



Review of Environmental Factors

Western Sydney Aerotropolis Growth Area –
Drinking Water – Package 1c (February, 2022)

Sydney
WATER

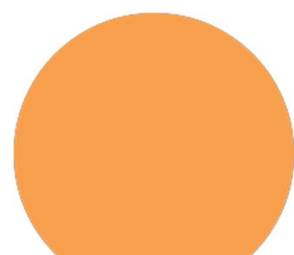
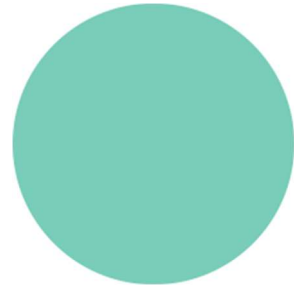
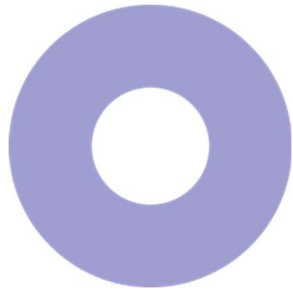


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Determination

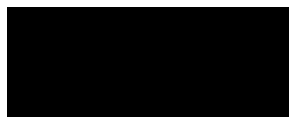
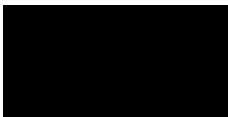
This Review of Environmental Factors (REF) assesses potential environmental impacts of the Western Sydney Aerotropolis Growth Area Drinking Water Package 1c Project and was prepared under Division 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act), with Sydney Water both the proponent 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, traffic and visual amenity impacts. During operation, no potential environmental impacts are anticipated. 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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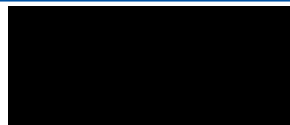
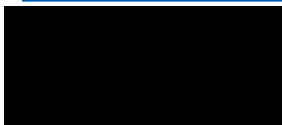
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1 Executive summary

Sydney Water plans to build new drinking water pipelines in the City of Penrith Local Government Area (LGA) to meet the growing demand for drinking water in the the Western Sydney Aerotropolis Growth Area (WSAGA).

Construction is expected to start in mid 2022 and take approximately 6 months. It is anticipated that this infrastructure will be commissioned for ultimate servicing in 2023. Most assets will be constructed in the verge and roadway, with the exception of the Kemps Creek underbore.

The work sites have generally been previously cleared and disturbed for construction of the road corridor. The main construction environmental impacts associated with the proposal are typical construction impacts such as vegetation clearing, soil erosion, noise, traffic and visual amenity. During operation, no potential environmental impacts are anticipated. A Construction Environmental Management Plan will be prepared by the contractor to mitigate potential environmental impacts.

The proposal will result in positive long-term environmental improvements by servicing future growth and enabling the sustainable use of resources, 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 proposal under Division 5.1 of the EP&A Act. This REF assesses the potential environmental impacts associated with the Western Sydney Aerotropolis Growth Area (WSAGA) Drinking Water Package 1c Project and identifies safeguards that avoid or minimise potential impacts.

2.2 Proposal background and need

The proposal is part of the WSAGA Drinking Water Project (**Figure 2-1**). The WSAGA Drinking Water Project will deliver trunk drinking water infrastructure to service the WSAGA and Western Sydney Aerotropolis (WSA) priority growth precincts. The area is currently serviced via a rural water supply network within the Cecil Park Water Supply Zone (WSZ) which has limited capacity to service the additional growth.

Package 1a and 1b are under construction and include trunk water mains that will enable servicing for the new Western Sydney Airport and construction water for major infrastructure projects within the WSAGA region including the M12 Motorway and Sydney Metro being delivered by Transport for NSW (TfSNW).

Package 1c (this REF) includes three new trunk water mains that will amplify drinking water capacity to the WSAGA and WSA. It is anticipated that Package 1c will be delivered by mid 2023.

Package 2 which consists of the Mamre Road trunk water main infrastructure will be subject to a separate REF.

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



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

Aspect	Relevance to proposal
Proposal need	An options assessment study conducted in 2019 determined that the existing trunk drinking water supply capacity from the Cecil Park WSZ is limited and cannot service the WSAGA and WSA priority growth precincts.
Proposal objectives	The proposal objective is to amplify the drinking water network to service growth in the WSAGA and WSA.
Consideration of alternatives/options	Alternatives and options for the proposal were considered. The preferred options were presented in an options assessment study and addendum report conducted in 2019 and 2020 as determined through a risk assessment process. Costs and key risks including environmental, community and technical aspects were assessed. The proposal was generally selected as the preferred option as it would achieve the proposal objectives with an acceptable level of risk at the least cost.



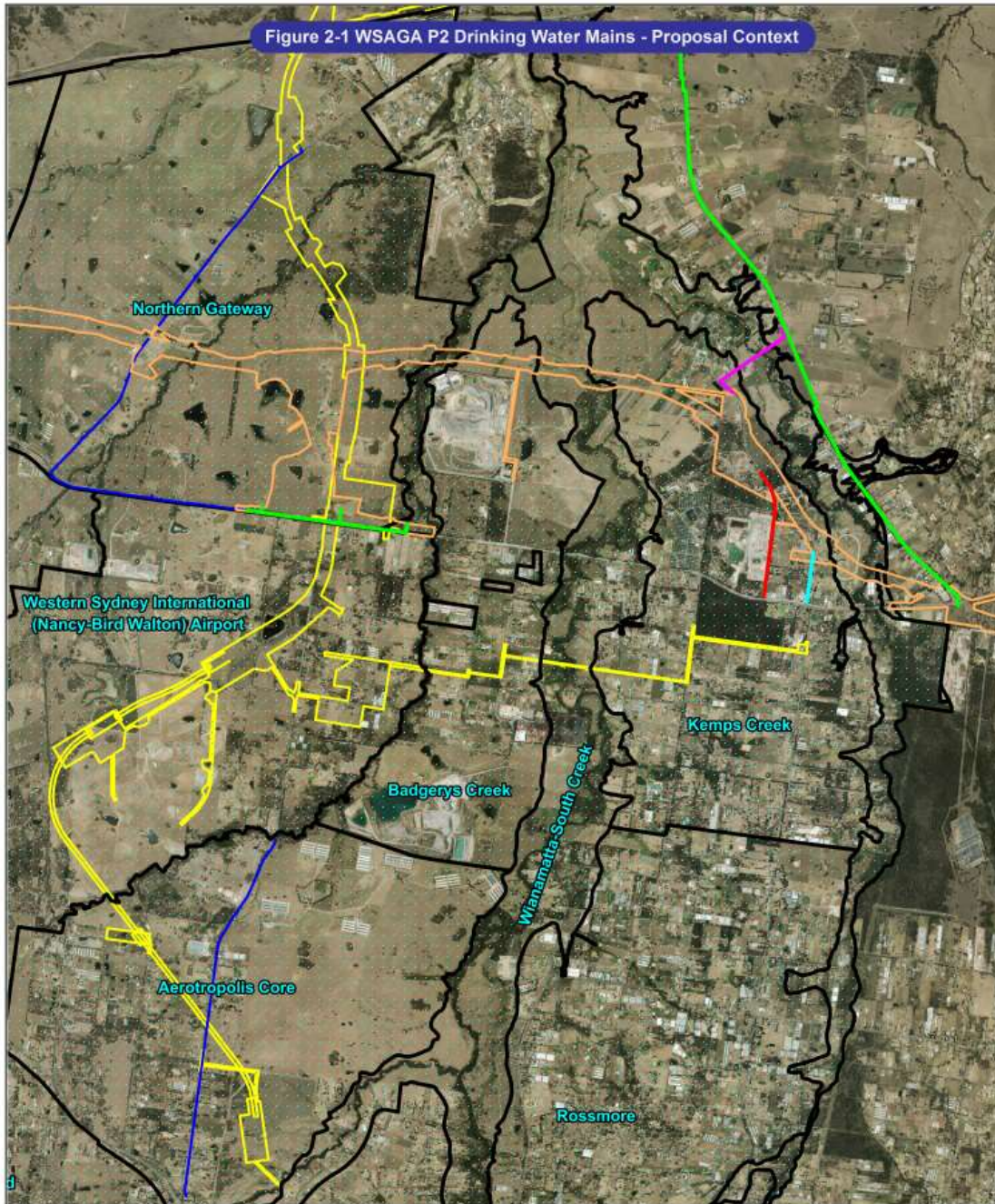


Figure 2-1 WSAGA P2 Drinking Water Mains - Proposal Context

LEGEND

- Proposed Salisbury Ave watermain (this REF)
- Proposed Clifton Ave watermain (this REF)
- Proposed Clifton Ave to Mamre Rd watermain (this REF)
- Proposed M12 DN900 and Mamre Road watermains (seperate approvals)
- Luddenham Rd, Badgerys Creek Rd and Elizabeth Drive watermains (seperate REF, approved and under construction)
- Proposed Sydney Metro Airport Railway Line
- Proposed M12 Motorway
- WSA SEPP Precinct Boundaries



Sydney WATER

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Figure 2-1: Proposal context



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
<p>Precautionary principle - <i>if there are threats of serious or irreversible environmental damage, lack of scientific uncertainty should not be a reason for postponing measures to prevent environmental degradation. Public and private decisions should be guided by careful evaluation to avoid serious or irreversible damage to the environment where practicable, and an assessment of the risk-weighted consequences of various options.</i></p>	<p>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 is designed to locate pipes in disturbed land, including road corridors where possible and by underboring sensitive areas to minimise environmental impact.</p>
<p>Inter-generational equity - <i>the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations.</i></p>	<p>The proposal will help to meet the needs of future generations by providing a reliable water service.</p>
<p>Conservation of biological diversity and ecological integrity - <i>conservation of the biological diversity and ecological integrity should be a fundamental consideration in environmental planning and decision-making processes.</i></p>	<p>The proposal will not significantly impact on biological diversity or impact ecological integrity. The project has been designed to reduce or avoid vegetation removal where possible.</p>
<p>Improved valuation, pricing and incentive mechanisms - <i>environmental factors should be included in the valuation of assets and services, such as 'polluter pays', the users of goods and services should pay prices based on the full life cycle costs (including use of natural resources and ultimate disposal of waste) and environmental goals</i></p>	<p>The proposal will provide cost efficient use of resources and provide optimum outcomes for the community and environment.</p>



3 Proposal description

3.1 Proposal details

Table 3-1 identifies the scope of work for the proposal. An overview of the proposal is provided in **Figure 3-1**. Site-specific environmental constraints mapping is provided in **Figure 3-2** to **Figure 3-6**.

Table 3-1: Description of proposal

Scope of work	Detailed description of work/ activity
Land ownership and location	<p>The proposal is located within the City of Penrith LGA. The proposal is located in the road verges of Salisbury Avenue, Clifton Avenue, and on land between Clifton Avenue and Mamre Road.</p> <p>Salisbury Avenue and Clifton Avenue are classified as local roads and are council owned. The land between Clifton Avenue and Mamre Road (Lot 8 and 9/DP812284, Lot 53/DP734584 and Lot 40/DP258414) is privately owned, however the proposal on this land is located within an existing easement.</p>
Proposal description	<p>The proposal will involve the installation of drinking water pipelines to service growth in the WSAGA and WSA.</p> <p>The three pipelines to be installed include:</p> <ul style="list-style-type: none"> • Salisbury Avenue watermain - a 500 metre DN250 pipeline, located in the eastern road verge of Salisbury Avenue between Elizabeth Drive and 26-32 Salisbury Avenue. • Clifton Avenue watermain - a 1200 metre DN300 pipeline, located in the western road verge of Clifton Avenue from Elizabeth Drive to 90 Clifton Avenue. • Clifton Avenue to Mamre Road watermain - a 970 metre DN300 pipeline, located within an existing Sydney Water easement under Kemps Creek and in the road verge of Clifton Avenue and Mamre Road. <p>Working areas will include the road reserve along the alignment as described above. The opposite road verge within areas of cleared vegetation will be used for laydown as required.</p>
Site establishment and access tracks	<p>Site establishment includes delineating the construction sites, storage and laydown areas, erosion and sediment controls, traffic management and any vegetation removal. All sites can be accessed via existing roads.</p>
Ancillary facilities (compounds)	<p>Construction compound(s) will likely be required for site sheds, construction amenities and materials laydown.</p>



Scope of work	Detailed description of work/ activity
	<p>Sydney Water’s Project Manager (after consultation with Sydney Water’s environment and community representatives and affected landowners) can approve alternative temporary ancillary construction facilities (such as compounds and access tracks), without additional environmental assessment or approval if the facilities meet the safeguard principles in Section 6.</p>
<p>Scope of work</p>	<p>Site establishment and preliminary investigations</p> <p>Site establishment and preliminary investigations including:</p> <ul style="list-style-type: none"> • establishing temporary compounds • installing erosion and sediment controls • traffic management measures • vegetation trimming/removal • removal of pavement, footpath and/or road surfaces • geotechnical, contamination and survey works. <p>Excavation, underboring and pipeline installation</p> <p>Construction of drinking water pipelines along Salisbury Avenue and Clifton Avenue. Open trenching will be the primary construction method with trenchless technology used for the Kemps Creek crossings.</p> <p>Typical trenches will be up to 1.5 metres wide and up to 2 metres deep in road verges and 3 metres deep at road crossings. The maximum trenchless depth for creek crossing is expected to be 10 metres. Pipelines may be installed with trenchless methods along the alignment or adjusted slightly to reduce environmental or community impacts. Working areas would include the road reserve along the alignment, including the opposite road verge.</p> <p>Open trench pipeline construction would include:</p> <ul style="list-style-type: none"> • traffic management • installing environmental and safety measures • excavating trenches, including stockpiling of spoil material on the upslope side of trenches, or at temporary site compounds • shoring and dewatering trenches, depending upon trench depth and groundwater levels • installing pipelines • pipe welding • backfilling the trench with bedding material and excavated soil • compacting trench fill material



Scope of work	Detailed description of work/ activity
	<ul style="list-style-type: none"> • installing ancillary structures including stop valves and pits • restoring areas disturbed by the construction works • site demobilisation and restoration. <p>Trenchless pipeline construction would include:</p> <ul style="list-style-type: none"> • civil works to level and stabilise the site • installing fencing and safety measures • excavating the entry and exit pits, indicatively 2m by 6m • 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 • site demobilisation and restoration.
Commissioning	<p>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:</p> <ul style="list-style-type: none"> • pressure/leakage testing on the pipelines • disinfection of pipelines • testing and commissioning for all modes of operation • discharge and dechlorination (if required) of the test-water.
Restoration	<p>Disturbed areas will be restored to the pre-existing condition following construction in consultation with council and road authorities. The Construction Environmental Management Plan (CEMP) will detail site restoration works to be undertaken once construction works are finished. Site restoration activities would include:</p> <ul style="list-style-type: none"> • backfilling of trenches as soon as works are finished (in addition to at the end of each work day as required) • dismantling of compounds, removal and disposal of waste material and removing construction signage



Scope of work	Detailed description of work/ activity
	<ul style="list-style-type: none"> • restoring ground cover and vegetation • restoration of road pavement surfaces and drainage where pipework is trenched into place • removing erosion and sediment controls, fencing and traffic management measures.
Materials/ equipment	<p>The equipment and materials used to construct the proposal would be confirmed during the pre-construction phase. Typical equipment likely to be used includes but is not limited to:</p> <ul style="list-style-type: none"> • excavators • rock breakers / jackhammers • compactor • concrete truck and pump • concrete saws • drill rig • backhoe • tipper trucks • bogie / truck and dog • light vehicle • street sweeper • franna crane • generators • air compressors • skip bins • sediment tank • power tools (various) • confined spaces safety equipment (e.g. gantry/davit) • site facilities and amenities • storage containers • water truck <p>Typical materials include:</p> <ul style="list-style-type: none"> • pipes • valves and other fixtures • concrete for encasement • granular materials • reused excavated material for pipe trench fill
Work hours	<p>Work and deliveries will be scheduled to occur during standard daytime hours:</p> <ul style="list-style-type: none"> • 7am to 6pm, Monday to Friday • 8am to 1pm, Saturdays <p>Works that may be required outside of standard working hours include the delivery of oversize equipment and utility connections (at periods of low demand).</p>



Scope of work	Detailed description of work/ activity
	Sydney Water's Project Manager can approve work outside of standard daytime hours, following the approval process described in the safeguards in Section 6 .
Proposal timing	Construction is expected to start in the second half of 2022 and take approximately 6 months.



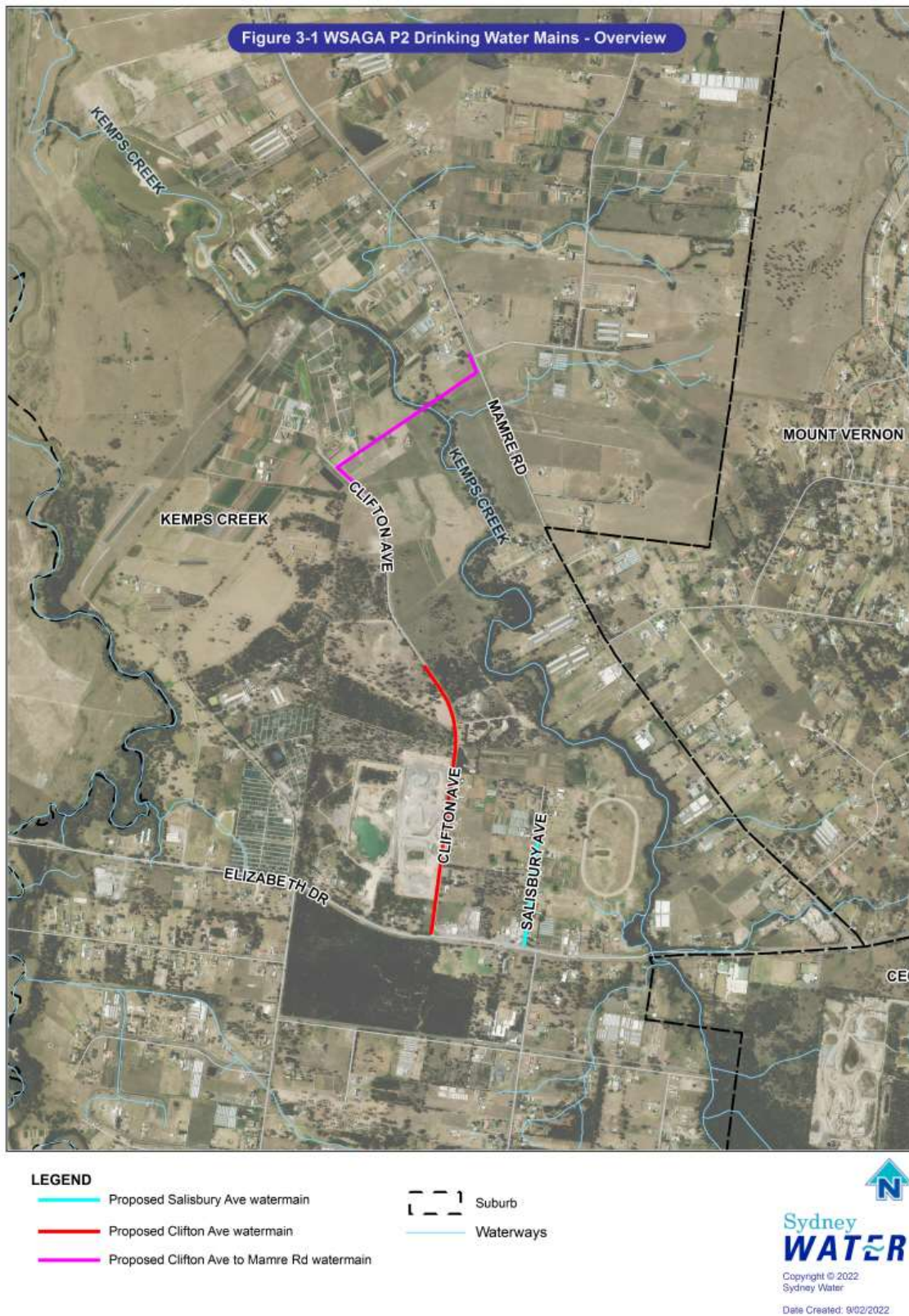


Figure 3-1: Proposal overview

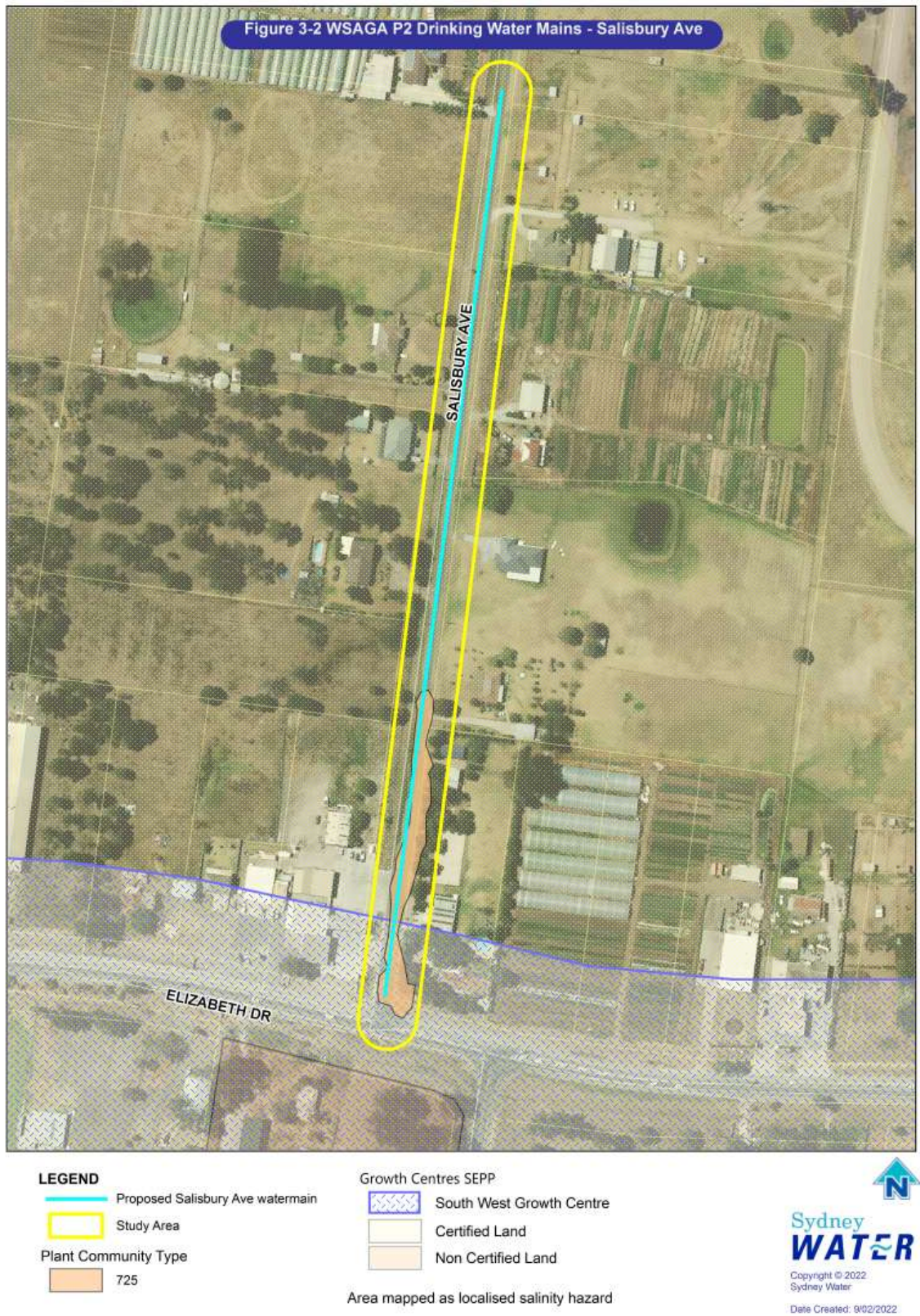


Figure 3-2: Salisbury Avenue



Figure 3-3: Clifton Avenue

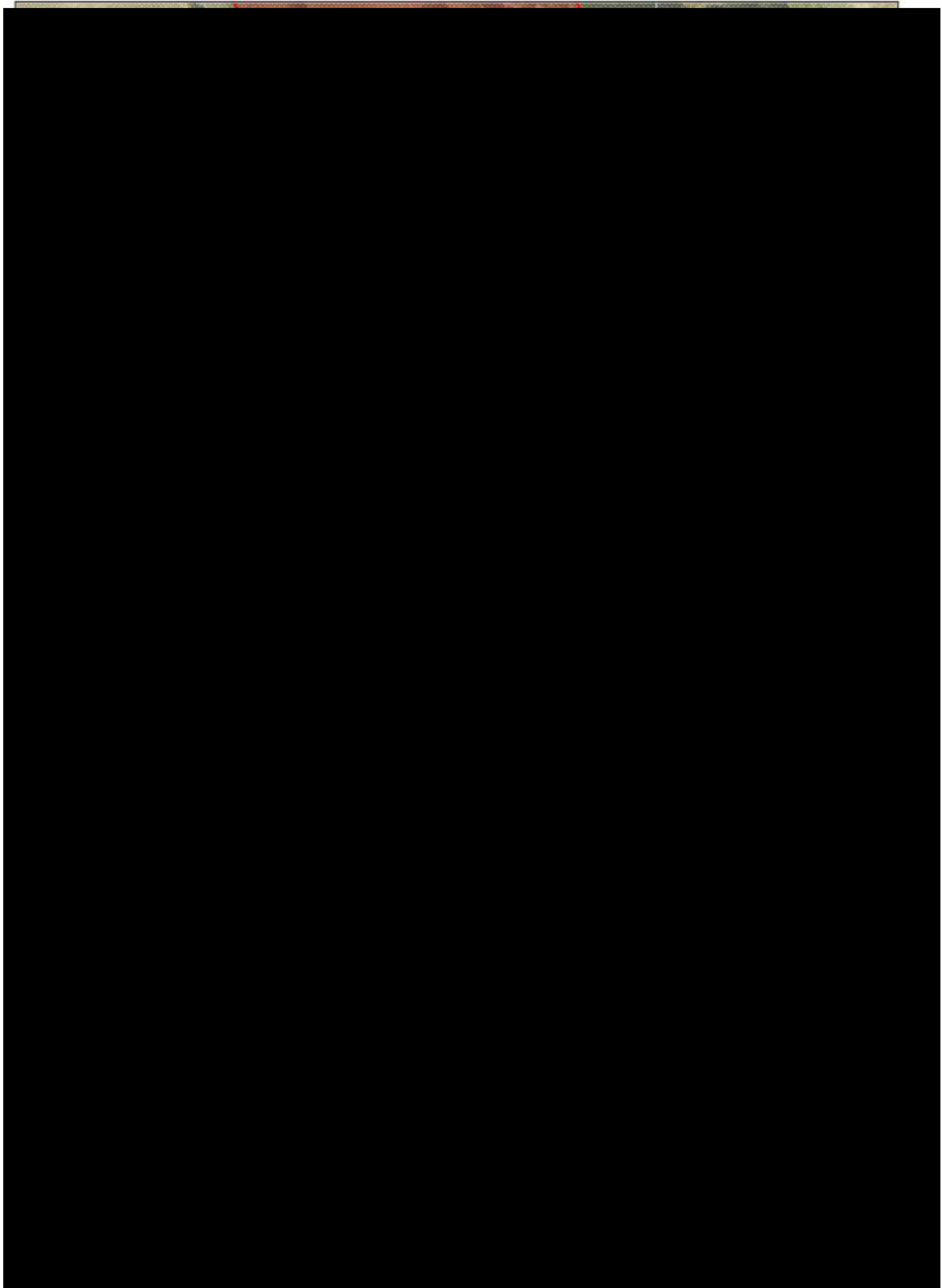


Figure 3-4: Clifton Avenue



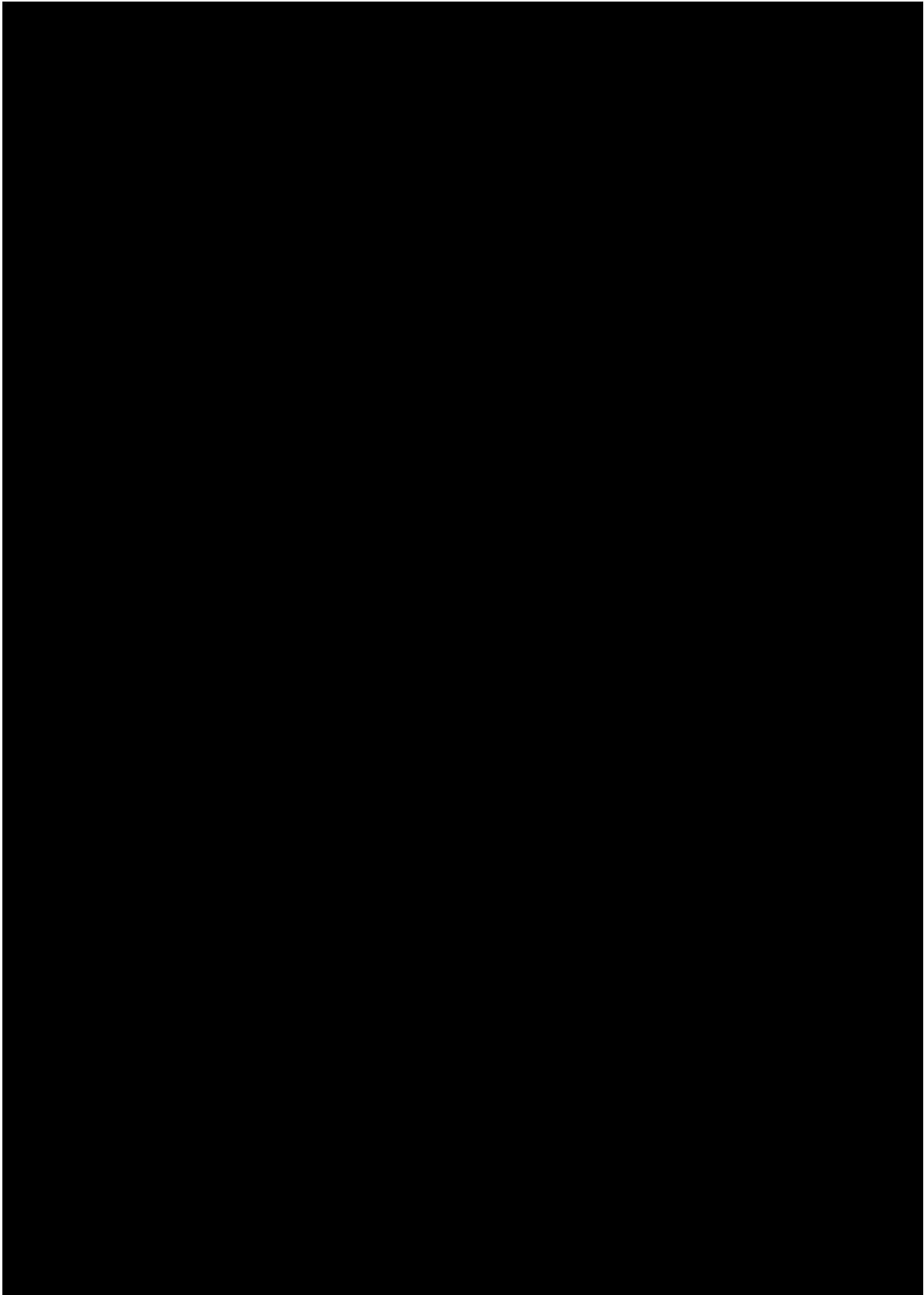


Figure 3-5: Clifton Avenue to Mamre Road



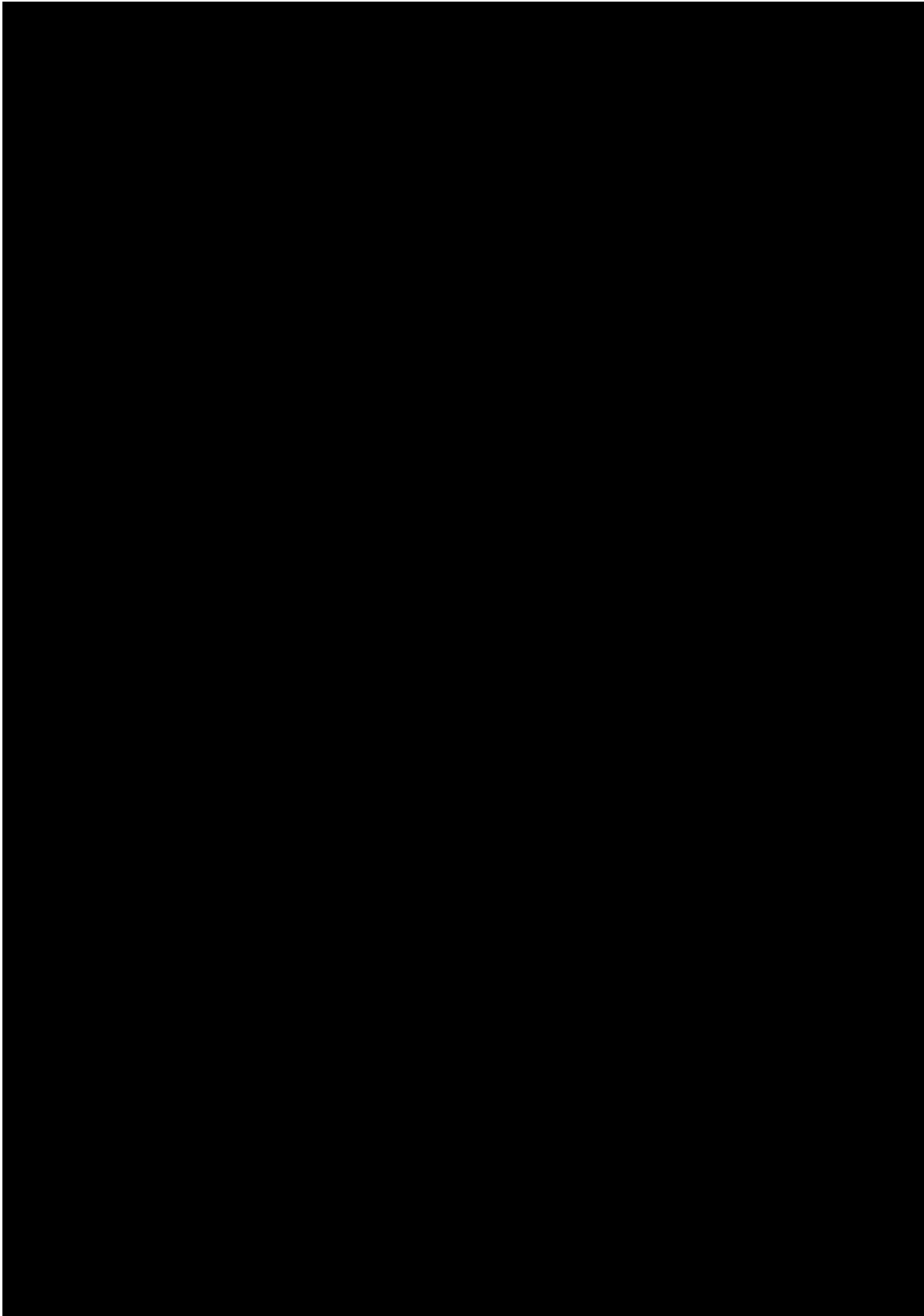


Figure 3-6: Clifton Avenue to Mamre Road



3.2 Field assessment area and changes to the scope of work

The scope of this REF is based on the latest concept design at the time of REF preparation. The final alignments 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 changed alignment assessed by the Environmental Representative:

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

Changes to the proposal outside the study area can only occur:

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

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



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) and for the potential for native vegetation plantings in accordance with Sydney Water's Biodiversity Offset Guide.

4.2 Consultation 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.

Consultation is required under clause 13(1) of the *State Environmental Planning Policy (SEPP) Infrastructure 2007* as the proposal involves excavation of council managed sites. Penrith City Council is required to be consulted in accordance with this clause. Further detail is provided in **Appendix B**.

Concurrence from Transport for New South Wales is required under clause 29(1) of the *SEPP Western Sydney Aerotropolis 2020* as sections of the proposal are located on 'Transport Corridor Land'.

Further detail is provided in **Section 5**. Preliminary consultation has already been undertaken as a part of project management and concept design, which will be captured in the Community Relations Outcomes report at the finalisation of the planning phase.



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. A planning context figure is provided in **Figure 5-1**.

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

Environmental Planning Instrument	Relevance to proposal
State Environmental Planning Policy (Infrastructure) 2007	<p>Clause 125(1) of the Infrastructure SEPP permits development by or on behalf of a public authority for water reticulation systems without consent on any land.</p> <p>As Sydney Water is a public authority, the proposal is permissible without consent.</p>
State Environmental Planning Policy (Western Sydney Aerotropolis) 2020 (Aerotropolis SEPP)	<p>Part of the proposal (Clifton to Mamre Road watermain) is located within land in which the Aerotropolis SEPP applies. The proposal is located on land zoned as ENZ Environment and Recreation and intersects with an area of high biodiversity value. Underboring has been selected to avoid native vegetation clearing.</p> <p>As per Clause 7(1) of the Aerotropolis SEPP, the provisions of the Infrastructure SEPP still apply, as the proposal does not meet the modifications noted in that clause. Therefore, the proposal can be undertaken without development consent. The proposal does not require native vegetation removal in land zoned as ENZ.</p> <p>Clause 26 of the SEPP applies to land shown as the 'flood planning area'. The proposal will cross discrete areas mapped as flood planning area. Once construction is complete, the proposal will be primarily underground, and no flood impacts are expected.</p> <p>Clause 29(1) of the SEPP states that concurrence from Transport for New South Wales is required if development is on land identified as 'Transport Corridor Land'. The proposal meets this threshold and Sydney Water will liaise with Transport for New South Wales.</p> <p>The site falls within areas with airport safeguard development controls (such as lighting and wildlife hazards) under the SEPP, however these provisions do not relate to the proposal.</p>
State Environmental Planning Policy (Western Sydney Employment Area) 2009 (WSEA SEPP)	<p>Part of the proposal (Clifton to Mamre Road watermain) is located within land in which the WSEA SEPP applies. The proposal is located on land zoned as SP2 Infrastructure.</p>



Environmental Planning Instrument	Relevance to proposal
	<p>Clause 33(1) of the SEPP states that the SEPP 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.</p> <p>Clause 33C of the SEPP states that concurrence from Transport for New South Wales is required if development is on land identified as Precinct 12 (Mamre Road). A portion of the proposal is located within the Mamre Road Precinct. Sydney Water will liaise with Transport for New South Wales.</p>
<p>Sydney Regional Environmental Plan (SREP) No 20—Hawkesbury-Nepean River (No 2—1997)</p>	<p>The SREP aims to protect the environment of the Hawkesbury- Nepean system by ensuring that the impacts of future land uses are considered in a regional context. As the proposal is within an area listed in Clause 2(1) – Penrith LGA, the general planning considerations set out in Clause 5 have been considered.</p>
<p>SEPP (Sydney Region Growth Centres) 2006</p>	<p>Under clause 18A (1) of the Growth Centres SEPP, development for public utility undertakings (other than electricity generating works or water recycling facilities) may be carried out without consent on land to which the Growth Centres SEPP applies. The construction footprint at the southern extent of Clifton Avenue and Salisbury Avenue is within certified land in the South West Growth Centre. No existing native vegetation clearing is proposed within non-certified land.</p>
<p>Penrith Local Environmental Plan (LEP) 2008</p>	<p>The majority of the proposal is located within the Penrith LEP. The proposal is located on land zoned as SP2 Infrastructure, RU4 Primary Production Small Lots and RU2 Rural Landscape.</p> <p>A portion of the proposal is on land zoned under the Aerotropolis SEPP. Clause 6 of the Aerotropolis SEPP states that the LEP does not apply to land shown on the SEPPs Land Application Map.</p> <p>A portion of the proposal is on land zoned under the WSEA SEPP. Clause 8 of the WSEA states that the WSEA SEPP prevails over LEPs in the event of inconsistency.</p>



Table 5-2: Consideration of key environmental legislation

Legislation	Relevance to proposal	Permit or approval	Timing and responsibility
<i>Environmental Planning and Assessment (EP&A) Act 1979</i>	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
<i>Protection of the Environment Operations (POEO) Act 1997</i>	<p>The POEO Act is the main piece of NSW legislation covering pollution and waste management. Construction and operation of the proposal is not a scheduled activity. An EPL is not required.</p> <p>There is a requirement under Part 5.7 of the POEO Act to immediately report any pollution incidents to the relevant authority where material harm to the environment is caused or threatened. The definition of material harm and the relevant authorities are identified in Part 5.7 of the POEO Act.</p> <p>The Contractor is responsible for immediately reporting such incidents in accordance with SWEMS0009 Responding to incidents with an environmental impact.</p>	N/A	During construction, Contractor
<i>Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) (Commonwealth)</i>	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



Legislation	Relevance to proposal	Permit or approval	Timing and responsibility
<p><i>Biodiversity Conservation Act 2016 (BC Act)</i></p>	<p>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.</p> <p>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 C.</p>	N/A	N/A
<p><i>Fisheries Management Act 1994 (FM Act)</i></p>	<p>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.</p> <p>The proposal has been designed to avoid dredging or reclamation of key fish habitat by underboring at Kemps creek. The underbored section does not involve harm to marine vegetation, dredging, reclamation or obstruction of fish passage. A permit or consultation under the FM Act is not required permitted all banks, beds and passages are untouched.</p>	N/A	N/A



Legislation	Relevance to proposal	Permit or approval	Timing and responsibility
<i>Water Act 1912/ Water Management Act 2000</i>	Section 60A of the <i>Water Management Act</i> 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 dewatering may be conducted, as such a WSW approval is required.	WSW Approval	Pre-construction, Sydney Water with dewatering information from the Contractor.
<i>Heritage Act 1977</i>	The <i>Heritage Act 1977</i> provides for the conservation of environmental heritage in NSW. The proposal is not located within the curtilage or in the vicinity of any heritage items(see Section 6.2.6).	N/A	N/A
<i>Roads Act 1993</i>	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 (i.e., Mamre Road, Elizabeth Drive). The proposal will impact state and regional roads. A road occupancy licence will be required.	ROL	Pre-construction, Contractor
<i>National Parks and Wildlife Act 1974</i>	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 is not within National Parks, State Conservation areas or nature reserves. An Aboriginal Heritage 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



Legislation	Relevance to proposal	Permit or approval	Timing and responsibility
<i>Biosecurity Act 2015</i>	<p>This Act requires any person to prevent, eliminate or minimise any biosecurity matter (ie weeds) or risks from animal or plant pests and diseases.</p> <p>Three priority weeds were identified in the vicinity of the proposal. Safeguards have been included in Section 6.2.3 of this REF to ensure compliance with the requirements of this Act.</p>	N/A	During construction, Contractor
<i>Waste Avoidance and Resource Recovery Act 2001</i>	<p>The <i>Waste Avoidance and Resource Recovery Act 2001</i> (WARR Act) provides a framework to avoid waste and recover resources.</p> <p>The proposal would manage waste according to the WARR Act, adopting the Resource Management Hierarchy Principles of avoidance, resource recovery and disposal. Construction waste would be managed in accordance with the Waste Classification Guidelines (EPA 2014).</p>	N/A	Pre and during construction, Sydney Water



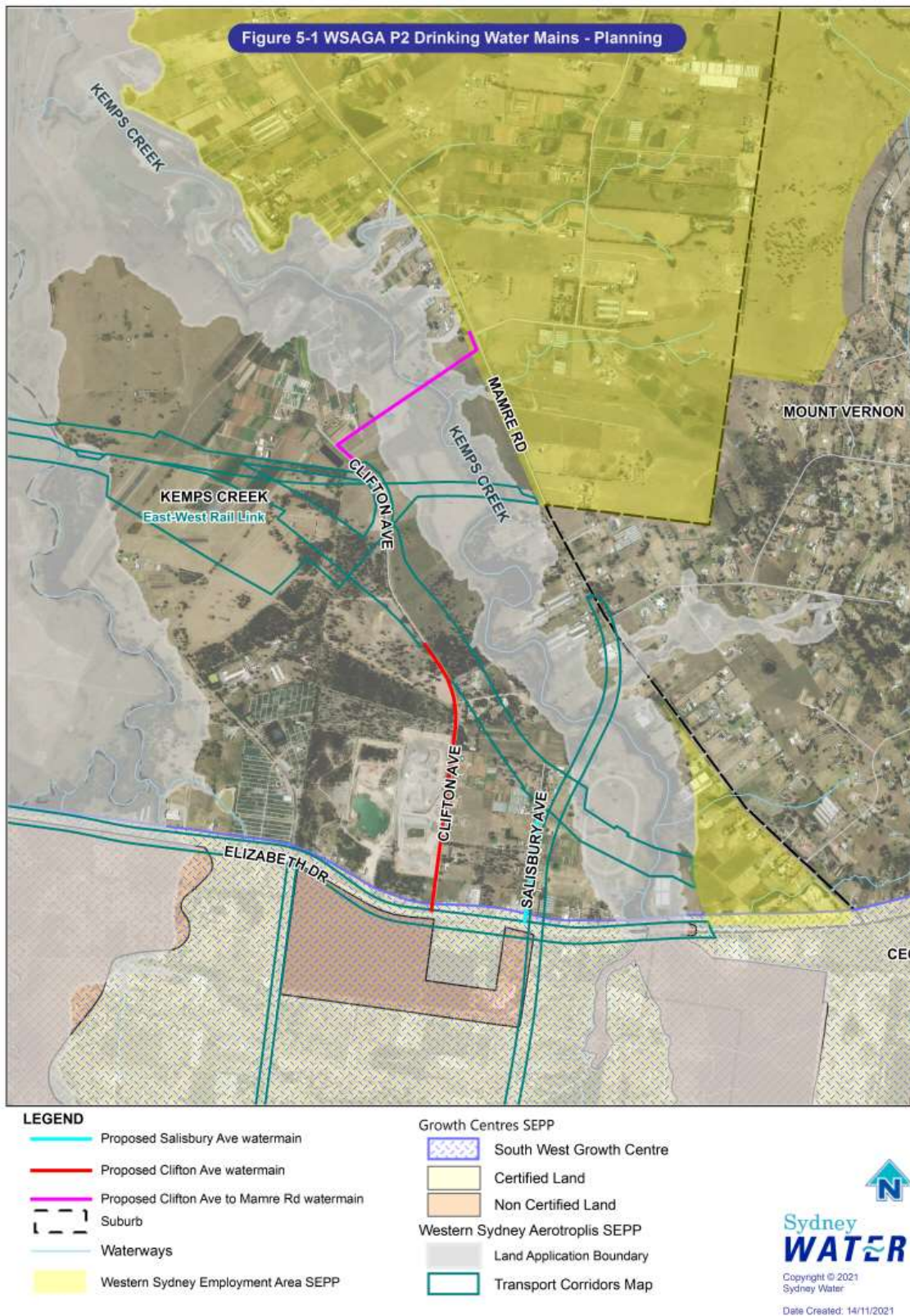


Figure 5-1: Planning context

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 CEMP (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 landscape within the study area is comprised of mixed land use, predominantly cleared of native vegetation with current land uses including infrastructure, public open space, and residential areas. Outside the proposal alignment, land use is mostly rural/agricultural and extensive past clearing of native vegetation and intensive grazing by cattle is evident across the landscape. 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 environmental and potential impacts

The study area is underlain by two geological units; alluvial floodplain deposits, comprising the surface material near creeks, and Bringelly Shale bedrock (Penrith 1:100 000 Geological Map (Clark & Jones, 1991)).

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 trenches will be up to 1.5 metres wide and up to 2 metres deep. The maximum trenchless depth of the creek crossing is expected to be 10 metres. The dimension of the launch and retrieval pits are typically around 4 metres by 8 metres.

The primary geotechnical constraints within the study area identified in the WSAGA Geotechnical Interpretive Report, 2021, include:

- moderate erodibility soil (as identified for the Blacktown soil landscape)
- areas of moderate to high soil salinity
- potential soft alluvial soils and shallow groundwater present in isolated areas (such as low lying areas in vicinity of creeks)
- localised slope instabilities
- excavated spoil from the site is not suitable for re-use as backfill (unless soil sorting is undertaken).



In addition, constraints for the underbore at Clifton Avenue to Mamre Road (Kemps Creek) include:

- highly variable ground conditions including potential for soft alluvium soils
- nearby high voltage tower (Transgrid)
- likely to encounter groundwater
- slaking of Bringelly Shale when excavated and exposed to water.

A search of the Australian Soil Resource Information System (ASRIS) identified that the proposal site is not located in an area where Acid Sulfate Soils (ASS) occur.

No known contaminated sites were identified from a search of the EPA Contaminated Land Record undertaken on 16 November 2021.

Inappropriate management of saline soils has the potential to impact surrounding land and waterways from off-site leaching of contaminants/saline soils.

The works are not proposing to 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
<p>Prevent sediment moving offsite in accordance with <i>Managing Urban Stormwater, Soils and Construction, Volume 1 and 2A</i> (Landcom 2004 and DECC 2008), including:</p> <ul style="list-style-type: none"> • 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 from drainage lines.
<p>Minimise ground disturbance and stabilise disturbed areas progressively.</p>
<p>Ensure imported material is certified for intended use and is free from contamination including asbestos.</p>
<p>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.</p> <p>Sydney Water Project Manager to contact Property Environmental Services for advice regarding management options.</p>
<p>Stop work during heavy rainfall or in waterlogged conditions when there is a risk of sediment loss off site.</p>



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.
<p>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:</p> <ul style="list-style-type: none"> • 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

The proposal crosses Kemps Creek which is classified as key fish habitat.

Water quality sampling was undertaken and assessed as part of the M12 project EIS (Transport for NSW, 2020). It was determined that the water quality of Kemps Creek was poor when compared to the ANZECC Water Quality Guidelines for the protection of aquatic ecosystems (ANZECC 2000).

Notwithstanding, inadequate site management may lead to potential sedimentation impacts to watercourses. Trenchless crossing techniques such as micro tunneling or horizontal direction drilling would be used to cross Kemps Creek. Use of this technique would mitigate impacts to surface water drainage patterns and would not require the diversion of surface water flows in these creeks.

The proposal will require:

- Trenched excavation to a depth of up to 2 m which is considered at low to medium risk of intercepting permanent groundwater tables, although perched groundwater tables may be encountered. Risks associated with groundwater ingress are likely to increase in low lying areas and near Kemps Creek, particularly during or after prolonged or heavy rainfall.
- Potential 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 (Aerotropolis SEPP Flood Mapping) near Kemps Creek. The proposal is not likely to adversely affect flood behaviour given the works would not permanently change surface topography and drainage patterns, would occur largely outside flood prone areas and construction works would be temporary and move along the alignment.
- Discharge of drinking water from existing pipes for connections and commissioning will be in line with Sydney Water’s D0001667 Water Quality Management During Operational Activities procedure.
- Storage of fuels and chemicals on site.

Safeguards
Use appropriate controls to avoid potential sedimentation to waterbodies.
<p>Minimise the impacts to creeks where crossings are required. Prior to construction the methodology will be assessed based on:</p> <ul style="list-style-type: none"> • geotechnical and constructability issues • construction footprint and duration • ease of reinstatement • environmental issues (flora and fauna, geomorphology, contamination, heritage, water quality and hydrology) •
The stockpiling of soil/sediment should be located as far away from the waterway as possible and managed so that it is secure against flooding or outside flood liable land.
Bund potential contaminants and store on robust waterproof membrane, away from drainage lines.
Keep functioning spill kit on site for clean-up of accidental chemical/fuel spills. Keep the spill kits stocked and located for easy access.
Locate portable site amenities away from watercourses or drainage lines.
<p>Sydney Water will obtain a groundwater Water Supply Work Approval from the Natural Resource Access Regulator (NRAR). The Delivery Contractor is responsible for:</p> <ul style="list-style-type: none"> • 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).
Discharge all water in accordance with Sydney Water's Discharge Protocols Standard Operating Procedure (WPIMS5021), including erosion controls, discharge rate, dechlorination, monitoring. Re-use potable / groundwater water where possible.



If discharge to the environment is not possible, seek approval and discharge criteria from the relevant Sydney Water Network Area Manager prior to discharge to the wastewater system. Otherwise tanker by a licensed waste contractor and dispose off-site to an appropriately licensed facility.
Store all chemicals and fuels in accordance with relevant Australian Standards and Safety Data Sheets. Record stored chemicals on site register. 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.
Conduct any equipment wash down within a designated washout area.
Ensure equipment is leak free. Repair oil/fuel leaks immediately or remove from site and replace with a leak-free item.
Prepare Drilling Fluid Management plan to avoid impacts, including: <ul style="list-style-type: none"> • contain and monitor drilling fluids at entry/exit points • identification and management of frac-outs and risk of frac-outs • re-use and/or disposal of drilling fluids (checking waste classification).

6.2.3 Flora and fauna

A specialist assessment of flora and fauna has been undertaken and has been summarised here. The flora and fauna assessment included a desktop review including database searches for flora and fauna previously recorded, a flora and fauna survey, likelihood of occurrence assessment for the identified flora and fauna, and assessment of significance for those species that were found to be likely to occur.

Impacts to the threatened species and communities present or likely to occur, listed under the EPBC Act have been considered by undertaking Significant Impact Criteria (SIC) assessments. Impacts to the threatened species and communities present or likely to occur, listed under the BC Act have been considered through undertaking a Test of Significance (ToS).

The complete specialist flora and fauna assessment is provided as **Appendix C**.

Existing environment

The vegetation and fauna habitat throughout the study area has been modified by past disturbances which have included development and agricultural land uses. Most of the study area consists of urban native / exotic or unvegetated lands, including hard stand areas, road verges and private properties. The study area also supports ecological values including areas of native vegetation, threatened ecological communities, 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 below in **Table 6-1**.

Table 6-1: 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 threshold 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 threshold criteria
Shale – Gravel Transition Forest	Broad-Leaved Ironbark - Grey Box - Melaleuca decora grassy open forest on clay/gravel soils of the Cumberland Plain, Sydney Basin Bioregion (724)	Endangered Ecological Community	Critically Endangered Ecological Community
Cooks River / Castlereagh Ironbark Forest	Broad-leaved Ironbark - Melaleuca decora shrubby open forest on clay soils of the Cumberland Plain, Sydney Basin Bioregion (725)	Endangered Ecological Community	Does not meet threshold criteria
Castlereagh Scribbly Gum Woodland	Hard-leaved Scribbly Gum - Parramatta Red Gum heathy woodland of the Cumberland Plain, Sydney Basin Bioregion (883)	Vulnerable Ecological Community	Endangered Ecological Community
Swamp Oak Floodplain Forest	Cumberland Swamp Oak open forest on riverflats of the Cumberland Plain and Hunter valley (1800)	Endangered Ecological Community	Does not meet threshold criteria

The field survey identified the following key ecological values within the study area:

- One threatened flora species, *Dillwynia tenuifolia* (Vulnerable, BC Act) along Clifton Avenue.
- Three priority weeds including African Olive, Blackberry and Fireweed.
- Habitat for one threatened mollusc species, Cumberland Plain Land Snail *Meridolum corneovirens* (Endangered, BC Act).



- Habitat connectivity of canopy vegetation along the road verges and riparian corridors.
- Kemps Creek, a 4th order watercourse which was observed to be in poor condition.
- One hollow bearing tree adjacent to Kemps Creek.

Potential Impacts

The proposal has been designed to reduce impacts on ecological values and to minimise removal of native vegetation and habitat. A section of the alignment across Kemps Creek will be constructed using trenchless construction methods to minimise impacts on riparian vegetation and connectivity, and to avoid impacts on key fish habitat.

Around 0.03 hectares of native vegetation impacted directly by the proposal falls within land mapped as 'Existing Certified' under the Growth Centres SEPP. This area of vegetation is exempt from further assessment under either the New South Wales (NSW) Biodiversity Conservation Act 2016 (BC Act) or the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act).

The remainder of impacts to native vegetation associated with the proposal occur outside the extent of land subject to the Growth Centres SEPP, referred to as non-biocertified land.

Up to around 0.29ha of non-biocertified native vegetation will be removed from the road verge in areas, including:

- <0.01 ha Cumberland Plain Woodland (PCT 849)
- 0.26 ha Cooks River/Castlereagh Ironbark Forest (PCT 725)
- 0.02 ha Castlereagh Scribbly Gum Forest (PCT 883).

Depending on site-specific constraints, tree trimming may be required to facilitate construction. Trimming of native vegetation for the entire proposal will be preferred over vegetation removal wherever possible to minimise vegetation impacts.

A SIC assessment was prepared for Shale - Gravel Transition Forest and Castlereagh Scribbly Gum Woodland. On the basis of criteria outlined in the Matters of National Environmental Significance: Significant impact guidelines (Commonwealth of Australia, 2013) it is considered unlikely that a significant impact on a Matter of NES would result from the proposal.

A ToS was prepared for one Critically Endangered Ecological Community, three Endangered Ecological Communities, one threatened flora species and one threatened fauna species. It was concluded that the project will not have a significant impact on the ecological communities or threatened species, therefore a BDAR is not required.

Urban native / exotic vegetation located along private property may also need to be removed, particularly to enable construction of the Clifton Avenue to Mamre Road watermain. Consultation with the affected landowners will occur prior to works being undertaken.

Given the potential for the 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 numbers in accordance with the Guide are summarised in **Table 6-2** and would be confirmed once native vegetation clearance is verified during construction. The Contractor shall consult with relevant local Councils for areas where offset plantings may be conducted.

The proposal is located within and adjacent to category 1 and 2 bushfire prone land. The contractor will review NSW rural fire service updates and follow Total Fire Ban (TOBAN) mandates.

Table 6-2: Non-statutory biodiversity offset recommendation

Vegetation Community	Impact Area (Ha)	Offset Multiplier	Offset requirement
Cumberland Plain Woodland (PCT 849)	0.01	3 (moderate)	0.04 ha
Cooks River/Castlereagh Ironbark Forest (PCT 725)	0.26	3 (moderate)	0.78 ha
Castlereagh Scribbly Gum Forest (PCT 883)	0.02	3 (moderate)	0.04 ha

Safeguards
<p>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.</p> <ul style="list-style-type: none"> • Any minor: <ul style="list-style-type: none"> - vegetation trimming or - removal of exotic vegetation or - removal of planted native vegetation <p>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.</p> • 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.
All staff on site are to be educated during toolbox talks on the identification characteristics of the threatened species and advised to not handle fauna species under any circumstances.
Minimise vegetation clearance and disturbance, including impacts to standing dead trees and riparian zones. Where possible, limit clearing to trimming rather than the removal of whole plants.
Physically delineate vegetation to be cleared and/or protected on site and install appropriate signage prior to works commencing.
Adjust methodology (eg avoid area, hand excavate, implement exclusion fencing) to protect sensitive areas where possible (such as mature trees, hollow bearing trees, known threatened species, populations or ecological communities).
Avoid impact to the <i>Dillwynia tenuifolia</i> (Vulnerable, BC Act). An exclusion zone is to be established prior to works occurring at this location.
Retain dead tree trunks, bush rock or logs in-situ unless they are in the impact area and moving is unavoidable. Reposition material elsewhere on the site or approved adjacent sites. If native fauna is likely to be present, a licenced ecologist should inspect the removal and undertake fauna relocation.
Protect trees in accordance with the requirements of Australian Standard 4970-2009 for the Protection of Trees on Development Sites. Do not damage tree roots unless absolutely necessary and engage a qualified arborist where roots >50mm are impacted within the Tree Protection Zone.
Pre-clearance inspections for Cumberland Plain Land Snail, including relocation to adjacent retained habitats if individuals are observed during works
<p>Vegetation removal must not occur until the following are complete:</p> <ul style="list-style-type: none"> • the area to be removed has been physically delineated • the Contractor's Environmental Representative has confirmed consistency with approval documentation • pre-clearing surveys, if relevant and • written authorisation to commence clearing from Sydney Water Project Manager. <p>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.</p>
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.



<p>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.</p>
<p>If any damage occurs to vegetation outside of the study area (as shown in the CEMP), notify the Sydney Water Project Manager and Environmental Representative so that appropriate remediation strategies can be developed.</p>
<p>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.</p>
<p>Offset residual impacts to native vegetation and trees in accordance with the Biodiversity Offset Guideline (SWEMS0019.13).</p>
<p>To prevent spread of weeds:</p> <ul style="list-style-type: none"> • Clean all equipment including PPE prior to entering or leaving the work sites. • Wrap straw bales in geo-fabric to prevent seed spread.
<p>Manage biosecurity in accordance with:</p> <ul style="list-style-type: none"> • <i>Biosecurity Act 2015</i> (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.
<p>If replanting near Sydney Water pipelines refer to '<i>Which trees can damage wastewater pipes?</i>' link from Sydney Water website.</p>
<p>In TOBAN period:</p> <ol style="list-style-type: none"> 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

6.2.4 Air and energy

Existing environment and potential impacts

The proposal is in a rural-residential area. Potential sensitive receivers include residential and agricultural receivers.

The proposal will potentially result in dust/ pollution from:

- dust generated from excavation, stockpiling and exposed soils



- dust generated by construction vehicles travelling on disturbed/ unsealed area (i.e. road verge)
- emissions from machinery, equipment and vehicles used during construction.

Dust and emissions have the potential to impact on air quality and amenity of nearby sensitive receivers. The construction activities and restoration of disturbed areas would be undertaken progressively. This will minimise potential air quality impacts and reduce the exposure of any one sensitive receiver to dust emissions. These 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. Maintain equipment in good working order, comply with the clean air regulations of the <i>Protection of the Environment Operations Act 1997</i> , 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: <ul style="list-style-type: none"> • 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

Waste generated during construction would be predominantly non-hazardous and of 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, gravels, sands, fencing, off-cut materials and barricades
- green waste from vegetation removal
- excavated material (e.g. spoil) which is unsuitable and/or not required for reuse.



Opportunities to reduce, recycle and reuse on this project would be sought with the Contractor and documented in the CEMP.

Hazardous materials

A preliminary contamination study for the WSAGA identified the following contamination hazards:

- roads and associated emissions from vehicle exhausts and runoff sediments
- herbicide / pesticide use and incidental minor filling.

Contaminants of potential concern that may be present include polycyclic aromatic hydrocarbons, heavy metals, asbestos containing materials (ACM), pesticides and herbicides.

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 <i>Waste Avoidance and Resource Recovery Act 2001</i> .
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

An Aboriginal Heritage Due Diligence Assessment was undertaken for the proposal and is contained in **Appendix D**. The assessment identified if Aboriginal objects were likely to be in the study area and if so, whether the proposal was likely to harm those objects.

The findings of the assessment including site specific details are presented in **Table 6-3** below.



Table 6-3: Aboriginal heritage sites within or bordering study area

Watermain	Site name (AHIMS No.)	Description	Distance from proposal	Mitigation
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The assessment identified that provided that the identified Aboriginal archaeological sites and PAD areas are avoided by the proposed works, there are no archaeological constraints to the proposal and according to the Heritage NSW *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* the proposed works can proceed with caution

Non-Aboriginal heritage

The proposal is not located within or in the vicinity of any Non-Aboriginal heritage items.



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 heritage items before construction, to protect them from damage. Refer to Table 6-4 for known heritage items to be avoided.
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.
The Clifton Avenue Kemps Creek PAD 1 and PAD 2 heritage item within the study area will be avoided. Works are to be contained to an existing easement. No work is permitted outside the existing easement.
The Clifton Avenue Kemps Creek PAD 3 and PAD 4 heritage item within the study area will be avoided. Trenchless technology will adopted to avoid impacts to this heritage area.
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. There are residential and commercial receivers located along Salisbury Avenue, Clifton Avenue and Mamre Road.

Existing noise levels in the study area will primarily be influenced by traffic on these roads, nearby major arterial roads such as on Elizabeth Drive, commercial operators such as Nolan Quarries, and other infrastructure projects occurring in the area.

The proposal will generate noise and vibration during construction from power tools, excavators and other heavy machinery. Work and deliveries will be scheduled to occur during standard daytime hours where possible. However, the proposal is expected to require work outside these hours. Elizabeth Drive and Mamre Road are classified as state roads and will require ROLs issued by TfNSW where works are on or near to the road. Consultation with TfNSW and council will dictate the management of potential traffic disruptions and corresponding working hours.

The works have the potential to exceed the Interim Construction Noise Guideline (ICNG) and impact sensitive receivers, including residential properties, local business 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 no/permanent changes to background noise. Noise generated during operation will not exceed the noise criteria in the Noise Policy for Industry (EPA, 2017).

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 (e.g. 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 (e.g. all stationary and mobile plant will be fitted with residential type silencers)
- engine brakes will not be used when entering or leaving the work site(s) or within work areas
- regularly inspect and maintain equipment in good working order
- arrange work sites where possible to minimise noise (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 (i.e. for scheduled night work (not emergency works)),
- notify all potentially impacted residents and sensitive noise receivers not less than one week prior to commencing night work.
- seek approval from the Sydney Water Project Manager in consultation with Sydney Water's Environment and communications representatives.

6.2.8 Traffic and access

Existing environment and potential impacts

The majority of the proposal is located in the road corridors of Salisbury Avenue, Clifton Avenue and Mamre Road. Pipes will generally be laid in the road verge. Elizabeth Drive and Mamre Road are classified as a state road.

Sydney Water will consult with Council or TfNSW as required by the Infrastructure SEPP and obtain ROLs. 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. This may result in traffic delays and/or traffic diversions depending on the number of lanes available. Generally, these temporary partial closures will only occur when trenching works are in progress.

The land between Clifton Avenue and Mamre Road (Lot 53/DP734584 and Lot 40/DP258414) is privately owned. Access will be required via either 235-245 or 258 Clifton Avenue to enable works within the existing easement, as well as access directly from Mamre Road. Sydney Water will consult with residents prior to any works impacting access occurring.

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. A ROL shall be obtained 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 (e.g. no major materials deliveries at school drop off or pick up times etc.).
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

Social

The main construction impacts to the community will be from noise, air quality and traffic impacts. There are several sensitive receivers along the pipeline alignments. Impacts to these receivers can have a negative effect on the community. However, these receivers will be impacted by construction only and impacts will be short-term as the pipeline is progressively constructed.

Visual

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 councils and residents and the safeguards listed below. There will be negligible operational visual impacts as the completed works will be mostly underground.

Safeguards
Undertake works in accordance with Sydney Water Communications policies and requirements including: <ul style="list-style-type: none"> • notify impacted residents and businesses • erect signs to inform the public on nature of work • personnel treat community enquiries appropriately.
Restore work sites to pre-existing condition or better.
Minimise visual impacts (e.g. retain existing vegetation where possible).
Direct artificial light away from sensitive receivers where possible (i.e. residents, fauna or roadways).
Maintain work areas in a clean and tidy condition.



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 WSAGA. Major nearby projects include Western Sydney Airport, Sydney Metro – Western Sydney Airport, M12 Motorway and developments within the Mamre Road Precinct.

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 the view to coordinate works where practicable.

6.2.11 General Environmental Management

Safeguards

Prepare a CEMP addressing the requirements of this environmental impact 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 (eg heritage)
- 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.

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

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

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

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 and Environmental Representative 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 WSAGA Drinking Water Package 1c Project. The proposal is required to amplify the drinking water network to service growth in the WSAGA.

During construction, the main potential environmental impacts of the proposal are typical construction impacts such as vegetation clearing, soil erosion, traffic 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 proposal is unlikely to have a significant impact on the environment. Accordingly, 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 road closures, traffic, noise and dust however there will be environmental improvements by providing a reliable water service to the local community.
A transformation of a locality	The proposed work will not result in the transformation a locality. All new infrastructure will be located primarily underground.
Any environmental impact on the ecosystem of the locality	The proposed work will not result in long term environmental impacts to ecosystems of the locality. The proposal has been designed to avoid impacts where possible and offsets will be provided.
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 in the road verge.
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 work 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 <i>Biodiversity Conservation Act 2016</i>)	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 drinking water 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 area (i.e., Mamre Road developments). The potential cumulative impact will be short term and managed through the safeguards proposed.
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?		N
Be likely to generate traffic that will strain the capacity of the road system in the LGA?	Y	
Involve connection to, and have a substantial impact on, the capacity of a Council owned sewerage system?		N
Involve connection to, and use of a substantial volume of water from a Council owned water supply system?		N
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?	Y	
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?	Y	
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?		N
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?		N
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)?		N
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?		N
Clause 16 – consultation with public authorities other than councils		
Will the proposal be located on land adjacent to land reserved under the <i>National Parks and Wildlife Act 1974</i> or to land acquired under Part 11 of that Act? <i>If so, consult with DPIE (NPWS).</i>		N
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? <i>If so, consult with DPIE (NPWS)</i>		N
Will the proposal be adjacent to an aquatic reserve or a marine park declared under <i>Marine Estate Management Act 2014</i> ? <i>If so, consult with the Department of Industry.</i>		N



ISEPP clause	Yes	No
Will the proposal be in the foreshore area within the meaning of the <i>Sydney Harbour Foreshore Authority Act 1998</i> ? If so, consult with Sydney Harbour Foreshore Authority		N
Will the proposal comprise a fixed or floating structure in or over navigable waters? consult TfNSW		N
Will the proposal be located on land in a mine subsidence district within the meaning of the <i>Coal Mine Subsidence Compensation Act 2017</i> ? If so, consult with Subsidence Advisory NSW.		N
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)		N



Appendix C – WSAGA Flora and fauna assessment (Biosis, 2022)



Appendix D – WSAGA Drinking Water Main Aboriginal Heritage Due Diligence Assessment (KNC, 2021)

This appendix has been removed to protect sensitive Aboriginal heritage information.

