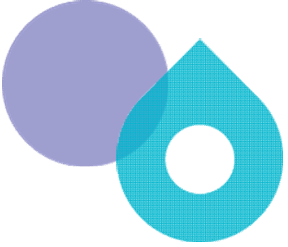




# Review of Environmental Factors

Servicing Growth in West Dapto Package 3  
(Cleveland Precinct) (October, 2023)

Sydney  
**WATER**



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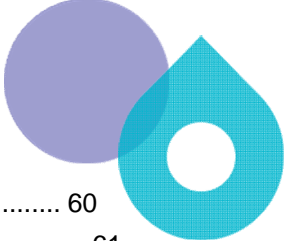
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# Determination

This Review of Environmental Factors (REF) assesses potential environmental impacts of Servicing Growth in West Dapto Package 3 (Cleveland Precinct) (the proposal). The REF was prepared under Division 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act), with Sydney Water both the proponent and determining authority.

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


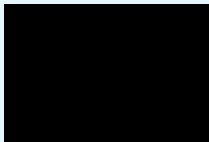


## Decision Statement

The main potential construction environmental impacts of the proposal include impacts from noise and traffic, and to biodiversity, Aboriginal heritage, soil, and water. During operation, minor visual impacts are expected. The proposal will not be carried out in a declared area of outstanding biodiversity value and is not likely to significantly affect threatened species, populations or ecological communities, or their habitats. Therefore, a Species Impact Statement (SIS) and/or Biodiversity Development Assessment Report (BDAR) is not required.

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

## Certification

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

Prepared by:	Reviewed by:	Endorsed by:	Approved by:
 Grace Corrigan REF author Sydney Water Date: 13/10/23	 Sarah Mitchell Environment Representative Sydney Water Date: 17/10/2023	 Sam Ali Project Manager Sydney Water Date: 17/10/2023	 Elissa Howie A/ Environment and Heritage Manager Sydney Water Date: 17 October 2023



# 1 Executive summary

Cleveland Precinct is within the West Lake Illawarra Growth Area. This REF assesses a package of works that will provide wastewater services for about 4,500 new dwellings within Cleveland Precinct, in the suburbs of Cleveland, Huntley, and Horsley. The proposal would provide wastewater infrastructure to the area by constructing and operating wastewater mains and upgrading an existing wastewater pumping station (SP1012). The proposal includes constructing:

- about 2.8km of DN375 gravity wastewater main south of Cleveland Road (Work Lot B)
- about 1.3km of DN300 gravity wastewater main north of Cleveland Road (Work Lot C)
- about 0.7km of OD315 rising wastewater main on residential roads in Horsley (Work Lot C)
- capacity upgrades to SP1012 on the corner of Riverpark Way and Fairwater Drive, Horsley.

Construction is expected to start late 2023 and will be completed by 2025.

The construction corridor is comprised of low-density residential properties, small businesses, and local roads. An area of remnant native vegetation is located immediately south of Horsley. Cleveland is largely open grassland areas. The alignment generally traverses flat to gently undulating land on private property. Some small waterways and coastal wetland areas are present throughout the landscape.

The main potential construction environmental impacts of the proposal include impacts from noise and traffic, and to biodiversity, Aboriginal heritage, soil, and water. During operation, minor visual impacts are expected.

The proposal will result in the removal of up to 0.37ha of threatened vegetation and 0.45ha of non-threatened vegetation. The construction corridor has been designed to avoid and minimise impacts to sensitive ecological features as much as possible, including coastal wetlands, habitat, and high-quality patches of connected vegetation. This design is mostly within areas that have been already developed, historically cleared, or contain degraded vegetation. Less destructive technologies such as micro-tunnelling and establishing no-go zones have also been applied.

[REDACTED]

Aboriginal Heritage Impact Permit (AHIP) is required.

Environmental mitigation measures have been proposed to avoid, minimise, and mitigate the potential impacts of the proposal on the environment. It is considered that, given the nature, scale and extent of impacts and implementation of the mitigation measures outlined in this REF, the proposal is unlikely to have a significant impact on the environment and an environmental impact statement is not required under Division 5.1 of the EP&A Act.

# 2 Introduction

## 2.1 Context

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

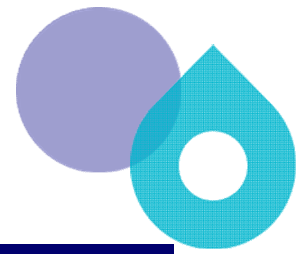
We are a statutory State-owned corporation and are classified as a public authority, and a determining authority for the proposal under Division 5.1 of the EP&A Act. This REF assesses the potential environmental impacts associated with the proposal and identifies mitigation measures that avoid or minimise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

## 2.2 Proposal background and need

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

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

Aspect	Relevance to proposal
Proposal need	<p>The West Lake Illawarra Growth Area is about 15km south-west of Wollongong within the Wollongong and Shellharbour Local Government Areas (Figure 2-1). This growth area was formerly known as West Dapto Urban Release Area (WDURA) and adjacent growth areas (AGA). The West Lake Illawarra Growth Area is about 5,550 hectares in size and will require wastewater and drinking water services for about 30,000 residential and non-residential properties by 2048. Construction of these services will be delivered in stages.</p> <p>The proposal assessed in this REF will provide wastewater services to Cleveland Precinct (Figure 2-2). The proposal will be undertaken in conjunction with works assessed under the Water and wastewater servicing of the West Dapto Urban Release Area and Adjacent Growth Area Environmental Assessment (EA) (Sydney Water, 2012). Together they will manage the future service demand expected from about 4,500 new dwellings within Cleveland Precinct. Further details about this previous assessment are discussed in Section 5.1 of the REF.</p>
Proposal objectives	<p>The proposal objectives are to:</p> <ul style="list-style-type: none"><li>• provide the timely delivery of trunk assets and upgrades to an existing wastewater pumping station (SP1012)</li><li>• service growth in Cleveland Precinct</li><li>• meet Sydney Water statutory and regulatory obligations</li><li>• protect public health</li></ul>



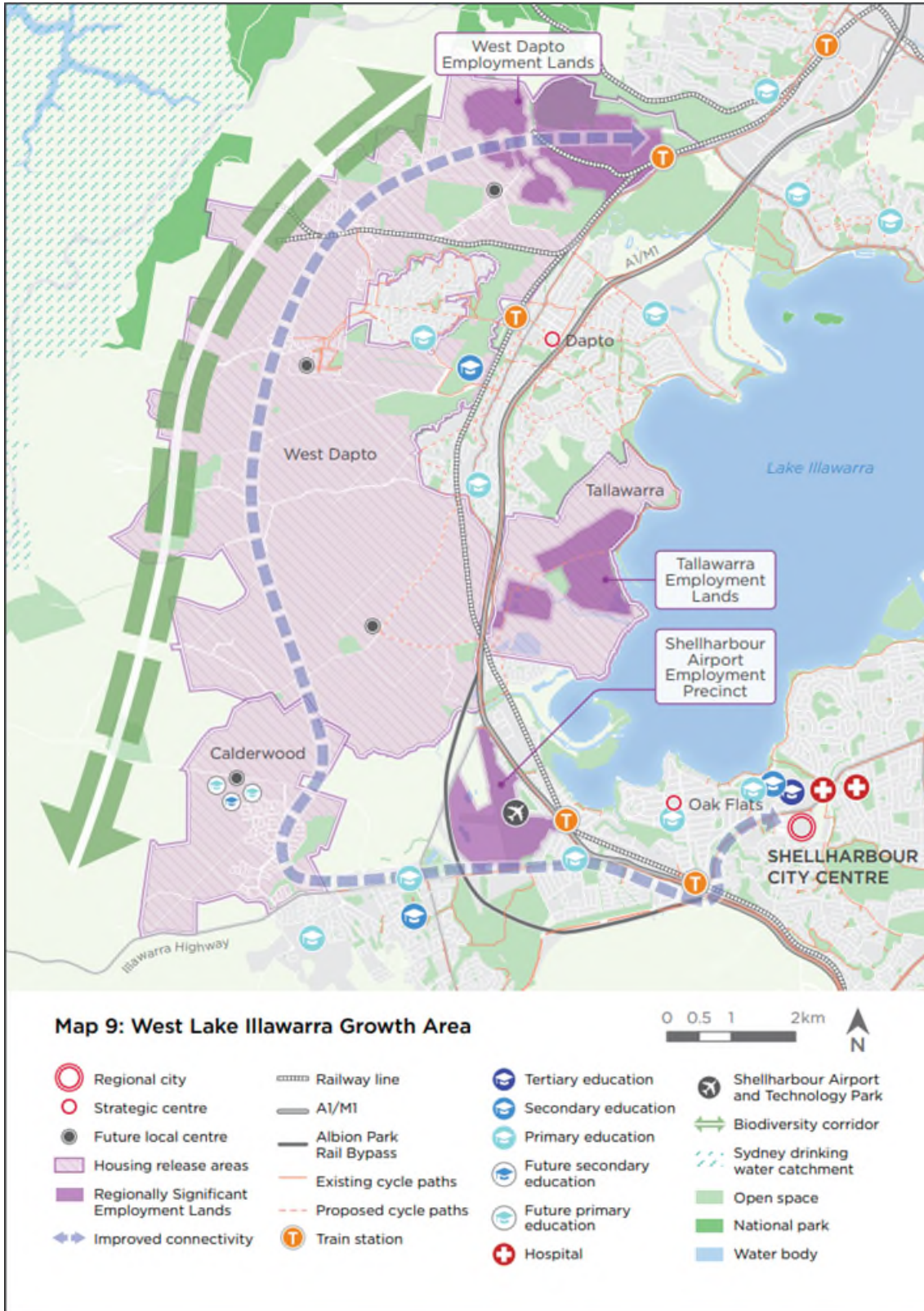
Aspect	Relevance to proposal
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- protect catchment and river health
- provide affordable and efficient wastewater services
- provide resource and energy efficient wastewater services.

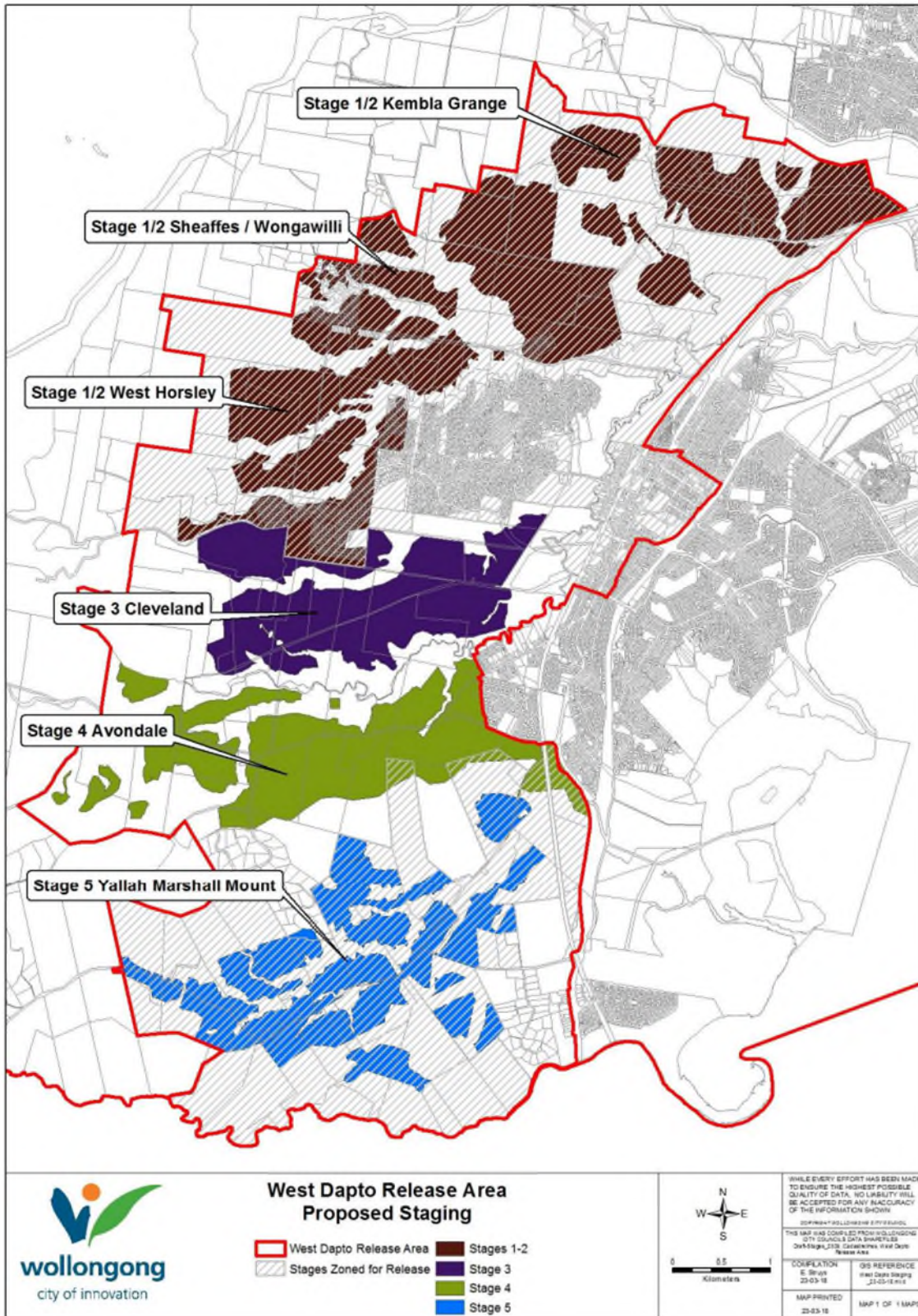
<p>Consideration of alternatives/options</p>	<p>It was identified early in planning that the preferred servicing strategy for the Cleveland Precinct would be to transfer wastewater flows to the Wollongong Wastewater Treatment System. These servicing options had to meet compliance requirements under the Environment Protection Licence (EPL) number 218 for the Wollongong Wastewater Treatment System, including dry weather and wet weather performance. A total of five wastewater servicing options (WW1-5) were developed (Sydney Water, 2021). The options included:</p> <ul style="list-style-type: none"> <li>• WW1 – duplicate existing wastewater line to SP1012 and upgrade capacity of SP1012 to meet increased flows (Work Lot C). Create a new carrier main that follows Mullet Creek towards Robins Creek (Work Lot B).</li> <li>• WW2 – same alignments as WW1, however a staged approach that uses smaller mains than WW1.</li> <li>• WW3 – Work Lot C is the same as WW1 however Work Lot B connects to existing Dapto 2 carrier main instead of duplicating the carrier main.</li> <li>• WW4 – Work Lot B is the same as WW1 however connects to existing Dapto 2 carrier main earlier than WW1. Defer extension down to Mullet Creek and Robins Creek.</li> <li>• WW5 – Tankering of wastewater, for first release areas so that capital is deferred until 2024.</li> </ul> <p>WW2 and WW3 did not meet hydraulic modelling criteria and were therefore not considered further. WW5 was also not considered further as it was not a suitable long-term solution for the proposed development.</p> <p>WW1 was identified as the preferred option over WW4 as it has:</p> <ul style="list-style-type: none"> <li>• a lower cost</li> <li>• alignment with the strategy for future growth in the area</li> <li>• smaller scope than WW4.</li> </ul> <p>During concept design, the alignment for Work Lot C was further refined to avoid or minimise environmental impacts including impacts to coastal wetlands, threatened vegetation and areas of high-risk Aboriginal heritage.</p> <p>Concept design identified the additional need for a rising main linking SP1012 to existing Dapto 2 carrier main.</p>
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**Figure 2-1** Location of the West Illawarra Growth Area. Cleveland Precinct is part of the West Dapto housing release area (DPIE, 2021)



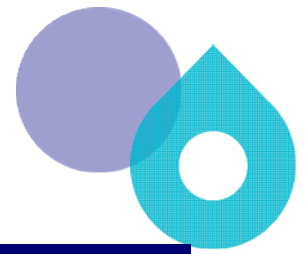
**Figure 2-2** Location of Cleveland Precinct within the West Dapto housing release area (Wollongong City Council, 2021)

## 2.3 Consideration of Ecologically Sustainable Development

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

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

Principle	Proposal alignment
<p><b>Precautionary principle</b> - <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 there is no scientific uncertainty relating to the proposal.</p> <p>The REF has been prepared based on the results of specialist assessments, including fieldwork, to gain an accurate appreciation of the surrounding environment. The proposal has been developed to avoid environmental impacts where possible, and mitigation measures would be implemented to minimise impacts. This proposal is therefore considered to be consistent with the precautionary principle.</p> <p>Once operational, the proposal would connect new properties into the wastewater network. The proposal would support continued compliance with the EPL, which would reduce the risk of any serious or irreversible environmental damage from the new assets.</p>
<p><b>Inter-generational equity</b> - <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 wastewater service.</p> <p>The development of the wider West Lake Illawarra Growth Area requires wastewater servicing. This proposal provides the infrastructure necessary to support the development of the area in a way that protects the environment, by managing the predicted increases of wastewater volumes generated in the area. The proposal has also been developed to avoid or minimise environmental impacts where possible, such as avoiding direct impacts to coastal wetlands, threatened vegetation and watercourses in the area.</p> <p>The proposal involves some activities that may result in social and environmental disturbance. However, these would be managed in accordance with the mitigation measures in this REF to minimise impacts.</p>



Principle	Proposal alignment
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**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.*

There are sensitive ecological areas in or near the proposal corridor, such as threatened vegetation, coastal wetlands, habitat features, and Key Fish Habitat (KFH). The proposal will not significantly impact on biological diversity or impact ecological integrity. The construction corridor has been designed to avoid and minimise impacts to sensitive ecological features as much as possible. This includes using non-intrusive construction methodologies such as trenchless methods and having no-go zones to reduce impacts to vegetation. Additionally, implementing non-statutory biodiversity offsets will also support future improvement of the biological diversity and ecological integrity of the area.

**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 optimum outcomes for the community and environment. This has been achieved through actions including:

- sizing the mains based on growth predictions, to reduce the need for future duplication, upgrade, or replacement
- identifying cost-efficient use of resources during construction, e.g. re-use of waste material
- identifying non-intrusive construction methodologies such as techniques methods to minimise environmental impacts to waterways and other sensitive areas
- providing suitable wastewater infrastructure for future population demands and optimum outcomes for the community and environment.



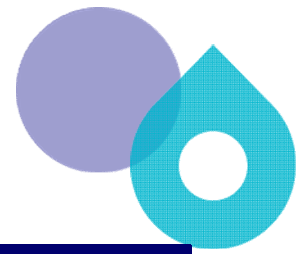
# 3 Proposal description

## 3.1 Proposal details

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

**Table 3-1** Description of proposal

Aspect	Detailed description
Proposal description	<p>The proposal consists of the construction and operation of wastewater mains, and upgrades to SP1012 (Figure 3-1 and Figure 3-2). The proposal includes:</p> <ul style="list-style-type: none"> <li>• constructing about 2.8km of DN375 (inside diameter 375mm) gravity wastewater main south of Cleveland Road, Cleveland and Huntley (Work Lot B) (about 0.3km trenchless and about 2.5km open trench)</li> <li>• constructing about 1.3km of DN300 gravity wastewater main north of Cleveland Road, Horsley and Cleveland (Work Lot C) (about 0.1km trenchless and about 1.2km open trench)</li> <li>• constructing about 0.7km of OD315 (outside diameter 315mm) rising wastewater main on residential roads in Horsley (Work Lot C) (about 0.23km trenchless and about 0.47km open trench)</li> <li>• performing upgrades to increase capacity of SP1012, on the corner of Riverpark Way and Fairwater Drive, Horsley.</li> </ul> <p>The mains will be constructed using a combination of conventional open trenching, and trenchless methods in sensitive locations. Construction methodologies will also depend on pipe depth, soil type, and other design factors.</p>
Location and land ownership	<p>The proposal is located in the suburbs of Huntley, Horsley and Cleveland in Wollongong City Council local government area (LGA).</p> <p><b>Work Lot B</b></p> <p>Work Lot B gravity main is located on a mix of council land, privately owned land, and developer owned land:</p> <ul style="list-style-type: none"> <li>• Verge and roadway of Daisy Bank Drive and Cleveland Road.</li> <li>• 129 Cleveland Road, Cleveland (Lot 313, DP 1188000).</li> <li>• Cleveland Road, Cleveland (Lot A, DP 156446).</li> <li>• 273-275 Cleveland Road, Cleveland (Lot 1, DP 194419).</li> <li>• 353 Cleveland Road, Huntley (Lot 1, DP 741423).</li> </ul>



Aspect	Detailed description
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**Work Lot C**

Work Lot C gravity main is located on council land and developer owned land:

- Verge and roadway of Bridgewater Drive and Riverpark Way.
- Fairwater Drive, Cleveland (Lot 402, DP 1254873).
- Cleveland Road, Cleveland (Lot 310, DP 1188000).
- 148 Cleveland Road, Cleveland (Lot 1, DP 532391).
- Stockyard Crescent, Horsley (Lot 2, DP 1159862).

Work Lot C rising main is located on the verge and roadway of council roads: Fowlers Road, Ashton Vale Grove, Galway Court, and Fairwater Drive.

**SP1012**

SP1012 is an existing Sydney Water wastewater pumping station located on Sydney Water land at the corner of Riverpark Way and Fairwater Drive, Horsley (Lot 6028, DP 1006031). The pumping station has existing access from Fairwater Drive.

**Site compounds**

The site compounds are shown in Figure 3-2 and located on council land and privately owned land:

- SC1 – Land adjacent to SP1012 at Fairwater Drive, Horsley (Lot 5518, DP 1039814).
- SC2 – 353 Cleveland Road, Huntley (Lot 1, DP 741423), near western end of Work Lot B gravity main.

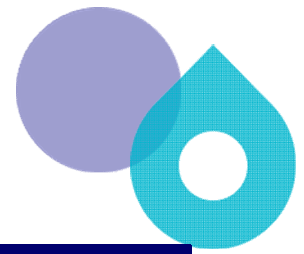
<p>Site establishment and access tracks</p>	<p>Site establishment would involve:</p> <ul style="list-style-type: none"> <li>• marking out and establishing designated areas of the proposal such as the construction corridor, access tracks and compounds</li> <li>• establishing no-go zones as outlined in Section 6.2.3 and 6.2.4 of this REF (including the boundary of mapped coastal wetlands, avoided vegetation and identified AHIMS sites)</li> <li>• establishing erosion and sediment controls</li> <li>• stripping and stockpiling of topsoil for reuse during restoration</li> <li>• removing vegetation approved for clearing.</li> </ul> <p>The primary access point to the construction corridor would be off Cleveland Road for Work Lot B and Fairwater Drive for Work Lot C. Temporary access roads will need to be constructed to access the gravity main alignment. To minimise the impacts associated with vehicular and machinery access, existing access tracks will be used where</p>
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Aspect	Detailed description
	<p>available. Access roads will be constructed within the mapped construction corridor shown in Figure 3-1 and Figure 3-2.</p>
<p>Ancillary facilities (compounds)</p>	<p>Site compounds will likely be required to house site sheds, construction amenities and material laydown. Indicative locations for the compounds are detailed above and shown in Figure 3-2. The proposed locations may shift outside of the indicative areas shown in this REF. The exact location of these compounds will be chosen by the contractor and remain within the construction corridor, in consultation with the landowners and approved by Sydney Water's Project Manager as described in the mitigation measures in Section 6.</p> <p>An additional four site compounds have been assessed as part of the works being undertaken under the EA. To reduce the overall impact of both proposals on the community, this proposal may use those site compounds if needed.</p>
<p>Methodology</p>	<p>Following site establishment, the methodology would include pipe installation and pumping station upgrades.</p> <p><b>Wastewater mains</b></p> <p>The wastewater mains would be installed underground using a combination of open trenching and trenchless methodology. Generally, trenching is the preferred method for pipeline installation in locations without significant environmental or development constraints as it allows open access to the pipeline during construction. The width of the construction corridor disturbed by open trenching would vary depending on the ground conditions and the depth of excavation required. About 8m of pipe would be installed per shift using this method. Methodology for open trenching includes:</p> <ul style="list-style-type: none"> <li>• stringing pipes along the construction corridor</li> <li>• excavating trenches, including stockpiling spoil material beside trenches</li> <li>• shoring trenches or benching the trench profile, depending on trench depths</li> <li>• spreading granular bedding material such as sand or gravel along the base of the trench before pipe laying</li> <li>• installing the main</li> <li>• constructing maintenance holes and maintenance shafts</li> <li>• backfilling the trench with compacted bedding material and excavated soil</li> <li>• replacing topsoil and restoring areas disturbed by construction</li> <li>• testing the main</li> <li>• connecting the main to the existing wastewater network.</li> </ul> <p>Trenchless techniques such as micro-tunnelling and Horizontal Directional Drilling (HDD) will be used to mitigate environmental impacts and avoid sensitive areas including KFH. These techniques would be used for the installation of about 0.63km of</p>

Aspect	Detailed description
	<p>gravity and rising mains. Micro-tunnelling is the preferred methodology for the trenchless section of gravity main. About 10m of pipe would be installed per shift using this method. Methodology for trenchless excavation includes:</p> <ul style="list-style-type: none"> <li>• excavating the launch and receival pits</li> <li>• stockpiling excavated material beside launch and receival pits</li> <li>• benching the excavation</li> <li>• micro-tunnelling the wastewater main</li> <li>• managing waste generated from soil displacement</li> <li>• refilling the pits once the wastewater main has been installed</li> <li>• reinstating road pavement, road verge and vegetation where required.</li> </ul> <p>Both methods would be undertaken sequentially, with areas being reinstated progressively to minimise impacts on the operation of the road network and surrounding receivers.</p> <p>Ventilation shafts will also need to be installed along the pipeline alignments at regular intervals. They are about 300mm in diameter and will allow ventilation of odours from the mains into the atmosphere at a height of between 8 and 16 metres. Location and height of the ventilation shafts are indicative and will be confirmed during detailed design.</p> <p><b>SP1012</b></p> <p>The upgrade to SP1012 includes:</p> <ul style="list-style-type: none"> <li>• replacing the existing pumps with two new submersible pumps to increase capacity of SP1012 from 50L/s to 106L/s</li> <li>• installing a temporary bypass to operate for 2-3 months during pump replacement, to maintain wastewater flows</li> <li>• modifying the existing wet well including the installation of new pump guide rails, pipe brackets and other steelwork as required</li> <li>• modifying the existing valve chamber including widening and lengthening of the chamber and installing new pipework and fittings</li> <li>• installing new valves and pipework including a pressure main scour line, isolation valve, stop and non-return valves, actuated control valves, pipes, and fittings</li> <li>• constructing an above ground electrical switchroom building including associated utilities, lighting and electrical equipment</li> <li>• decommissioning the existing outdoor kiosk</li> <li>• installing a pad mount transformer</li> <li>• extending the existing access road and moving mountable kerbs</li> </ul>





Aspect	Detailed description
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- installing anchoring points in the concrete around the Emergency Storage Structure (ESS) openings for anchoring of fall arrester, harness and tripod.

The existing Emergency Relief Structure within the pumping station is not proposed to be modified and shall continue to discharge directly into the creek adjacent to the site.

**Commissioning** Commissioning involves testing and running the new equipment to ensure it works correctly and is integrated with existing plant operations. Commissioning will be carried out according to Sydney Water procedures. The exact commissioning steps depend on the type of the equipment, but typically include:

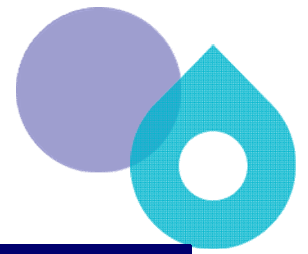
- preparing and testing new infrastructure which may include pressure leak tests, checking of all equipment and safety devices
- performance testing including sampling where required
- providing site labelling (signage and labelling of equipment)
- operator training and preparing maintenance manuals.

**Restoration** The construction corridor will be restored to the pre-existing condition following construction in consultation with landowners, including Wollongong City Council. This may include re-planting, re-turfing, and/or re-installing hardstand. The proposal would largely occur within cleared agricultural landscape and road reserve. Any native vegetation removed during construction would be restored according to Sydney Water SWEMS0025.11 Guideline for native revegetation following construction.

**Materials/ equipment** Materials/ equipment may include the following:

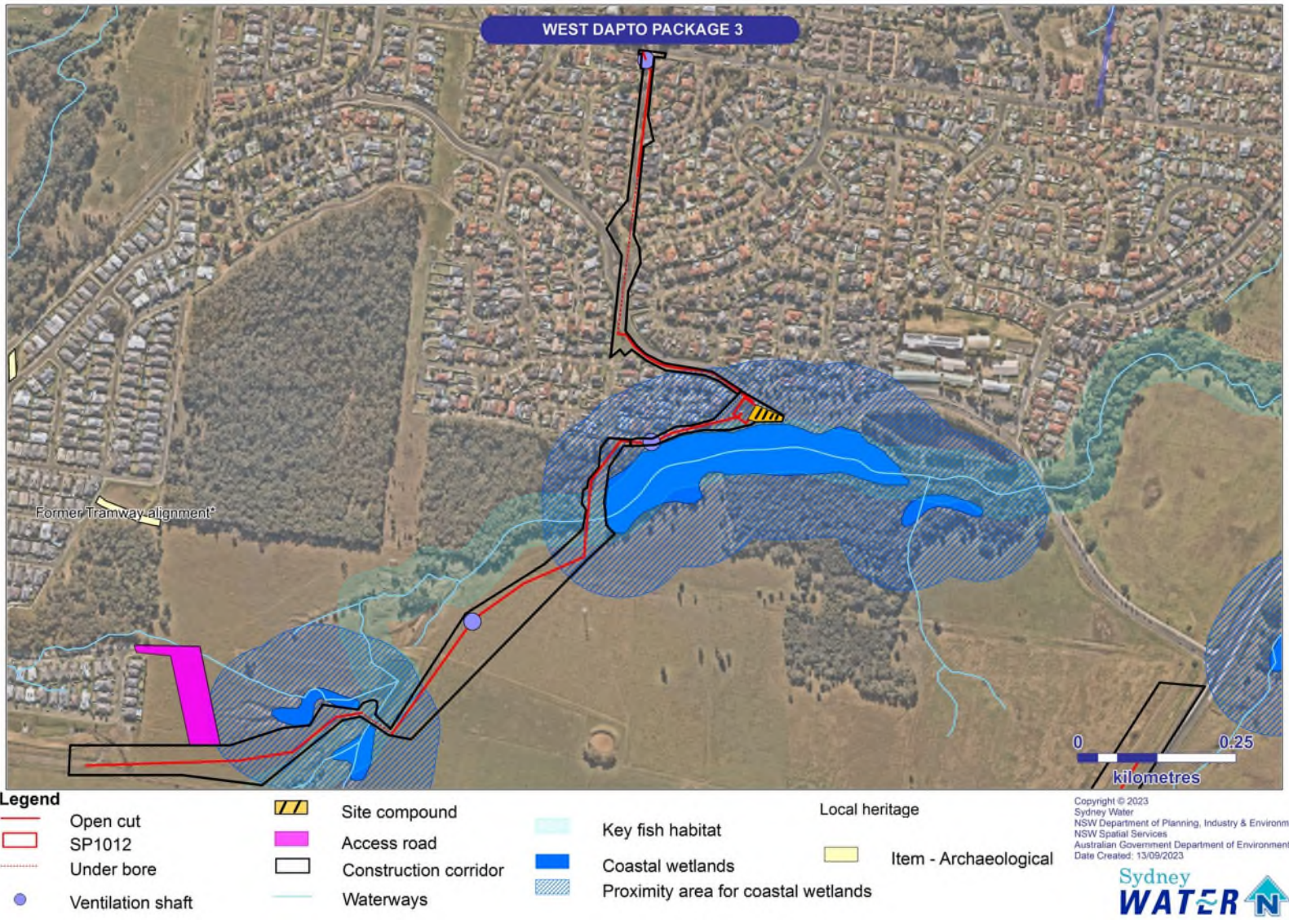
- |  |   |
|--|---|
| • compactor  | • semi-trailers and large delivery trucks |
| • concrete agitator trucks                             | • signage                                 |
| • concrete saws  | • site facilities and amenities           |
| • concrete truck and pump                              | • skip bins                               |
| • confined spaces safety equipment (e.g. gantry/davit) | • storage containers                      |
| • cranes   | • temporary fencing                       |
| • excavators   | • tip trucks                              |
| • generators   | • tunnelling machine                      |
| • hand tools   | • vacuum trucks                           |
| • horizontal borer                                     | • vibratory roller                        |
| • hydraulic pipe jackers                               | • water cart and pump                     |
|  | • light vehicles.                         |



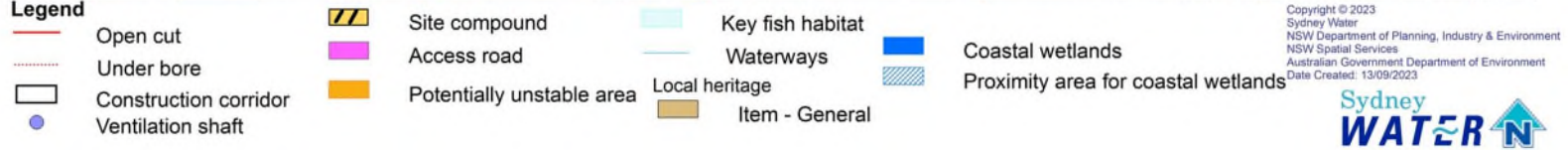
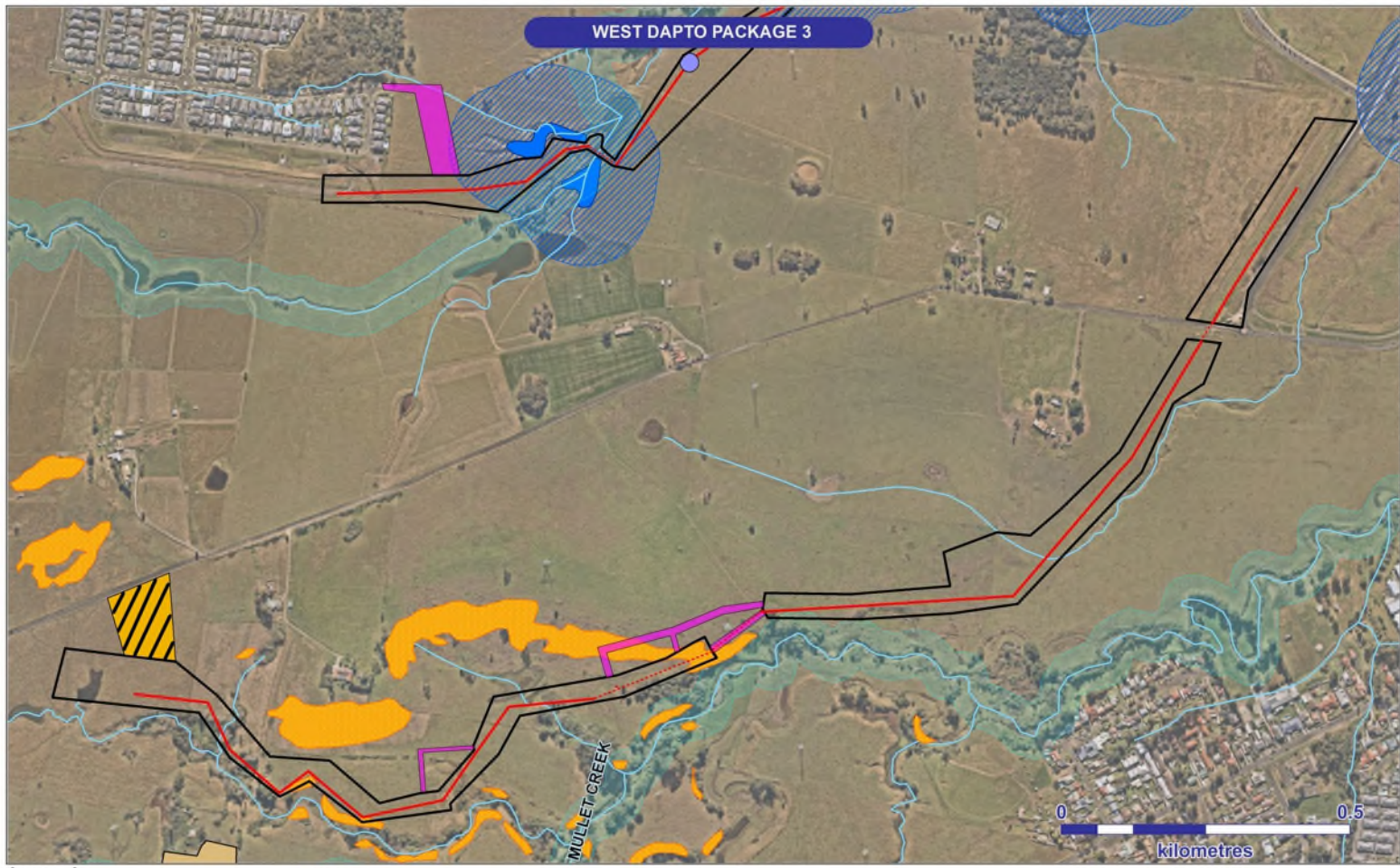


Aspect	Detailed description
	<p>Wherever possible machinery and equipment would be removed from the site each day or stored at the construction compounds between shifts.</p>
Work hours	<p>Work and deliveries will be scheduled to occur during standard daytime hours of:</p> <ul style="list-style-type: none"><li>• 7am to 6pm, Monday to Friday</li><li>• 8am to 1pm, Saturdays.</li></ul> <p>Some work outside of standard construction hours may be required at the pumping station and during open trenching activities. Sydney Water's Project Manager can approve work outside of standard daytime hours, in addition to the out of hours work assessed in this REF. The approval process is described in the mitigation measures in Section 6.</p>
Proposal timing	<p>Construction is expected to start late 2023 and take about 18 months.</p>
Operational requirements	<p>The program of works would be operated according to standard Sydney Water procedures and policies. This includes routine inspections, and cleaning and repair, as necessary.</p> <p>The operation of the proposal will not exceed the current requirements of EPL number 218.</p> <p>During operation, SP1012 would continue to operate automatically. It would also have the ability to be controlled remotely and would have built in redundancies to minimise the risk of discharges to the environment in the event of operational problems.</p> <p>Sydney Water would access SP1012 on a regular basis via Fairwater Drive to undertake general maintenance and deliver materials. Maintenance activities would be undertaken in line with Sydney Water's existing maintenance procedures.</p> <p>Additional maintenance activities would be subject to supplementary environmental impact assessment if required by Sydney Water's procedures.</p>





**Figure 3-1** Location of proposal and key environmental constraints (Work Lot C)



**Figure 3-2** Location of proposal and key environmental constraints (Work Lot B)



## 3.2 Construction corridor and changes to the scope of work

The proposal shown in this REF is indicative and based on the latest design at the time of REF preparation. The final proposal may change based on detailed design and construction planning. If the construction corridor, construction methods or construction timing 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 REF construction corridor and has no net additional environmental impact, or
- is outside the REF construction corridor but reduces the proposal's overall environmental impact (subsection 5.4(a) of the EP&A Act).

Changes to the proposal outside the construction corridor can only occur:

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

The contractor will demonstrate in writing how the changes meet these requirements. If the changes meet these requirements, Sydney Water's Project Manager can approve them 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 Sydney Water’s community and stakeholder engagement guidelines.

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

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

The nature, scale and extent of the proposal’s potential impact has been evaluated in this REF. If our work impacts the community in some way, we will consult with affected groups throughout the proposal. This includes engaging the broader community and stakeholders during plan or strategy development or before making key decisions. Consultation will be performed in accordance with a project-specific Community and Stakeholder Action Plan (CSAP) and Communication Strategy.

Key stakeholders identified to date include:

- Wollongong City Council
- utility owners
- developers (Newquest, Stocklands and Aixa)
- property owners and adjacent residential receivers impacted by the proposal
- registered Aboriginal parties, as part of the Aboriginal Cultural Heritage Assessment Report (ACHAR).

A summary of consultation performed to date for the proposal, including some consultation outcomes, is shown below.

**Table 4-1** Consultation summary

Stakeholder	Queries	Outcomes
Wollongong City Council	Regular meetings held between council, Sydney Water, and delivery contractor. Items discussed include design and location of Sydney Water assets and	<ul style="list-style-type: none"><li>• Changing the depth of maintenance holes and removing ventilation shafts to minimise impact to council land, e.g. sporting fields, future roads.</li></ul>


Stakeholder	Queries	Outcomes
	site compounds, construction timing, and future council projects.	<ul style="list-style-type: none"> <li>Proposing compound locations to minimise impact to future council road upgrades.</li> </ul>
Developers	Individual meetings with property developers in June 2023, and ongoing engagement regarding plans, design, timings.	<p>Aixa – Sydney Water updated alignments to accommodate subdivision layouts.</p> <p>Newquest – Sydney Water updated alignments to accommodate subdivision layouts.</p> <p>Stockland – shared information on wastewater line currently being built by Stockland, which will tie in to Sydney Water asset/s.</p>
Impacted property owners including residential receivers	Asking about construction footprints and direct impacts to properties.	Ongoing engagement with individual property owners to identify queries related to design or construction.
Registered Aboriginal parties	Consultation was undertaken by the heritage specialist, Kelleher Nightingale Consulting (KNC), with 9 stakeholders about the test excavation methodology for the ACHAR. Additionally, the Draft ACHAR was provided to these stakeholders for review.	<p>KNC’s response to queries from these stakeholders about the test excavation methodology is detailed in section 7.3 of Appendix D. No responses opposed the methodology.</p> <p>Details about the replies to the Draft ACHAR are provided in section 7.4 of Appendix D. No issues were raised with the outcomes of the ACHAR.</p>

Sydney Water and/or the delivery contractor will continue to consult with stakeholders throughout pre-construction and construction of the proposal.

## 4.2 Consultation required under State Environmental Planning Policies and other legislation

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

The ongoing consultation with Wollongong City Council for the proposal includes consultation on items relevant to TISEPP, such as:

- 
- temporary partial lane closures and road closures of council roads
  - impacts to council roads and footpaths
  - use of council land for construction compounds.

A TISEPP consultation letter highlighting the above matters was submitted to council on 7 September 2023, under clauses 2.10(1)(e) and 2.10(1)(f) of TISEPP. Sydney Water and/or the delivery contractor will continue to consult with council throughout pre-construction and construction on TISEPP matters, in conjunction with the matters discussed in Section 4.1. Sydney Water did not receive any feedback to this letter within the consultation period. Further detail is provided in Appendix B.

Department of Primary Industry (DPI Fisheries) was notified in July 2023 under s199 of the *Fisheries Management Act 1994* during REF preparation, as the work involves reclamation or dredging in a waterway classified as KFH (open trenching for pipe installation). DPI Fisheries response has been incorporated into Table 5-2, Section 6.2.2, and Section 6.2.3 of the REF.



# 5 Legislative requirements

## 5.1 Previous approvals

In 2012, Sydney Water prepared the Water and wastewater servicing of the West Dapto Urban Release Area and Adjacent Growth Areas Environmental Assessment (EA) (Sydney Water, 2012) to assess the impacts of constructing and operating water and wastewater infrastructure. Sydney Water sought Concept Approval for all of the proposal components, and Project Approval for the proposal components required to service early release precincts.

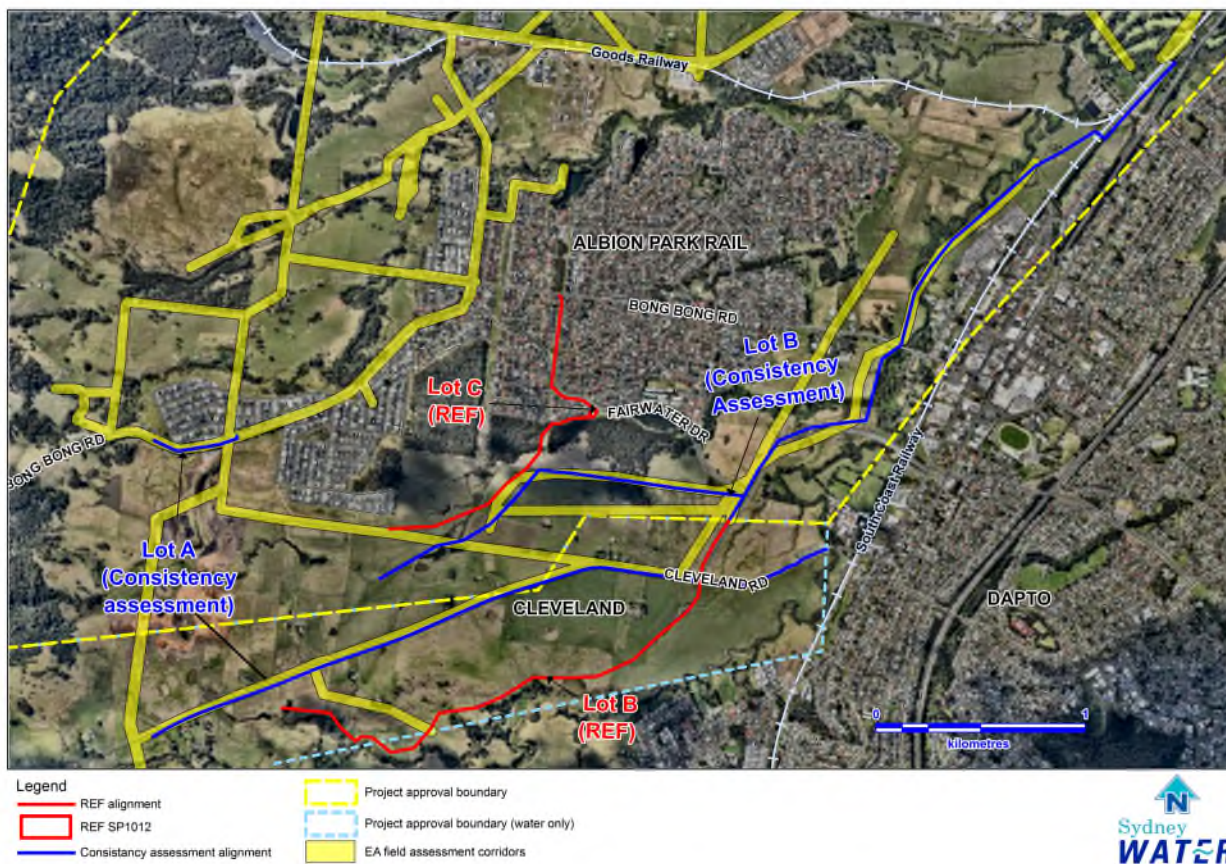
The Minister for Planning and Infrastructure granted Concept and Project Approvals (MP09\_0189) under Part 3A of the EP&A Act on 14 June 2013. These approvals included a number of Minister's Conditions of Approval (MCoA).

In October 2011, Part 3A of the EP&A Act was repealed. In accordance with transitional arrangements for public infrastructure projects already approved under Part 3A, the proposal will continue to be subject to Part 3A provisions, and the Minister for Planning and Infrastructure (now the Minister for Planning) remains the approval authority.

In 2016, the Concept Approval was modified to align the Concept Approval and Project Approval Areas (Modification 1). This change removed the AGA and southern section of WDURA from the Concept Approval. The change made the Concept Approval boundary align with the Project Approval boundary. Modification 1 also removed duplicate MCoA requirements for the Concept Approval. The Minister for Planning and Infrastructure granted approval of Modification 1 under Part 3A on 6 January 2016. The project approved under the Concept and Project Approval was then named 'Water and Wastewater Servicing of the West Dapto Urban Release Area precincts of Kembla Grange, Sheaffes/Wongawilli and West Horsley'. As shown in Figure 5-1 below, the existing approval applies to land mapped within the Project Approval boundary. This REF covers works:

- outside the Project Approval Area and/or
- includes components not envisaged in the EA and follows substantially different alignments/field assessment areas to those assessed in the EA.

All Package 3 works not included in this proposal will be constructed under the EA.



**Figure 5-1** Location of EA field assessment area and REF

## 5.2 Strategic context

### 5.2.1 Illawarra Shoalhaven Regional Plan 2041

This plan (DPIE, 2021) aims to protect and enhance the region’s assets and plan for a sustainable future. It is the overarching policy document guiding strategic land use planning in the region. It applies to the local government areas of Wollongong, Shellharbour, Kiama, and Shoalhaven. Among other aspects, the plan informs local councils’ land use planning, assists agencies in asset and infrastructure planning for future growth, and informs the wider community of the NSW government’s approach to creating a connected, sustainable, innovative, and vibrant region.

The plan identifies 15 regionally significant precincts that will drive jobs creation, housing diversity, and vibrant communities. In total, these precincts represent more than 2,300 hectares of land and opportunity for around 38,000 new homes.

One of these precincts is the West Lake Illawarra Growth Area. The proposal is within this growth area. In order to realise the vision for the region and deliver more homes and space for business, the area will require essential utility services. Sydney Water is planning to deliver water and wastewater infrastructure to the West Dapto area to service this planned future growth. This proposal is consistent with this regional plan by supporting future development in the area.

### 5.2.2 Wollongong Local Strategic Planning Statement 2020

This Planning Statement (Wollongong City Council, 2020) demonstrates how council will continue to implement the actions contained in the Illawarra Shoalhaven Regional Plan and other state government policy documents as required and as applicable. It provides the 20-year vision for the area and identifies details future land use actions, studies and strategies to be undertaken by Council as well as used as a guide in the assessment of planning proposals to ensure they have strategic merit and are consistent with Council's vision for the local government area.

The Planning Statement identifies that West Dapto is planned to provide about 19,500 homes over the next 40-50 years. To facilitate this, it recognises infrastructure as a key consideration in future land use planning.

The Planning Statement also notes that most of existing residential properties are connected to Sydney Water's water and wastewater networks and references the existing Project Approvals to provide these services to the West Dapto area. The proposal would support the land use planning identified for West Dapto in the Planning Statement by providing connection to Sydney Water's network.

The Planning Statement also refers to Council's West Dapto Vision 2018 (Wollongong City Council, 2018). This vision is outlined below.

### 5.2.3 West Dapto Vision 2018

This vision (Wollongong City Council, 2018) sets out the vision for the West Dapto area as communities that are healthy, sustainable, and resilient with active and passive open space accessible by walkways, cycleways and public transport. To support this, the vision notes that timely implementation of infrastructure is necessary to deliver sustainable and high-quality suburbs with diverse housing choices.

The proposal supports the vision for West Dapto by providing important infrastructure to support future development in the area.

## 5.3 Environmental legislation

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

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

**Table 5-1** Environmental planning instruments relevant to the proposal

Environmental Planning Instrument	Relevance to proposal
Wollongong Local Environmental Plan 2009	The proposal is on land zoned:

Environmental Planning Instrument	Relevance to proposal
<p>State Environmental Planning Policy (Transport and Infrastructure) 2021 (TISEPP)</p>	<ul style="list-style-type: none"> <li>• C2 Environmental Conservation</li> <li>• C3 Environmental Management</li> <li>• R2 Low Density Residential</li> <li>• RU2 Rural Landscape.</li> </ul> <p>Section 2.126(6) of the TISEPP permits development by or on behalf of a public authority for wastewater reticulation systems without consent on any land in the prescribed circumstances. There are some limitations on land reserved under the <i>National Parks and Wildlife Act 1974</i>, but the proposal is not located on any land to which this applies.</p> <p>The proposal involves development related to a wastewater pumping station and wastewater mains. Development is carried out in the prescribed circumstances if it is carried out by or on behalf of a public authority.</p> <p>As Sydney Water is a public authority, the proposal is permissible without consent.</p>
<p>State Environmental Planning Policy (Biodiversity and Conservation) 2021 (BCSEPP)</p>	<p><b>Koala habitat protection (2020 and 2021) (Chapters 3 and 4)</b></p> <p>The proposal is located within the Wollongong LGA which forms part of the South Coast Koala Management Area. The proposal involves excavation, construction and limited vegetation removal in pre-disturbed land which is predominantly open paddock. As detailed in Section 6.2.3, it would not be considered viable koala habitat. As such no impacts on koala habitat would occur as a result of the proposal.</p>
<p>State Environmental Planning Policy (Resilience and Hazards) 2021 (RHSEPP)</p>	<p><b>Coastal Management (Chapter 2)</b></p> <p>The works are on land to which Chapter 2 of this SEPP applies.</p> <p>No works would be performed within coastal wetlands. However, the construction corridor of Work Lot C is located within an area mapped as proximity area for coastal wetland under RHSEPP. Therefore, the requirements of clause 2.8 should be considered. The proposal must not significantly impact:</p> <ul style="list-style-type: none"> <li>a) The biophysical, hydrological or ecological integrity of the adjacent coastal wetland or littoral rainforest, or</li> </ul>

## Environmental Planning Instrument

## Relevance to proposal

- b) the quantity and quality of surface and ground water flows to and from the adjacent coastal wetland or littoral rainforest.

The above clauses have been considered as part of the assessment of impacts to proximity areas for coastal wetland in Section 6.2.3 of this REF.

**Table 5-2** Consideration of key environmental legislation

Legislation	Relevance to proposal	Permit or approval	Timing and responsibility
<i>Protection of the Environment Operations (POEO) Act 1997</i>	The proposal is consistent with an existing activity under EPL No. 218 for Wollongong Sewage Treatment System and existing compliance requirements. Temporary relaxation of the EPL is not required during construction or commissioning. A variation to the EPL is not required for operation. It is expected that the upgrades to the wastewater assets will allow the system to meet its compliance requirements.	Conditions in existing EPL No. 218	NA
<i>Biodiversity Conservation (BC) Act 2016</i>	<p>The BC Act lists species and ecological communities which are protected in NSW. The impact of the proposal on threatened species, communities and their habitats has been assessed in Section 6.2.3.</p> <p>Section 7.3 of the BC Act requires that the significance of the impact on threatened species and endangered ecological communities or their habitats is assessed using a five-part test. Where a significant impact is likely to occur, a species impact statement (SIS) must be prepared in accordance with the Environment Agency Head's requirements, or a Biodiversity Development Assessment Report (BDAR) must be prepared by an accredited assessor in accordance with the Biodiversity Assessment Method (BAM).</p> <p>Assessments of significance were conducted for threatened entities with the potential to occur in the Study Area (Appendix C). These</p>	NA	NA



Legislation	Relevance to proposal	Permit or approval	Timing and responsibility
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assessments concluded that the proposal is not likely to result in a significant impact upon any threatened entity listed under the BC Act. Therefore, a SIS or BDAR is not required.

<p><i>National Parks and Wildlife (NPW) Act 1974</i></p>	<p>The proposal is not on National Parks land.</p> <p>Under section 86 of this Act, it is an offence to harm or desecrate an Aboriginal place or object unless authorised by an Aboriginal heritage impact permit (AHIP).</p> <p>Under section 90(1) of the Act “the Director-General may issue an Aboriginal heritage impact permit”. The regulation of Aboriginal heritage impact permits is provided in Part 6 Division 2 of the Act, including regulations relating to consultation (section 90N). An AHIP is required for an activity which will harm an Aboriginal object.</p> <p>Under section 87(1) it is a defence against prosecution if “(a) the harm or desecration concerned was authorised by an AHIP and (b) the conditions to which that AHIP was subject were not contravened”.</p> <p>Section 87(2) provides a defence if “the defendant exercised due diligence to determine whether the act or omission constituting the alleged offence would harm an Aboriginal object and reasonably determined that no Aboriginal object would be harmed”.</p> <p>An Aboriginal Cultural Heritage Assessment Report (ACHAR) has been undertaken as part of the REF (Appendix D).</p> <p>Based on the results of the test excavation and impact assessment [REDACTED]</p> <p>[REDACTED] a land based AHIP under section 90 of the NPW Act is required.</p>	<p>AHIP</p>	<p>Pre-construction, Sydney Water</p>
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Legislation	Relevance to proposal	Permit or approval	Timing and responsibility
<i>Fisheries Management (FM) Act 1994</i>	<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. If the proposal involves dredging work (excavation in water land) or obstructs fish passage in KFH, and/or harms marine vegetation then a permit from DPI Fisheries may be needed.</p> <p>Construction of the Work Lot C gravity main alignment across a tributary of Mullet Creek (Reed Creek) would involve work within the bank of a watercourse listed as KFH. Open trenching of this section of the creek is required. DPI Fisheries have been notified in accordance with section 199 of the FM Act. Sections 6.2.2 and 6.2.3 of this REF identify mitigation measures to manage impacts to Key Fish Habitat.</p>	Notification	Pre-construction, Sydney Water
<i>Water Act 1912/ Water Management Act 2000</i>	<p>All dewatering activities require an approval under Section 91B of the Water Management Act 2000.</p> <p>Section 60A of the Water Management Act states that it is an offence to take water without a licence. A Water Access Licence (WAL) is required under section 61 where groundwater extraction will be greater than 3ML.</p> <p>Groundwater is likely to be extracted from excavations during construction. It is expected that groundwater extractions would exceed 3ML per year. A Water Supply Works Approval (WSWA) and WAL application was submitted to DPE Water on 8 August 2023.</p>	WAL, WSWA	Pre-construction, Sydney Water and D4C
<i>Roads Act 1993</i>	<p>The works occur mostly on private land and would be accessed using local roads under the control and management of Wollongong City Council. The works are not within 100m of a traffic signal and are not located on a classified road. Therefore, a Road Occupancy Licence (ROL) from Transport for NSW (TfNSW) would not be required. However,</p>	NA	NA

Legislation	Relevance to proposal	Permit or approval	Timing and responsibility
	<p>ROIs from Wollongong City Council may be required.</p>		
<p><i>Environment Protection and Biodiversity Conservation (EPBC) Act 1999</i></p>	<p>Matters of National Environmental Significance (MNES) relevant to the proposal include nationally threatened species and ecological communities.</p> <p>An ecological assessment (Appendix C) confirmed that:</p> <ul style="list-style-type: none"> <li>• it is unlikely that a significant impact on a MNES will result from the project</li> <li>• a referral of the proposed action to the Australian Government Minister for the Environment for approval under the EPBC Act is not required.</li> </ul>	<p>NA</p>	<p>NA</p>
<p><i>Biosecurity Act 2015</i></p>	<p>The <i>Biosecurity Act 2015</i> provides the framework to protect our community from the adverse effects from animal and plant pests, diseases and weeds to maintain market access and protect infrastructure and other important assets. The Act also provides the framework to help protect our environment from invasive pests and diseases.</p> <p>The Act is tenure neutral. This means that all land managers, regardless of whether it is private or public land, have the same responsibilities. The action taken by the land manager will be guided by legislation, regional strategic management plans (including weed and pest animal plans) and what is reasonably practicable to eliminate, prevent or minimise a risk.</p> <p>The construction corridor contains several weed species which are listed under the Act and have an associated biosecurity duty. These weeds and appropriate mitigation measures have been discussed in Section 6.2.3 of this REF.</p>	<p>Compliance with biosecurity duty</p>	<p>Construction, D4C</p>





# 6 Environmental assessment

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

## 6.1 Existing environment

The proposal is located in the suburbs of Horsley, Huntley and Cleveland within the Wollongong LGA. The surrounding area is generally characterised by a rural landscape with open grasslands and some wetland areas surrounding townships such as Horsley. The townships consists of low-density residential properties, small businesses, and local roads. Mullet Creek and smaller tributaries are located in or near the proposal. The suburb of Dapto is located to the east of the proposal, separated from the proposal by the South Coast Railway.

Within Horsley, the alignment of the proposal generally follows road verges and property boundaries, minimising impacts to private property where practicable. Within open grassland areas, the alignment generally traverses flat to gently undulating land on private property. Some small waterways and coastal wetland areas are present throughout the landscape.

The area also contains previously recorded Aboriginal heritage objects and areas of high Aboriginal archaeological sensitivity identified in the previous EA (refer to Section 5.1).

The existing environment is described further throughout Section 6.2.

## 6.2 Environmental aspects, impacts and mitigation measures


### 6.2.1 Topography, geology and soils

#### Existing environment

The landscape of the Study Area is generally very gently sloping towards the north. The regional soil landscape mapping of the Kiama 1:100,000 sheet (Hazleton 1992) indicates that the construction corridor overlaps the following soil landscapes:

- Fairy Meadow (SWfa) – is a swamp landscape, overlying Quaternary sediments, and is characterised by alluvial plains, floodplains, valley flats and terraces.
- Shellharbour (ERsh) – is an erosional landscape and is defined by rolling low hills with long sideslopes and broad drainage plains on Budgong Sandstone.

The proposal is not in an area impacted by known contamination as indicated on NSW Environment Protection Authority (EPA) list of notified sites accessed on 10 July 2023 (EPA, 2023). A review of the historic aerial imagery (NSW Government, 2023) indicates that previous land use within the construction corridor was large rural or semi-rural lots, similar to the current



land use within the suburb of Cleveland. The low-density residential properties within the suburb of Horsley had been built by 2004. The risk of historical contamination is low.

Additionally, the proposal:

- is in an area with mapped low-moderate salinity hazard (DPIE, 2023b)
- is partly on an area mapped as potentially unstable soils (Potential instability with a slope of more than 15% has been identified at the southern end of Work Lot B)
- is not in an area impacted by an existing exploration or mining title
- is outside areas mapped as impacted by acid sulfate soils (ASS) (DPIE, 2023a). A low probability of ASS occurrence (at more than four metres depth) is mapped to the north-east of the site.

### Potential impacts – construction

Construction involves excavating and stockpiling soil to install underground mains. The mains would be installed using a combination of open trenching and trenchless methodologies. About 4.8km of underground mains are required to be installed, at depths of up to 10m. Trenchless methodologies, although not as intrusive as open trenching, still require excavation for launch and retrieval pits at regular intervals. Ground disturbance is likely to be required at the pumping station for the new scour line, switchroom, and access track adjustments. These activities have the potential to cause erosion and sedimentation. Excavation will expose soil and increase the risk of soil mobilising during rain or windy conditions.

If not adequately managed, construction activities could potentially result in the exposure of saline soils and ASS. Although the risk of encountering ASS is very low, if it is found and exposed to air, sulfuric acid may form. Exposure of ASS and saline soils may impact the quality of surface water, groundwater, and soil, and may damage or corrode infrastructure.

The potential for instability can restrict pipeline construction methods and the choice of construction materials. Works are proposed to be trenchless close to potentially unstable soils, or where there are waterways, road crossings, or infrastructure crossings.

### Potential impacts – operation

Generally, the works would not permanently change the surface topography of the area. Following the installation of the gravity and rising mains, the excavations would be backfilled, and the surface returned to a condition similar to that before the disturbance. Future developers will backfill locations where the mains have been installed with low pipe cover.

Installation of above ground elements at SP1012 will result in a minor change to the runoff from the site during operation. The amount of hardstand within the site would increase, so there will be less permeable surfaces. The direction of surface runoff is not expected to change.

### Mitigation measures

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

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

**Mitigation measures**

Prevent sediment moving offsite in accordance with *Managing Urban Stormwater, Soils and Construction, Volume 1 and 2A* (Landcom 2004 and DECC 2008), including:

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

Minimise ground disturbance and stabilise disturbed areas progressively.

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

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

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

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

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

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

Erosion and sediment mitigation devices are to be erected in a manner consistent with current best management practice (i.e. *Managing Urban Stormwater: Soils and Construction 4th Edition Landcom, 2004*) to prevent entry of sediment into the waterway before any earthworks being undertaken. These are to be maintained in good working order for the duration of the works and subsequently until the site has been stabilised and the risk of erosion and sediment movement from the site is minimal.

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

## Mitigation measures

Any material removed from the waterway that is to be temporarily deposited or stockpiled on land is to be located well away from the waterway and to be contained by appropriate erosion and sediment control devices.

If found, manage acid sulfate soils in accordance with the Acid Sulfate Soils Management Advisory Committee: Acid Sulfate Soils Assessment Guidelines (ASSMAC, 1998) and prepare an Acid Sulfate Soils Management Plan (ASSMP).

If required, 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:

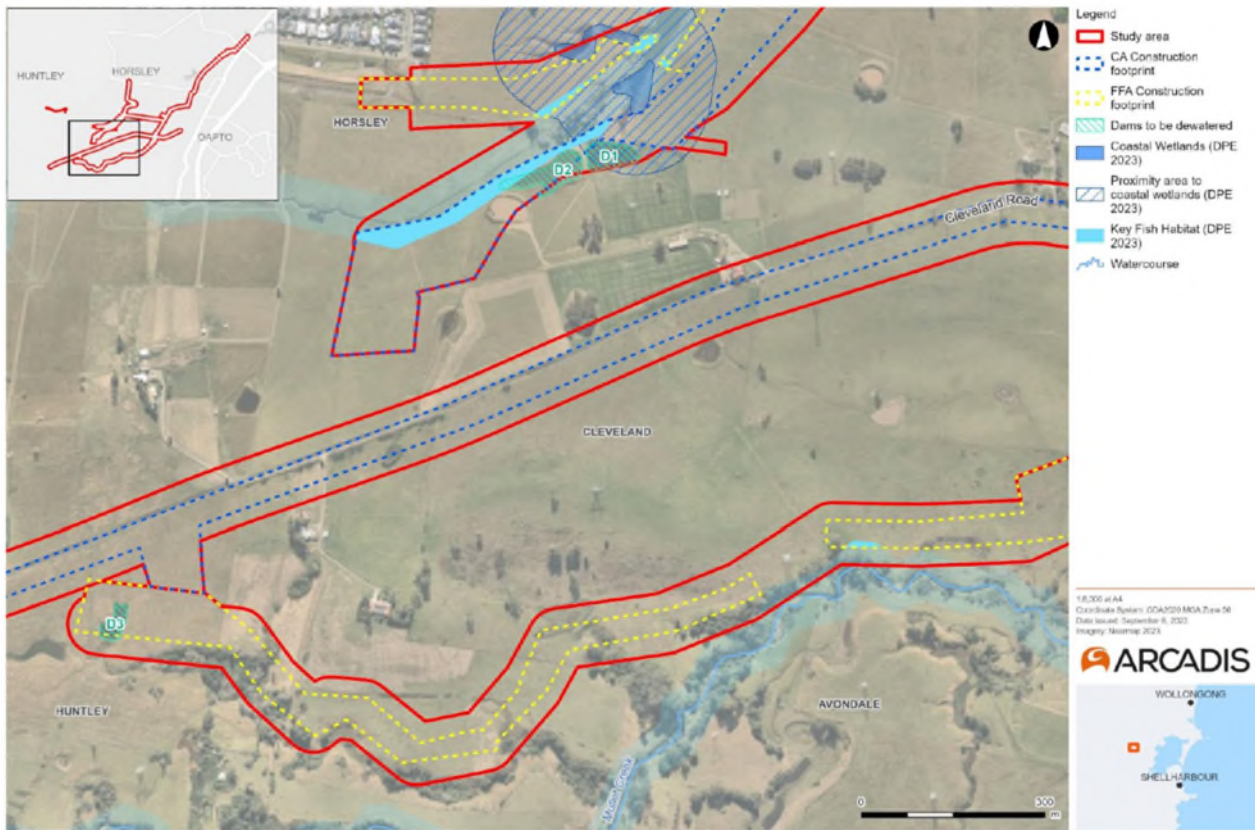
- stabilise existing areas of erosion
- minimise water use on site
- avoid rotation and vertical displacement of the original soil profile
- backfill excavations deeper than one metre in the same order, or treat or use this material as fill at depths more than one metre from the finished level.

### 6.2.2 Water and drainage

#### Existing environment

The construction corridor is adjacent to Mullet Creek. Four tributaries of Mullet Creek cross the construction corridor (see Figure 3-1 and Figure 3-2). Of these, two are mapped as KFH.

There was one farm dam identified within the construction corridor, identified as D3 within the figure below (Figure 6-1). Some sections of farm dams and tributaries within the Study Area are mapped as coastal wetland with sections of the proposal within the proximity area for coastal wetlands (Figure 3-1). The construction corridor does not encroach on land mapped as coastal wetland.



**Figure 6-1** Location of farm dams in relation to the construction corridor.

The pumping station and some sections of the gravity mains are located within 1 in 100-year flood zones (BMT WBM Pty Ltd, 2018).

A large portion of the mains are located within the Fairy Meadow Terrain Unit which is known to have a high seasonal water table (Sydney Water, 2012). It is therefore likely that groundwater would be encountered during construction.

**Potential impacts – construction**

Waterway crossings will be required at the locations shown in Table 6-2.

**Table 6-2** Waterway crossings

Scope	KFH	Waterway	Lot and DP	Methodology
Work Lot B gravity main	No	Tributary of Mullet Creek	Lot 313, DP 1188000	Open trench
Work Lot B gravity main	No	Tributary of Mullet Creek	Lot A, DP 156446	Open trench
Work Lot B gravity main	No	Tributary of Mullet Creek	Lot 1, DP 194419	Open trench

Scope	KFH	Waterway	Lot and DP	Methodology
Work Lot C gravity main	Yes	Tributary of Mullet Creek (Reed Creek)	Lot 402, DP 1254873	Open trench
Work Lot C gravity main	Yes	Tributary of Mullet Creek (Reed Creek)	Lot 1, DP 532391	Trenchless

Trenchless construction is not possible at 4 of the 5 crossings, where they are shallow, perennial drainage lines. Of the 4 open trenching locations one is located within mapped KFH. Under Section 199 of the FM Act, notification and consultation with DPI Fisheries was undertaken. DPI Fisheries responded on 12 July 2023 and had no objections to the proposal, and provided recommendations which have been included as mitigation measures in this REF.

Construction activities will involve excavation and temporary stockpiling, with the potential to cause sedimentation to waterways if not adequately managed. The excavations will be progressively backfilled and restored to a condition similar to that before the disturbance.

The southern crossing for the Work Lot C gravity main (Lot 1, DP 532391) is proposed to be trenchless construction. Trenchless construction has a potential risk of drilling fluid escaping the bore and entering the environment from a spill or frac-out (drilling intercepting faults and fractures in the rock). If not adequately managed, construction in or near waterways has the potential to cause sedimentation and impact water quality and aquatic flora and fauna.

The farm dam within the construction corridor will be dewatered to enable construction of the final section of pipe. The impacts of dewatering this farm dam are assessed in Section 6.2.3.

The proposal involves excavations and ground disturbance within the proximity area for coastal wetlands. The construction corridor has been sited to be outside of coastal wetlands. Coastal wetlands may be indirectly impacted should uncontrolled erosion lead to increased turbidity and reduced water quality. Impacts to coastal wetlands and proximity areas, including water quality, have been assessed in Table 6-11.

Construction may result in minor impacts to flood behaviour because excavations may cause minor alterations to flow paths and drainage patterns. These impacts are unlikely to be significant due to the temporary and localised nature of the proposal. All compound sites are located outside the 1 in 100-year flood zone. The flood profile of the area will be restored following construction.

Groundwater inflows are expected when excavation extends near or below the groundwater table. The use of steel shoring boxes would result in a reduction of inflows into the open pits. However, it is anticipated that groundwater dewatering will still be required. Based on known inflows, groundwater level, construction method and schedule, it was determined that the volume of groundwater extracted for the duration of the proposal would likely be above 3ML. Therefore, a WSWA and a WAL will be required. An application was submitted to DPE Water on 8 August 2023.

The proposal may require on-site fuel and chemical storage, which will be managed in accordance with the mitigation measures below to avoid any pollution of nearby waterways. Fuels and chemicals would typically be stored within site compounds.

A temporary bypass is required to be installed for 2-3 months during construction. If not installed correctly, bypasses may leak or cause wastewater to travel offsite and impact nearby waterways. Mitigation measures outlined below will reduce the risk of any bypass failures.

### Potential impacts – operation

Once complete the proposal would be underground with limited surface infrastructure. We do not anticipate any long-term impacts on surface water, drainage, flooding or groundwater. The new scour line is not expected to cause an increase in overflows, or changes in water quality or quantity compared to the existing setup.

The mains will connect to the existing wastewater network and will be managed under existing licences (e.g. EPL) and operating procedures, ensuring no impacts to groundwater or surface water quality during operation.

### Mitigation measures

With the implementation of the mitigation measures in Table 6-1 and below, impacts to waterways can be adequately managed, and residual impacts are expected to be low.

**Table 6-3 Environmental mitigation measures — water and drainage**

Mitigation measures
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 and/or aquatic spill kit on site for clean-up of accidental chemical/fuel spills in mapped KFH. Keep the spill kits stocked and located for easy access.
Locate portable site amenities, chemical storage and stockpiles of erodible materials away from watercourses, drainage lines and flood prone areas.
Machinery is not to enter or work from the waterway unless in accordance with the proposal.
The contractor will obtain a groundwater Water Supply Works Approval and where dewatering is >3ML per water year (from 1 July) a Water Access Licence from DPE Water will also be obtained. The contractor is responsible for 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 Water Quality Management During Operational Activities Policy (D0001667) including erosion controls, discharge rate, dechlorination, monitoring. Re-use potable / groundwater water where possible.
Dewater excavations in accordance with the Delivery Management Guidance Standard 9.1 Excavation Dewatering (ENV-GS-001). Extracted groundwater would be tested and (if required) treated before disposal directly into the environment.

Dewater excavations in waterways as follows:

- pumps used in waterways are to be screened with mesh of no greater than 6mm in diameter

## Mitigation measures

- daily checks of the sediment levels in the dewatering sediment dams are to be conducted to ensure adequate storage capacity
- dewatering operations must ensure retention of spoil for a long enough period to allow mobilised sediments to settle out
- a visual inspection of the waterway is to be conducted at all times during dewatering operations to ensure that no visible plumes are generated within the waterway from dewatering operations.

If discharge to the environment is not possible, seek approval and discharge criteria from the relevant Sydney Water Network Area Manager before discharge to the wastewater system. Otherwise tanker by a licensed waste contractor and dispose off-site to an appropriately licensed facility.

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 and to be stored away from drainage lines. 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.

Before use at the site and/or entry into the waterway, machinery is to be appropriately cleaned, degreased, and serviced. Spill kits are to be available on site at all times during the works.

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).

Silt curtains or a coffer dam should be deployed around instream work sites and stormwater outlet headwall construction zones where required. In addition to standard erosion and sediment control measures, to protect against any impacts to water quality.

The stockpiling of sediment should be located as far away from the waterway as possible and managed so that it is secure against flooding, to at least the 1 in 10-year flood interval.

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

The width of the trench through waterways are to be minimised as far as is practical to conduct the works.



## Mitigation measures

If possible, avoid open cut trenching through riffle zones.

KFH is to be infilled with the original sediment from the site, and the in-stream habitat features that existed before the works are to be rehabilitated.

Works are to be undertaken during low flows in the waterway.

DPI Fisheries (1800043536) and the Environment Protection Authority (131 555) are to be notified immediately if any fish kills occur in the vicinity of the works. In this situation, all works other than emergency response procedures are to stop until the issue is rectified and approval is given by DPI Fisheries and/or the EPA for the works to proceed.

If wastewater bypass is required:

- pressure test hoses before, and monitor during bypass
- monitor wastewater flows to ensure critical flows are not reached
- stop bypass if leaks occur
- bund access chambers
- contain wastewater spills and pump back to wastewater system or disposal tanker.

Where required steel shoring boxes will be used to reduce inflow of groundwater into open trench.

Protect Groundwater Dependent Ecosystems by minimising extraction of groundwater and removal of native vegetation.

Locate launch and receiver pits in dry areas of the construction corridor, away from the coastal wetlands and larger waterbodies.

Use appropriate controls to avoid potential sedimentation to waterbodies (e.g. floatation boom).

Consider the DPI Water [Guidelines for laying pipes and cables in watercourses on waterfront land](#) during the design and construction of works within 40m of waterways to protect waterfront land.

Include:

- evidence that the design conditions have been reviewed, and why or why not they can be implemented
- consideration of a contingency plan if there is a large time gap between pipe installation and the property developer completing their work.

### 6.2.3 Flora and fauna

A Flora and Fauna assessment was completed by Arcadis in September 2023 (Appendix C). This assessment covered works under this REF as well as works under the EA (being assessed under a separate consistency assessment). This REF only discusses impacts from construction of the REF scope of works, referred to in the specialist assessment as the REF or FFA.

The Study Area of the assessment includes the proposed wastewater mains (with a 50m buffer), the construction corridor, site compounds and laydown areas. Access roads were not included as part of the Study Area as it has been assumed they will have low ecological impact and be designed to avoid any impact to flora and fauna. The impact area assumed wholesale clearing within the construction corridor. Therefore, this assessment is considered to present a worst-case scenario and it is likely that impacts can be minimised on-site through minor reductions in the construction corridor where feasible.

### Existing environment

Existing land use within the precinct is mostly peri-rural and includes activities such as grazing. Other surrounding land uses include sports fields, low-density residential properties, electrical transmission lines, railways, roads and open green space. There are some assemblages of threatened and non-threatened native vegetation communities which partly overlap with the construction corridor. However, most of the construction corridor has been subject to historical land clearing and modification, and does not support vegetation conforming to a recognised Plant Community Type (PCT). Large areas support agricultural pastures and exotic grasslands. The area is also mapped as bushfire prone.

### Vegetation communities

Three different PCTs were confirmed to be present within the Study Area during site inspection:

- PCT 3078 Illawarra Lowland Wet Vine Forest
- PCT 3327 Illawarra Lowland Red Gum Grassy Forest
- PCT 4051 South Coast Lowland Red Gum-Swamp Oak Forest.

The existing environment within the Study Area, as verified by site assessment, is summarised below (Table 6-4).

**Table 6-4 Existing environment within the Study Area**

PCT	PCT description	Associated TEC	Vegetation condition	TEC listing
3078	Illawarra Lowland Wet Vine Forest	Illawarra Subtropical Rainforest in the Sydney Basin Bioregion (BC Act)  Illawarra-Shoalhaven Subtropical Rainforest of the Sydney Basin Bioregion (EPBC Act)	Moderate – fully structured assemblage with native species across all strata, but with a moderate composition of exotic species.	0.06ha of PCT 3078 within the construction corridor meets the criteria for the below listings:  BC Act – Endangered  EPBC Act – Critically Endangered

PCT	PCT description	Associated TEC	Vegetation condition	TEC listing
3327	Illawarra Lowland Red Gum Grassy Forest	Illawarra Lowlands Grassy Woodland in the Sydney Basin Bioregion (BC Act)  Illawarra and south coast lowland forest and woodland ecological community (EPBC Act)	Moderate	None.  Although conforming to PCT 3327, the assemblage of PCT 3327 within the construction corridor does not meet the definition of the BC Act listing or EPBC Act listing.
4051	South Coast Lowland Red Gum-Swamp Oak Forest	None	Low-moderate condition, mostly scattered native trees with an understorey dominated by exotic species	NA

Additional vegetation types not conforming to a PCT have been classified as:

- emergent and aquatic
- planted native and exotic
- weeds and exotics
- agricultural pastures and exotic grasslands.

The impact of the proposal on the above vegetation communities has been detailed in Table 6-7.

### Priority weeds

A total of 75 exotic species were recorded in the Study Area during the site survey. Of these, nine are listed as 'priority weeds' under the *Biosecurity Act 2015* for the South East Local Land Services region, which includes the Wollongong City LGA. Seven species are listed as Weeds of National Significance (WoNS). Additionally, five weed species are considered weeds of regional concern. These weeds are listed in Table 6-5 with their associated biosecurity duty.

**Table 6-5** Priority weeds present in the Study Area

Scientific name	Common name	Biosecurity duty			
		WoNS	Priority	Regional Concern	
<i>Anredera cordifolia</i>	Madeira Vine	✓	✓	✓	<b>Prohibition on dealings.</b> Must not be imported into the state or sold.

Scientific name	Common name	WoNS	Priority	Regional Concern	Biosecurity duty
<i>Asparagus aethiopicus</i>	Ground Asparagus	✓	✓	✓	<b>Prohibition on dealings.</b> Must not be imported into the state or sold.
<i>Cestrum parqui</i>	Green Cestrum		✓	✓	<b>Regional Recommended Measure.</b> Land managers should mitigate introduction and/or spread. Should not be bought, sold, grown, carried, or released into the environment.
<i>Rubus fruticosus species aggregata</i>	Blackberry	✓	✓	✓	<b>Prohibition on dealings.</b> Must not be imported into the state or sold.
<i>Lantana camara</i>	Lantana	✓	✓		<b>Prohibition on dealings.</b> Must not be imported into the state or sold.
<i>Olea europaea subsp. cuspidata</i>	African Olive		✓		<b>Regional Recommended Measure.</b> Should not be traded, grown, carried, or released into the environment.
<i>Sagittaria platyphylla</i>	Sagittaria	✓	✓		<b>Prohibition on dealings.</b> Must not be imported into the state or sold.
<i>Salix babylonica</i>	Weeping Willow	✓	✓	✓	<b>Prohibition on dealings.</b> Must not be imported into the state or sold.
<i>Senecio madagascariensis</i>	Fireweed	✓	✓		<b>Prohibition on dealings.</b> Must not be imported into the state or sold.

### Threatened Flora and Fauna

Desktop searches identified 41 threatened flora species were recorded or predicted to occur within 10 km of the Study Area. Of these, nine species were identified as having a moderate or higher likelihood of occurrence in the Study Area.

Desktop searches identified 111 threatened and 72 migratory fauna species were recorded or predicted to occur within 10 km of the Study Area. Of these, 28 species were identified as having a moderate or higher likelihood of occurrence in the Study Area.

### Flora and Fauna habitats

The Study Area contains potential terrestrial and aquatic habitat for threatened and non-threatened fauna and flora (Table 6-6).

**Table 6-6** Potential flora and fauna habitat within the Study Area

Habitat feature	Presence within Study Area	Fauna association	Importance to fauna
Artificial structures such as culverts and bridges	Yes	Threatened microbats	Roosting habitat
Koala feed trees	Yes – <i>Eucalyptus tereticornis</i> (Forest Red Gum), and <i>E. amplifolia</i> (Cabbage Gum)	Koala, within the South Coast management area	Feed trees
Waterbodies and creek lines	Yes – Mullet Creek and several farm dams	Mullet Creek is KFH – relevant to aquatic fauna.  Farm dams – aquatic biota, terrestrial flora, terrestrial fauna such as common ducks, wetland birds, and frogs.  No potential habitat for any threatened fish or dragonfly species.	KFH provides important foraging and breeding habitat.  Farm dams – habitat and potential foraging habitat.
Hollow-bearing trees (HBT)	None	Arboreal species	Habitat

Field surveys targeted areas which represented suitable habitat for threatened species identified as having a moderate or higher likelihood of occurrence. No threatened flora or fauna were identified during field surveys.


#### Aquatic habitats

Aquatic habitat is present in or near the Study Area.

Waterways within the construction corridor mapped as KFH are considered Category 2 waterways, which are generally associated with a tributary of a major waterway and generally surrounded by native vegetation. Waterways within the construction corridor, not mapped as KFH, are considered Category 3 waterways, which are generally associated with a lower order stream with little or no native vegetation and may be degraded (Sydney Water, 2012). During field surveys, locally common fauna species were recorded along Mullet Creek.

The farm dam in the construction corridor is not considered KFH. It is considered a first order stream, which mean no other streams join into it.

The Study Area contains several mapped areas of coastal wetlands and proximity area for coastal wetlands under the RHSEPP. These occur along Mullet Creek and the unnamed tributary that joins Mullet Creek. The mapping of coastal wetlands extends into terrestrial areas supporting native and non-native vegetation.



Habitat for threatened fish or dragonfly species is considered to be low in waterbodies across the Study Area. A review of the DPI Fisheries NSW Spatial Data Portal did not identify any streams or waterbodies mapped as threatened species habitat.

Low-lying areas to the south of Fairwater Drive are considered to have low-moderate potential of supporting terrestrial groundwater-dependent ecosystems (GDEs). PCTs 3327 and 4501 are mapped in these locations.

### Potential impacts

During construction, the proposal involves direct and indirect impacts to native vegetation and habitat.

Direct impacts to vegetation are summarised below (Table 6-7) and shown in Figure 6-2 to Figure 6-4. No-go zones would be installed for vegetation within the construction corridor that is not to be impacted. Vegetation impacts assessed here are the maximum areas to be impacted. The construction corridor and pipeline alignments have been designed as much as possible to avoid threatened vegetation, large patches of contiguous vegetation, and habitat features.

Direct and indirect impacts to fauna habitat impacts are summarised below (Table 6-8). Impacts to threatened fauna are assessed in Table 6-9 and impacts to threatened flora are assessed in Table 6-10.

**Table 6-7** Direct impacts to vegetation

PCT	TEC	Description	Area of impact	Significance	Assessment of significance
3327	Yes – BC and EPBC Act	Illawarra Lowland Red Gum Grassy Forest	0.09ha 0.06ha is consistent with the TEC description. 0.03ha conforms to the PCT but is not consistent with the TEC description.	Test of Significance (ToS) (BC Act) and Significant Impact Criteria (SIC) (EPBC Act) assessments have been undertaken to determine the significance of impacts to these TECs.  Unlikely to be a significant impact.	<ul style="list-style-type: none"> <li>The proposal will not result in or increase the likelihood of extinction of the local occurrence of these communities.</li> <li>The proposal will remove a minor fraction of the total extent of these communities.</li> <li>The proposal would not fragment an existing patch of these communities.</li> <li>The proposal is unlikely to impact adjoining patches of these communities or suitable habitat such that they substantially reduce in quality or integrity.</li> </ul>
3078	No	Illawarra Lowland Wet Vine Forest	0.25ha	NA	NA
4051	No	South Coast Lowland Red Gum-Swamp Oak Forest	0.03ha		
NA	NA	Emergent and aquatic native vegetation	0.10ha		
NA	NA	Planted native and exotic vegetation	0.05ha		

PCT	TEC	Description	Area of impact	Significance	Assessment of significance
NA	NA	Weeds and exotics	0.30ha		

**Table 6-8** Direct and indirect impacts to fauna habitat

Habitat feature	Type of impact	Predicted impact
Artificial structures such as culverts and bridges	None	No structures suitable for habitation by threatened fauna are to be removed, so no direct impacts are expected.
HBT	None	There are none within the construction corridor, so no direct impacts are expected.
Koala feed trees	Direct	<p>No impacts to koala habitat are expected.</p> <p>Koalas are considered to have a low likelihood of occurrence in the Study Area, as majority of the records are found west of the Illawarra Escarpment. A 0.09ha patch of PCT 3327 containing Forest Red Gum, and <i>E. amplifolia</i> (Cabbage Gum) will be removed by the proposal. However, no koala individuals or signs of koala were identified during field surveys.</p> <p>The predominantly open paddock and pre-disturbed land covering most of the construction corridor is not considered viable koala habitat.</p> <p>As the likelihood of occurrence of koala is low, assessments of significance of impact under the BC Act and EPBC Act are not required.</p>
Waterbodies and creek lines	Direct and indirect	<ul style="list-style-type: none"> <li>Mullet Creek, its tributary (Reed Creek), and proximity areas for coastal wetlands directly impacted through open trenching.</li> <li>KFH will be directly and indirectly impacted, through trenching and micro-tunnelling of Reed Creek.</li> </ul>



Habitat feature	Type of impact	Predicted impact
Vegetation	Indirect	<ul style="list-style-type: none"> <li data-bbox="896 367 1344 399">• A farm dam will require dewatering.</li> </ul> <p data-bbox="851 430 2016 590">Fauna injury and mortality may occur during vegetation clearing, vehicle collisions, or accidental entrapment from falling into open trenches during construction. Most fauna which may occur during the Study Area are mobile species which should be able to move out of the area relatively easily.</p>



## Impacts to threatened fauna

Vegetation clearing would cause habitat loss for threatened fauna considered to have a moderate or higher likelihood to occur in the Study Area. Coastal wetlands, riparian corridors and open woodland within the Study Area may provide roosting and/or foraging habitat for threatened species.

Removal of vegetation will result in the loss of feed trees for arboreal mammals and other nectivorous mammals and birds.

ToS and SIC assessments have been undertaken for 17 of the 28 species described above. They have been undertaken for threatened fauna species identified as having a moderate or higher likelihood to occur and have suitable habitat that will be impacted by the proposal. Refer Appendix C and Appendix D of the specialist report in Appendix C of this REF.

It was determined that the proposal is unlikely to have a significant impact on the threatened fauna species listed in Table 6-9 for the following reasons:

- The areas of potential habitat to be removed are small and fragmented in the landscape and contain general habitat features, that if removed will not jeopardise the persistence of a species in the locality.
- Most are bird or bat species that are highly mobile and able to traverse the landscape in search of suitable habitat resources.
- Larger areas of higher quality, more suitable habitat will be retained in the broader Study Area and locality.

**Table 6-9** Impacts to threatened fauna requiring ToS and SIC assessments

Species type	Species names	Habitat impacted	ToS	SIC
Arboreal mammals	Eastern Pygmy-possum ( <i>Cercartetus nanus</i> ) Grey-headed Flying-fox ( <i>Pteropus poliocephalus</i> )	Removal of 0.34ha from PCTs 3078 and 3327	Yes, to both	Yes, for Grey-headed Flying Fox only
Waterbirds	Australasian Bittern ( <i>Botaurus poiciloptilus</i> ) Latham's Snipe ( <i>Gallinago hardwickii</i> )	Removal of 0.03ha from PCT 4051	Yes, for Australian Bittern only	Yes, to both
Waterbirds	Blue-billed Duck ( <i>Oxyura australis</i> ) Freckled Duck ( <i>Stictonetta naevosa</i> )	De-watering farm dam, impacts to 0.10ha emergent native and aquatic vegetation	Yes, to both	No, to both
Tree roosting woodland and nectivorous birds	Scarlet Robin ( <i>Petroica boodang</i> )	Removal of 0.09ha from PCT 3327	Yes	No
Tree roosting woodland and nectivorous birds	Spotted Harrier ( <i>Circus assimilis</i> )	Removal of 0.12ha from PCT 3327 and 4051	Yes	No
Hollow-roosting woodland birds and cockatoos	Dusky Woodswallow ( <i>Artamus cyanopterus cyanopterus</i> ) Gang-gang Cockatoo ( <i>Callocephalon fimbriatum</i> ) Glossy-black Cockatoo ( <i>Calyptorhynchus lathami lathami</i> )	Removal of 0.37ha of PCT 3078, 3327 and 4051	Yes, for all	Yes, for Gang-gang cockatoo and Glossy-black cockatoo
Raptor and owl species	Little Eagle ( <i>Hieraaetus morphnoides</i> ) Eastern Osprey ( <i>Pandion cristatus</i> )	Removal of 0.12ha of PCT 3327 and 4051	Yes, for all	No, for all



Species type	Species names	Habitat impacted	ToS	SIC
	Square-tailed Kite ( <i>Lophoictinia isura</i> )			
Raptor and owl species	White-bellied Sea-eagle ( <i>Haliaeetus leucogaster</i> ) Powerful Owl ( <i>Ninox strenua</i> ) Masked Owl ( <i>Tyto novaehollandiae</i> )	Removal of 0.37ha of PCT 3078, 3327 and 4051	Yes, for all	No, for all





### Impacts to threatened flora

Vegetation clearing would result in the loss of habitat for threatened flora species considered to have a moderate or higher likelihood to occur in the Study Area.

Habitat exists within the impacted areas that may provide habitat for threatened species likely to occur. Some species were not surveyed due to being outside of the specific survey period. Pre-clearing surveys should be undertaken during the specified survey period for these species in areas of suitable habitat to check for presence.

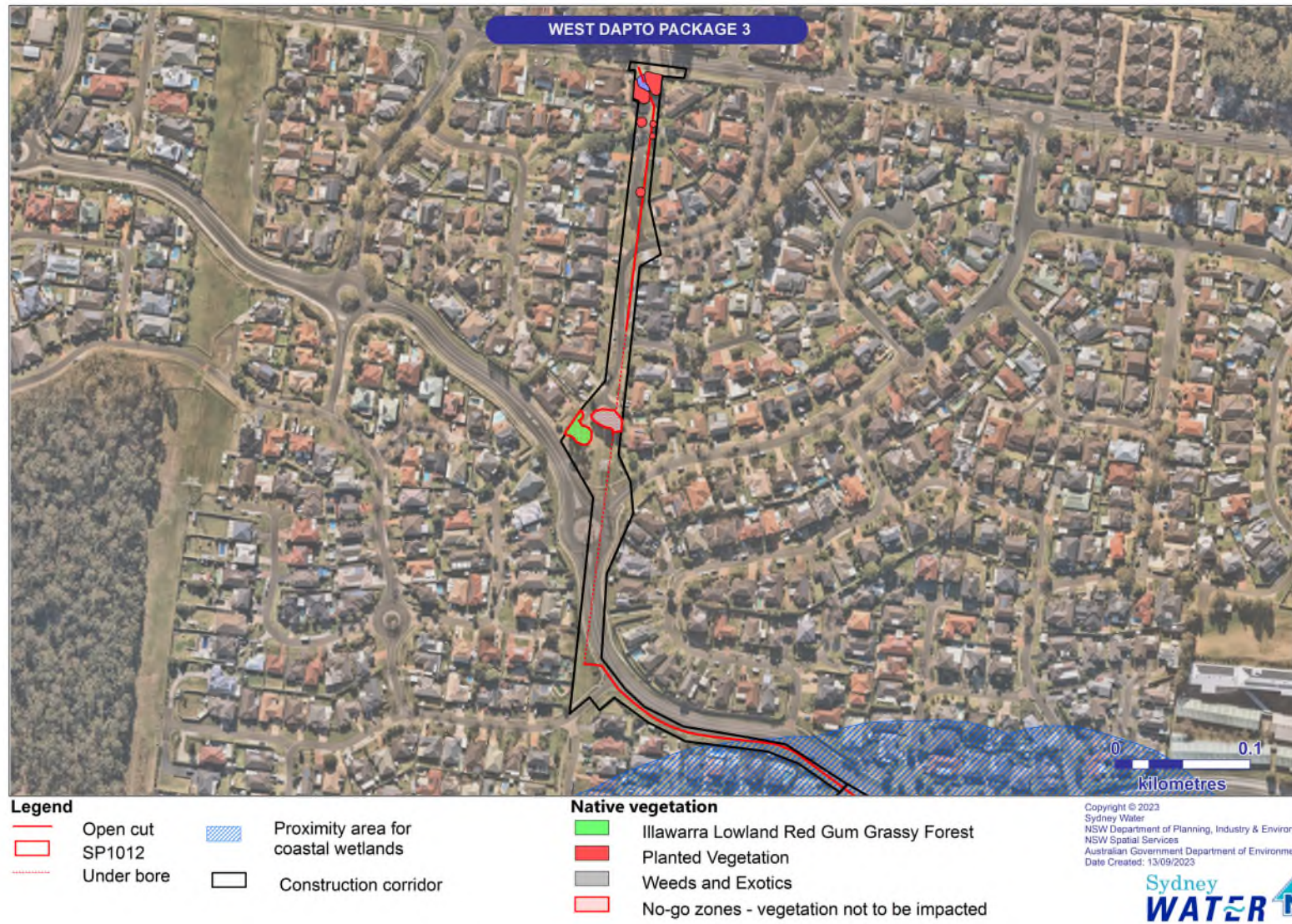
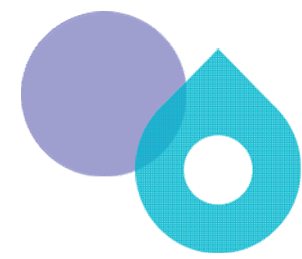
ToS and SIC assessments have been undertaken for the threatened flora species identified as having a moderate or higher likelihood to occur and have suitable habitat that will be impacted by the proposal. Refer Appendix C and Appendix D of the specialist report in Appendix C of this REF.

It was determined that the proposal is unlikely to have a significant impact on the threatened flora species listed in Table 6-10 for the following reasons:

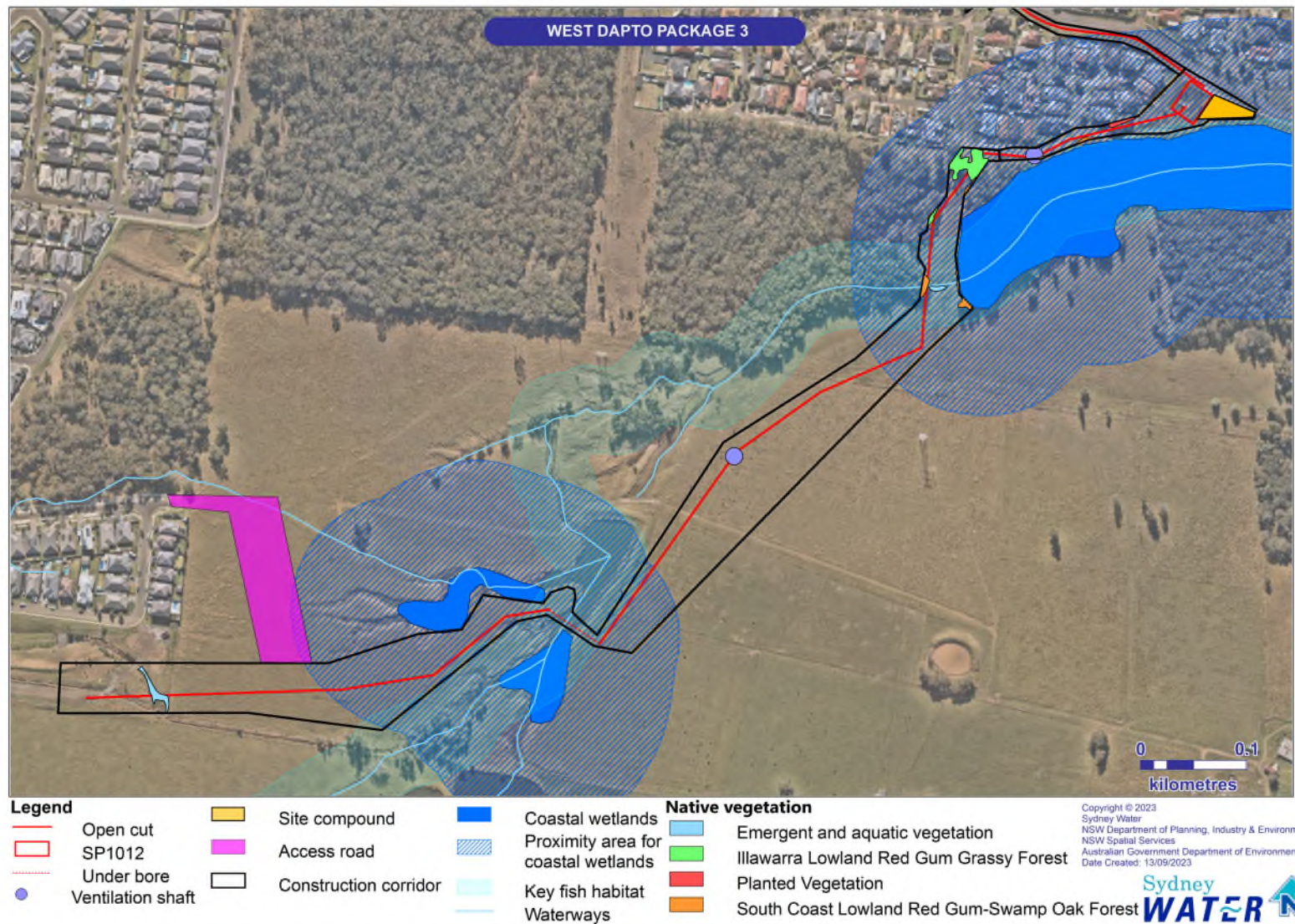
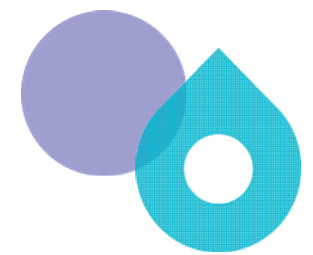
- The areas of potential habitat to be removed are small and degraded, showing signs of historical and ongoing disturbance and having a high composition of weeds.
- No individuals have been historically recorded or were recorded during current surveys in the areas of potential habitat to be removed or in immediately adjacent areas.
- Larger areas of higher quality, more suitable habitat will be retained in the broader Study Area and locality.

**Table 6-10** Impacts to threatened flora

Species	Habitat impacted	ToS	SIC
<i>Cynanchum elegans</i> White-flowered Wax Plant	Removal of 0.34ha of PCT 3078 and 3327	Yes	Yes
<i>Zieria granulata</i> Illawarra Ziera	Removal of 0.34ha of PCT 3078 and PCT 3327	Yes	Yes
<i>Solanum celatum</i>	Removal of 0.34ha of PCT 3078 and PCT 3327	Yes	No
<i>Chorizema parviflorum</i>	Removal of 0.09ha of PCT 3327	Yes	No
<i>Lespedeza juncea</i> subsp. <i>sericea</i>	Removal of 0.09ha of PCT 3327	Yes	Yes
<i>Pimelea curviflora</i> subsp. <i>curviflora</i>	Removal of 0.09ha of PCT 3327	Yes	Yes
<i>Pterostylis gibbosa</i> Illawarra Greenhood	Removal of 0.09ha of PCT 3327	Yes	Yes
<i>Rhodamnia rubescens</i> Scrub Turpetine	Removal of 0.25ha of PCT 3078	Yes	Yes
<i>Syzygium paniculatum</i> Magenta Lilly Pilly	Removal of 0.25ha of PCT 3078	Yes	Yes

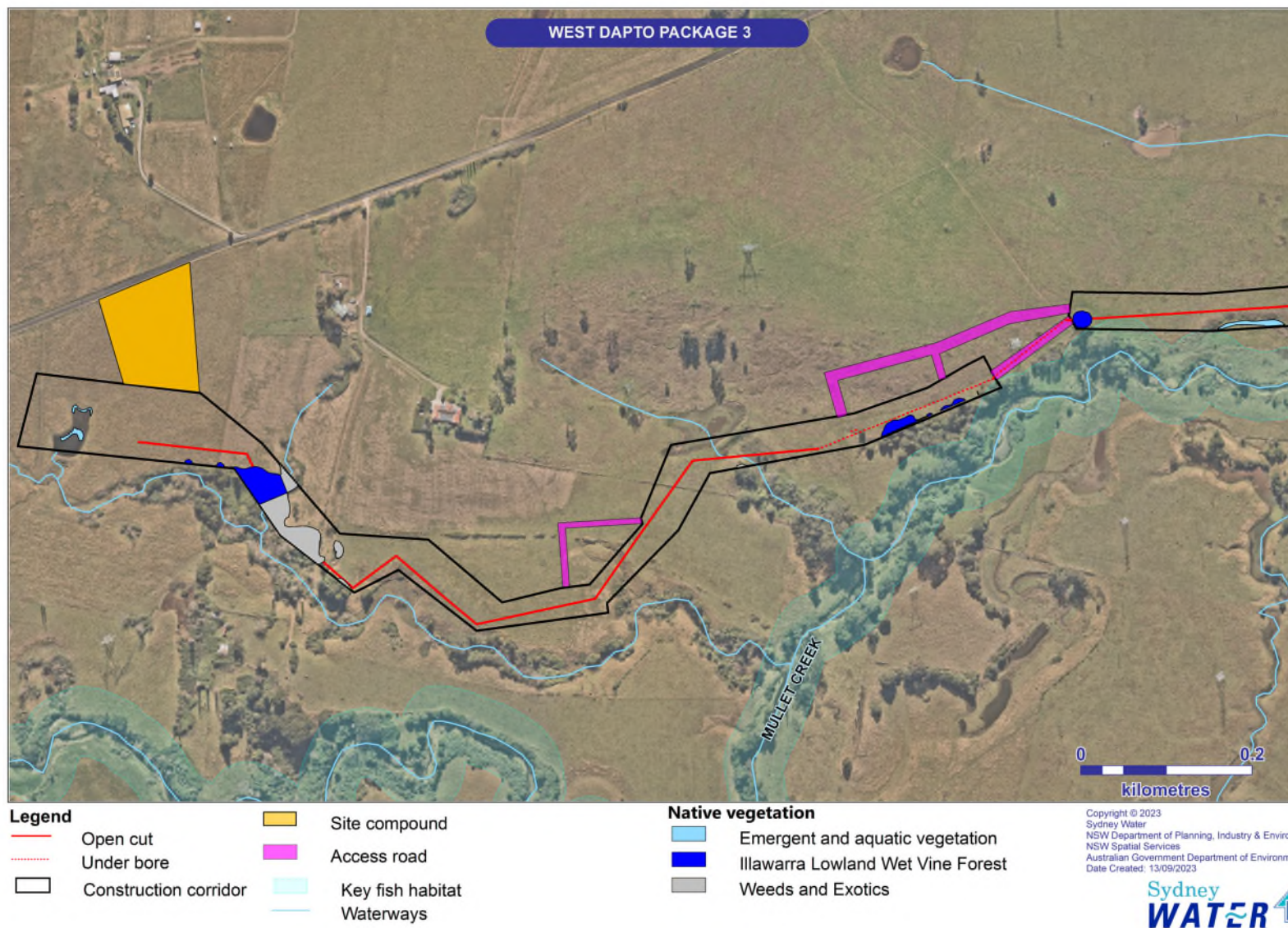
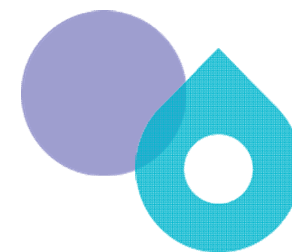


**Figure 6-2** Work Lot C rising main – vegetation within construction corridor



**Figure 6-3** Work Lot C SP1012 upgrade and gravity main – vegetation within construction corridor





**Figure 6-4** Work Lot B gravity main – vegetation within construction corridor

## Impacts to coastal wetlands and proximity areas

Although the works are not within coastal wetlands, they are partly on land mapped as proximity area for coastal wetlands.

Section 2.8(1) of the RHSEPP states that the “consent authority should be satisfied that the proposed development will not significantly impact on: a) the biophysical, hydrological or ecological integrity of the adjacent coastal wetland or littoral rainforest, or b) the quality and quantity of surface and ground water flows to and from the adjacent coastal wetland or littoral rainforest.”

Development consent is not required; however Sydney Water has considered the above requirements to ensure the proposal will not significantly impact on coastal wetlands (Table 6-11). No significant impacts are expected. Direct impacts to proximity areas, and indirect impacts to both coastal wetlands and proximity areas, can be managed through the mitigation measures in this REF (Table 6-14).

**Table 6-11** Consideration of impacts to coastal wetlands and proximity areas

Clause	Consistency with the clause
(a) the biophysical, hydrological or ecological integrity of the adjacent coastal wetland or littoral rainforest, or	<p>The proposal has been positioned to avoid impacts to mapped coastal wetlands and minimise encroachment on mapped proximity areas for coastal wetlands.</p> <p>Native vegetation will be removed within proximity areas. The proposal will result in impacts likely to modify the biophysical characteristics of the areas, and may reduce the ecological integrity of the proximity area at locations where native vegetation is being removed.</p> <p>Mitigation measures have been developed to minimise the risk of construction activities on mapped coastal wetlands when being undertaken in proximity areas. Measures have also been identified to restore disturbed areas progressively following works to minimise impacts upon the biophysical, hydrological and ecological integrity of proximity areas for coastal wetlands.</p>
(b) the quantity and quality of surface and ground water flows to and from the adjacent coastal wetland or littoral rainforest.	<p>The proposal has the potential to impact surface and ground water flows in proximity areas for coastal wetlands. Construction activities upslope of coastal wetlands have the potential to increase sedimentation in surface flows, which may run into wetland areas and decrease water quality. Incorrect discharge of water from farm dams could cause erosion issues, sedimentation impacts to coastal wetlands and/or damage to emergent and native aquatic vegetation.</p> <p>Mitigation measures will be implemented and maintained to assist in controlling risks to surface and ground water flows to adjacent coastal wetland areas. Mitigation measures include actions to remediate disturbed land progressively following works.</p>



## Other impacts

There is a low likelihood of potential impacts to GDEs within the Study Area. Impacts could occur through drawdown of the water table because of excavation activities, creation of potential barriers to underground flow, and wastewater or chlorinated water entering the environment due to pipe failure during operation. Mitigation measures within this REF would reduce the risk of impacts to GDEs.

Indirect impacts are summarised below (Table 6-12) and can be mitigated by following the mitigation measures in Table 6-14.

**Table 6-12** Indirect impacts from the proposal

Description of impact	Assessment of impact
Edge effects on native vegetation	The clearing of areas of vegetation may create some new edges to adjacent urban and rural areas. These new edges could be subject to degradation by the establishment and spread of weeds and enriched runoff from the use of the maintenance access tracks.
Invasion and spread of weeds, pathogens and disease	An increase in the movement of people, vehicles, machinery, vegetation waste and soil during construction may facilitate the introduction or spread of exotic grasses and other weeds. The proposal has the potential to increase the spread of pathogens that threaten native biodiversity values, such as soil-borne pathogens.
Erosion, sedimentation and changes to hydrology	Vegetation removal and ground disturbance has the potential to present an erosion and sedimentation risk to nearby aquatic environments if measures to mitigate these impacts are not implemented.

## Sydney Water biodiversity offset requirements

Although formal offsets are not required under the BC Act, Sydney Water has an internal position to maintain or enhance biodiversity outcomes if projects have residual biodiversity impacts. Vegetation removed will be offset in accordance with Sydney Water's non-statutory offset guide as outlined in the safeguards below.

Table 6-13 outlines the restoration requirements for impacts to vegetation from the proposal, including listed TECs present within the construction corridor.

**Table 6-13** A summary of offsets obligation for proposal impacts

Vegetation Community	Impact Area (ha) / Number of Trees	Offset Multiplier	Maximum Offset Requirement
PCT 3078 – Illawarra Lowland Wet Vine Forest	0.25ha	2:1	0.50ha
PCT 3327 – Illawarra Lowland Red Gum Grassy Forest	0.03ha	2:1	0.06ha
PCT 3327 – Illawarra Lowland Red Gum Grassy Forest	0.06ha	3:1	0.18ha
PCT 4051 – South Coast Lowland Red Gum-Swamp Oak Forest	0.03ha	2:1	0.06ha
Emergent and aquatic vegetation	0.10ha	2:1	0.20ha
HBTs (if encountered)	NA	2 nest boxes or salvaged hollows for each one removed.	NA
<b>Total</b>			<b>1.00ha</b>

## Mitigation measures

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

**Table 6-14 Environmental mitigation measures — flora and fauna**

**Mitigation measures**

Any native vegetation removed during construction would be restored according to Sydney Water SWEMS0025.11 Guideline for native revegetation following construction.

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.

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

Contractor to consult Taronga Zoo's Ben Zerbes (Mobile: 0417 201 180, Email: [bzerbes@zoo.nsw.gov.au](mailto:bzerbes@zoo.nsw.gov.au)) before the removal of vegetation to determine the usefulness of vegetation waste as koala feed. Dispose excess vegetation (non- weed) that cannot be used for site stabilisation or koala feed at an appropriate green waste disposal facility.

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

Contact to submit an exemption request:

[CDResiliencePrograms@sydneywater.com.au](mailto:CDResiliencePrograms@sydneywater.com.au) or [CustomerHub.DutyManager@sydneywater.com.au](mailto:CustomerHub.DutyManager@sydneywater.com.au)

Limit the extent of the direct pipeline construction impact to a maximum width of 10m through native vegetation.

Underbore/micro-tunnel in cases where impacts could be potentially significant.

Wash down vehicles and all equipment at appropriate depot or wash down facility to limit weed and pathogen spread.

Have appropriate stockpiling, locate construction facilities and vehicle turning areas in already cleared areas.

Targeted surveys for *Chorizema parviflorum* and *Pterostylis gibbosa* within PCT 3327 are to be undertaken during September/October before any potential habitat impacts.

Any unexpected threatened species or ecological communities identified during the pre-clearing assessment should be appropriately assessed through a supplementary impact assessment.

Pre-clearance surveys would identify any breeding or nesting activities by native fauna and as far as practical no breeding sites would be disrupted.

A suitably qualified ecologist would:

- accompany the delivery contractor to complete a pre-clearing assessment of the site before commencement of works which will include searches for frogs within 100m of waterbodies
- supervise clearing of HBTs and occupied habitat identified during pre-clearance surveys

## Mitigation measures

- supervise dewatering of farm dam.

During the pre-clearance surveys, if any HBTs are found in or near the proposed pipeline, they would be marked by an ecologist so that they are retained and avoided by contractors.

HBT removal should be avoided (if they are encountered).

Where fauna species are identified in vegetation to be cleared, animals would be removed and relocated to adjacent bushland before felling. If this is not possible, the tree would be sectionally dismantled or soft felled under the supervision of an ecologist or wildlife carer, before relocating the animal.

If any priority weeds are identified during construction, these would be removed and disposed of at an appropriate waste facility. The equipment used for removing them would be cleaned to minimise the likelihood of transferring and exotic plant materials.

Vehicles, equipment, materials, and footwear are to be clean on entry (free of soil, mud and/or seeds) to minimise the risk of introduction or spread of *Phytophthora cinnamomi*.

Cover open trenches overnight to avoid fauna becoming trapped. Additionally, trenches should be checked each morning for possible trapped fauna.

Where possible, construction activities will be limited to normal working hours to avoid noise and lighting impacts to fauna using habitat near the Study Area.

The delivery contractor will offset any impacts as a result of the proposal in accordance with the Sydney Water Biodiversity Offset Guide.

No disturbance or removal of vegetation in mapped coastal wetlands.

A suitable minimum clearance level beneath the floor of waterbodies adjacent to coastal wetlands is to be determined to minimise the risk of waterbody breaches during trenchless.

Minimise the removal of vegetation within proximity areas for coastal wetlands during detailed design and construction.

Physically markup construction corridor to ensure all works are out of the coastal wetlands (marking the coastal wetlands as a no-go zone), and provide toolbox talks to construction personnel around the significance of the wetland and measures required.

Locate launch and receiver pits in dry areas of the Study Area, away from the wetlands and larger waterbodies.

Physically delineate native vegetation to be protected and designate those areas as 'no-go zones', including signage where required.

Revegetating following completion of trenching works with endemic species.

## 6.2.4 Heritage

### Aboriginal heritage

#### Existing environment and potential impacts

A specialist Aboriginal cultural heritage assessment report (ACHAR) was undertaken by Kelleher Nightingale Consulting Pty Ltd (KNC) and is summarised here. This ACHAR includes an assessment of the context of the Study Area, due diligence assessment of the Study Area, test excavation results, stakeholder consultation outcomes, and assessment of the test excavation results. The complete assessment is provided as Appendix D.

#### Existing environment

The Study Area for this assessment includes the construction corridor assessed in this REF, a buffer corridor, and associated compounds and access. The Study Area has been subject to varying levels of subsurface disturbance from past land use practices. The construction of modified drainage channels, transport and utility corridors, and structures in addition to fluvial activity from Mullet Creek and its tributaries are likely to have disturbed the subsurface deposit in these areas.


The Study Area is generally low-lying and flood prone. The field inspection supported existing understanding of archaeological landscapes within this part of the Illawarra region, that the Aboriginal land use was more widespread than intensive. Although historically the area had abundant water and other resources (including permanent water sources and elevated areas suitable for camping), these low-lying and saturated conditions would not be suitable for longer-term or intensive human occupation. The archaeological potential of the Study Area is variable, as it has been subject to varying degrees of historical disturbance. These disturbances include roads, driveways, utilities, and infrastructure installation, and low to moderate intensity agriculture, including earthworks and vegetation removal.

#### Aboriginal heritage due diligence (AHDD)

Numerous records of the Aboriginal Heritage Information Management System (AHIMS) database are located in the vicinity of the proposal. Four previously registered AHIMS sites are registered as being in or within 100m of the Study Area.

Several Aboriginal heritage investigations have previously been undertaken within and in the vicinity of the Study Area. These investigations were primarily carried out as part of residential development planning and infrastructure projects. The following previous investigations were reviewed in the Due Diligence Assessment (DDA):

- West Dapto Release Area Aboriginal Heritage Management Plan – Aboriginal Heritage Management Plan prepared to support the West Dapto Release Area master planning process which included the Study Area
- WDURA and AGA Water and Wastewater Servicing – Aboriginal heritage assessment undertaken to inform the Environmental Assessment for proposed water and wastewater infrastructure to service the WDURA and AGA

- 
- McPhail Lands, West Dapto – archaeological investigations for subdivision and development of rural properties adjacent to Bong Bong Road at Horsley
  - Fairwater Drive Extension – archaeological investigations for the extension of Fairwater Drive from Sierra Drive at Horsley in the west to Cleveland Drive at Cleveland in the south
  - Fowlers Road Extension – archaeological investigations for the extension of Fowlers Road from the Princes Highway at Dapto in the east to Fairwater Drive at Cleveland in the west
  - Cleveland Road Precinct – archaeological investigations as part of proposed redevelopment of rural properties adjacent to Cleveland Road between Horsley in the north, and Mullet Creek in the east and south
  - Dapto Land Review – archaeological investigations within land owned by Stockton between Bong Bong Road in the north, the Cleveland Road Precinct in the east and Cleveland Road in the south
  - West Dapto Package 3 Water and Wastewater Servicing: Aboriginal heritage consistency and due diligence assessment – background review and site inspection, including areas within the REF and EA Study Areas.

A field inspection of the Study Area was carried out as part of the DDA to expand on the findings of the desktop assessment and identify Aboriginal objects or sites. It also assessed the potential for the archaeologically sensitive landforms within the Study Area to contain Aboriginal objects.



The culmination of the above Aboriginal heritage investigations is a reasonably well-surveyed region with numerous sites and areas identified as containing or having the potential to contain Aboriginal archaeological sites.

#### Archaeological Test Excavation

Archaeological test excavation was carried out within the construction corridor, where PADs could not be avoided by the proposal. Test excavations were done to obtain further information about the nature and significance of the Aboriginal archaeological sites at these locations and how they may be impacted. Test excavations were completed in May and June 2023, as recommended by the Aboriginal due diligence assessment and in accordance with the Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales (DECCW 2010b). Details of the test excavation locations are provided in Appendix D.

#### Aboriginal Community Consultation

The aim of consultation is to integrate cultural and archaeological knowledge and ensure registered stakeholders have information to make decisions on Aboriginal cultural heritage. For the preparation of this ACHAR, consultation with Aboriginal people has been undertaken in accordance with the Aboriginal Cultural Heritage Consultation Requirements for Proponents



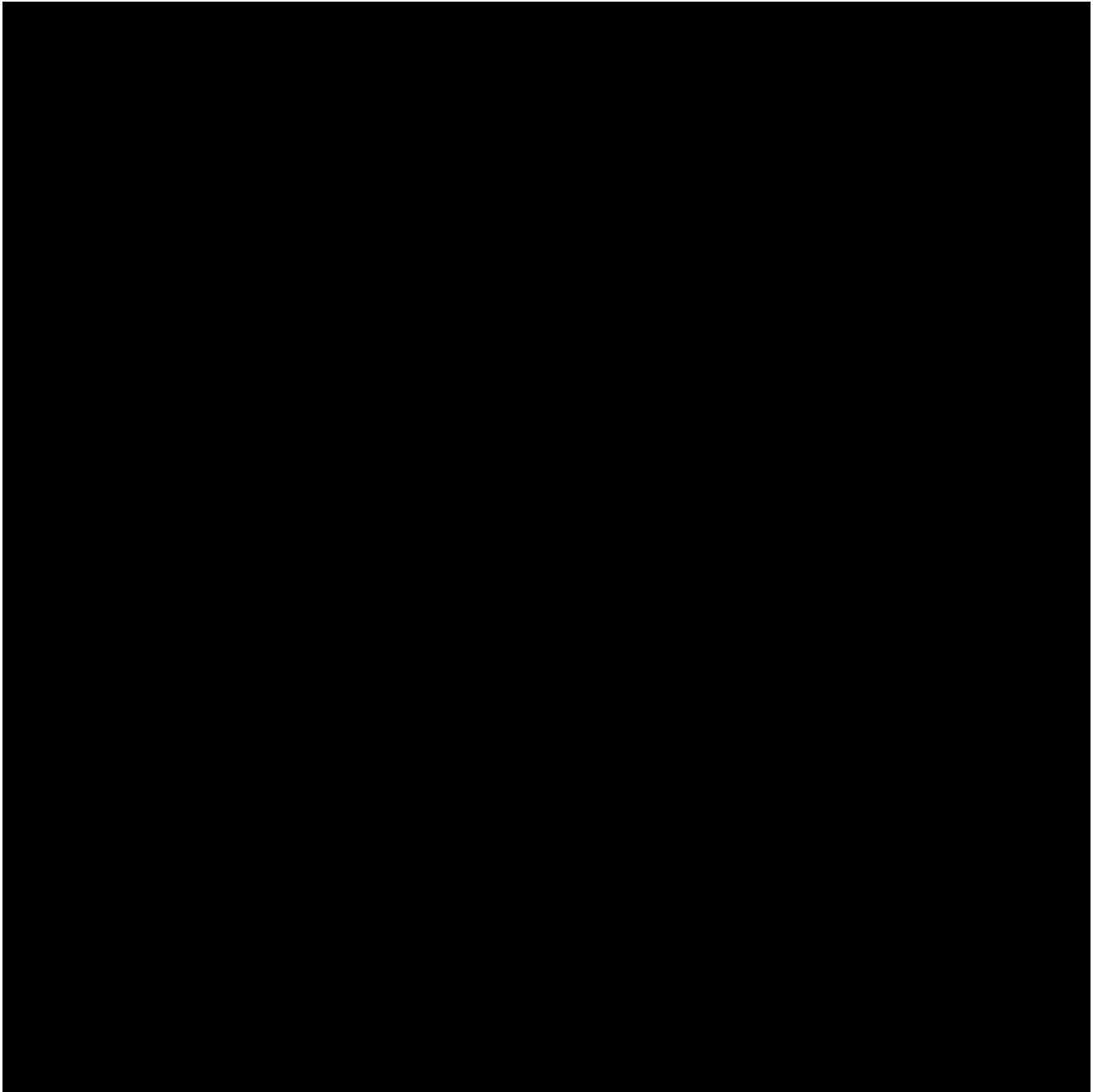




(DECCW, 2010a) and the requirements of Clause 60 of the National Parks and Wildlife Regulation 2019. Details of this stakeholder consultation is provided in Appendix D.

#### Aboriginal archaeological sites within the Study Area

Aboriginal archaeological sites within the Study Area, identified following test excavation, are shown below (Table 6-15).

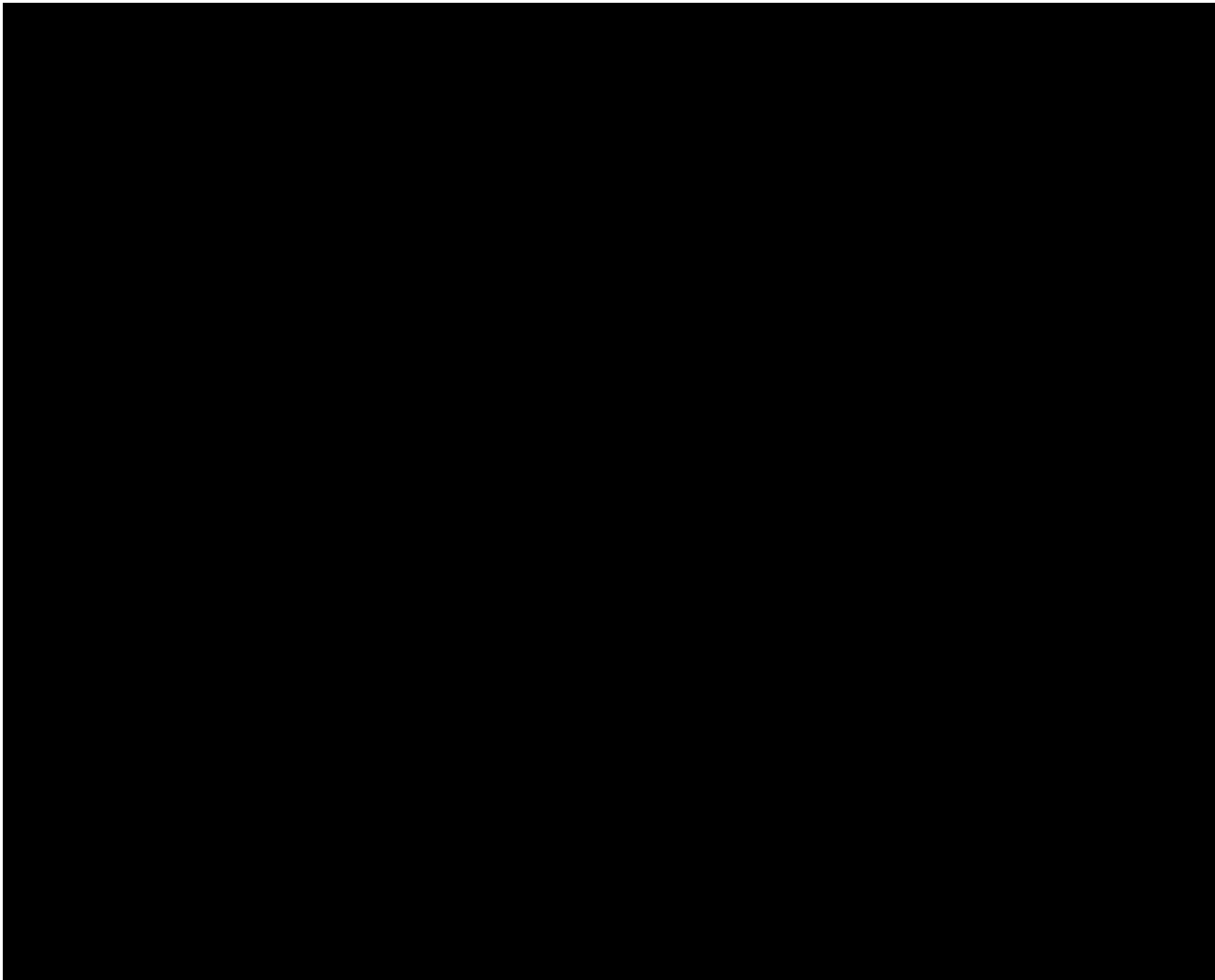


Specific cultural, social or aesthetic values for the sites within the study area were not provided by the registered Aboriginal stakeholders following the review of the draft ACHAR.

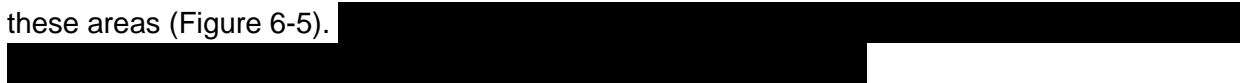




## Potential impacts

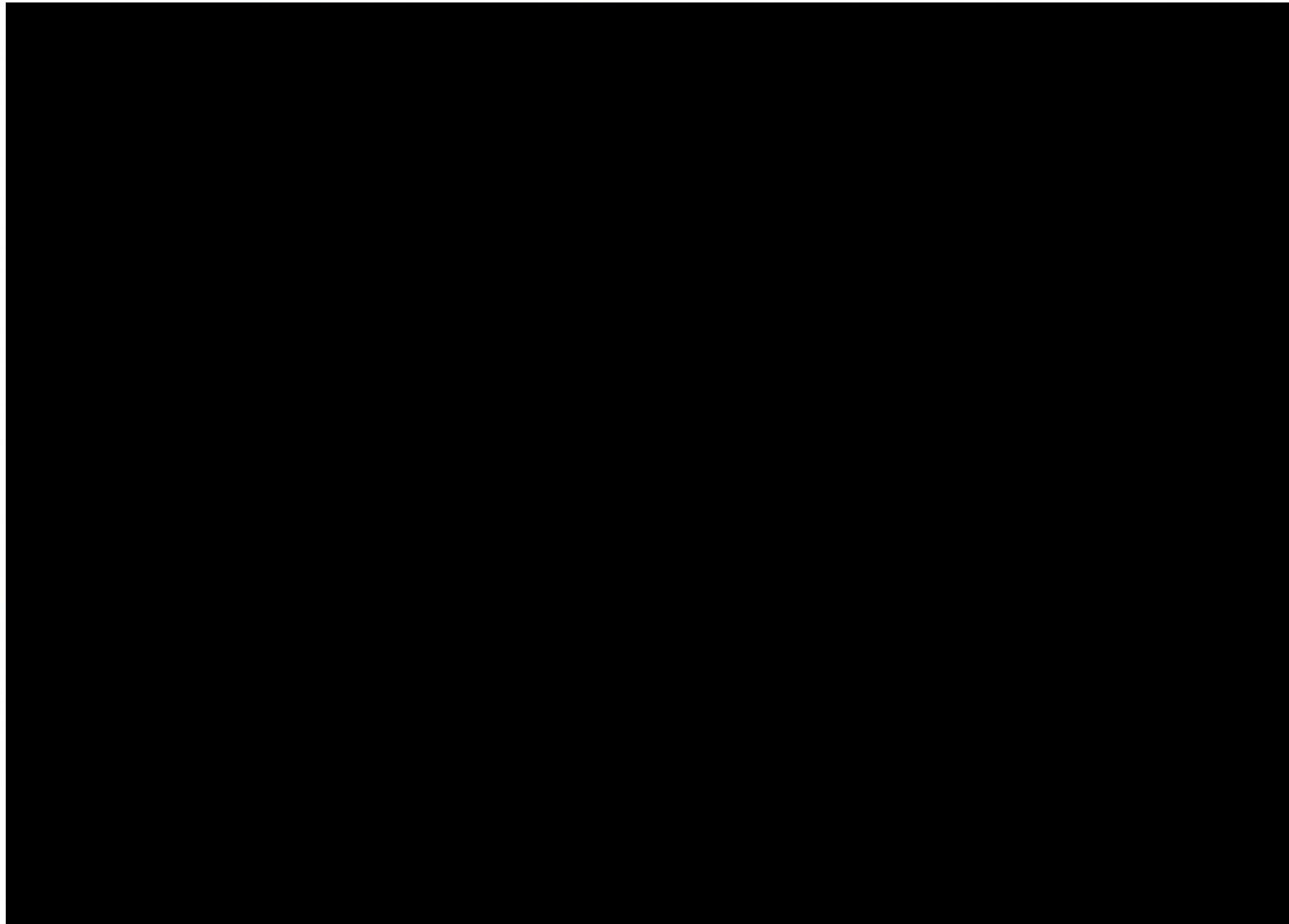
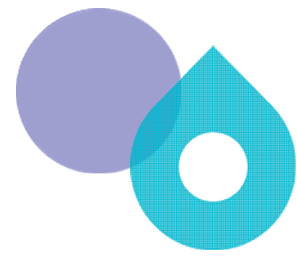


Where unavoidable impacts to Aboriginal archaeological sites have been identified, an Aboriginal Heritage Impact Permit (AHIP) would be obtained by Sydney Water before starting construction in these areas (Figure 6-5).





Aboriginal heritage information must not be made publicly available or be published in any form or by any means by Sydney Water or our contractors / joint ventures, unless where approval has been sought from the AHIMS Registrar and provided in writing to Sydney Water. Sydney Water has removed this information out of respect for Aboriginal cultural heritage and the Aboriginal community.



**Figure 6-5** Identified Aboriginal archaeological sites within the study area

## Non-Aboriginal heritage

### Existing environment

There are no non-Aboriginal heritage items near the proposal. The nearest non-Aboriginal heritage item is about 140m south of the Work Lot B gravity main. This item is 'House ("Cleveland")', listed under the Wollongong Local Environmental Plan 2009 (item no. 5950).

### Potential impacts

Due to the distance to the nearest non-Aboriginal heritage item and the localised nature of works, the proposal is not anticipated to impact any listed non-Aboriginal heritage item.

### Mitigation measures

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

**Table 6-17 Environmental mitigation measures — heritage**

Mitigation measures
Do not make publicly available or publish, in any form, Aboriginal heritage information on sites / potential archaeological deposits, particularly regarding location.
Repeat the basic AHIMS search if it is older than 12 months. Conduct additional assessment if new sites are registered and could be impacted by the works.
If any Aboriginal object or non-Aboriginal relic is found, cease all excavation or disturbance in the area and notify Sydney Water Project Manager in accordance with <a href="#">SWEMS0009</a> .
Apply for an AHIP for the impacted sites, with an approved AHIP required before starting any works that impact the site/s.
Working within the curtilage of the AHIP must be undertaken in accordance with the conditions of the AHIP. Comply with all AHIP conditions during construction.
[REDACTED]
Harm to any Aboriginal objects and declared Aboriginal places is only permitted once an Aboriginal Heritage Impact Permit (AHIP) has been granted.
Toolbox talk covering Aboriginal heritage should be completed by all onsite staff, prior to commencement of all activities. The toolbox talk is to be approved by a heritage specialist and should include:
<ul style="list-style-type: none"><li>• clear explanation of heritage constraints</li><li>• go and no-go areas, processes and measures to avoid impacts</li><li>• stop work procedures</li></ul>

## Mitigation measures

- contact details to obtain further heritage guidance if needed.

### 6.2.5 Noise and vibration

#### Existing environment and potential impacts

The area surrounding the construction corridor includes low-density residential and large rural blocks. These large rural blocks are subject to future residential development. There are two schools (Dapto Public School and Dapto High School) within 500m of the construction corridor. At its closest point, the South Coast Railway Line is about 600m east of the construction corridor.

Where possible, the proposal will occur during standard hours. However, contingency has been included in this assessment for out of hours night work. For example, bypass pumps may need to run continuously once the temporary bypass is installed. Some night work may also be required during open trenching activities.

It is anticipated that work would be conducted for about 5 shifts per week for about 18 months.

The likelihood of noise impact was assessed using Table 2 of the Draft Construction Noise Guideline (EPA 2020). The review indicated that the likelihood of noise impact is medium risk and therefore a quantitative noise impact assessment was undertaken (Appendix E).

The construction program and likely use of noisy equipment is detailed in Table 6-18 and Table 6-19 below.

**Table 6-18 Proposed construction program**

Scope	Activities	Duration
Site mobilisation	Install compounds and access track, delineate construction corridor, install environmental controls, strip stockpiles, remove vegetation	1-2 months
Compound use	Ongoing use of amenities, storage, laydown, parking areas	18 months
Work Lot B gravity main	Open trench – progress about eight metres per shift	17-18 months
Work Lot B gravity main	Underboring – progress about ten metres per shift	3-4 months
Work Lot C gravity main	Open trench – progress about eight metres per shift	7-8 months
Work Lot C gravity main	Underboring – progress about ten metres per shift	1-2 months


Scope	Activities	Duration
Work Lot C rising main	Open trench – progress about eight metres per shift	3-4 months
Work Lot C rising main	Underboring – progress about ten metres per shift	1-2 months
Pumping station upgrades (SP1012)	Civil, mechanical, and electrical work within an existing pumping station	5-6 months
Site demobilisation	Remove compounds and restore disturbed areas	1-2 months

**Table 6-19** Use of noisy equipment

Activity	Noisier equipment required	Tasks requiring this equipment	Frequency of use of noisy equipment
Site mobilisation/demobilisation	Grinders, concrete saws	Install fence and footpath	Less than an hour, intermittently, about ten times during mobilisation  Generally hand tools will be used with noisier equipment required for cutting
Compound use	Grinders, demo saw	Cut pipe	Daily
Open trench	Grinders, demo saw 36t excavator with hammer as contingency	Cut pipe and reinforcement Rock breakout (contingency)	Daily
Underboring	Demo saw, excavator with hammer	Cut pipe and reinforcement	Daily
Pumping station upgrades (SP1012)	Concrete saw, grinders, 36t excavator with hammer	Cut and break out concrete	For roughly the first two weeks of construction

### Construction noise impacts

The noisiest plant chosen for the noise assessment is the 13.5t excavator with hammer, as this is the closest size equipment to the 36t excavator with hammer that may be used.



As a conservative, worst-case approach, the noisiest plant for day work (excavator with hammer) was also assessed as part of night work, even though the use of this equipment outside of standard construction hours is unlikely to be regular or often.

This assessment is considered to be sufficient to predict and assess worst-case noise impacts since:

- the noisiest equipment would not be used all shift, every shift, during both day and night work, and is therefore a conservative estimate
- multiple pieces of equipment may be used at any one time for different activities at different locations. Assessing use of the noisiest plant across the full construction corridor is a representation of the cumulative noise impacts that may be experienced
- open trenching and underboring are linear activities and no individual receiver would be impacted by noise every shift from these activities over the 18 months.

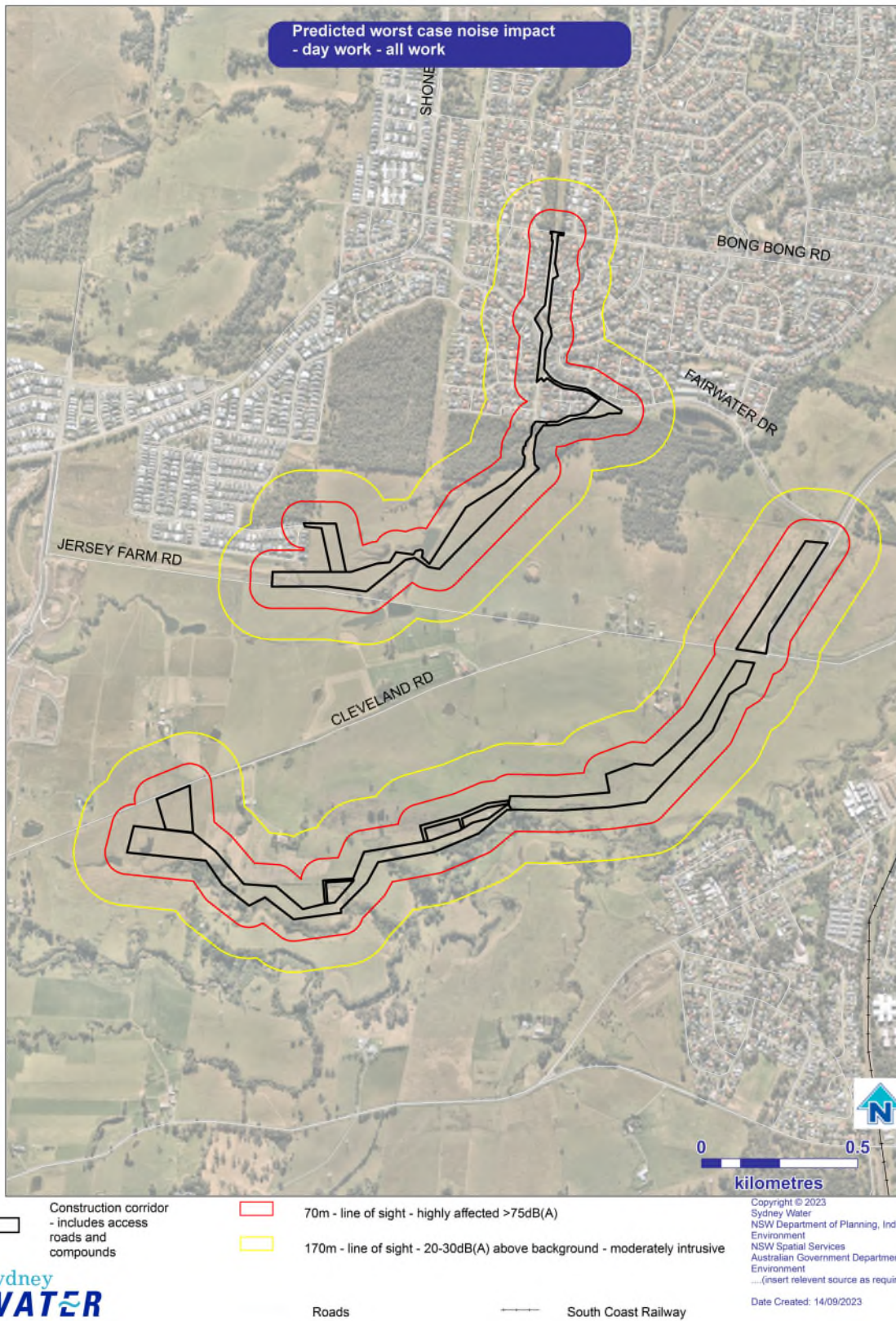
Predicted worst-case noise impacts for residential receivers during day work are shown in Figure 6-6. Additional mitigation measures are recommended up to 170m from the construction corridor.

Dapto Public School is about 225m east of the pumping station. Dapto High School is about 400m south-east of the Work Lot B pipeline.

Although the schools may be affected by construction noise during day work, no additional noise mitigation measures are recommended for the schools.

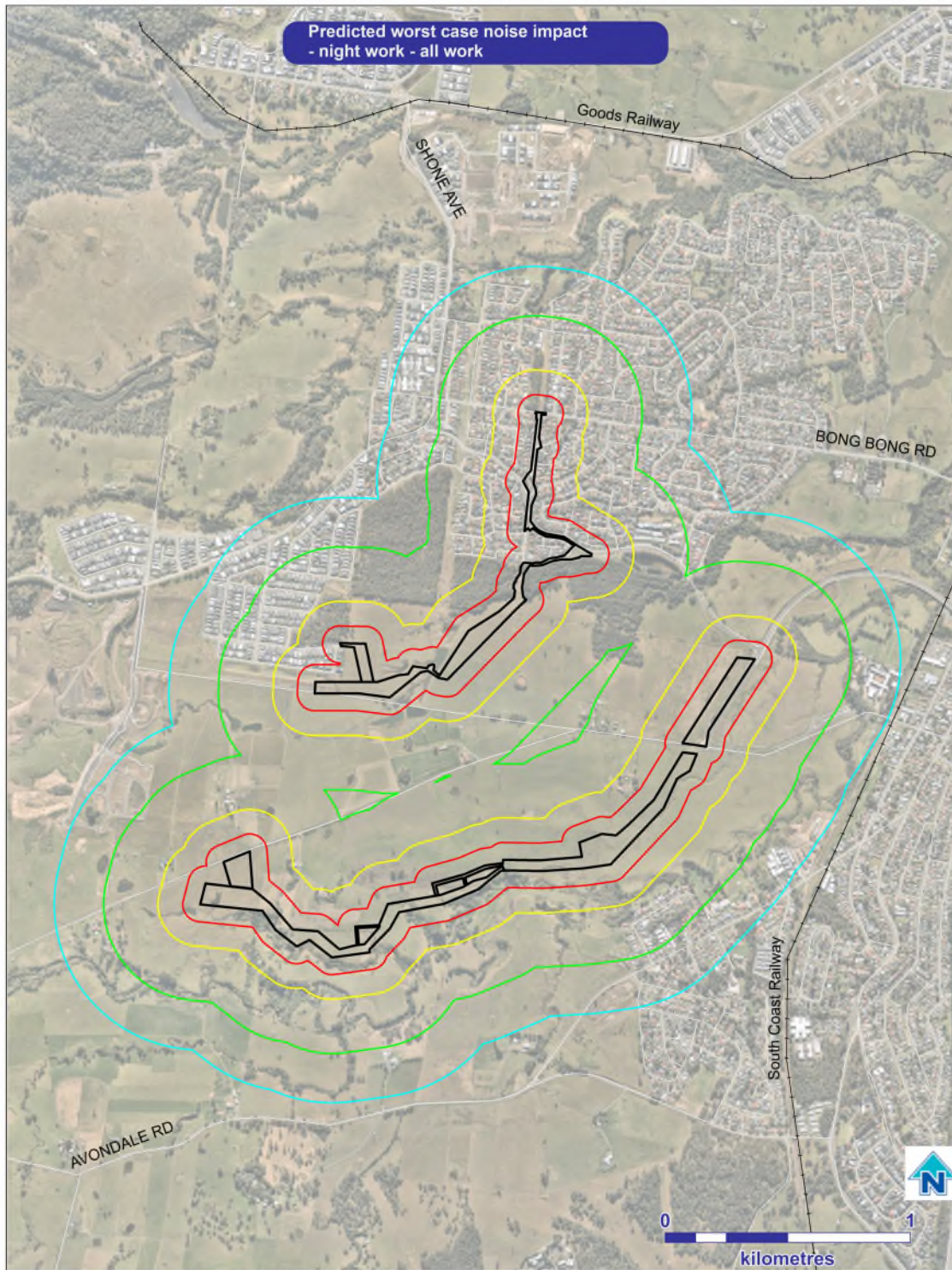
Predicted worst-case noise impacts for residential receivers during night work are shown in Figure 6-7. Additional mitigation measures are recommended up to 590m from the construction corridor.








There are no non-residential receivers predicted to be noise-affected during the day or night to an extent that noise mitigation measures are recommended.



**Figure 6-6** Worst case noise impacts – day work





 Construction corridor - includes access roads and compounds	 70m - line of sight - highly affected >75dB(A)  170m - no line of sight - 20-30dB(A) above background - moderately intrusive  170m - line of sight - >30dB(A) above background - highly intrusive  390m - no line of sight - 10- 20dB(A) above background - clearly audible  590m - no line of sight - 5-10dB(A) above background - noticeable	 Roads <small>Copyright © 2023 Sydney Water NSW Department of Planning, Industry &amp; Environment NSW Spatial Services Australian Government Department of Environment ...(insert relevant source as required) Date Created: 14/09/2023</small>
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**Figure 6-7** Worst case noise impacts – night work

## Construction vibration

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

The following vibratory plant and equipment may be used:

- Small (5-12t) hydraulic hammer – minimum working distance of 2m
- Medium (12-18t) hydraulic hammer – minimum working distance of 7m
- Large (18-34t) hydraulic hammer – minimum working distance of 22m.

No operational noise or vibration impacts are expected.

## Mitigation measures

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

**Table 6-20 Environmental mitigation measures — noise and vibration**

### Mitigation measures

Works must comply with the ICNG (DECC, 2009), including scheduling work and deliveries during standard daytime working hours of 7am to 6pm Monday to Friday and 8am to 1pm Saturday. No work to be scheduled on Sunday nights or public holidays. Any proposed work outside of these hours must be justified.

The proposal will also be carried out in accordance with:

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

All reasonable and feasible noise mitigation measures should be justified, documented and implemented on-site to mitigate noise impacts.

Incorporate standard daytime hours noise management safeguards into the CEMP, including but not limited to:

- identify and consult with the potentially affected residents before the start of work:
  - describe the nature of works; the expected noise impacts; approved hours of work; duration, complaints handling and contact details
  - determine need for, and appropriate timing of respite periods (e.g. times identified by the community that are less sensitive to noise such as mid-morning or mid-afternoon for works near residences)
- implement a noise complaints handling procedure

## Mitigation measures

- plant or machinery will not be permitted to warm-up near residential dwellings before the nominated working hours
- appropriate plant will be selected for each task, to minimise the noise impact (e.g. all stationary and mobile plant will be fitted with residential type silencers)
- engine brakes will not be used when entering or leaving the work site(s) or within work areas
- regularly inspect and maintain equipment in good working order
- arrange work sites where possible to minimise noise (e.g. generators away from sensitive receivers, site set up to minimise use of vehicle reversing alarms, site amenities and/ or entrances away from noise sensitive receivers)
- use natural landforms/ mounds or site sheds as noise barriers
- schedule noisy activities around times of surrounding high background noise (local road traffic or when other noise sources are active).

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

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

As night works are needed, the contractor would:

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

As 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

## Mitigation measures

- identify community notification requirements
- seek approval from the Sydney Water Project Manager in consultation with the environment and communications representatives.

Community engagement will begin before work starts, with notification to impacted residents and businesses within the zone of influence. Consider worst-case noise impact scenarios during night works and day works when identifying stakeholders to be notified.

This may also include face to face engagement and door knocks. Consultation will include number of night shifts per week and mitigation measures to be adopted.

Community preference will determine if shifts can extend to more than 2 night shifts per week and the appropriate respite periods.

Ongoing engagement will continue on an ad-hoc basis. For sensitive receivers / highly impacted residents, regular follow-up will be done (i.e. one-on-one meetings, emails, texts, phone discussions).

Engagement during construction will be ongoing and include proactive management of issues to minimise complaints. Where complaints and enquiries arise, action will be taken to address these with appropriate mitigation adopted.

Regular project updates will be sent to surrounding community and emailed to key stakeholders.

Correspondence will include an option for residents and businesses to sign up to a regular update email.

Verification of predicted noise levels during construction will be obtained via attended noise monitoring. Continuous monitoring will be considered if complaints are received.

Noise barriers will be installed between the work area and nearby residences at the pumping station for specific works.

Noisy/annoying work will only happen before 12am midnight.

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


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

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

## 6.2.6 Air and energy

### Existing environment

A search of the National Pollution Inventory identified no pollutant sources within one kilometre of the proposal. The nearest listed items are Wongawilli Colliery about 2km to the northwest and Jemena Eastern Gas Pipeline about 2km to the southeast (DCCEEW, 2023).



The air quality in the proposal site is typical of a semi-rural/rural residential area on the urban fringe. Local pollution sources include odours from agriculture, vehicle emissions, solid fuel heaters, bushfires, backyard burning and existing wastewater systems including SP1012.

The main nearby sensitive receivers are residents located adjacent to the proposal on local roads including Riverpark Way, Fairwater Drive, Ashton Vale Grove and Galway Court.

### Potential impacts – construction

During construction, the proposal has the potential to impact on air quality by generating:

- dust during general construction and excavation, including earthworks, stockpiles, and use of imported fill
- emissions including greenhouse gas emissions from machinery, equipment and vehicles used during construction, including:
  - construction equipment
  - delivery vehicles transporting materials to construction sites
  - vehicles removing waste materials from construction sites
  - staff vehicles.
- odour generated by construction activities including:
  - installation and operation of the bypass setups at the pumping station
  - works connecting to the existing wastewater network.

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

### Potential impacts – operation

Potential operational impacts on air quality would include odours from SP1012 and ventilation shafts. Offensive odours generally occur when the wastewater becomes anaerobic (lacking oxygen) due to poor ventilation or stagnant conditions in the mains which may be caused by low or no flows. As population increases, and the flow of wastewater increases, this would reduce likelihood of these odours being generated.

Ventilation will be managed by the ventilation shafts, which would vent out air at a height of about 8 to 16m. Residents may experience some odour from ventilation shafts, but appropriate design and location would reduce the likelihood of odour impacting on amenity. Upgrades to SP1012 would be designed to minimise offensive odours. Odours from the pumping station would be managed by chemical dosing.

Sydney Water would manage odour in accordance with the requirements of the POEO Act and Sydney Water’s existing procedures. All odour complaints would be registered and investigated. We would implement engineering, operational or other odour reduction measures where verified complaints are received about odour releases from the wastewater system. Significant odour impacts from operation of the proposal are considered unlikely.

Vegetation removal would release greenhouse gases and reduce the potential of the local environment to absorb greenhouse gases in the future. As the proposal would require minimal vegetation clearance, and vegetation removal would be offset, potential impacts are considered minimal.

The proposal would require increased energy to operate SP1012 and this would marginally increase Sydney Water’s total energy use. The proposal would be operated in accordance with energy use procedures that apply to Sydney Water’s existing network.

### Mitigation measures

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

**Table 6-21 Environmental mitigation measures — air and energy**

Mitigation measures
Use alternatives to fossil fuels where practical and cost-effective.
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"><li>• water exposed areas (using non-potable water source where possible such as water from excavation pits)</li><li>• cover exposed areas with tarpaulins or geotextile fabric</li><li>• modify or cease work in windy conditions</li><li>• modify site layout (place stockpiles away from sensitive receivers)</li><li>• vegetate exposed areas using appropriate seeding.</li></ul>
Cover all transported waste.
Minimise the potential for odours (e.g. minimise the number of open access chambers, close maintenance holes overnight).

## Mitigation measures

Ensure odour control measures are available and ready to use during the works, such as such as deodoriser sprays or temporary installation of ventilation fans to draw odours away from heavily trafficked or odour sensitive areas.

Design the mains with adequate slope and ventilation to reduce the risk of odour emissions.

### 6.2.7 Waste and hazardous materials

#### Existing environment and potential environmental impacts

At the pumping station, the following hazardous building materials (HBM) may be present:

- unknown HBMs may be present within the in-ground pits
- potential asbestos-containing material insulation within fuses.

It is unlikely that either of these HBMs would be encountered while working in the pumping station.

Our corporate objectives include to be a resource recovery business with an increasing portfolio of circular economy products and services. This includes reducing waste through recycling and re-use, and encouraging our suppliers to minimise waste.

The proposal has the potential to generate the following waste streams:

- general construction waste such as excess concrete, redundant pieces of pipe/fittings
- broken bricks, timber, paper, plastic and metal
- green waste from clearing vegetation including weeds
- domestic waste including food scraps, aluminium cans, glass bottles, plastic and paper containers, and putrescible waste generated by site construction personnel
- wastewater and grey water from temporary amenities
- spoil that is not suitable for backfilling, from trenching and other excavations
- groundwater dewatered from excavations
- wastewater and drilling fluid generated from trenchless construction and the compound sites.

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

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

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

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

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

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

### Mitigation measures

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

**Table 6-22 Environmental mitigation measures — waste and hazardous materials**

Mitigation measures
A Waste and Resource Recovery Plan (WRRP) must be prepared to appropriately manage and classify any materials including soils, construction/demolition wastes and associated stockpiles.
The plan will be prepared by the Delivery Contractor (or nominated environmental consultant) and approved by the Sydney Water Project Manager in consultation with the Environmental Representative and Property Environmental Services.
Manage waste in accordance with relevant legislation and maintain records to show compliance e.g. waste register, transport and disposal records. Record and submit <a href="#">SWEMS0015.27 Contractor Waste Report</a> .
Provide adequate bins for general waste, hazardous waste and recyclable materials.
Minimise stockpile size and ensure delineation between different stockpiled materials.
Manage waste and excess spoil in accordance with the NSW EPA Resource Recovery Orders and Exemptions (if applicable) and / or Waste Classification Guidelines. Where materials are not suitable or cannot be reused onsite or offsite, recycle soils at a licensed soil recycling facility or dispose at an appropriately licenced landfill facility.
Prevent pollutants from escaping including covering skip bins.
Dispose excess vegetation (non-weed) that cannot be used for site stabilisation at an appropriate green waste disposal facility.
An unexpected finds procedure to be implemented for any unexpected contamination or hazardous materials identified on site (e.g. unexpected contamination within SP1012).



## 6.2.8 Traffic and access

### Existing environment

Most of the proposal will be constructed in cleared agricultural lands. As shown in Figure 3-1 and Figure 3-2, access roads will be constructed for the sections of the alignment not located within the road corridor, road verge, or in otherwise previously disturbed areas.

A northern section of the Work Lot C gravity main, most of the Work Lot C rising main, and a northern section of the Work Lot B gravity main are located on the verge and roadway of local roads. These local roads provide access to private properties. The roads intersected by the proposal are listed in Table 6-23.

**Table 6-23** Local roads and bus routes intersecting with the proposal

Road	Lanes	Speed limit	Pedestrian facilities/ active transport/ public transport
Bridgewater Drive	One (one-way, access via Selwyn Grove only)	50km/h	No formalised footpaths. Indented parking along northern side of Bridgewater Drive.
Riverpark Way	2	50km/h	No formalised footpaths
Fairwater Drive	4 (including one parking lane on each side)	50km/h	Footpaths on both sides, except for the section between Riverpark Way and Boddington Way. There are no bus stops within the construction corridor. However, two bus routes (31 and 33) travel along Fairwater Drive within the construction corridor, during proposed construction hours. These buses travel along Fairwater Drive between 5:40am and 8:45pm Monday to Friday, 7am to 11:40pm Saturdays, and 7am to 8pm Sundays and public holidays.
Boddington Way	One (one-way, access via Fairwater Drive only)	50km/h	Formalised footpath on northern side. Indented parking along southern side.
Ashton Vale Grove	2	50km/h	Yes, on the western side of the road between Fairwater Drive and Benares Court. There is footpath access only, between Fairwater Drive and the southern end of Ashton Vale Grove (no direct vehicle access between these two roads).
Galway Court	2	50km/h	Footpath joining from northern end of Galway Court to Bong Bong Road.
Cleveland Road	2	50km/h	No formalised footpaths.
Fowlers Road/ Daisy Bank Drive	2	50km/h	No formalised footpaths. Wide road shoulder with bicycle path on the eastern verge.

## Potential impacts

During construction, vehicles would access the site from the Princes Highway. Construction vehicles will use local roads including the roads listed above.

The proposal would result in a minor, short-term increase in heavy vehicle movements on the surrounding road network. Total vehicle numbers and movements are expected to be low, with up to 20 vehicles at one time. The proposal will require heavy vehicle movements during construction for the delivery of pipe and construction materials including concrete and excavation and haulage operations. In addition, light vehicles would be required to transport staff and small items of equipment to and from the work sites. The vehicles would be located at individual sites for short periods of time and would be moving progressively along the alignment. Some private property access and street parking may be temporarily impacted during the works. There may be more regular plant and vehicle movement in and out of the proposed compounds, with vehicle movements likely to peak at the start and end of each shift.

Impacts to local roads and bus routes are summarised below (Table 6-24). A traffic management plan (including organising any required ROLs from council) would be prepared in consultation with Wollongong City Council before construction starts.

**Table 6-24** Impacts to local roads and bus routes

Road	Overlap with construction corridor	Impact	Mitigation
Bridgewater Drive	Work Lot C gravity main	Lane closures likely to be required.	Private property access to be managed through traffic control.
Riverpark Way	Work Lot C gravity main	Lane closures likely to be required.	Private property access to be managed through traffic control.
Fairwater Drive	Work Lot C rising main	Lane closures likely to be required. Bus routes: lane and/or road closures may require temporary relocation or closure of bus stops, and timetable delays due to reduced speed limits and reduced lane availability.	Footpath access and private property access to be managed through traffic control. Consult with bus authorities.
Boddington Way	Work Lot C rising main	Likely to be temporarily closed during construction of the Work Lot C gravity main at the top of the street.	Alternate access to be provided. Footpath access and private property access to be managed through traffic control.

Road	Overlap with construction corridor	Impact	Mitigation
Ashton Vale Grove	Work Lot C rising main	Lane closures likely to be required.	Footpath access and private property access to be managed through traffic control.
Galway Court	Work Lot C rising main	Lane closures likely to be required.	Footpath access and private property access to be managed through traffic control.
Cleveland Road	Work Lot B gravity main	Lane closures likely to be required.	Private property access to be managed through traffic control.
Fowlers Road/ Daisy Bank Drive	Work Lot B gravity main	Lane closures likely to be required.	Bicycle path and private property access to be managed through traffic control.

During operation, maintenance activities would be performed in line with Sydney Water’s existing maintenance procedures. An increase in traffic during operation as a result of this proposal is not expected.

### Mitigation measures

With the implementation of the mitigation measures below, the proposal would be unlikely to result in significant impacts on traffic and access during construction and operation.

**Table 6-25 Environmental mitigation measures — traffic and access**

Mitigation measures
Prepare a Traffic Management Plan (TMP) in consultation with council before construction starts. Wollongong City Council, emergency services, bus companies and the community would be notified of traffic control arrangements including the timing of any temporary road and lane closures.
Minimise traffic impacts near residential properties, schools and businesses by consulting with them (e.g. no major materials deliveries at school drop off or pick up times etc.).
Manage sites to allow people to move safely past the works, including alternative pedestrian, 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 proposal, and any temporary road or lane closures.

## Mitigation measures

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

The works are predominantly on the fringes of existing urban development. The alignment passes through areas of both urban and rural visual components. Development associated with Cleveland Precinct is ongoing and the characteristics of the area are likely to change over time.

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

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

During construction, there would be temporary impacts on visual amenity from equipment, generation of waste and construction activities such as earthworks within the construction corridor. There will also be some 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 mitigation measures listed below.

Once operational, the proposal would have significant social benefits, enabling the development of Cleveland Precinct. Most of the infrastructure of the proposal would be located below ground and as such would not be visible once operational. Visual impacts associated with above ground structures would consist of:

- proposed upgrades to SP1012
- installation of ventilation shafts.

The proposed upgrades to SP1012 would be mostly underground, with the exception of above ground electrical switchroom and pad mount transformer.

The proposal would include the installation of ventilation shafts. The ventilation shafts would generally consist of a 300mm diameter supported pipe, which would be between 8 and 16m tall. The final location and height of these ventilation shafts would be confirmed during detailed design but would be in proximity to existing and future residential receivers. Currently views for nearby residents are unrestricted in all directions. Before the development of Cleveland Precinct, the visual impacts of these ventilation shafts may have a moderate impact to nearby residents. Ventilation shafts would be constructed from either matte stainless-steel material or glass fibre reinforced plastics and would remain unpainted. Consultation with affected landowners would be undertaken, and if required, painting of ventilation shafts in a sympathetic colour would be considered. Detailed design would consider reducing the scale of ventilation shafts where feasible.

While the proposal would alter the visual characteristic of the area, as development of the area continues, it is anticipated that these above ground structures would become less prominent and so the visual impacts will reduce over time.

The proposal would result in minor impacts on private property, as the ventilation shafts would need to be installed above-ground on private property. A CSAP and Communication Strategy has been developed that outlines the communication approach to be taken by Sydney Water and its contractors for the life of the proposal, including engagement with private properties. Sydney Water will maintain and implement the CSAP and Communication Strategy during all stages of the proposal.

### Mitigation measures

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

**Table 6-26 Environmental mitigation measures — social and visual**

Mitigation measures
Undertake works in accordance with Sydney Water Communications policies and requirements including: <ul style="list-style-type: none"><li>• notify impacted residents and businesses</li><li>• erect signs to inform the public on nature of work</li><li>• personnel treat community enquiries appropriately.</li></ul>
Work sites will be restored to pre-existing condition or better.
Minimise visual impacts (e.g. retain existing vegetation where possible).
Direct artificial light away from sensitive receivers where possible (ie residents, fauna or roadways).
Maintain work areas in a clean and tidy condition.
The scale of ventilation shafts, and their final locations, would be confirmed during detailed design and would consider visual impacts on receivers. Consultation with affected landowners would be undertaken, and if required, painting of ventilation shafts in a sympathetic colour would be considered.
Site restoration including roads, verges and vegetation is to be performed in consultation with private property owners and council.

### 6.2.10 Cumulative and future trends

#### Potential environmental impacts

The proposal is located in an area that is subject to ongoing development of Cleveland Precinct. Cumulative impacts are likely to be negligible given the small scale of the proposal relative to the overall works planned within the development area and the proposed timeline of the broader development within Cleveland Precinct. Construction of residential properties by the developer is not anticipated to begin while construction of this proposal is underway. However, if that was to

occur, cumulative impacts may result, including:

- cumulative noise and air quality impacts from works being undertaken concurrently
- potential traffic management issues during construction
- community construction fatigue as a result of works being undertaken simultaneously or concurrently.

Implementing mitigation measures will reduce the scale and extent of cumulative impacts.

Additionally, the proposal will be undertaken in conjunction with Sydney Water works approved under the EA (as detailed in Section 5.1). These works are located within the suburbs of Horsley, Dapto, Cleveland and Huntley and include the construction of 9.15km of wastewater mains and 0.45km of water mains. Cumulative impacts to environmentally sensitive areas such as TECs, threatened species and potential habitat, coastal wetlands, and Aboriginal heritage have been considered in specialist studies in Section 6.2.3 and Section 6.2.4 of this REF.

A search of the Major Projects Planning Portal for the suburbs of Horsley and Cleveland was undertaken. Aside from future residential development, no major projects were identified within 1km of the proposal.

Climate change-related factors such as bushfires, flooding, and extreme storm events that could impact the proposal were considered in the flora and fauna and water and drainage sections of this REF. The proposal is unlikely to further exacerbate future trends as the new assets are mostly underground and operational impacts are not expected.

Pumping station SP1012 is an operational site, and will continue to operate during construction of the proposal. The pumping station must remain accessible during construction, in the event of any emergencies, inspections, or any other routine work requiring access. The proposal will expand Sydney Water's network of wastewater infrastructure to ensure there is sufficient capacity to meet the demands of projected population growth.

### Mitigation measures

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

**Table 6-27 Environmental mitigation measures — cumulative and future trends**

#### Mitigation measures

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

If the proposal occurs within in the same construction corridor at the same time as works being constructed under the EA, apply the more stringent mitigation measures.

### 6.2.11 General environmental management

**Table 6-28** Environmental mitigation measures — general environmental management

#### Mitigation measures

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

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

- go/ no go areas and boundaries of the 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.

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

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

The contractor 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.

Sydney Water's Project Manager (after consultation with the environmental and community representatives and affected landowners) can approve temporary ancillary construction facilities (such as compounds and access tracks), without additional environmental assessment or approval if the facilities 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 mitigation measures in the EIA
- no disturbance of contaminated land or acid sulfate soils
- will be rehabilitated at the end of construction.

## Mitigation measures

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 (e.g. heritage and contamination)
- other potential incidents relevant to the scope of works.

All site personnel should be inducted into the IMP.

To ensure compliance with legislative requirements for incident management (e.g. *Protection of the Environment Operations Act 1997*), Sydney Water's employees and contractors will follow [SWEMS0009](#). Attach [SWEMS0009](#) to the CEMP.

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

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





## 7 Conclusion

Sydney Water has prepared this REF to assess the potential environmental impacts of West Dapto Package 3 (Cleveland Precinct). The proposal is required to manage the future service demand for wastewater expected from about 4,500 new dwellings in Cleveland Precinct.

The main potential construction environmental impacts of the proposal include impacts from noise and traffic, and to biodiversity, Aboriginal heritage, soil, and water. During operation, minor additional visual impacts are expected. Given the nature, scale and extent of impacts and implementation of the mitigation measures outlined in this REF, the proposal is unlikely to have a significant impact on the environment. Therefore, an environmental impact statement is not required under Division 5.1 of the EP&A Act.

The REF considers how the proposal aligns with the principles of ESD. The proposal will result in positive long-term environmental improvements by providing a safe and reliable wastewater service. The proposal will not result in the degradation of the quality of the environment and will not pose a risk to the safety of the environment.

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# Appendices



## Appendix A – Section 171 checklist

Section 171 checklist	REF finding
Any environmental impact on a community	There may be environmental impacts during construction from noise and traffic, and to biodiversity, Aboriginal heritage, soil, and water. During operation, minor additional visual impacts are expected. There will be environmental improvements by installing a reliable wastewater service to support future growth.
Any transformation of a locality	The proposal will not result in the transformation of a locality.
Any environmental impact on the ecosystems of the locality	The proposal will result in minor environmental impacts to ecosystems of the locality, including vegetation and waterways. The proposal will lead to environmental improvements by ensuring a reliable wastewater service to collect and treat wastewater, minimising any impacts on the ecosystem.
Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of the locality	The proposal will have a minor impact on the aesthetic, recreational, scientific or other environmental quality or value of the locality. There will be a minor visual impact during operation, from installing ventilation stacks and other new above-ground infrastructure.
Any effect upon a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or any other special value for present or future generations	The proposal will only have a minor impact upon the 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. [REDACTED]
Any impact on the habitat of any protected animals (within the meaning of the <i>Biodiversity Conservation Act 2016</i> )	The proposal will have a non-significant impact on the habitat of protected animals. Small areas of threatened flora and fauna habitat would be removed.
Any endangering of any species of animal or plant or other form of life, whether living on land, in water or in the air	The proposal will not be endangering any species of animal, plant or other form of life, whether living on land, in water or in the air.
Any long-term effects on the environment	The proposal 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 proposal will not cause the degradation of the quality of the environment.
Any risk to the safety of the environment	The proposal will not increase risk to the safety of the environment.



Section 171 checklist	REF finding
Any reduction in the range of beneficial uses of the environment	The proposal would slightly reduce the range of beneficial uses of the environment. The construction corridor and compound sites would be unavailable for public, private, or developer use during construction.
Any pollution of the environment	Environmental mitigation measures will mitigate the potential for the proposal to pollute the environment. No pollution of the environment is expected. The proposal will operate in accordance with EPL 218.
Any environmental problems associated with the disposal of waste	Waste disposal will be in accordance with the environmental mitigation measures, and no environmental problems associated with the disposal of waste are expected.
Any increased demands on resources (natural or otherwise) that are, or are likely to become, in short supply	The proposal will not increase demand on resources, that are, or are likely to become, in short supply.
Any cumulative environmental effect with other existing or likely future activities	The proposal will have a cumulative environmental effect with other existing or likely future activities, including other Sydney Water work and residential development in the area.
Any impact on coastal processes and coastal hazards, including those under projected climate change conditions	The proposal will not have any impact on coastal processes or hazards, and coastal processes and coastal hazards will not have any impact on the proposal.
Any applicable local strategic planning statements, regional strategic plans or district strategic plans made under the EP&A Act, Division 3.1	The proposal is to service growth and the applicable strategic planning statements or plans have been considered in the system planning and options selection process.
Any other relevant environmental factors.	The proposal has been assessed against the factors listed above, and there are no other relevant environmental factors to consider.



## Appendix B – Consideration of TISEPP consultation

TISEPP section	Yes	No
<b>Section 2.10, council related infrastructure or services – consultation with council</b>		
Will the work:		
Potentially have a substantial impact on stormwater management services provided by council?		X
Be likely to generate traffic that will strain the capacity of the road system in the LGA?		X
Connect to, and have a substantial impact on, the capacity of a council owned sewerage system?		X
Connect to, and use a substantial volume of water from a council owned water supply system?		X
Require temporary structures on, or enclose, a public space under council's control that will disrupt pedestrian or vehicular traffic that is not minor or inconsequential?	X	
Excavate a road, or a footpath adjacent to a road, for which the council is the roads authority, that is not minor or inconsequential?	X	
<b>Section 2.11, local heritage – consultation with council</b>		
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
<b>Section 2.12, flood liable land – consultation with council</b>		
Will the work be on flood liable land (land that is susceptible to flooding by the probable maximum flood event) and will works alter flood patterns other than to a minor extent?		X
<b>Section 2.13, flood liable land – consultation with State Emergency Services</b>		
Will the work be on flood liable land (land that is susceptible to flooding by the probable maximum flood event) and undertaken under a relevant provision*, but not the carrying out of minor alterations or additions to, or the demolition of, a building, emergency works or routine maintenance? * (e) Div.14 (Public admin buildings), (g) Div.16 (Research/ monitoring stations), (i) Div.20 (Stormwater systems)?		X
<b>Section 2.14, development with impacts on certain land within the coastal zone– council consultation</b>		
Is the work on land mapped as coastal vulnerability area and inconsistent with a certified coastal management program?		X
<b>Section 2.15, consultation with public authorities other than councils</b>		
Will the proposal be on land adjacent to land reserved under the <i>National Parks and Wildlife Act 1974</i> or land acquired under Part 11 of that Act? <i>If so, consult with DPE (NPWS).</i>		X
Will the proposal be on land in Zone C1 National Parks and Nature Reserves or on a land use zone that is equivalent to that zone? <i>If so, consult with DPE (NPWS).</i>		X
Will the proposal include a fixed or floating structure in or over navigable waters? <i>If so, consult TfNSW.</i>		X
Will the proposal be on land in a mine subsidence district within the meaning of the <i>Coal Mine Subsidence Compensation Act 2017</i> ? <i>If so, consult with Subsidence Advisory NSW.</i>		X
Will the proposal be on land in a Western City operational area specified in the <i>Western Parkland City Authority Act 2018</i> , Schedule 2 and have a capital investment value of \$30 million or more? <i>If so, consult the Western Parkland City Authority.</i>		X
Will the proposal clear native vegetation on land that is not subject land (ie non-certified land)? <i>If so, notify DPE at least 21 days before work starting. (Requirement under s3.24 Chapter 3 Sydney Region Growth Centres - of the SEPP (Precincts – Central River City) 2021).</i>		X



## Appendix C – Flora and fauna assessment





## Appendix D – Aboriginal cultural heritage assessment report

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

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





## Appendix E – Noise and vibration assessment





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**Review of Environmental Factors** | Servicing Growth in West Dapto Package 3 (Cleveland Precinct)

