycling in accordance with the *Waste Avoidance and Resource Recovery Act 2001*.
Manage waste and excess spoil in accordance with the NSW EPA Waste Classification Guidelines. Dispose wastes at an appropriately licenced facility.
Prevent pollutants from escaping including covering skip bins.
Dispose excess vegetation (non-weed) that cannot be used for site stabilisation at an appropriate green waste disposal facility.

If fibro or other asbestos containing material is identified, restrict access and follow Sydney Water's Asbestos Management – Minor Works procedure, Document Number 746607. Contact Sydney Water Project Manager (who will consult with Property Environmental Services propertyenvironmental@sydneywater.com.au).

6.2.6 Heritage

Existing environment and potential impacts

Aboriginal heritage

The proposal is located within a high risk landscape for Aboriginal heritage (<200m from waters) and there are several registered AHIMS sites within the precinct. Existing sites within the precinct generally consist of low density artefact scatters, isolated finds and areas of potential archaeological deposits (PAD) on elevated landforms and in proximity to local waterways.

An Aboriginal Heritage Due Diligence assessment of the study area was prepared by Kelleher Nightingale Consulting in August 2021 [redacted]. This assessment found the majority of the current study area has been modified by road construction, utilities installation and agricultural land use, leading to a low likelihood of any intact archaeological deposit remaining within the study area. [redacted]

[redacted]

[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]

European heritage

The proposal is partly located within the curtilage of the locally listed 'Gateposts to Colesbrook' (Item I3 – Penrith LEP and Item I3 – Western Sydney Employment Area SEPP) at 269-285 Mamre Road, Kemps Creek (Lot 8, DP 253503). While this listing captures the entire property boundary,

the heritage item comprises two stone gateposts at the Mamre Road entrance only (**Figure 6-1**). Of the two gateposts, only one remains standing. The proposal will involve trenching of a wastewater pipeline through the front of this property, passing within 5m of the gateposts. The pipeline will be installed a minimum of 3m from the gateposts to avoid impacting these structures. Provided the environmental safeguards below are implemented, there would be negligible impact to the heritage values of this item.

Figure 6-1 Heritage gateposts to be avoided at 269-285 Mamre Road, Kemps Creek

The proposal will also be trenched on the opposite side of Mamre Road to the locally listed 'Bayley Park – House' (Item I3 – Penrith LEP and Item I3 – Western Sydney Employment Area SEPP) at 919-929 Mamre Road, Kemps Creek (Lot 35 DP 258414). No impact to this item is expected given its distance from the works.

There are no other heritage items within 50m of the proposal.

Safeguards
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.
Install protective hard barriers (ie. ATF fencing, concrete barriers or water-filled barriers) and signage around the heritage listed gateposts at 269-285 Mamre Road, Kemps Creek before construction, to protect them from damage

If any Aboriginal object or non-Aboriginal relic is found, cease all excavation or disturbance in the area and notify SW Project Manager in accordance with SWEMS0009.
All site personnel must be inducted by a heritage specialist 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.

6.2.7 Noise and vibration

Existing environment and potential impacts

The proposal is situated in a predominantly rural residential area. Existing noise levels in the study area are primarily influenced by traffic on Mamre Road and Bakers Lane, noise from nearby construction and development sites, combined with noise from the mixed rural residential environment. The Mamre Road Precinct was recently rezoned as a warehousing and logistics precinct, as it is connected to the proposed Western Sydney Freight Line, will be affected by aircraft noise and is not suitable for noise sensitive land uses.

The proposal will generate noise and/or vibration during construction from power tools, excavators and other heavy machinery. Works will predominantly occur during standard daytime hours. Some night work may be required for works within/adjacent roadways to minimise impacts to traffic. The works have the potential to exceed the Interim Construction Noise Guideline and impact on sensitive receivers, including residential properties, local businesses and members of the public. However, works are of short duration, will progress along the alignment and all reasonable and feasible measures will be implemented to reduce noise impacts during construction.

During operation, there will be permanent changes to background noise at both pump station sites. The nearest sensitive receiver is 160m north of SP1222. Given each pumping station will consist of underground, submersible pumps, the noise levels from each pumping station are expected to be low. Noise generated during operation will not exceed the noise criteria in the Noise Policy for Industry (EPA, 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).

Vibration may be generated during deep excavation at the pumping station sites and construction of access roads. The nearest residence is 160m from SP1222 and vibration impacts are not expected at this distance.

Safeguards
Works must comply with the Interim Construction Noise Guideline (DECC 2009), including schedule 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 holidays. The Proposal will also be carried out in accordance with:

- Sydney Water's Noise Management Procedure SWEMS0056
- Noise Policy for Industry (EPA, 2017).

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

Incorporate standard daytime hours noise management safeguards into the CEMP:

- identify and consult with the potentially affected residents prior to the commencement:
  - describe the nature of works; the expected noise impacts; approved hours of work; duration, complaints handling and contact details.
  - determine need for, and appropriate timing of respite periods (eg times identified by the community that are less sensitive to noise such as mid-morning or mid-afternoon for works near residences)
  - acceptance by the community of longer construction periods in exchange for restriction to construction times.
- implement a complaints handling procedure for dealing with noise complaints
- plant or machinery will not be permitted to warm-up near residential dwellings before the nominated working hours.
- appropriate plant will be selected for each task, to minimise the noise impact (eg all stationary and mobile plant will be fitted with residential type silencers)
- engine brakes will not be used when entering or leaving the work site(s) or within work areas.
- regularly inspect and maintain equipment in good working order
- arrange work sites where possible to minimise noise (eg generators away from sensitive receivers, minimise use of vehicle reversing alarms).
- schedule noisy activities around times of surrounding high background noise (local road traffic or when other noise sources are active).

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

- justify the need for out of standard daytime work
- consider potential noise impacts and: implement the relevant standard daytime hours safeguards; Sydney Water's Noise Management Code of Behaviour (SWEMS0056.01) and other reasonable and feasible management measures
- identify community notification requirements
- seek approval from the Sydney Water Project Manager in consultation with Sydney Water’s Environment and communications representatives.

If night works are needed, the Contractor would:

- justify the need for night works

• consider potential noise impacts and implement the relevant standard daytime and out of hours safeguards and other reasonable and feasible management measures • identify community notification requirements (ie 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 Sydney Water's Environment and communications representatives.
If works on Sundays or public holidays are required, the Contractor would: • justify why all other times are not feasible • consider potential noise impacts and, implement relevant standard daytime, out of hours and night-time safeguards and other reasonable and feasible management measures • identify community notification requirements • seek approval from the Sydney Water Project Manager in consultation with Sydney Water's Environment and communications representatives.
The pumping stations must be designed to meet the requirements of the Noise Policy for Industry (EPA, 2017) and this must be verified on commissioning.
Conduct a dilapidation survey / asset condition assessment prior to works which have potential to damage existing structures.

6.2.8 Traffic and access

Existing environment and potential impacts

The proposal is located along Mamre Road and Bakers Lane, Kemps Creek and can be accessed via existing sealed roads. Pipes will generally be laid in the road verge and/or just outside the Mamre Road corridor. Mamre Road is a State road managed by TfNSW and Bakers Lane is a local road managed by Penrith City Council. Both roads have a single lane in each direction with no footpaths.

Sydney Water has considered the future widening of Mamre Road by TfNSW in the design and location of the proposed wastewater network. The pressure pipelines are generally located under the future footpath, within the future road corridor and the gravity pipelines are mostly offset by 2m from the future road boundary, inside private property.

During construction, partial road closures will be required to facilitate the works along Bakers Lane. Sydney Water will consult with Council and TfNSW as required by the Infrastructure SEPP and obtain road occupancy licenses. Partial road closures will typically involve temporary closure of one lane of traffic adjacent to pipeline construction to accommodate equipment, removal of spoil and delivery of bulk materials. Generally, these temporary, partial closures will only occur when

trenching works are in progress. The availability of street parking will also be temporarily impacted during the works.

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. 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 the day. Any access ways affected by construction will be reinstated to their original condition.

New access roads, off Mamre Road, are required for both pumping stations. Permanent access to each station will include a dual lane all-weather sealed access road (min 8m wide), with kerb and gutter plus surface and subsurface drainage systems (as required) to the nearest public road. A vehicle turning and parking area designed to fit a 19m semi-trailer will be provided at each pump station site. A minimum of four spaces for vehicle parking will be allowed for. Bollards shall be placed, where required, to protect the wet well, valve chamber, emergency storage structure and above ground structures from vehicles.

Safeguards
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 TfNSW roads. The Contractor will obtain a Road Occupancy Licence (ROL) from TfNSW, including if works are within 100m of traffic signals when construction commences.
Minimise traffic impacts near residential properties, schools and businesses by consulting with them (eg no major materials deliveries at school drop off or pick up times etc.).
Manage sites to allow people to move safely past the works, including alternative pedestrian, bicycles, pram and wheelchair access.
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.

6.2.9 Social and visual

Existing environment and potential impacts

Social

The proposal will have a positive impact on the community by providing a wastewater network that supports the growth of the Precinct and the creation of 17,000 new jobs in Western Sydney. The

main construction impacts to the community will be from noise, air quality and traffic impacts. There are several sensitive receivers in the study area including:

- residents, pedestrians and road users
- Emmaus Catholic College, Mamre Anglican School and Little Smarties Early Learning Centre
- industrial warehouses and development areas
- primary production properties.

Impacts to these receivers can have a negative effect on the community. However, these receivers will be impacted by pipeline construction only and impacts will be short-term as the pipeline is progressively constructed.

Visual

The works are not within any of the visually sensitive locations identified in the draft Mamre Road Precinct Development Plan (DPIE, 2020). The community may experience temporary visual impacts associated with the establishment of site compounds and worksites during construction. These temporary visual impacts would be mitigated in consultation with stakeholders, such as council and residents and the safeguards listed below.

The works will involve the construction of new, permanent above ground structures, including the pump station buildings and vent stacks. Considering the future industrial use of the Mamre Road Precinct, these new above ground structures are not expected to significantly impact the visual character of the environment. The pumping stations will be landscaped to reduce/minimise any permanent visual impacts. The pipelines will be entirely underground and will not be visible.

Safeguards
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 (eg retain existing vegetation where possible).
Direct artificial light away from sensitive receivers where possible (ie residents, fauna or roadways).
Maintain work areas in a clean and tidy condition.

6.2.10 Cumulative

Potential environmental impacts

The potential for cumulative impact is high due to the changing nature and extensive infrastructure work planned and currently underway in the Mamre Road Precinct. A search of the Department of Planning, Industry and Environment Major Projects register was undertaken on the 4 August 2021. Key nearby projects along Mamre Road include the Kemps Creek Data Centre, Yiribana Logistics Centre, Kemps Creek Warehouse, Logistics and Industrial Facilities Hub, Aspect Industrial Estate and Access Logistics Park among others.

Cumulative impacts are likely to relate largely to vegetation clearing, noise and traffic. The degree of impact will be dependent on the design and stage of completion of the other projects. Should overlap of schedules occur, Sydney Water will coordinate with the project manager for these projects, as relevant, to minimise potential cumulative impacts, including to surrounding rural residences and businesses.

Safeguards
Continue to consult with key stakeholders that are constructing infrastructure in the area with a view to coordinate works where practicable.

6.2.11 General Environmental Management

Safeguards
Prepare a Construction Environmental Management Plan (CEMP) addressing the requirements of this environmental assessment. The CEMP should specify licence, approval and notification requirements. Prior to the start of work, all project staff and contractors will be inducted in the CEMP. The CEMP must be readily available on site and include a site plan which shows: • go/ no go areas and boundaries of the 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.
Sydney Water's Project Manager (after consultation with Sydney Water's environment 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 • 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 this REF • 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 an Incident Management Plan (IMP) outlining actions and responsibilities during: • predicted/ onset of heavy rain during works • spills • unexpected finds (eg. heritage and contamination) • other potential incidents relevant to the scope of works. All site personnel should be inducted into the IMP.
Immediately notify the Project Manager, Community Relations Representative (Delivery Management) and Environmental Representative (Delivery Management) of any complaints.
To ensure compliance with legislative requirements for incident notification (eg. *Protection of the Environment Operations Act 1997*), Sydney Water's employees and contractors will follow SWEMS0009.

7 Conclusion

Sydney Water has prepared this REF to assess the potential environmental impacts of the Mamre Road Precinct Wastewater Network project. The proposal is required to provide wastewater infrastructure to the growing area.

During construction, the main potential environmental impacts of the proposal are typical construction impacts such as vegetation clearing, soil erosion, noise and visual amenity. During operation, the main impacts are associated with air quality and visual amenity. It is considered that, given the nature, scale and extent of impacts and implementation of the safeguards outlined in this REF, the proposed work is unlikely to have a significant impact on the environment and an environmental impact statement is not required under Division 5.1 of the EP&A Act.

The proposal has been considered in accordance 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.

8 Appendices

Appendix A – Clause 228 checklist

Clause 228 checklist	REF finding
Any environmental impact on a community	There may be short-term impacts on the community from partial road closures, traffic, noise and dust. However, there will be environmental improvements by providing a reliable wastewater service to the local community that supports growth and the creation of 17,000 new jobs in Western Sydney.
A transformation of a locality	The precinct was rezoned in June 2020 for industrial purposes, the proposed work will not result in the transformation a locality. The majority of the infrastructure will be underground.
Any environmental impact on the ecosystem of the locality	The proposed work will result in clearing of native vegetation, impacting ecosystems of the locality. Appropriate vegetation offsets and an environmentally sensitive design will mitigate this impact. There will be environmental improvements by ensuring a reliable wastewater service will collect and treat wastewater, minimising any impacts on local ecosystems.
Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of the locality	The proposed work will not result in a reduction of the aesthetic, recreational, scientific or other environmental quality or value of the locality. All pipelines will be underground and above ground pumping station structures will be landscaped appropriately in keeping with the rezoned industrial land use.
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 proposed works are in a precinct rezoned for industrial purposes and will not have any effect upon a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or any other special value for present or future generations.
Any impact on the habitat of any protected animals (within the meaning of the Biodiversity Conservation Act 2016)	The proposal will result in the removal of some habitat of protected animals, however it will not result in a significant impact to any of the Threatened Ecological Communities within the study area. Safeguards, including biodiversity offsets have been identified to avoid or minimise impacts on habitat areas.

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 proposed work 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 proposed work will not have any long-term impacts on the environment but will have a long-term benefit by providing a reliable and modern wastewater service for the area.
Any degradation of the quality of the environment	The proposed work will not cause the degradation of the quality of the environment.
Any risk to the safety of the environment	The proposed work will not increase risk to the safety of the environment.
Any reduction in the range of beneficial uses of the environment	The proposed work will not have any reduction in the range of beneficial uses of the environment.
Any pollution of the environment	Environmental safeguards will mitigate the potential for the proposed work to pollute the environment. No pollution of the environment is expected.
Any environmental problems associated with the disposal of waste	The disposal of wastes will be conducted in accordance with the environmental safeguards, 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 proposed work 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 proposed work may have a cumulative impact due to the extensive infrastructure work currently underway in the precinct.
Any impact on coastal processes and coastal hazards, including those under projected climate change conditions	The proposed work will not have any impact on coastal processes or hazards.

Appendix B – Consideration of ISEPP consultation

ISEPP clause	Yes	No
Clause 13, 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
Involve connection to, and have a substantial impact on, the capacity of a Council owned sewerage system?		x
Involve connection to, and use of a substantial volume of water from a Council owned water supply system?		x
Involve installation of a temporary structure on, or enclosing, a public space under council's control that will cause a disruption to pedestrian or vehicular traffic that is not minor?		x
Involve excavation of the surface of, or a footpath adjacent to, a road for which the council is the roads authority that is not minor or inconsequential?	x	
Clause 14, 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
Clause 15, flood liable land – consultation with council		
Will the work be located on flood liable land (that is land that is susceptible to flooding by the probable maximum flood event) and will they alter flood patterns other than to a minor extent?		x
Clause 15AA, flood liable land – consultation with State Emergency Services		
Will the work be located on flood liable land (ie. 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
Clause 15A, 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
Clause 16 – consultation with public authorities other than councils		
Will the proposal be located on land adjacent to land reserved under the *National Parks and Wildlife Act 1974* or to land acquired under Part 11 of that Act*? If so, consult with DPIE (NPWS).*		x
Will the proposal be located on land in Zone E1 Nationals Parks and Nature Reserves or in a land use zone that is equivalent to that zone? *If so, consult with DPIE (NPWS)*		x
Will the proposal be adjacent to an aquatic reserve or a marine park declared under *Marine Estate Management Act 2014? If so, consult with the Department of Industry.*		x
Will the proposal be in the foreshore area within the meaning of the *Sydney Harbour Foreshore Authority Act 1998? If so, consult with Sydney Harbour Foreshore Authority*		x
Will the proposal comprise a fixed or floating structure in or over navigable waters? consult *TfNSW*		x
Will the proposal be located 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 involve clearing of native vegetation on land that is not subject land (ie non-certified land)? *If so, notify DPIE at least 21 days prior to work commencing. (requirement under SEPP (Sydney Region Growth Centres cl 18A)*		x