Review of Environmental Factors

Maroubra Reservoir (WS0067) Dam safety works and condition assessment.

Sydney WATER

Table of contents

Figures

Tables

1 Executive summary

Maroubra Reservoir is a declared dam under the *Dams Safety Act 2015* due to the potential loss of life should the reservoir wall fail. Declared dams are required to be managed in accordance with the Dams Safety Regulation 2019 to ensure that any risks that may arise in relation to dams (including any risks to public safety and to environmental and economic assets) are of a level that is acceptable to the community.

Sydney Water is proposing to remove vegetation at Maroubra Reservoir in order to both meet dam safety requirements as well as undertake dam safety inspections and condition assessments to comply with the *Dams Safety Act 2015* and Dams Safety Regulation 2019 obligations. Additional vegetation removal has been identified for Sydney Water to meet its General Biosecurity Duty under the *Biosecurity Act 2015*.

The proposed removal of vegetation has been assessed in accordance with Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act), under which Sydney Water has a duty to consider the potential impacts of its activities to the fullest extent possible before deciding to proceed with the activity.

A previous proposal by Sydney Water to clear a larger amount of vegetation at Maroubra Reservoir was determined in late 2023. However, when notified of the works, some community members raised concerns regarding the need for the vegetation removal and potential biodiversity impacts. As a result of the community concern, the previous proposal was discontinued.

Sydney Water has since obtained additional specialist arborist and ecological reports, undertaken technical investigations and consulted with dam safety engineers to identify areas of vegetation that may be retained under a new proposal to meet dam safety inspection and condition assessment requirements. The current proposal, subject of this document, is for a reduced footprint of vegetation removal that would enable the required dam safety inspections and assessments to be undertaken, as required under the *Dams Safety Act 2015* and Dams Safety Regulation 2019.

In order to fully consider the potential community impacts of the proposed vegetation removal at Maroubra Reservoir, Sydney Water is inviting comment on this document prior to determining the proposal. Sydney Water's determination of the proposal will be made available on Sydney Water's website when available.

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.

Sydney Water is 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 Maroubra Reservoir dam safety and condition assessment works and identifies mitigation measures to eliminate or reduce any negative impacts and enhance positive impacts where possible.

2.2 Proposal background and need

Maroubra Reservoir (Sydney Water asset WS0067) is a critical water supply asset servicing 27,000 properties in the Maroubra Zone (Randwick Local Government Area). The reservoir is predominately a buried, below ground asset. The roof and top of the reservoir (about 2-3m height) is exposed above ground and the constructed reservoir roof is visible. The earth embankments are structural component of the reservoir and support to the buried reservoir walls.

Maroubra Reservoir is a declared dam as proclaimed by the Declared Dams Order 2024 (NSW Government Gazette 12; 19/01/2024) and in accordance with the *Dams Safety Act 2019*. The Dams Safety Regulation 2019 prescribes numerous requirements for declared dams including the requirement for Dam Safety Management Systems (Part 5), Operations and Maintenance Plans (Clause 9), emergency plans (Clause 10) and many safety requirements (Part 6). Maroubra Reservoir has been categorised as a High A consequence dam in accordance with Clause 6 of the Dams Safety Regulation 2019. This reflects the significance of impact to people, property and the environment likely to occur in the event a critical dam wall and embankment failure occurred.

Sydney Water is required to ensure the dam (reservoir) asset meets and adheres a range of legislative requirements and relevant standards such as guidelines published by the Australian National Committee on Large Dams (ANCOLD). To comply with obligations under the *Dams Safety Act 2015* and Regulations, Sydney Water is required to undertake a dam safety inspection and condition assessment, including of the dam (reservoir) embankment and embankment toe. In addition, the general safety requirements for declared dams are that the embankment and within 5m of the embankment toe must be clear of trees, shrubs and obstructive ground cover (generally, grass ground cover is required). Vegetation within this 5m range can impact and destabilise the embankment leading to dam safety risks. Vegetation can also harbour fossorial (ground burrowing or digging) animals that may also impact and threaten the structural integrity of the embankment. For example, at Maroubra Reservoir, there is evidence of foxes occupying the site and digging fox dens into the embankment.

At Maroubra Reservoir, vegetation growth, including mature trees, shrubs and obstructive groundcover, is present on the embankment and within 5m of the toe. This is not compliant with dam safety requirements and is preventing the completion of legally required dam safety inspections and condition assessment of the dam wall.

The need to remove vegetation from the embankment and toe is driven individually and collectively by various parts of Sydney Water's Dam Safety Management System, including dam risk assessment, the operations and maintenance plans and the consideration of relevant guidelines such as *Operations and maintenance plan guideline* (Dams Safety NSW, 2020) and other industry guidelines such as published by the Australian National Committee on Large Dams (ANCOLD).

Table 2-1 below 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	Maroubra Reservoir (WS0067) is a declared dam as proclaimed by the *Declared Dams Order 2024* (NSW Government Gazette 12; 19/01/2024) and in accordance with the *Dams Safety Act 2015*. The Dams Safety Regulation 2019 prescribes numerous requirements for declared dams including the requirement for Dam Safety Management Systems (Part 5), Operations and Maintenance Plans (Clause 9), emergency plans (Clause 10) and many safety requirements (Part 6). Maroubra Reservoir has been categorised as a High A consequence dam in accordance with Clause 6 of the Dams Safety Regulation 2019. To comply with obligations under the *Dams Safety Act 2015* and Regulations, Sydney Water is required to undertake a dam safety inspections and assessments, including of the dam (reservoir) embankment and embankment toe. The embankment is a designed, engineered structural element of the reservoir. The general safety requirements for dams are that the embankment and within 5m of the embankment toe must be clear of trees, shrubs and obstructive ground cover (generally, grass ground cover is required). Vegetation within this 5m range can impact and destabilise the embankment leading to dam safety risks. Vegetation can also harbour fossorial (ground burrowing or digging) animals that may also impact and threaten the structural integrity of the embankment. For example, at Maroubra Reservoir, there is evidence of foxes occupying the site and digging fox dens into the embankment. At Maroubra Reservoir, vegetation growth, including mature trees, shrubs and obstructive groundcover, are present on the embankment and within 5m of the toe. This is not compliant with dam safety requirements and is preventing Sydney Water from undertaking comprehensive dam safety inspections and condition assessments of the dam asset that are legally required. The need to remove vegetation from the embankment and toe is driven individually and collectively by various parts of Sydney Water's Dam Safety Management System, including dam risk assessment, the operations and

Aspect	Relevance to proposal
	maintenance plans and the consideration of relevant guidelines such as *Operations and maintenance plan guideline* (Dams Safety NSW, 2020) and other industry guidelines such as published by the Australian National Committee on Large Dams (ANCOLD).
Proposal objectives	The proposal objectives are to: • Ensure Maroubra Reservoir complies with obligations under the *Dams Safety Act 2015* and its Regulation. • Ensure Maroubra Reservoir complies with industry guidelines such as published by the Australian National Committee on Large Dams (ANCOLD). • Manage Maroubra Dam in accordance with the Sydney Water Dam Safety Management System. • Enable a comprehensive condition assessment of the Maroubra Reservoir embankment and toe to be undertaken with minimal vegetation removal.
Consideration of alternatives/options	There are two options: 1. 'Do nothing' – no vegetation removed. This would lead to limited effective condition assessment of the Maroubra Reservoir embankment and toe. 2. Undertake proposed works (as detailed in Section 3) – remove vegetation necessary to meet dam safety requirements, effectively manage dam related risks and to undertake a comprehensive condition assessment of the Maroubra Reservoir embankment and toe. Option 1, do nothing option is deemed unacceptable to Sydney Water. Under this option, the Maroubra Reservoir dam will remain non-compliant with dam safety legislative requirements and the dam safety related risks will not be appropriately managed and controlled. Sydney Water will be limited in its ability to undertake effective condition assessments and inspections of the dam embankment structure. This is inconsistent with appropriate management and operation of a declared dam, and with Sydney Water's Enterprise Risk Management Framework and risk appetites. Option 2 is the preferred option because it would ensure the Maroubra Reservoir dam would comply with legislative and industry requirements for declared dams and supports implementing appropriate actions to mitigate and manage the dam safety related risks. This option is consistent with Sydney Water's Risk Management Framework and risk appetite. Option 2 would enable Sydney Water to undertake effective condition assessment and inspections of the dam embankment structure and would support appropriate, safe management and operation of a declared dam.

Aspect	Relevance to proposal
	The vegetation growth on the embankment and within 5m of the embankment toe is not compliant with dam safety requirements as specified under the *Dams Safety Act 2015*, it's Regulation and industry guidelines such as those published by the ANCOLD. The need to remove vegetation from the embankment and toe is driven individually and collectively by various parts of Sydney Water's Dam Safety Management System, including dam risk assessment, the operations and maintenance plans and the consideration of relevant guidelines such as *Operations and maintenance plan guideline* (Dams Safety NSW, 2020) and other industry guidelines such as published by the ANCOLD. The general safety requirements for dams are that the embankment and within 5m of the embankment toe must be clear of trees, shrubs and obstructive ground cover (generally, grass ground cover is required). The Option 2 scope and vegetation removal requirements has been developed based on assessment of Maroubra Reservoir by a Dam Safety Engineer and in consultation with Dams Safety NSW. Consequently, there is minimal and limited options or flexibility regarding the selection and/or avoidance of vegetation to be removed. Option 2 aims to retain trees and plants where possible, however any retaining of trees is limited to the toe area and determined on a individual plant basis in consultation with the Dam Safety Engineer. Option 2 identifies two areas on site for replanting and translocation of suitable plants. These areas are deemed suitable due their location being sufficiently outside the dam embankment and toe area. Any replanting would be of native species deemed suitable based on their ecological and dam safety aspects and attributes. As discussed in Section 3.1, additional technical investigations and consultation has determined that a number of plants initially identified for removal (the previous proposal) can now be retained. Sydney Water has considered the locations of these plants and deemed these individual plants are of lower risk to be affecting the integrity of the structural embankment and reservoir wall. However there remains a possibility that the condition assessment and subsequent review by a specialist dam safety engineer may identify the need to remove these plants in the future.

3 Proposal description

3.1 Proposal details

To comply with obligations under the *Dams Safety Act 2015* and Regulations, Sydney Water is required to undertake a dam safety inspection and assessment, including of the dam (reservoir) embankment and embankment toe. In addition, the general safety requirements for declared dams are that the embankment and within 5m of the embankment toe must be clear of trees, shrubs and obstructive ground cover (generally, grass ground cover is required).

The proposal involves management of vegetation at the Maroubra Reservoir property to ensure compliance with dam safety requirements. Vegetation removal (trees, shrubs and obstructive ground cover) from within the embankment and 5m from the embankment toe is required to enable Sydney Water to undertake the visual inspection and geotechnical investigations for the condition assessment, which would then be reviewed by a specialist dam safety engineer. Vegetation within the work footprint that has been identified for removal or retention is illustrated in **Figure 3-1**. In some instances, some trees within the embankment toe area may be retained, however may require some trimming and/ or pruning for their structural integrity, safety and/or the health of the tree. The embankment is an engineered structure and the outcome of the condition assessment may identify additional maintenance and corrective actions needed to restore and/or maintain the safety and integrity the dam asset, its structural embankment and compliance with dam safety requirements. Undertaking corrective actions identified from the condition assessment is not within scope of this REF and would require a separate environmental assessment and planning approval.

Where possible, the proposal would aim to translocate suitable plants, rather than removing and killing of individual plants. This would involve careful excavation and relocation of suitable native plants, from their current position to either of two designated replanting areas outside the dam embankment clearance zone. This would occur for individual trees, shrubs or plants that are identified as appropriate native species and likely to survive translocation. Depending on the species, size and form of the plant, individuals may be excavated and transported either by hand or machinery. Minor excavation in the replanting zone would occur to replant root systems. Contemporary horticultural and arboricultural practices would be implemented.

The current proposal includes a reduced footprint and vegetation removal impact following additional technical investigations and consultation with a dam safety engineer, Dam Safety NSW and community feedback on the proposal. A number of plants previously identified for removal can now be retained. Sydney Water has considered the locations of these plants and deemed these individual plants are of lower risk to be affecting the integrity of the structural embankment and reservoir wall. However there remains a possibility that the condition assessment and subsequent review by a specialist dam safety engineer may identify the need to remove these plants in the future.

Table 3-1 describes the proposal and **Figure 3-1** shows the location and key environmental constraints of the proposal area.

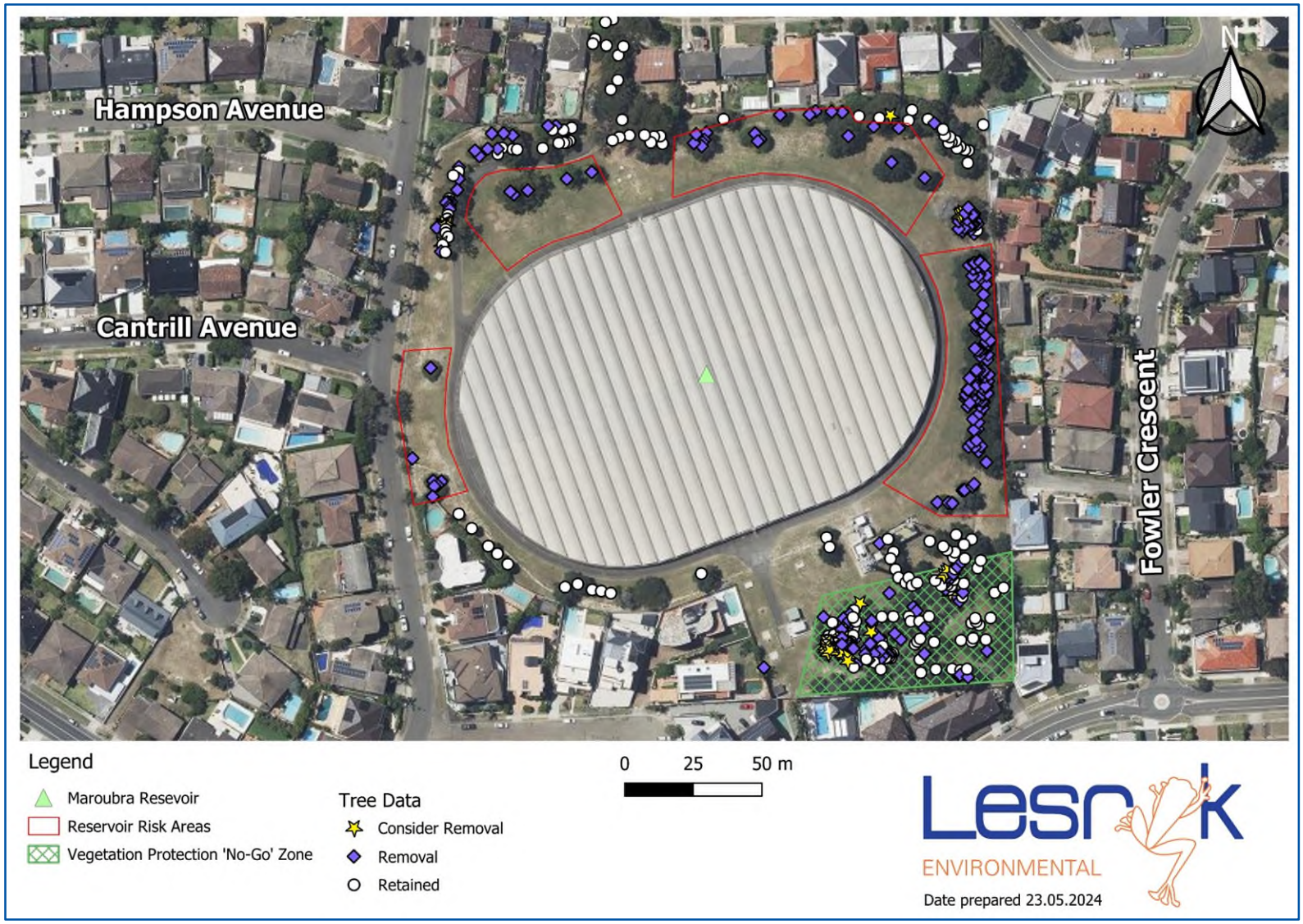
Table 3-1 Description of the proposal

Aspect	Detailed description
Proposal description	The proposal involves dam safety works at Maroubra Reservoir. This includes: • Vegetation removal of identified plants from the Maroubra Reservoir embankment and toe area to comply with dam safety requirements and Sydney Water's General Biosecurity Duty under the *Biosecurity Act 2015*. • Pruning of trees to reduce the risk of failure, improve structural integrity and maintain clearance from buildings, powerlines and other infrastructure, and removal of dead or dying branches to reduce the risk of falling branches and to improve the health of the tree. • Condition assessment of the Maroubra Reservoir embankment and toe area. This would involve visual and geotechnical investigations of the ground conditions. • Translocation of suitable plant individuals from the embankment and/or toe area to designated replanting area within the Maroubra Reservoir site property. • Replanting of suitable native species within the designated replanting area within the Maroubra Reservoir site property. Due to the limited and lack of appropriate space for replacement planting within the Maroubra Reservoir, Sydney Water proposes to undertake offset planting in consultation and collaboration with Randwick Council to ensure the preservation and enhancement of green spaces and habitat corridors in the area. However the environmental and site specific assessment of this replanting is not considered within this REF and would need to be completed after consultation and agreement with Council is completed. **Not within Scope** Vegetation management within southeastern corner of the site, identified as the 'no-go' zone in Figure 3-1. Whilst the arborist assessment (refer to Appendix 8) makes recommendations regarding individual trees and plants within this area, this is not within the scope of this proposal. Vegetation management in this area would a separate environmental assessment and planning approval. Undertaking corrective actions identified from the inspection and condition assessment are not within scope of this REF and would be subject to a separate environmental assessment and planning approval.
Location and land ownership	Maroubra Reservoir is located in a suburban landscape setting within the suburb of Maroubra. The reservoir site includes both Lot 9, DP 771879 and Lot 9, DP 519241, and the land is owned by Sydney Water Corporation. The

Aspect	Detailed description
	property contains water supply and treatment infrastructure including the water reservoir (Sydney Water asset WS0067) and chlorination dosing asset (Sydney Water asset WT0075). The Maroubra Reservoir site is bound by Johnston Parade to the north, Fowler Crescent to the east, Storey Street and Vinnie Place to the south, and Armour Avenue to the west. Residential properties and development are present immediately adjacent to all property boundaries of the Maroubra Reservoir site, with the exception of approximately 120m length of the western site perimeter being located immediately adjacent the Armour Avenue roadway and pedestrian sidewalk.
Site establishment and access tracks	A sealed vehicle access road exists within the site leading from Johnston Parade and provides a loop around the oval-shaped reservoir roof. Areas requiring vegetation removal can be accessed directly from internal, sealed access roads within the Maroubra Reservoir site.
Methodology	Tree and shrub removal is expected to involve cutting trunks as close as possible to ground level. Stumps would typically be painted with herbicide (eg. Glyphosate). Trees would be removed using a combination of dismantling, felling, sectional felling and/ or crane removal, as appropriate. Tree pruning and deadwood removal shall be carried out in accordance with AS4970-2009 Pruning of Amenity Trees. Where possible, the proposal would aim to translocate suitable plants rather than removing and killing individual plants. This would involve careful excavation and relocation of suitable native plants from their current position to either of the two designated replanting areas outside the dam embankment clearance zone. This would occur for individual trees, shrubs or plants that are identified as appropriate native species and likely to survive translocation. Depending on the species, size and form of the plant, individuals may be excavated and transported either by hand or machinery. Minor excavation in the replanting zone would occur to replant root systems. Contemporary horticultural and arboricultural practices would be implemented.
Restoration	The cleared embankment and toe areas are planned to be restored and maintained as a grassy, lawn type surfaces in accordance with dam safety requirements. Replanting and translocated plantings within the site would require ongoing maintenance. Once plants are established, future vegetation management and maintenance would be implemented via the Sydney Water Property Environmental Management Plan.
Materials/ equipment	Contemporary horticultural and arboricultural practices would be implemented. Equipment and machinery that would be used includes: • General vehicles

Aspect	Detailed description
	• 4.5 tonne GVM truck • Forestry mulcher / chipper - 12" 2.7 tonne GVM chipper expected. • Arborist equipment and general tools (Chainsaws, brush cutters, pole saws, secateurs, leaf blowers) • Tree climbing equipment, if required (e.g. ropes, harness) • Geotechnical rig • Herbicide application equipment (e.g. spot-spray packs, herbicide applicator, applicator brush) • General hand tools (mattocks, shovels)
Work hours	Work and deliveries would be scheduled to occur during standard daytime hours of: • 7 am to 6 pm, Monday to Friday • 8 am to 1 pm, Saturdays. The proposal is not expected to require work outside these hours.
Proposal timing	Works are proposed to occur mid-2024. The exact timing would depend on the outcome of community consultation activities. Vegetation removal, translocation (where feasible) and replanting activities are anticipated take about seven (7) days to complete. Work would be undertaken between the work hours 7am - 6pm Monday to Friday and 8am - 1pm Saturday. The subsequent visual inspection and geotechnical investigations would be complete within about six months. Any corrective actions identified from the inspection and condition assessment are unknown at the time of writing this document and are outside of scope of this REF. Such corrective actions would be subject to their own environmental assessment and planning approval.
Operational requirements	The cleared embankment and toe areas are planned to be restored and maintained as a grassy, lawn type surfaces in accordance with dam safety requirements. Vegetation identified to be retained would be maintained, however no new plants would be permitted to establish, germinate or grow within the required dam safety clearance areas. This would be operationalised via the implementation of Sydney Water's Property Environmental Management Plan for the site.

Figure 3-1 Location of proposal and key environmental constraints, illustrating the location of vegetation individuals required to be removed and individuals targeted and planned to be retained, as identified by Canopy Consulting 2024 (taken from Lesryk Environmental, 2024).



4 Consultation

4.1 Community and stakeholder consultation

Sydney Water provided notification of the previously proposed works at Maroubra Reservoir via letter dated 15 March 2024. Letters were delivered to residential properties surrounding and in proximity to the Maroubra Reservoir property. Following this notification, customers and community stakeholders contacted Sydney Water regarding the works. As a result, Sydney Water initiated further engagement with the customers and community stakeholders.

On 3 April 2024 Sydney Water met with representatives of Randwick City Council at Maroubra Reservoir. The meeting involved a site tour and discussion of the project context and proposed works. After this meeting, Randwick City Council provided follow-up correspondence to Sydney Water via letter dated 11 April 2024.

On 11 April 2024, Sydney Water held a community engagement forum and met with community representatives at Maroubra Reservoir. A notification and invitation to attend was sent via letter to the surrounding residential properties. About 35 people attended this event. This community meeting included a site tour and discussion of the project context and proposed works with the community attendees. Sydney Water listened and obtained feedback from community members who attended.

In response to the community and stakeholder feedback, Sydney Water has revised and modified this proposal aiming to retain plants and minimise vegetation impacts as much as possible. This has involved undertaking additional technical investigations along with consultation with Dam Safety Engineers and Dam Safety NSW. The outcome is that a number of plants initially identified as requiring removal have now been identified as able to be retained.

In response to community and stakeholder feedback, Sydney Water has committed to putting the REF for the current proposal on Public Exhibition to facilitate another opportunity for the community to be consulted on the proposal.

4.2 Consultation on this REF

The community and stakeholders are invited to comment on this REF. Information about the proposal and the REF process can be found on the Sydney Water Talk website, and submissions must be made in writing and received by the date identified on the website. The REF will be available to download from https://www.sydneywatertalk.com.au during the display period identified on the website.

Sydney Water will collect information in written submissions to help us assess the proposal. The information may be disclosed to appropriate agencies such as the EPA. If the respondent indicates at the time of submission that the information should remain confidential, Sydney Water will attempt to ensure this. However, there may be legal justification for its release, for example under the *Government Information (Public Access) Act 2009*. At the end of the public display period,

Sydney Water will consider all submissions received and prepare a Decision Report. The Decision Report will, after consideration of feedback received, document Sydney Water's decision on whether or not to proceed with the proposal as described in this REF and amended (if required) in the Decision Report. This Decision Report will also be available from sydneywatertalk.com.au.

4.3 Consultation required under State Environmental Planning Policies and other legislation

Sydney Water is required to consult with councils and other authorities when our activities may impact other agencies' infrastructure or land. This is specified in the State Environmental Planning Policy (Transport and Infrastructure) 2021 (TISEPP). No formal consultation was required under the TISEPP Legislative requirements (refer to Section 5.1.1 and Appendix 4 of this REF).

Given the limited suitable space available for replanting trees on land at Maroubra Reservoir, Sydney Water would work with Randwick City Council to identify potential opportunities for replanting trees on council land near the reservoir site.

5 Statutory position

5.1 Environmental Planning and Assessment Act 1979

The *Environmental Planning and Assessment Act 1979* (EP&A Act), the Environmental Planning and Assessment Regulation 2021 (EP&A Regulation) and their associated environmental planning instruments (EPIs), such as State environmental planning policies (SEPPs) and local environmental plans (LEPs) provide the framework for assessing environmental impacts and seeking planning approval of development proposals or activities by public authorities in NSW. Statutory State-owned corporations such as Sydney Water are defined as public authorities under section 1.4 of the EP&A Act.

Public authorities can assess and determine their activities under Division 5.1 of the EP&A Act. In order to do this, they must first determine whether or not their proposal requires consent or is prohibited under any EPI. They must also determine if their proposal is likely to have a significant impact on the environment, and/ or whether it is declared as a project to which Division 5.2 of the EP&A Act applies. If a proposal is likely to have a significant impact on the environment, then the preparation of an EIS is required in accordance with section 5.7 if the EP&A Act. If Division 5.2 of the EP&A Act applies, then approval from the Minister for Planning is required.

Sydney Water is the proponent and determining authority under the EP&A Act. The Maroubra Reservoir dam safety works have been assessed in accordance with Part 5, Division 5.1 of the EP&A Act. This REF documents the environmental impact assessment of the work including consideration against the matters listed in clause 171 of the *Environmental Planning and Assessment Regulation 2021* (refer Appendix 3). This REF has been prepared consistent with the *Guidelines for Division 5.1 assessments* (NSW Department of Planning and Environment, 2022) that are approved under clause 170 of the Regulation.

5.1.1 Consideration of relevant Environmental Planning Instruments

Local Environmental Plan	
Local government area (LGA)	Randwick Local Government Area
Applicable Local Environmental Plan	Randwick Local Environmental Plan 2012
Land use zoning	SP2 Infrastructure (Water Supply System).
State Environmental Planning Policies	
State Environmental Planning Policy (Transport and Infrastructure) 2021 (TISEPP)	The proposed work and activities are permitted without consent in accordance with both Clause 2.159(2) and of the TISEPP. Clause 2.159(2) states: *Development for the purpose of water storage facilities may be carried out without consent if it is carried out by or on behalf of—*

	(a) any public authority on land in Zone RU1 Primary Production, Zone RU2 Rural Landscape, Zone SP1 Special Activities, Zone SP2 Infrastructure or an equivalent land use zone The land is zoned as SP2 Infrastructure (Water Supply System) in accordance with the *Randwick LEP 2012*. Therefore, the works may proceed in accordance with Division 5.1 of the *Environmental Planning and Assessment Act 1979*. Part 2.2, Division 1 of the TISEPP prescribes circumstances where consultation with local Council and other authorities is required. Appendix 4 documents the consideration of these provisions of the TISEPP. For this proposal at Maroubra Reservoir, no formal consultation is triggered as required. However Sydney Water has committed to putting the REF for the current proposal on Public Exhibition to facilitate another opportunity for the community, Randwick City Council and other authorities, to be consulted on the proposal.
State Environmental Planning Policy (Biodiversity and Conservation) 2021	Clause 2.4 of this SEPP states that this Policy *does not affect the provisions of any other State Environmental Planning Policy or any provisions of a local environmental plan that are mandatory provisions under the Standard Instrument (Local Environmental Plans) Order 2006*. Clause 6 also notes that this *Policy does not affect authorisations under other Acts that are required to be obtained in connection with the clearing of vegetation*. Therefore, the TISEPP prevails over this Policy, to the extent of any inconsistency. Specifically, for development permitted without consent under the TISEPP, the TISEPP Clause 2.3 definition of Consent prevails as it defines *that no other type of consent, licence, permission, approval or authorisation is required such as an approval to remove or prune vegetation that would otherwise be required.* All vegetation impact (removal or pruning) activities are undertaken as part of the development permitted without consent and therefore do not require a permit or approval. The work is not located in land to which Chapter 4, 5, 6 or 13 of this SEPP applies.

State Environmental Planning Policy (Resilience and Hazards) 2021	The works are not located with Coastal Wetlands, Littoral Rainforest or their proximity area's. Since the proposal is permitted without consent in accordance with the TISEPP, there are no additional requirements under this SEPP.
State Environmental Planning Policy (Planning Systems) 2021	In accordance with this SEPP, the proposed works do not meet criteria of State Significant Development, State Significant Infrastructure or Regionally significant development. Since the proposal is permitted without consent under the TISEPP, the proposal may proceed in accordance with Division 5.1 of the EP&A Act.

5.1.2 Confirmation of Part 5 position

The activities described in this REF are permitted without development consent in accordance with Clause 2.159(2)(a) of the *State Environmental Planning Policy (Transport and Infrastructure) 2021*. The land is zoned as *SP2 Infrastructure (Water Supply System)* in accordance with the *Randwick Local Environmental Plan 2012.*

As detailed and discussed in Sections 6 and 7 of this REF, after consideration of 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 EIS is not required and consideration of the proposal may proceed in accordance with Division 5.1 of the EP&A Act. The proposed dam safety work at Maroubra Reservoir does not trigger an EIS under the Act or any EPI, or through the environmental assessment process (this REF document) under Division 5.1 of the EP&A Act.

5.2 Consideration of other relevant legislation

5.2.1 Biodiversity Conservation Act 2016

Part 7 of the *Biodiversity Conservation Act 2016* (BC Act) makes provisions about biodiversity assessment and approvals under EP&A Act, including regarding assessment requirements, impacts to threatened species and biodiversity offsets.

Clause 7.3 of the Biodiversity Conservation Regulation 2017 provides for the creation of the Biodiversity Values (BV) and also describes the types of land that may be included on the BV Map. No vegetation within the Maroubra Reservoir site has been included in (within the curtilage of) the BV Mapping. Offsetting in accordance with Clause 7.2 of the BC Regulation is therefore not required.

As discussed in Section 6.2.3 of this REF, threatened entities and/or their habitat have been recorded at the Maroubra Reservoir site. These include the following listings under the BC Act:

- Eastern Suburbs Banksia Scrub Critically Endangered Ecological Community (*Biodiversity Conservation Act 2016*)
- Magenta Lilly Pilly (*Syzygium paniculatum*) (listed as a threatened species under *Biodiversity Conservation Act 2016* (NSW) and *Environmental Protection and Biodiversity Conservation Act 1999* (Commonwealth))
- Yellow-bellied Sheathtail-bat (*Saccolaimus flaviventris*) (Vulnerable status under the *Biodiversity Conservation Act 2016)*
- Southern Myotis (*Myotis macropus*) (Vulnerable status under the *Biodiversity Conservation Act 2016*)

Specialist ecological assessments have been prepared for the proposal (Lesryk Environmental, 2022 and 2024 addendum) and include an assessment of significance of the impact of the proposal to these threatened entities (Refer Appendix 6 and 7 of this document). Although Sydney Water does not plan to remove the two Magenta Lilly Pilly individuals, an assessment of significance has been undertaken to ensure consideration of the proposal to the fullest extent possible, and to assess the low-likelihood worst case scenario that the two individuals require removal. The assessment of significance concluded that no significant impact to these entities is likely. The preparation of a Species Impact Statement (or Biodiversity Development Assessment Report were Sydney Water to choose that option) for these entities is not required.

Section 7.2(1) of the BC Act prescribes that for the purposes of Part 7 of this Act, *development or an activity is likely to significantly affect threatened species if…*

> *b) the development exceeds the biodiversity offsets scheme threshold if the biodiversity offsets scheme applies to the impacts of the development on biodiversity values…*

Section 7.2(2) of the BC Act states:

> *to avoid doubt, subsection (1)(b) does not apply to development that is an activity subject to environmental impact assessment under Part 5 of the* EP&A Act.

This proposal is being assessed under Part 5, Division 5.1 of the EPA&A Act (refer to Section 5.1.2 of this document). In accordance with Section 7.2(2) of the BC Act, Section 7.2(1)(b) does not apply in this context. Even if it was applicable, the clearing would not exceed the biodiversity offsets scheme thresholds specified in 7.2 (1)(b).

The works would not have a significant impact on any threatened species, populations or communities. The works are not likely to directly harm protected fauna, but may harm habitat of protected fauna by removing vegetation. Although localised impacts may result from a reduction in vegetation and habitat, overall, no significant impacts to native fauna are likely. In accordance with *Section 2.8(1)(a)(iv)* of the BC Act, it is a defence to prosecution for an offence under Division 1 if the activity is:

> *authorised by an approval granted by a determining authority within the meaning of Part 5 of that Act after compliance with that Part*.

This REF and its assessment fulfil the requirements of *Section 2.8(1)(a)(iv)* of the BC Act. The proposal would 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.

There is evidence of foxes (*Vulpes vulpes*) occupying the site and digging fox dens within and into the embankment. Predation by the Fox (*V. vulpes*) in NSW is listed as a *Key Threatening Process* under Schedule 4 of the BC Act 2016. The condition assessment is unlikely to have a direct influence on foxes, however the implementation of any corrective actions identified from the condition assessment would be expected to support actions that discourage and inhibit foxes.

5.2.2 Biosecurity Act 2015

The *Biosecurity Act 2015* outlines biosecurity matters (Part 2 and section 10) and various offences and duties under the Act (e.g. parts 3-4). Schedule 1 provides special provisions relating to weeds.

Part 3, Section 22 of the *Biosecurity Act 2015* states:

> *any person who deals with biosecurity matter or a carrier and who knows, or ought reasonably to know, the biosecurity risk posed or likely to be posed by the biosecurity matter, carrier or dealing has a biosecurity duty to ensure that, so far as is reasonably practicable, the biosecurity risk is prevented, eliminated or minimised.*

This includes pest animal and plants species as defined under Section 15 of the Act, and anything declared by the regulations to be a pest for the purposes of this Act.

The specialist arborist (**Appendix 8**) and ecological reports (**Appendix 6** and **7**) identified within the Maroubra Reservoir site the occurrence of weeds subject to a General Biosecurity Duty to prevent, eliminate or minimize any biosecurity risks they may pose. Tree species identified include Sweet Pittosporum (*Pittosporum undulatum*), Easter Cassia (*Senna pendula*), Chinese Hackberry (*Celtis sinensis*) and Cocos Palm (*Syagrus romanzoffiana*). Removal of these species on the site is recommended.

Mitigation measures outlined in this REF can adequately ensure the spread of any exotic or weed plant species trimmed, pruned or encountered during the works is effectively prevented, eliminated or minimised.

There is evidence of foxes (*Vulpes vulpes*) occupying the site and digging fox dens within and into the embankment. The fox is a *Priority Pest Animal* in accordance with the *Biosecurity Act 2015*. The biosecurity risks and impacts posed or likely to be posed by priority pest animal species are generally regulated under Part 3 of the *Biosecurity Act 2015* (NSW) and the general biosecurity duty requirements. The condition assessment is unlikely to have a specific, direct influence of foxes, however the implementation of any corrective actions identified from the condition assessment would be expected to support actions that discourage and inhibit foxes. It is expected that the condition assessment would identify the need for a corrective action regarding the existing fox den onsite, and it would likely be infilled in accordance with dam safety requirements.

5.2.3 Dams Safety Act 2015

Maroubra Reservoir is a declared dam as proclaimed by the *Declared Dams Order 2024* (NSW Government Gazette 12; 19/01/2024) and in accordance with the *Dams Safety Act 2015*. The Dams Safety Regulation 2019 prescribes numerous requirements for declared dams including the requirement for Dam Safety Management Systems (Part 5), Operations and Maintenance Plans (Clause 9), emergency plans (Clause 10) and many safety requirements (Part 6). Clause 11 provides that guidelines may be issued by Dams Safety NSW and that owners of declared dams must have regard to this material. Maroubra Reservoir has been categorised as a High A consequence dam in accordance with Clause 6 of the Dams Safety Regulation 2019. This classification level demonstrates that significant impact to people, property and the environment is likely to occur in the event a critical dam wall and/or embankment failure occurred.

The work is required to ensure that Sydney Water meets its compliance obligations under this legislation and, overall, to maintain the safety of this dam asset to ensure Sydney Water protect the public and the environment. The need to remove vegetation from the embankment and toe is driven individually and collectively by several aspects of Sydney Water's Dam Safety Management System, including dam risk assessment, the operations and maintenance plans and the consideration of relevant guidelines such as *Operations and maintenance plan guideline* (Dams Safety NSW, 2020) and other industry guidelines such as published by the Australian National Committee on Large Dams (ANCOLD).

5.2.4 Environmental Protection and Biodiversity Conservation Act 1999 (Commonwealth)

Under the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act), a person must not take an action that has, will have or is likely to have a significant impact on any of the 'Protected matters' (matters of national environmental significance) without approval from the Australian Government Minister for the Environment. One of the listed protected matters are threatened species and ecological communities listed under the EPBC Act.

As discussed in Section 6.2.3, two planted Magenta Lilly Pilly (*Syzygium paniculatum*) individuals occur within the site. The Magenta Lilly Pilly is listed as a Vulnerable threatened species under *the* EPBC Act (Commonwealth)). Although Sydney Water does not plan to remove the two Magenta Lilly Pilly individuals, an assessment of significance has been undertaken to ensure consideration of the proposal to the fullest extent possible, and to assess the low-likelihood worst case scenario that the two individuals require removal. Lesryk (2022) provide an ecological assessment including assessment of significance of the proposal on the Magenta Lilly Pilly (*Syzygium paniculatum*) in accordance with the *Significant Impact Guidelines* prepared under the Act (Department of the Environment 2013). The conclusion is that no significant impact is likely. The proposal is not likely to have a significant impact on Magenta Lilly Pilly. Referral of the proposal to the Commonwealth Minister for the Environment as a controlled action is not required.

The Eastern Suburbs Banksia Scrub (ESBS) is listed as a Critically Endangered Ecological Community under the EPBC Act. As discussed in section 5.2.1 and 6.2.3, the work would not harm or impact this ecological community. ESBS is known to occur in the southeastern corner of the site. The specialist arborist assessment report (**Appendix 8**) identified tree and biosecurity risks within this area and makes recommendations including the removal of some individual trees.

Vegetation management within this area is outside the scope of the proposal, however Sydney Water would be required to appropriately action any risks and ensure compliance with biosecurity obligations (refer section 5.2.2). Any actions and proposal (once such actions and their scope are identified) would require an environmental assessment and planning approval.

The proposed work would not impact any other protected matter listed under the EPBC Act. 21or the purpose of the EPBC Act, the work is not on Commonwealth land and would not impact Commonwealth land.

5.2.5 Heritage Act 1977

The Maroubra Reservoir and site is not listed on or within the curtilage of any heritage register or inventory under the *Heritage Act 1977* (Heritage Act). The proposal would not impact any listed heritage items. No additional approvals under the Heritage Act are required.

5.2.6 National Parks and Wildlife Act 1974

The work is not located within or near reserved land prescribed under the *National Parks and Wildlife Act 1974* (NPWS Act).

A due diligence Aboriginal heritage assessment was conducted as part of this REF (refer Section 6.2.4). It concluded that no Aboriginal objects would be harmed by the activities. The work area is disturbed land consistent with Clause 80(b)(4) of the *National Parks and Wildlife Regulation 2009*. Any ground disturbance by the works would therefore fit low impact activities in accordance with Clause 80(b) of the Regulation and the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (Department of Environment, Climate Change and Water NSW, 2010). The mitigation measures outlined in Section 6.2.4 can adequately address the event that Aboriginal objects are unexpectedly encountered. No additional approvals under this Act are required.

5.2.7 Pesticides Act 1999

The use and application of herbicides in this proposal triggers the application of the *Pesticides Act 1999* (Pesticides Act). The Pesticides Act controls and regulates the use of pesticides in New South Wales and aims to promote the protection of, and minimise the risks to, human health, the environment, property and trade, in relation to the use of pesticides. Pesticides include agricultural chemical products and veterinary chemical products, which are defined in the Agricultural and Veterinary Chemicals Code and include substances which effect pests, plants and include insect repellents for humans. The Pesticides Regulation 2017 makes provisions regarding the use of pesticides, including requirements for licensing, training, record keeping and associated penalties for breaches of the Act or Regulation.

The herbicides to be used and applied to vegetation under this proposed work are pesticides in accordance with Section 5 of the Pesticides Act. Section 5A of the Act defines *prescribed pesticide work* and in accordance with Section 45(1) a person carrying out prescribed pesticide work is required to hold a licence. Clause 7 of the Regulation outlines different kinds of licences for

prescribed pesticide work. Section 5B of the Act prescribes about determining a fit and proper person to hold a licence. Part 3 of the Regulation prescribes qualification requirements and criteria required to use pesticides. Under the Regulation, Clause 4 makes an exemption for domestic like use of a pesticide and defines the conditions required to meet this exemption. Clause 6 of the Regulation defines different types of *prescribed pesticide work*, including 6(1)(f) *ground applicator work* – being defined as *"being the use by an individual of pesticides (other than fumigants) for the control of weeds or of pests affecting plants or soil for fee or reward…."*.

Part 2 of the Pesticides Act prescribes about control of pesticides and includes a range of offences relating to wilful or negligent misuse of pesticides, misuse of pesticides and other general offences relating to control of pesticides.

The herbicides to be used and applied to vegetation as part of the proposal are pesticides in accordance with Section 5 of the Pesticides Act. All pesticide activities must comply with the Pesticides Act and its Regulation, including regarding the use, management and record keeping. The mitigation measures specified in Section 6 would ensure compliance and appropriate management of pesticides for this work. This includes:

- All pesticide/herbicide use in accordance with the Sydney Water *Pesticide Use Procedure* (SWEMS0017).
- All pesticide/herbicide use in accordance with the Sydney Water Pesticide Use Notification Plan (SWEMS0017.02).Use of licenced, appropriately qualified individuals.
- Appropriate records of pesticide use are generated and retained.
- Competent and compliant use, storage and management of chemicals.

5.2.8 Protection of the Environment Operations Act 1997

The *Protection of the Environment Operations Act 1997* (PoEO Act) is the primary legislative instrument in NSW regarding environment protection and pollution of the environment. The PoEO Act regulates air pollution, water pollution, noise pollution and waste management. It includes provisions for clean-up notices, prevention notices, prohibition notices, audits and issuing environment protection licences. The PoEO Act classifies protection offences as Tier 1, 2 or 3. Offences can attract penalties for corporations and individuals. Any person may bring civil proceedings in the Land and Environment Court for an order to remedy or restrain a breach of the PoEO Act or regulations. The PoEO Act prohibits carrying out development works without a licence of scheduled development work for scheduled activities (as identified in Schedule 1 of the Act). The Act also prohibits polluting activities without a licence (both scheduled and unscheduled).

The proposed Maroubra Reservoir works do not constitute a scheduled activity under the PoEO Act. The proposed vegetation removal activities are not expected to result in any environmental pollution. All waste generated by the proposed vegetation removal would be disposed of at an appropriately licenced landfill facility. Therefore, the proposed works do not require a licence under this Act.

Part 5.7 of the PoEO Act prescribes regarding the duty to notify of pollution incidents and material harm to the environment. During the undertaking of the works, in the event a pollution incident

occurs that causes or threatens material harm to the environment, Part 5.7 must be complied with, including the immediate reporting of the incident.

5.2.9 Sydney Water Act 1994

As prescribed in Section 21 of the *Sydney Water Act 1994* (SW Act), the principal objectives of the Sydney Water Corporation, and of equal importance, are:

- to be a successful business
- to protect the environment by conducting its operations in compliance with the principles of ecologically sustainable development contained in section 6 (2) of the *Protection of the Environment Administration Act 1991*, and
- to protect public health by supplying safe drinking water to its customers and other members of the public in compliance with the requirements of any operating licence.

In addition, Section 21(1) requires that Sydney Water, in implementing the above principal objectives, have the following special objectives:

- to reduce risks to human health,
- to prevent the degradation of the environment.

One of Sydney Water's objectives under the SW Act is to protect the environment by conducting its operations in accordance with the principles of ecologically sustainable development (ESD), as defined under the *Protection of the Environment Administration Act 1991* (PoEA Act) and EP&A Regulation. An assessment of the proposed dam safety works in terms of the principles of ESD is provided below in Table 5.2.9.

Table 5.2.9 Consideration of the proposal against the principles of ecologically sustainable development (ESD)

Principle	Proposal alignment
Precautionary principle – *if there are threats of serious or irreversible environmental damage, lack of scientific uncertainty should not be a reason for postponing measures to prevent environmental degradation. Public and private decisions should be guided by careful evaluation to avoid serious or irreversible damage to the environment where practicable, and an assessment of the risk-weighted consequences of various options.*	The proposal would not result in serious or irreversible environmental damage and there is no scientific uncertainty relating to the proposal. Whilst the proposal may cause localised impacts, for example through vegetation removal, the work would not lead to serious environmental damage. Retaining vegetation on the reservoir (dam) embankment and toe area poses a risk to the structural integrity of the dam asset. Maroubra Reservoir has been categorised as a High A consequence dam in accordance with Clause 6 of the Dams Safety Regulation 2019. This classification level indicates that significant impact to people,

Principle	Proposal alignment
	property and the environment is likely to occur in the event a critical dam wall and/or embankment failure occurred. The consequence of not undertaking the work is more likely to lead to a significant risk of serious damage to the safety of the environment compared with undertaking the proposed work. Overall, whilst the vegetation removal may lead to localised impacts at this location, it is unlikely to have significant impact on the environment. Therefore, proceeding with this proposal is deemed the appropriate option to manage dam related risks to the community and environment.
Inter-generational equity – *the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations.*	The work is required to ensure Sydney Water meets its compliance obligations for declared dams and, overall, maintains the safety of this dam asset, protecting the public and the environment. Maroubra Reservoir is a critical water supply asset servicing 27,000 properties in the Maroubra Zone (Randwick LGA). The ongoing and continued maintenance and operation of Maroubra Reservoir is required to ensure to the provision of safe, reliable drinking water to current and future generations.
Conservation of biological diversity and ecological integrity – *conservation of the biological diversity and ecological integrity should be a fundamental consideration in environmental planning and decision-making processes.*	The proposal would not significantly impact on biological diversity or impact ecological integrity. While the vegetation removal may lead to small, localised ecological and biodiversity impacts at this location, the impacts are unlikely to have significant impact on the environment (Refer to Section 6.2; Appendix 6 and 7).
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 would facilitate the management and operation of Maroubra Reservoir in line with Dam Safety requirements. Appropriate management actions would ensure the ongoing operation of the Sydney Water asset. The removal of identified weeds on site would improve the environmental value of the land.

As discussed in Sections 2, 3 and 5 of this REF, the proposed work is required to ensure Sydney Water meets their compliance obligations under the Sydney Water Act and other legislation and, overall, to maintain the safety of this dam asset to ensure Sydney Water protect the public and the environment. One objective of the vegetation removal is the ensure and maintain the structural integrity of the Maroubra Reservoir (dam) and protect the community and environment from risks associated with dam and/or embankment failures. Maroubra Reservoir is categorised as a High A consequence dam in accordance the Dams Safety Regulation 2019 and this classification reflects the significance of impact to people, property and the environment likely to occur in the event a critical dam wall and embankment failure occurred. Therefore, the work is consistent with the Sydney Water special objectives to reduce risks to human health and to prevent the degradation of the environment. The proposal has been assessed in consideration of the principles of ecologically sustainable development (**Table 5.2.9**). The proposal would enable Sydney Water to appropriately mitigate and action risks to the Maroubra Reservoir and ensure we continue to supply safe drinking water whilst protecting public health and the environment.

Section 46 of the Sydney Water Act provides that Sydney Water may remove a tree that is destroying, damaging or interfering with a work of the Corporation. Section 46 prescribes the process and requirements for Sydney Water to comply with regarding removal of trees destroying, damaging or interfering with a work. Section 3 defines work as meaning (a)… *storages, water mains*… *stormwater drainage channels*... or (c) *any works ancillary or antecedent to any works referred to in paragraph (a) or (b)*. Overall, the vegetation determined as required to be removed may be removed under Section 46 as the vegetation is deemed as posing a threat (destroying, damaging or interfering) to the embankment and structural integrity of the dam (reservoir) structure.

5.2.10 Waste Avoidance and Resource Recovery Act 2001

The proposal would manage waste according to the *Waste Avoidance and Resource Recovery Act 2001* (WARR Act), adopting the Resource Management Hierarchy Principles of avoidance, resource recovery and disposal. Waste generated that is requiring disposal would be managed in accordance with the Waste Classification Guidelines (NSW Environment Protection Authority, 2014).

6 Environmental assessment

Section 6 describes the existing environment and assesses direct and indirect impacts associated with the construction and operation of the proposal**.** It also identifies mitigation measures to minimise the impacts of the proposal. These mitigation measures would be incorporated into contract documents and a Construction Environmental Management Plan (or similar) prior to starting work.

6.1 Existing environment

Maroubra Reservoir is located in a suburban landscape setting within the suburb of Maroubra. The reservoir site includes both Lot 9, DP 771879 and Lot 9, DP 519241. The property contains water supply and treatment infrastructure including the water reservoir (asset WS0067) and chlorination dosing asset (WT0075). The reservoir is a predominately a buried, below ground asset. The constructed reservoir roof and top of the reservoir (approximately 2-3m in height) is exposed above ground and the constructed reservoir roof is visible from ground level.

The reservoir structure is oval in shape. Although predominantly buried, the reservoir is an elevated structure and is geographically the highest topographical point in this locality of Maroubra. Embankments slope away from the reservoir in all directions.

The Maroubra Reservoir site is bound by Johnston Parade to the north, Fowler Crescent to the east, Storey Street and Vinnie Place to the south, and Armour Avenue to the west. Residential properties and development are present immediately adjacent to all property boundaries, with the exception of approximately 120m length of the western site perimeter being located immediately adjacent the Armour Avenue road verge and sidewalk. All residential properties immediately adjacent the Maroubra Reservoir property along Johnsons Parade, Fowler Crescent, Storey Street, Vinnie Place and Armour Avenue are generally laid-out and constructed with their rear yards orientated and adjoining the boundary of the Maroubra Reservoir property (Figure 3-1; Appendix 1). Along parts of the Maroubra Reservoir site, residential properties and buildings occur within the 5m zone of the embankment toe (**Figure 3-1** and **Appendix 1**).

All endemic vegetation within the site was originally cleared during the construction of Maroubra Reservoir, and vegetation currently present is either native regrowth and/or individuals that have self-propagated or planted native or exotic individuals and/or individuals that have self-propagated. Ecological values are discussed in detail in Section 6.2.3. The Eastern Suburbs Banksia Scrub (ESBS) Critically Endangered Ecological Community occurs in the south-eastern corner of the Maroubra Reservoir property. This area is also mapped, described and included in the *Eastern Suburbs Banksia Scrub Endangered Ecological Community Recovery Plan* (Department of Environment and Conservation (NSW), 2004). The ESBS community is located outside the embankment and toe area and would not be disturbed by the proposed vegetation clearing. Planted individuals of the Magenta Lilly Pilly (*Syzygium paniculatum*), a threatened flora species, occur within the site and within the work footprint zone. Microbats have been recorded within this

site and two threatened species, the Yellow-bellied Sheathtail-bat (*Saccolaimus flaviventris*) and Southern Myotis (*Myotis macropus*) and their habitat have potential to be present the site.

In addition to the water supply infrastructure, a telecommunications tower and its associated infrastructure is located south of the reservoir within the property boundary. This is not Sydney Water infrastructure and the occupied land is leased and maintained by a third party.

The Maroubra Reservoir site access and entry is via Johnston Parade. A sealed vehicle access road exists within the site leading from Johnston Parade and provides a loop around the oval-shaped reservoir roof. Areas requiring vegetation removal can be accessed directly from the internal access road. The Maroubra Reservoir is a Sydney Water secured property and not accessible or open to the public. Residential properties adjacent and surrounding the reservoir can view and observe into the reservoir property.

Refer to **Figure 3-1** and **Appendix 1** photos.

6.2 Environmental aspects, impacts and mitigation measures

6.2.1 Topography, geology and soils

Existing environment and potential impacts

The Maroubra Reservoir location is geographically the highest topographical point in this locality of Maroubra. The reservoir structure is oval in shape. Although predominantly buried, the constructed reservoir roof is exposed above ground (approximately 2-3m height) and is visible. A sealed vehicle access road exists within the site leading from Johnston Parade and provides a loop around the oval-shaped, above-ground reservoir roof. The structural embankments steeply slope away from the reservoir roof in all directions. Vegetation removal is required on the slopes of the embankments.

The Soil Landscapes of the Sydney 1:100,000 Sheet (Chapman and Murphy, 1989) (accessed via NSW DPIE's eSPADE portal) indicated that the Maroubra Reservoir site is underlain by an Aeolian Newport geology. The landscape of this geology is described by Chapman and Murphy (1989) (accessed via NSW DPIE's eSPADE portal) as "*shallow windblown sands of the Newport soil landscape unit overlie the Newport and Garie Formations of the Middle Triassic Narrabeen Group, which consist of interbedded laminite, shale and quartz to lithic quartz sandstone. In some instances the underlying material is Hawkesbury 109 Sandstone. This is a medium to coarse-grained quartz sandstone with minor shale and laminite lenses'.*

The Maroubra Reservoir was constructed during the late 1950s to early 1960's and historic aerial photographs (refer to **Appendix 2**) illustrate the site and soils were heavily disturbed during the construction of the infrastructure. The land was excavated to construct the buried reservoir. The reservoir embankments are an engineered structure designed to meet specifications and requirements at the time of construction. The soils present in the embankment are disturbed and are not likely to exhibit the same characteristics of the surrounding soil type or mapped soil landscapes. The embankments are likely to be mixed natural soil with some soil modification. For example, the embankments would have been built according to engineered design specifications

including regarding soil grading, composition and compaction attributes and modification, such as introduced soil, aggregate material and/or compaction of natural soils, may have occurred at the time of construction.

As discussed in Section 6.1, residential properties and development predominately occur immediately adjacent to all boundaries of the Maroubra Reservoir property. Residential properties and buildings are located downslope of the embankments and frequently occur within the 5m zone of the embankment toe (refer to **Figure 3-1** and **Appendix 1**).

Geotechnical investigations would result in a minor disturbance to the ground. In addition, the proposal has the potential to disturb the soils and ground of the embankment and toe from the removal of vegetation. Removal of vegetation from the reservoir embankments may increase the exposed ground surfaces, increasing the susceptibility of the embankment to erosion. Stump grinding has the potential to cause very minor, shallow and highly localised ground disturbance. Stump grinding may occur in locations considered suitable from a dam safety perspective, however grinding is expected to not be implemented on embankments. Any exposed ground surfaces from the work would be stabilised and remediated as soon as possible. Once the work is completed, any cleared embankment and toe areas would be restored and maintained as a grassy, lawn type surface. Machinery and equipment tracking has potential to impact the embankment slopes if not carefully managed.

Minor excavation would take place in two designated replanting areas to support plant translocation and replanting activities (refer to **Figure 3-1**). These replanting locations were selected as they are sufficiently outside the dam embankment clearance zone. The size of the excavation would depend on the individual plant attributes such as its species, size, form, habit and root structure. Contemporary horticultural and arboricultural practices would be implemented and work would be undertaken by suitably qualified and/or experienced, licensed subcontractors.

The Maroubra Reservoir site has no known contaminated land issues (refer also to Section 6.2.7 discussion).

The embankment is an engineered structure and the outcome of the condition assessment may be the identification of additional maintenance and corrective actions needed to restore, maintain and/or achieve the engineering design of the embankment, ensure the safety, integrity and compliance of the dam asset. Implementation of any corrective actions is not within the scope of this REF. Such corrective actions would be subject to additional environmental assessment and planning approval.

No significant impacts to topography, geology and soils are likely and the mitigation measures stated in **Table 6-1** can adequately control and mitigate risks.

Mitigation measures

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

Mitigation measures
The work site will be managed in accordance with Managing Urban Stormwater, Soils and Construction, Volume 1 and 2A (Landcom 2004 and DECC 2008) (the Blue Book), including implementing appropriate, effective controls to control and mitigate surface flow, erosion and sedimentation risks.
The Site Supervisor must have Erosion and Sediment Control competency.
All sediment and erosion control devices will be inspected regularly (including immediately after rainfall) and will be maintained and repaired as necessary so that they remain effective for the works duration.
Minimise disturbance to ground surfaces and the area of exposed surfaces. Restore disturbed areas as soon as feasible and in a progressive manner as works are completed.
The tyres of work vehicles and machinery will be checked before leaving the work sites. Tyres will be cleaned as necessary to ensure that soil or other erodible materials are not transferred outside the work site.
Any material transferred off work sites will be swept up as required and at least daily.
Vehicle and machinery movement will be confined to designated tracks, pathways and work areas and will keep to sealed areas where possible.
If excavated material or redundant equipment is left on site overnight, it will be covered, secured and adequately contained.
Ground disturbance and excavation will not take place during or after heavy rain when doing so is likely to cause soil erosion or soil structural damage. Under such circumstances, work will stop and only recommence after the ground surfaces have sufficiently dried out. Check Bureau of Meteorology website daily.
If any items that indicate contamination are discovered, works are to stop and the Sydney Water Project Manager and ER notified immediately. Indicators of contamination include discoloured soil, strong chemical or petrol odours or leachate, or asbestos like materials.
Any stockpiles of soils or fill are to be managed in an appropriate manner to prevent dust, erosion and sediment runoff.
Any areas that are disturbed or damaged by the works will be stabilised as soon as feasible.

6.2.2 Water and drainage

Existing environment and potential impacts

No waterways are located within the work site. A concrete drainage culvert exists located on or adjacent to the embankment toe, along the eastern embankment, western and northern

embankments. This collects surface drainage from the embankment and directs flows to stormwater infrastructure. The reservoir roof structure has been designed so that drainage is controlled and is not directed onto or across any embankments. The Maroubra Reservoir and surrounding area is not located within flood liable land or a flood planning area mapped under the *Randwick Local Environment Plan 2012*.

No significant ground disturbance is likely from the proposed activities. Minor excavation would be required for the plants being translocated and replanted in the two designated replanting areas (refer to **Figure 3-1**). These replanting locations were selected as they are sufficiently outside the dam embankment clearance zone. The size of the excavation would depend on the individual plant attributes such as the species, size, form, habit and root structure. The work would not encounter or impact groundwater.

Work activities such as vegetation removal and stump grinding have potential to cause very minor, highly localised ground disturbance. They can also increase the area of exposed ground presenting a greater susceptibility to erosion. For example, exposed ground surfaces are more susceptible to rainfall and surface flows inducing and leading to erosion and sedimentation impacts. Stump grinding may occur where considered suitable from a dam safety perspective, however grinding is expected to be not undertaken on embankments. Sediment-laden runoff has the potential to enter the drainage culvert and local stormwater infrastructure, potentially leading to waterway impacts. Any exposed ground surfaces would be stabilised and remediated as soon as possible. The work site footprint area would be managed in accordance with the Blue Book (*Managing Urban Stormwater, Soils and Construction, Volume 1 and 2A* (Landcom 2004 and DECC 2008)) to ensure appropriate management of surface drainage, erosion and sedimentation risks and impacts to waterways. Where applicable, sedimentation fencing/structures (e.g. sandbags; coir logs) would be erected prior to the commencement of work and/or tree removal, and kept in place for the duration of the proposed work. The proposal would not significantly change the existing drainage pattern or significantly increase surface drainage. The drainage culvert would continue to operate and mitigate surface drainage impacts to residential properties.

Native vegetation may be appropriately mulched and incorporated in the vegetated areas within non-embankment locations of the Maroubra Reservoir site. Mulched areas would be appropriately managed in accordance with the Blue Book (Landcom 2004 and DECC 2008) to ensure mulch is not transported by surface runoff and drainage during rain events (for example, mulch should be secured and/or retained in vegetated areas using coir logs).

The works require use of fuel driven machinery and equipment as well as application of herbicides. These aspects have the potential risk to pollute the environment if not appropriately managed. For example, oil, fuel and chemicals spills from equipment, machinery or vehicles, leading to impacts on waterways and water quality. The use and any storage of chemicals on-site has a risk of pollution to the environment if the chemicals are not appropriately managed. The quantities of herbicides/ pesticides on-site would be limited to only that amount required for the planned day of work. Refueling of machinery and equipment would be done off site if feasible. If not feasible, all refueling would be undertaken on flat ground, within a designated, bunded area away from waterways, drainage lines and environmentally sensitive areas.

The mitigation measures and safeguards prescribed in this REF can adequately control and mitigate risks related to water and drainage. No significant impacts from the proposal to waterways, drainage or water quality is likely.

Mitigation measures

Table 6-2 Environmental mitigation measures — water and drainage

Mitigation measures
An Incident Management Plan (IMP) will be prepared for the work. This will include procedures and processes to ensure effective prevention, preparedness, declaration, notification, response and recovery of incidents. The IMP will include clear procedures and responsibilities to ensure compliance with Part 5.7 of the POEO Act and immediate notification of the appropriate regulatory authorities for any incidents that cause or threaten material harm to the environment (as defined by the POEO Act).
In the event of an environmental incident causing or threatening 'material harm' to the environment, the following authorities must be notified immediately: 1. Emergency Services (Fire and Rescue NSW, the NSW Police and the NSW Ambulance Service) if the incident presents an immediate threat to human health or property (Call '000' or '112'). 2. NSW Environment Protection Authority 3. Ministry of Health 4. SafeWork NSW 5. Fire and Rescue NSW 6. Randwick City Council
In the event of any spill (eg. fuel, chemical), the Sydney Water Project Manager and Environmental Representative must be notified immediately.
A functioning spill kit/s will be kept in a readily accessible location at all times. All staff will be trained in its use.
No equipment, machinery or work vehicles will be washed on site, unless within a designated washout area agreed with the Environmental Representative.
SDS to be kept on site for all chemicals, fuels etc. All chemicals stored on site will be recorded on a register at site.
All chemicals and fuels will be stored in bunded areas, labelled, transported and used in accordance with Australian Standards and in line with best practices.
Refuelling should be done off site if feasible. If not feasible, all refuelling should be done within a designated bunded area away from waterways, drainage lines and environmentally sensitive areas.
Any fuel spill will be collected and the contaminated material disposed of at a licensed waste depot.

Mitigation measures
Equipment will not be used if there are any signs of fuel, oil or hydraulic leaks. Leaks will be repaired immediately or the equipment will be removed from site and replaced with a leak-free item.
All site personnel will be briefed in the procedures and requirements of the IMP.

6.2.3 Flora and fauna

Existing environment and potential impacts

Several site-specific ecological studies have been prepared for the Maroubra Reservoir site including:

- Lesryk Environmental Pty Ltd (2022) (refer to **Appendix 6**) and Addendum (2024) (refer to **Appendix 7**).
- Narla Environmental (2018) (Sydney Water 2018).
- Actinotus Environmental Consultants (2004) (cited by Sydney Water 2010).

In addition, a specialist arborist report was commissioned for the proposal and considers all trees occurring on site (Canopy Consulting, 2024, included as **Appendix 8** to this document). The arborist report also recommends management actions for those trees outside of the high-risk areas of the dam embankment and surrounds.

These reports are further discussed below. The potential impacts of the proposal on the biodiversity of the site are assessed in the 2022 and 2024 reports.

The 2022 study (refer to **Appendix 6**) identified that the vegetation within the Maroubra Reservoir embankment and toe work footprint area is dominated by planted and introduced species, and that this vegetation does not conform to any native vegetation Plant Community Type (PCT). The vegetation was characterised as regularly slashed lawns and bands of planted native trees above introduced shrubs and grasses with some remnant native species also present. The most common species is Coast Banksia (*Banksia integrifolia*) with Norfolk Island Hibiscus (*Lagunaria patersonia*), smaller Chinese Hackberry (*Celtis sinensis*) and remnant Old Man Banksia (*B. serrata*) to the east of the reservoir and planted eucalyptus, such as Bangalay (*Eucalyptus botryoides*), Swamp Mahogany (*E. robusta*) and River Peppermint (*E. elata*) to the north. Shrubs in the east include the weeds Lantana (*Lantana camara*) and Golden Wreath Wattle (*Acacia saligna*), and remnant native Coastal Tea-tree (*Leptospermum laevigatum*). Away from the regularly slashed areas which are dominated by Couch (Cynodon dactylon), the groundcover includes Panic Veldt Grass (*Ehrharta erecta*), Kikuyu Grass (*Cenchrus clandestinus*), African Lovegrass (*Eragrostis curvula*), Buffalo Grass (*Stenotaphrum secundatum*), Plantain (*Plantago lanceolata*) and Ground Asparagus (*Asparagus aethiopicus*). The condition and quality of fauna habitat onsite is such that it supports urban tolerant, woodland associated animals that are common to abundant throughout their distribution ranges.

Overall, for the area encompassing the reservoir embankments and within 5m of the embankment toe, the 2022 report (refer to **Appendix 6**) assessed the removal of all vegetation within this area (the previous proposal). The removal of this vegetation was assessed as not having a significant impact on any of threatened species or ecological communities. Following community feedback, additional technical investigations and re-evaluation of individual plants, a number of plants initially identified for removal as part of the previous proposal have would now be retained, given they pose a lower risk of affecting the integrity of the reservoir walls and embankments. Future engineering investigations and work at the reservoir, along with Sydney Water's General Biosecurity Duty may require the removal of some of this retained vegetation, however it is not included in the current proposal.

Table 6-3 summarises the species and number of trees to be removed. **Figure 3-1** illustrates the location of individual plants and indicates those to be removed and those planned and targeted to be retained. Weed species are also noted in **Table 6-3**.

The Eastern Suburbs Banksia Scrub Critically Endangered Ecological Community (CEEC) is known to occur at the site, at the southwestern corner of the property. This is documented in the 2010 report by Actinotus Environmental Consultants (Sydney Water, 2010) and the Department of Environment and Conservation (NSW) *Eastern Suburbs Banksia Scrub Endangered Ecological Community Recovery Plan* (2004). Mapping from 2018 showed ESBS as occurring over a much large area of the Maroubra Reservoir site, and included along the eastern boundary of the property. Assessing against the Approved Conservation Advice for the listing of Eastern Suburbs Banksia Scrub as a Critical EEC on the EPBC Act (Threatened Species Scientific Committee, 2021) and considering the key diagnostic features and minimum condition thresholds, the 2022 study (Lesryk Environmental, 2022) disproved this assessment and concluded that no ESBS occurs along the eastern boundary. Furthermore, it was confirmed that ESBS is not located within the embankment and toe area, and that no ESBS would be impacted by the work. The known area of ESBC located in the south-eastern corner of the property and mapped as part of the Recovery Plan (Department of Environment and Conservation (NSW), 2004), would not be impacted by the work. **Figure 3-1** of this document designates the ESBC area as a 'Protected Vegetation – No Harm Permitted' area and the mitigation measures included in **Table 6-4** ensure this area is delineated as a 'no-go zone' to that no activities or impact occurs within this area.

Vegetation being removed as part of this work is not located within an area that has been included in the Biodiversity Values (BV) Mapping (mapped under Part 7 of the Biodiversity Conservation Act 2016). No trees within the Maroubra Reservoir site are listed on the Randwick Council Significant Tree Register.

The 2022 study (Lesryk Environmental, refer to **Appendix 6**) confirmed the presence of two Magenta Lilly Pilly trees within the site. The Magenta Lilly Pilly (*Syzygium paniculatum*) is listed as Vulnerable under both the NSW *Biodiversity Conservation Act 2016* and the Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999*. The individuals were identified to be planted specimens and not located within typical habitat for this species. The nearest known population for this species is about eight (8) kilometres from the site. The two Magenta Lilly Pilly individuals are planned and targeted to be retained. However, in line with the precautionary principle, an assessment of significance of the impact to this species in the worst-case scenario

that these individuals require removal concluded the removal of these two individuals would not significantly impact the species or its habitat. Subsequently, no additional legislative approvals are required in the event these two individuals require removal (refer to **Appendix 6**).

In general, the native fauna identified occupying the site, or likely to occur at the site, are all considered to be urban tolerant, woodland associated animals that are common to abundant throughout their distribution ranges. Whilst the work requires removal of vegetation, Sydney Water is striving to remove as little vegetation as possible to minimise impact to fauna and their habitat onsite. The mitigation measures include requiring an ecologist to conduct a pre-clearance vegetation inspection for fauna and works to be supervised by an ecologist. An ecologist would be present onsite during works to supervise the vegetation removal and trimming activities. Where possible, native fauna encountered would be relocated by the licenced ecologist to suitable conditions in vegetated areas elsewhere on the Maroubra Reservoir site. The proposed vegetation removal is not likely to significantly harm or significantly impact such native fauna or their habitat. Microbat species and their habitat, such as tree hollows, were identified as present within the site. There is the potential for Yellow-bellied Sheathtail-bat (*Saccolaimus flaviventris*) and Southern Myotis (*Myotis macropus*) to occur at the site, however the proposal is not likely to significantly impact these species or their habitat. The mitigation measures in **Table 6-4** of this document include a commitment to installing habitat boxes targeting this microbat species to ensure any removed tree hollows are offset and their habitat features are retained.

The proposal would result in a disturbance footprint of about 0.5 hectares (ha) as opposed to the unlikely worst-case scenario and maximum footprint area of 0.69 ha (previous proposal). Although the work involves removal of vegetation and impact to native fauna habitat that would have a localised impact, the work would not likely significantly harm or impact native fauna or their habitat. The revised scope further reduced potential ecological impacts by retaining additional plants. The impact to native fauna and their habitat would be minimised by:

- Minimising vegetation removal by retaining plants (trees, shrubs and ground cover) where possible.
- Relocating and replanting suitable native plants in the replanting areas, outside and away from the embankment areas.
- Planting non-invasive endemic vegetation outside the embankment and required clearance zone .
- Installing habitat boxes to support local bird and bat populations.
- Undertaking offset planting in collaboration with Randwick Council to ensure the preservation and enhancement of green spaces and habitat corridors in the area.

To ensure consideration of the proposal to the fullest extent possible, the worst-case scenario and ecological impact of vegetation removal within the maximum footprint area was also assessed and determined to be unlikely to cause a significant impact to native fauna and ecological values. A localised impact may occur through the reduction of vegetation at the site however the identified mitigation measures in **Table 6-4** below can adequately mitigate and minimise these impacts and risks.

There is evidence of foxes (*Vulpes vulpes*) occupying the site and digging dens within and into the embankment. Fossorial (ground burrowing or digging) animals like the fox threaten the structural integrity of the embankment because their burrows and dens excavate into the embankment structure. Predation by the Fox (*V. vulpes*) in NSW is listed as a Key Threatening Process under Schedule 4 of the BC Act 2016. The fox is also a Priority Pest Animal in accordance with the *Biosecurity Act 2015* (NSW). The condition assessment is unlikely to have a direct influence of foxes, however the subsequent implementation of any corrective actions identified by the condition assessment would be expected to support actions that discourage and inhibit foxes.

Where appropriate, herbicide application would be used on plants within the embankment and toe work area, for example, the cut and paint method. Inappropriate use and management of herbicides may lead to localised environmental impacts. The identified mitigation measures can adequately control and mitigate such risks.

Overall, the vegetation is required to be removed to ensure the Maroubra Reservoir meets dam safety requirements. Vegetation can impact and destabilise the embankment leading to dam safety risks. For example, root growth can impact and destabilise the embankment essential to structurally support the reservoir. Vegetation can also harbour fossorial (ground burrowing or digging) animals such as foxes that may also impact and threatened the safety of the embankment. Evidence of foxes creating dens in the embankment has been recorded on site. Vegetation also obstructs and prevents condition assessment and the ability for Sydney Water to ensure the safe management of this dam structure. An event involving a critical failure of the Maroubra Reservoir dam wall and embankment could lead to significant environmental impacts, property damage and public safety and health impacts and therefore the risks and consequences associated with not maintaining the embankment and its structural integrity are significant. Removing vegetation is therefore consistent with and appropriate when considering Clause 171(2)(J) of the EP&A Regulation 2021, regarding Sydney Water's obligation to consider risk to the safety of the environment. This is also consistent with principle of ecologically sustainable development as not undertaking the work has potential to lead to a significant risk to the safety of the environment compared with undertaking the proposed work.

Figure 6-1 The Maroubra Reservoir previous proposal illustrating tree and shrub species and their location (taken from Lesryk Environmental, 2022).

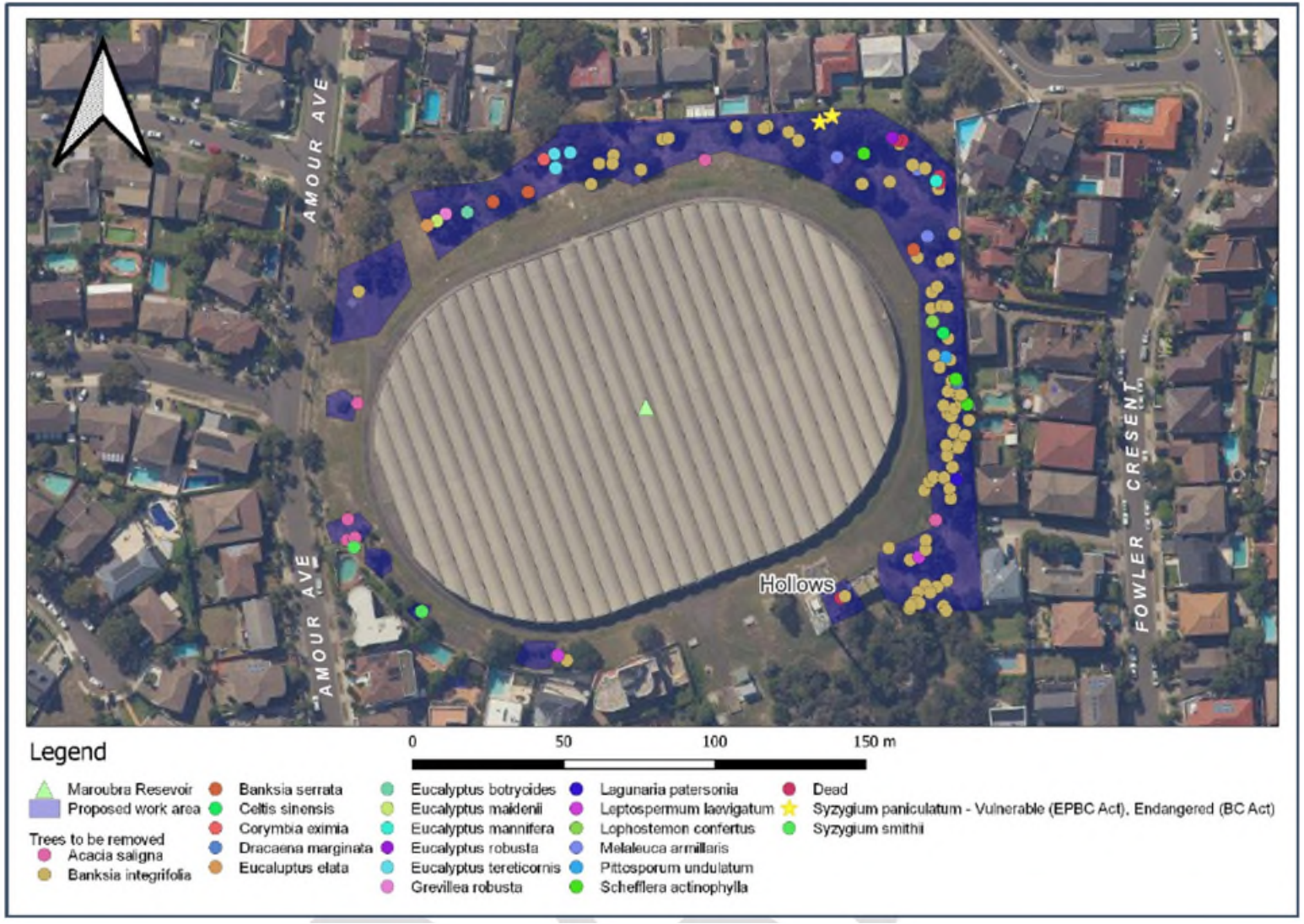


Table 6-3 Tree species and number of individuals identified for removal across the Sydney Water property*

Scientific name	Common name	Dam Safety Requirements	General Biosecurity Duty	Other (reason)
Acacia longifolia	Sydney Golden Wattle			2 (environmental weed)
Acacia salicina	Sally Wattle			1 (environmental weed)
Acacia saligna[P]	Golden Wreath Wattle	13		24 (environmental weed) 7 (dead tree removal)
Auracaria heterophylla	Norfolk Island Pine	1		
Banksia integrifolia[P]	Coast Banksia	56		3 (dead tree removal) 2 (deadwood, weak attachments etc) 2 (significant structural faults)
Banksia serrata	Old-Man Banksia			6 (dead tree removal)
Callistemon citrinus	Crimson Bottlebrush			4 (dead tree removal)
*Celtis sinensis**	Japanese Hackberry**	8	1	
Corymbia eximia[P]	Yellow Bloodwood	1		
Cupaniopsis anacardioides	Tuckeroo	1		
Dracaena marginata	Dragon Tree	1		
Eucalyptus botryoides	Mahogany Gum	1		1 (major deadwood)
Eucalyptus tereticornis[P]	Forest Red Gum	1		
Ficus rubiginosa	Port Jackson Fig			1 (inappropriate location)
Grevillea robusta[P]	Silky Oak	2		
Heptapleurum actinophyllum	Umbrella Tree**	5		
*Lagunaria patersonia**	Pyramid Tree	1		
Leptospermum laevigatum	Coast Tea Tree	1		4 (dead tree removal)
Melaleuca armillaris[P]	Bracelet Honey-myrtle	3		16 (dead tree removal)
Melaleuca nodosa	Prickly-leaved Paperbark			2 (dead tree removal)
Olea europaea subsp. cuspidata	African Olive**	1		
Phoenix canariensis	Canary Island Date Palm	1		
Pittosporum undulatum	Sweet Pittosporum**	27	35	
Senna pendula	Easter Cassia**		1	
Strelitzia nicolai	Giant Bird of Paradise	9		
Syagrus romanzoffiana	Cocos Palm**	1	4	

*Information taken from Canopy Consulting 2024 (**declared weed)

Mitigation measures

Table 6-4 Environmental mitigation measures — flora and fauna

Mitigation measures
No activities or impact is permitted to occur within the vegetation and area delineated as 'no-go zone' by Figure 3-1. Site establishment will designate and appropriately demarcate the Protected Vegetation (no harm permitted) area to ensure no activities or impact occurs within this area.
Site induction will include specifically informing site personnel regarding Figure 3-1 and the designated 'No-Go' Zone area.
Trees and vegetation removal and pruning activities will be undertaken consistent with: • Australian Standard *AS 4373-2007 Pruning of amenity trees.* • Australian Standard *AS 4970-2009 Protection of trees on development sites*.
Weeds will be managed, control and/or removed in consistent with the NSW Department of Primary Industries (2018) *New South Wales Weed Control Handbook – A guide to weed control in non-crop, aquatic and bushland situations* (7th Edition).
All herbicide use activities must comply with the *Pesticides Act 1999* and its Regulation, including regarding the chemical selection, use, management notification and record keeping aspects.
All herbicides used are to be registered for that target species by Australian Pesticides and Veterinary Medicines Authority.
Use appropriately qualified and/or experienced, licensed subcontractors to undertake vegetation removal, weed control and herbicide application in accordance with contemporary horticultural, arboricultural and bush regeneration practices and the *Pesticides Act 1999*.
The quantities of herbicides on-site should be limited to only that amount required for the planned day of work
Refilling of herbicide containers should only occur on in designated areas on clear, flat ground away, from waterways, drainage lines and environmentally sensitive areas and from the dripline of trees identified to be retained. Appropriate controls will be implemented to manage and contains risks of spill (eg. Refilling in bunded areas and/or implementing containment.
An ecologist or similar qualified person shall be present on-site to provide a pre-clearance assessment of vegetation and supervise the clearing of the any hollow-bearing tree.
The removal of the hollow-bearing tree should be off-set through the erection of suitably designed habitat boxes. These should be made to cater for the sheltering requirements of both hollow-dependent microbats and birds, with a minimum 6 boxes (3 x microbat; 3 x bird habitat boxes) being erected to off-set the number of cavities within the one tree being removed.
The location of the boxes within the subject site should be determined based on the outcomes of discussions held the Program Manager (i.e. to ensure they are not removed or disturbed by future works within the reservoir site).

Mitigation measures
Habitat box selection and their on-site installation shall be undertaken in consultation with the Sydney Water Environmental Representative. For example, when erected, the micro-bat habitat boxes should be placed on the north to north-western side of trees at a height of 5 m to 6 m.
The habitat boxes should be installed prior to vegetation removal commencing.
The habitat boxes should be monitored for a period of three years, with any damaged boxes, or those occupied by exotic species (e.g. Bees) being replaced/repaired.
If the vegetation to be removed is to be chipped and used for mulch, hand removal and appropriate disposal of crowns and/or fruit of Ground Asparagus and ripe Golden Wreath Wattle fruit should be undertaken prior to clearing to ensure dispersal of these weeds does not occur.
Where applicable, sedimentation fencing/structures (e.g. sandbags) will be erected prior to the commencement, and kept in place for the duration, of the proposed work
Where suitable, native non-invasive vegetation shall be mulched and used on-site.
Any green waste and weed species material not suitable for mulching and reuse should be appropriately contained and disposed of at a licenced waste disposal facility
If any topsoil is required to be imported to the site for replanting activities, it must meet Australian Standards for AS 4419 or AS 4454 to minimise introduction of weeds.
All weed material removed will be disposed off-site in sealed bags to a licenced disposal facility.
No smoking in or near vegetated areas at any time.
Hot work to follow appropriate procedures and permits. No hot work on total fire ban days (TOBAN).

6.2.4 Heritage

Existing environment and potential impacts

Aboriginal heritage:

A due diligence assessment was undertaken as part of this REF. The Aboriginal Heritage Information Management System (AHIMS) register was interrogated, and no registered sites are within the proposal site. The assessment concluded that no Aboriginal objects would be harmed by the proposal. The land within the site was significantly disturbed during the construction of the Maroubra Reservoir (Appendix 2). The reservoir embankment is a structural, engineered embankment and component of the Reservoir asset. The work area is disturbed land consistent with Clause 80(b)(4) of the *National Parks and Wildlife Regulation 2009*. Any ground disturbance by the works would therefore fit low impact activities in accordance with Clause 80(b) of the Regulation and the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (Department of Environment, Climate Change and Water NSW, 2010). The mitigation measures outlined in **Table 6-5** can adequately address the event that Aboriginal objects are unexpectedly encountered.

Non-Aboriginal heritage

The Maroubra Reservoir and site is not listed on any heritage register or inventory under the *Heritage Act 1977* or EPBC Act 1999. The proposal would not impact any listed heritage items. The Mitigation measures outlined in **Table 6-5** can adequately address the event that items of heritage value are unexpectedly encountered.

Mitigation measures

Table 6-51 Environmental mitigation measures — heritage

Mitigation measures
If any Aboriginal object/s (or suspected object/s) are unexpectedly found/discovered/uncovered on the site, all works are to cease, and the Environmental Representative is to be contacted immediately. The Environmental Representative will inform Sydney Water's heritage staff and DPIE in accordance with section 89A of the *National Parks and Wildlife Act 1974*
If any non-Aboriginal archaeological relics are unexpectedly found/discovered/uncovered during the excavation works, works must cease within that area and the Sydney Water Environmental Representative is to be contacted. The Environmental Representative must inform Sydney Water's Heritage staff and works within the affected area may only begin again after approval is given by Sydney Water's Heritage staff. Depending on the nature of the discovery, notification of the discovery of relics may be required under section 146 of the *Heritage Act 1977*
The disturbance of any 'relics' or 'artefacts' (as defined in the *Heritage Act 1977*) will only be permitted once these approvals have been granted

6.2.5 Noise and vibration

Existing environment and potential impacts

Maroubra Reservoir (WS0067) is located in a suburban landscape setting within the suburb of Maroubra. Although predominantly buried, the reservoir is an elevated structure and is geographically the highest topographical point in this locality of Maroubra. Embankments slope away from the reservoir in all directions. Residential properties and developments surround the entire Maroubra Reservoir site. Along parts of the Maroubra Reservoir site, residential properties and buildings occur within the 5m zone of the embankment toe (**Figure 3-1** and **Appendix 1**).

Machinery and equipment may generate minor, localised noise impacts whilst in use. The site is located within close proximity to residential properties that may be affected by noise generation. The locally high, topographical location of the Maroubra Reservoir may facilitate the travel of noise outwards from the reservoir. Noise emissions however are likely to be minor and intermittent. The works are expected to be completed within seven (7) days (weather permitting) and noise impacts would be of a short, temporary duration. All work would be conducted during standard daytime hours and no night work is required.

As such, works are categorised as 'short-term' as defined in the NSW Department of Environment and Climate Change (DECC) Interim Construction Noise Guideline (ICNG), and quantitative noise

assessment is not required on this occasion. Vegetation maintenance works are expected to be undertaken progressively around the reservoir and along the embankments over the duration of the work, with noise impacts concentrated at the localised, specific work area. As a result, the noise source location would redistribute as the works progress around the reservoir. A qualitative assessment has been carried out within this REF and mitigation measures have been recommended to ensure compliance with the ICNG and to minimise impacts arising from construction noise. Overall, surrounding residential properties are likely to be temporarily impacted by noise whilst tree removal activities are undertaken, however the noise impacts are assessed as unlikely to be significant. Reasonable and feasible safeguards would be implemented to manage and/or reduce impacts from noise and vibration during construction.

The works would not change the permanent noise levels of or from the Maroubra Reservoir site. After work completion, there would be no significant or permanent changes to background noise. Once complete, the proposal would not lead to any significant increase or amplification of noise and vibration generated by the operational Maroubra Reservoir infrastructure.

The mitigation measures included in **Table 6-6** below can adequately address, mitigate and/or reduce noise impacts. No significant construction or operational phase noise or vibration impacts are likely from the proposed works. Overall, no significant impact is likely from noise and vibration aspects.

Mitigation measures

Table 6-6 Environmental mitigation measures — noise and vibration

Mitigation measures
Works to be undertaken within the standard work hours (as specified in Section 3 of this REF). Standard work hours are: Monday to Friday 7am to 6pm, Saturday 8am to 1pm. No programmed site work will take place on Sundays or public holidays.
Works will be conducted in accordance with safeguards defined in the Interim Construction Noise Guidelines (DECC 2009) and in accordance with the Sydney Water Noise Management Procedure (SWEMS0056).
All reasonable and feasible measures will be implemented to reduce noise impacts during the proposed works, consistent with the Interim Construction Noise Guidelines (DECC 2009).
Equipment used will have efficient muffler design and be well maintained
Deliveries should be carried out during standard construction hours
Trucks should travel via major roads and routes where practicable and not be allowed to queue near residential dwellings.
Schedule works bearing in mind the activities and sensitivity of adjacent land uses (eg residential premises).

Mitigation measures
Any noise complaints will be addressed immediately in accordance with Sydney Water's Customer Complaint Procedure (SWIM Doc no. 735113)
All reasonable and feasible measures will be implemented to reduce noise impacts during the proposed works
Plant or machinery should not be permitted to warm-up or idle near residential dwellings outside the nominated working hours.
To the extent practical, noisy plant should be positioned and orientated so as to minimise noise impacts on noise sensitive receivers (eg residential properties).
The work site and delivery will be planned and designed to minimise the need for truck reversing movements.
Machinery, equipment and vehicles will not be left running or idling when not in use.

6.2.6 Air and energy

Existing environment and potential impacts

Maroubra Reservoir is located in a suburban landscape setting. Residential properties and development surround the entire Maroubra Reservoir site. The local residents are considered sensitive receivers.

The proposal would potentially result in minor dust generation and machinery emissions from:

- Emissions from fuel driven machinery, equipment and vehicles (eg. arborist equipment, mulcher)
- Removal and/or trimming of vegetation
- Vehicles and machinery within the site.
- Replanting and plant translocation activities which include minor excavation.

No significant air, odour or energy impacts or emissions would occur from these works. The work activities would require the use of arborist equipment and machinery, such as chainsaws, brush cutters, and mulching machinery. The vegetation removal activities are expected to be completed within seven (7) working days. The main air quality impacts would be trivial emissions from fuel driven equipment and potential for minor air quality impacts from dust or emissions. The work does not involve the extensive use of heavy vehicle and machinery. Quantities of fuel use over the project would be small and trivial regarding emission, climate change and air quality impacts. Minor ground disturbance from vegetation removal and replanting activities has the potential to generate or facilitate dust. Vegetation maintenance works are expected to be undertaken progressively around the reservoir and along the embankments over the duration of the work, with any emission and potential dust impacts concentrated at the localised, specific work area. Ground surfaces would be restored and secured appropriately as work progress. As a result, the potential impacts

would redistribute as the works progress around the reservoir. The implementation of the mitigation measures listed in **Table 6-7** and throughout this REF can effectively minimise and mitigate air quality and energy use impacts. Any potential impacts from dust are likely to be minor, temporary, localised. No significant air quality, odour or emissions are likely to be generated by the activities.

Mitigation measures

Table 6-7 Environmental mitigation measures — air and energy

Mitigation measures
Activities with the potential to generate dust will be closely monitored and dust suppression (water spraying) will occur where appropriate.
In the event of notable dust generation, appropriate dust suppression measures (eg watering down, stopping works during windy conditions) will be implemented.
No burning of any material is to be undertaken
Maintain vehicles and equipment in good working order, comply with the clean air regulations of the *Protection of the Environment Operations Act 1997*, have appropriate exhaust pollution controls, and meet Australian Standards for exhaust emissions.
Work vehicles/machinery will not be left running or idling when not in use
Work activities will be ceased during excessively windy conditions
All loads of waste that are transported to or from the work site will always be kept covered during transportation
Plant and equipment will be well maintained and turned off when not in operation
Any stockpiles will be appropriately secured, covered and/or contained to ensure dust generation in minimized and prevented.

6.2.7 Waste and hazardous materials

Existing environment and potential environmental impacts

The works would generate green waste from the removal of vegetation. Removed vegetation is planned to be mulched and used on-site where possible. During community consultation the community expressed interest in obtaining mulch for private use. Where feasible, Sydney Water would also consider opportunities to provide surplus mulch generated from native species to community members. Any green waste and weed species material not suitable for mulching and reuse would be appropriately contained and disposed of at a licenced waste disposal facility.

The Maroubra Reservoir is not listed on the NSW EPA public register of contaminated land and has no identified, known hazardous materials concerns. Sydney Water's HazCentral database

records a diverse range of known hazardous building material risks associated with various assets and components of the Maroubra Reservoir. However no known contamination or hazardous materials risks have been identified in association with the condition assessment and vegetation removal activities. The works would not disturb or impact known hazardous building material risks identified in HazCentral. Mitigation measures are included to address the event of unexpectedly encountering any hazardous substances during the works. In this scenario, works would cease immediately and be managed in accordance with the relevant Workplace Health and Safety and environmental regulations.

All waste would be classified in accordance with the NSW EPA Classification Guidelines and transported and disposed to an appropriately licensed facility.

The works would not involve the discharge of wastewater to the environment.

Minor ground disturbance would occur from replanting and vegetation removal activities. In the unlikely event of excess soil remaining, all spoil would be lawfully disposed of at an appropriately licenced waste disposal facility.

Small quantities of fuel would be needed onsite to operate equipment and machinery. This is not anticipated to generate waste and unused quantities would be removed from site and utilised elsewhere.

Any general waste developed by crews working on site must be disposed of in designated receptacles and the general waste would be taken offsite and disposed of appropriately. Opportunities to reduce, recycle and reuse on this project would be sought with the Project Manager and documented in the CEMP.

Mitigation measures included in **Table 6-8** below can adequately and effectively address risks associated with waste, hazardous substances and contamination of land. No significant impacts from hazardous materials, waste generation, transport and disposal and the risks to the environment are likely.

Mitigation measures

Table 6-82 Environmental mitigation measures — waste and hazardous materials

Mitigation measures
All waste material handling, transport and disposal will be in accordance with the requirements of the *POEO Act*, *Protection of the Environment (Waste) Regulation 2014*, WARR Act and relevant EPA or SafeWork NSW Guidelines.
Waste will be managed in accordance with the NSW EPA's *Waste Classification Guidelines* (November 2014). This will include: ○ waste classification of the material prior to leaving the site and ○ Recording (via an appropriate waste tracking system) of its legal off-site transportation for re-use, recycling, or disposal ○ Disposal to a facility licenced under the PoEO Act 1997 the to receive that waste material.
Manage waste according to the WARR Act and adopting the Resource Management Hierarchy Principles of avoidance, resource recovery and disposal.

Mitigation measures
Contractors must ensure that adequate bags or receptacles are available to collect and then remove all their general garbage from the work sites at the end of each working day.
Any fuel, lubricant or hydraulic fluid spillages will be collected using absorbent material (spill kits) and the contaminated material disposed of at a licensed waste depot
All wastes will be securely stored to ensure that any pollutants are prevented from escaping
All hazardous wastes on site (eg. fuel, chemicals) will be removed and disposed in accordance with the state and national regulations and guidelines and best practice for the removal of these materials. Any hazardous materials will be removed by suitably qualified, licensed, and experienced contractors only and disposed off at an appropriately licenced facility.
Hazardous materials located during the works should be sealed, labelled according to their contents, and temporarily stored within bunded areas until their removal from the work site and disposal at an appropriate EPA licensed facility as soon as possible
The work site(s) will be left clean and free of debris and other rubbish at the end of works
Work staff will remove all of their general garbage (including cigarette butts) from the work sites
The CEMP will include details of an unexpected finds protocol to address the event that contaminated materials/objects are unexpectedly identified during works. If items such as the following, are encountered or suspected whilst undertaking works, the works will stop immediately and the Sydney Water Project Manager immediately notified. ○ Ash and/or slag contaminated soils/fill materials ○ chemical containers ○ petroleum contaminated soils (staining/discolouration/odour) ○ asbestos-containing materials
The work site will be left clean and free of weeds, debris and other rubbish at the end of works.

6.2.8 Traffic and access

Existing environment and potential impacts

Access to the Maroubra Reservoir site is via a driveway from Johnston Parade, Maroubra. A sealed vehicle access road exists within the Maroubra Reservoir site leading from Johnston Parade and provides a loop around the above-ground, oval-shaped reservoir roof. Areas requiring vegetation removal can be accessed directly from internal, sealed access roads within the Maroubra Reservoir site. Vegetation removal and maintenance works are expected to be undertaken progressively around the reservoir and along the embankments over the duration of the work.

The vegetation removal activities are expected to be completed within seven (7) days. All works, vehicles and machinery would be confined to the Maroubra Reservoir site. No partial or full road closures are required. The proposal would not impact access to any road or residential property. The Maroubra Reservoir is not publicly accessible. A small number of vehicle movements would occur daily, as site crew and personnel arrive and leave site. The number of off-site vehicle movements (exiting or arriving to site) are expected to be very small and minimal, are not considered significant and would not noticeably impact on the surrounding traffic network.

Mitigation measures

Table 6-93 Environmental mitigation measures — traffic and access

Mitigation measures
Access to and within the Maroubra Reservoir site will be via approved access routes only.
Work vehicles will not obstruct local roadways or restrict access to any private driveways
To the extent practical, vehicle and equipment movements and routes within the site will avoid driving under or near trees and within the drip lines of trees identified to be retained.
Avoid vehicular movements on grassy areas during or after rainfall, when wet ground is more vulnerable to impacts from tyres/vehicles.
Vehicle and machinery movement will be confined to designated tracks, pathways and work areas and will keep to sealed areas where possible.

6.2.9 Social and visual

Existing environment and potential impacts

Maroubra Reservoir is located within an urban residential setting and topographically elevated compared the surrounding landscape. A potential impact is that the removal of vegetation would decrease visual screening and increase visibility and viewing opportunities a) from Maroubra Reservoir into residential properties, and b) from residential properties into other residential properties. Some visibility already exists over and/or through the tree canopy and into the residential properties however the removal of vegetation would remove and/or decrease screening, increase the visibility and viewing opportunities from Maroubra Reservoir into residential properties and/or from residential properties into other residential properties. The impact to individual properties would vary depending on the site-specific factors in that specific location, including if any vegetation to be retained is present within the visual catchment.

There are likely to be localised visual, amenity and privacy impacts to surrounding residential properties however overall, the impact is not likely to be significant. The reservoir site itself is an unmanned Sydney Water facility, with restricted access and not open to the general public.

Residential properties are generally laid-out and constructed with their rear yards orientated towards and adjoining the boundary of the Maroubra Reservoir property. Along parts of the

Maroubra Reservoir site, residential properties and residential buildings occur within the 5m zone of the embankment toe (**Figure 3-1** and **Appendix 1**).

Under the current proposal, a number of plants initially identified for removal have now been identified as being retained. Following re-evaluation and consultation with dam safety engineers, it was determined that these individual plants pose a lower risk to the integrity of the reservoir wall. Retention of some vegetation would help to minimise visual and privacy impacts from vegetation removal in localised areas. The vegetation impact and reduction in screening would be most apparent along the eastern periphery of the Maroubra Reservoir property. Whilst the works would remove vegetation on the embankment, no vegetation within residential properties would be removed. This would preserve some screening and minimise visual amenity impacts.

The Maroubra Reservoir is an unmanned property and receives operational site visits as needed, typically during daylight hours. Removing vegetation that acts as visual screening would not likely lead to significant visual and privacy impacts from the Sydney Water site, due to the unmanned nature of the operational site. Views from operational areas would generally and principally be into the rear yards and not into living spaces of the residential dwellings.

Due to the orientation of residential buildings bordering the site, the removal of vegetation within the Maroubra Reservoir site is unlikely to facilitate significant localised visual, amenity and privacy impacts between neighbouring properties. The reservoir is an elevated structure and the embankments are steeply sloping, particularly along the eastern boundary of the property. Viewing angles from residential properties are generally expected to be limited due the steep embankment and orientation of the residential property lots (refer to **Appendix 1** photographs as examples). Visibility and privacy impacts between neighbours (while minor in nature) are more likely to occur near the corners of the Maroubra Reservoir site boundary (eg. northeastern property corner) where some residential properties are orientated in a more perpendicular layout to each other. Plants targeted for retention and the replanting areas are located in corners of the site. This would help reduce loss of vegetation screening and minimise the potential risk of visibility and privacy impacts between such residential properties.

To ensure consideration of the proposal to the fullest extent possible, the worst-case scenario and impact from vegetation removal of all vegetation in the maximum footprint area was also assessed and determined to be unlikely to cause a significant impact on visual values. A localised impact may occur through the reduction of vegetation at the site however the mitigation measures outlined **Table 6-10** would adequately mitigate and minimise these impacts and risks.

The mitigation measures including onsite replantings, translocation of plants within the site and offset plantings outside reservoir property outlined in this REF would further ensure the proposal would minimise impacts on the social and visual values of the area.

From customer feedback received and the community engagement meeting (refer **Section 4.1**), Sydney Water identified a spectrum of diverse opinion by community members, both for and against this proposal. The public exhibition of this REF will facilitate another opportunity for the community to be consulted on the proposal and allow Sydney Water to further consider community feedback.

Mitigation measures

Table 6-104 Environmental mitigation measures — social and visual

Mitigation measures
Notifications will be sent to local residents and businesses in accordance with Sydney Water Communications policies and requirements prior to, during and after works as required. Customers will be notified as per Sydney Water's standard procedures.
Work areas will be maintained in a clean and tidy condition
All work equipment and materials will be contained within the designated boundaries of the work site
The spread of waste and vehicle parking will be minimised by: • Vehicles being parked in designated area/s • All waste and general rubbish being placed in receptacles and removed from site at the end of each day
All waste and signage generated during the works will be reused or removed from the work areas as soon as practicable and disposed of in accordance with the waste disposal safeguards
Appropriate information signs are to be displayed while work is in progress
The Sydney Water Project Manager will be notified immediately of any complaints (e.g. noise, dust). The Project Manager supported by the Sydney Water Community and Environmental Representatives will assist with the timely resolution of the complaint.

6.2.10 Cumulative and future trends

Potential environmental impacts

At the time of writing this REF, Sydney Water is not aware of any other relevant or notable works concurrently occurring in the area that could lead to cumulative impacts. The Maroubra Reservoir is an operational water supply asset and therefore, various maintenance and construction activities must occur on site.

The specialist arborist assessment report (included in **Appendix 8**) identified tree safety and biosecurity risks within the southeastern area of the Maroubra Reservoir property and made recommendations including the removal of some individual trees. This area is associated with Eastern Suburbs Banksia Scrub ecological community, listed as Listed as a critically endangered ecological community under both State and Commonwealth legislation (refer Section 5.2). Vegetation management of this area is outside the scope of the proposal, however Sydney Water will be required to appropriately action any risks and ensure compliance with biosecurity obligations (refer section 5.2.2). Additional vegetation removal has potential lead to cumulative impacts. Any actions and proposal (once such actions and their scope are identified) will require their specific environmental assessment and planning approval and include assessing cumulative impacts.

The vegetation removal and dam condition assessment activities may identify additional maintenance and corrective actions needed to ensure the safety, integrity and compliance of the dam asset. For example, observations and evidence of fox dens within the embankment are a known aspect needing corrective action.

Overall, the proposal would not result in any significant adverse long-term cumulative effects with other existing or planned activities. Delivery of the proposal would ensure the safe ongoing operation of the reservoir. Provided the mitigation measures identified in **Table 6-11** below are implemented, cumulative adverse effects with other existing or likely future activities are unlikely. However, potential cumulative impacts related to the corrective actions identified during the condition assessment would be assessed as part of the environmental assessment and planning approval for the delivery of those actions (once such actions and their scope are identified).

Mitigation measures

Table 6-115 Environmental mitigation measures — cumulative and future trends

Mitigation measures
Future infrastructure activities at Maroubra Reservoir must assess their cumulative impacts with this proposal and would need to be assessed further as part of the environmental assessment and planning approval of the future infrastructure activities once such actions and their scope are identified and confirmed.

6.2.11 General environmental management

General environment management requirements for the delivery of the proposal are identified in Table 6-12 below.

Table 6-126 Environmental mitigation measures — general environmental management

Mitigation measures
Prepare a Construction Environmental Management Plan (CEMP) addressing the requirements of this REF and any additional requirements in the Decision Report. The CEMP should specify any licence, approval and notification requirements. Prior to the start of work, all project staff and contractors will be inducted in the CEMP. The CEMP will outline how the works will be undertaken in conformance with the requirements of this REF. The CEMP must be readily available on site and include a site plan which shows (but not limited to): • no go areas and boundaries of the work area • location of environmental controls (including erosion and sediment controls, any fences or other measures to protect vegetation or fauna, spill kits, stockpile areas) • location and full extent of any vegetation disturbance.

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

- predicted/ onset of heavy rain during works

Mitigation measures

- spills
- unexpected finds (eg. heritage and contamination)
- other potential incidents relevant to the scope of works.
- Incidents causing or threatening material harm to the environment.

All site personnel will be inducted into the IMP.

Immediately notify the Sydney Water Project Manager, Project Community Relations Representative (and Project Environmental Representative of any complaints.

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

After completion of the works, the Sydney Water Maroubra *Reservoir Property Environmental Management Plan* shall be updated to reflect the change resulting from this proposal.

7 Conclusion

Sydney Water has prepared this REF to assess the potential environmental impacts of vegetation removal and geotechnical investigations for Maroubra Reservoir dam safety works. The proposal is required to ensure the Maroubra Reservoir complies with obligations under the *Dams Safety Act 2015* and its Regulation, as well as appropriately manage dam safety related risks. The vegetation removal is also required to ensure Sydney Water can undertake a comprehensive inspection and condition assessment of the structural embankment and embankment toe of the reservoir.

The main potential environmental impacts of the proposal include impacts from vegetation and habitat removal, including decreased visual screening of residential properties and minor impacts from undertaking works, such as noise generation. 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. It is noted that retaining vegetation on the reservoir (dam) embankment and toe area poses a risk to the safety, property and environment of the locality and surrounding area. The vegetation does not meet dam safety requirements, prevents appropriate embankment assessment and retaining vegetation on the embankment is a threat to the structural safety of the dam. Consistent with principle of ecologically sustainable development, it is considered that the option of not undertaking the work is more likely to lead to a significant risk to the safety of the environment compared with undertaking the proposed work. Overall, whilst the vegetation removal may lead to localised impacts at this location, it is unlikely to have significant impact on the environment. The mitigation measures outlined in this REF would support controlling, managing and minimising impacts and risks to the environmental from this proposal.

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Sydney Water (2018) *Biodiversity Assessment Report: Maroubra Water Filtration Plant and Reservoir. Asset No. WT0075 and WS0067*. Sydney Water unpublished report.

Sydney Water (2021) *Property Environmental Management Plan: Maroubra Water Filtration Plant and Reservoir, Johnston Parade, WT0075 and WS0067*. Sydney Water unpublished report.

Appendices

Appendix 1 Site photographs

Figure A1: Maroubra Reservoir embankment along the eastern boundary, viewing north and showing vegetation on the embankment that requires removal. Residential properties shown are Fowler Crescent properties.

Figure A2: Maroubra Reservoir and the northern embankment viewing eastwards.

Figure A3: Fox (*Vulpes vulpes*) den constructed into the Maroubra Reservoir embankment.

Figure A4: Maroubra Reservoir northern side embankment.

Appendix 2 Historical aerial photographs

Figure B1: Aerial photograph from 1940's

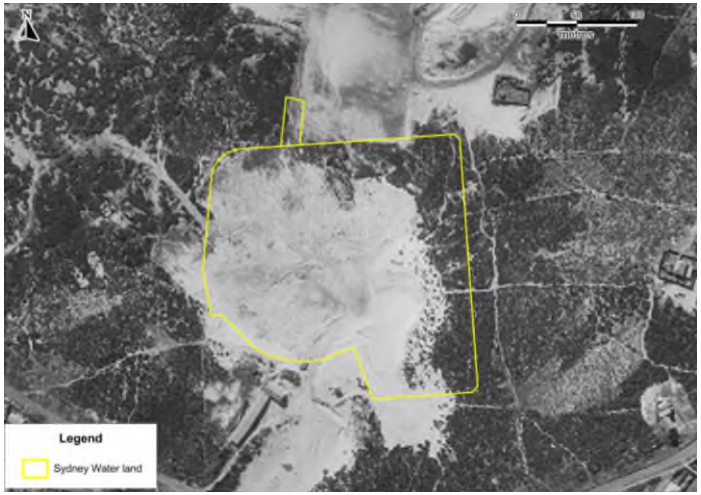


Figure B2: Aerial photograph from 1950's

Figure B1: Aerial photograph from 1960's

Figure B2: Aerial photograph from 1990's

Appendix 3 Section 171 checklist

Section 171 checklist	REF finding
Any environmental impact on a community	A range of potential impacts are identified and discussed in Section 6.2. The local community may be impacted by noise and other similar disturbances associated undertaking with the proposed activities and use of proposed equipment and machinery. These impacts are minor and short term according to the Interim Construction Noise Guidelines (2009) therefore, not requiring a qualitative noise assessment under the existing regulation. The current proposal reflects a reduced footprint and vegetation removal impact following additional technical investigations, consultation with a dam safety engineer, Dam Safety NSW and community feedback on the proposal. Sydney Water are aiming to remove as minimal vegetation as possible. Whilst the REF for the previous proposal identified a footprint of vegetation and work area, the additional technical investigations and consultation determined that a number of plants initially identified as requiring removal can now be retained. Sydney Water has considered the locations of these plants and deemed these individual plants are of lower risk to be affecting the integrity of the structural embankment and reservoir wall. However there remains a possibility (whilst considered low) that during the works or dam condition assessment these individual plants or trees identified for retaining are reassessed and deemed necessary to remove. Notwithstanding, the vegetation removal is required to ensure compliance with dam safety requirements and ensure the appropriate risk management of a declared dam asset. The vegetation within the Maroubra Reservoir site is valued by community members and the public, particularly for biodiversity values. The removal of vegetation is not desired by some community members and local residents. Vegetation removal may reduce the screening of residential properties surrounding the Maroubra Reservoir. This may increase visibility into the residential properties As discussed in Section 6.2.9, overall, the assessment of the impacts on the community is impacts are not likely to be significant. One objective of the vegetation removal is the ensure and maintain the structural integrity of the reservoir (dam) and protect the community from risks associated with dam and/or embankment failures. In consideration of this, not undertaking the work is more likely to lead to a significant risk to the safety of the environment and community compared with undertaking the proposed work. With the implementation of the safeguards

Section 171 checklist	REF finding
	outlined this REF, the environmental impacts, including to the community, would be minimised. Safeguards and commitments outlined include retaining plants, translocating and replanting suitable native species away from the embankment clearance zone and collaborating with local council to undertake offset plantings within the wider, surrounding area.
Any transformation of a locality	The proposed works do involve the removal of vegetation within the structural embankment and toe areas of the water reservoir, however the works are not expected to result in the significant transformation of a locality. As discussed in Section 6.2, Maroubra Reservoir site was significantly disturbed and transformed with the reservoir and water supply infrastructure were originally constructed. The work footprint is within the existing operational water supply asset and would maintain the operational landuse of this site. The proposed vegetation removal is required to ensure the ongoing safe operation and maintenance of a reservoir that is a declared dam. Whilst the work would lead to a localised reduction in vegetation and visual screening to residential properties, the proposal would not significantly transform the locality and its infrastructure landuse.
Any environmental impact on the ecosystems of the locality	The proposed removal of vegetation within the structural areas of the reservoir embankment and toe may lead to a minor impact from the localised reduction in vegetation and habitat available for native fauna, however it is not expected or likely to significantly impact the ecosystem of the locality. Ecological impacts would not be significant (refer to section 6.2.3 and **Appendix 6 and 7** of this REF). Provided the mitigation measures identified in Section 6 of this REF are implemented, there would be no significant adverse impacts on terrestrial ecosystems. Safeguards and commitments outlined to minimise ecological impacts include retaining plants where possible, translocating and replanting suitable native species away from the embankment clearance zone, installation of habitat boxes targeting native bird and bat species and collaborating with local council to undertake offset plantings within the wider, surrounding area.
Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of the locality	The proposed vegetation removal is limited to the structural areas of the reservoir embankment and toe area. The Maroubra Reservoir site is not accessible to the public and not available for public recreation. As discussed and assessed in detail in Section 6.2, vegetation removal may have a localised impact on reducing native fauna habitat, removing visual screen to residential properties and removing vegetation valued by members of the

Section 171 checklist	REF finding
	community. Overall, as discussed in Section 6, the proposal is not expected to significantly decrease or impact the aesthetic, recreational, scientific or other environmental quality or value of the locality. The mitigation measures identified in this REF are considered adequate to mitigate and manage potential impacts. Identified mitigation measures include retaining plants where possible, translocating and replanting suitable native species in designated areas away from the embankment clearance zone, installation of habitat boxes targeting native bird and bat species and collaborating with local council to undertake offset plantings within the wider, surrounding area.
Any effect upon a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or any other special value for present or future generations	The proposed works would not have any significant effect upon a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations. The proposed work aims to support the preservation of these values by maintaining the integrity and effectiveness of the dam embankment, thereby safeguarding the locality from risks associated with dam and/or embankment failures.
Any impact on the habitat of any protected animals (within the meaning of the *Biodiversity Conservation Act 2016*)	The Maroubra Reservoir site contains habitat of both protected native fauna and threatened fauna species (refer Section 6.2.3). As discussed in Section 6.2.3, and detailed **Appendix 6** and **7**, the works would not have a significant impact on any native species or threatened species, populations or communities. The works are not likely to directly harm protected fauna but may have a localised impact to native and protected fauna habitat from the vegetation removal. The native fauna identified occupying the site, or likely to occur at the site, are all considered to be urban tolerant, woodland associated animals that are common to abundant throughout their distribution ranges. The localised impact from the vegetation removal is not likely to significantly impact these species. No significant impacts to threatened or native fauna are likely. The potential impacts on any habitat of threatened or protected fauna would be minimised by implementation of the mitigation measures identified in this REF. Mitigation measures include pre-clearance vegetation inspections by appropriate ecologist/s, retaining plants where possible, translocating and replanting suitable native species away from the embankment clearance zone, installation of habitat boxes targeting native bird and bat species and collaborating with local council to undertake offset plantings within the wider, surrounding area.

Section 171 checklist	REF finding
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 Maroubra Reservoir site contains habitat of both protected native fauna and threatened fauna species (refer Section 6.2.3). As discussed in Section 6.2.3 and detailed **Appendix 6** and 7 of this REF, the works would not have a significant impact on any native species or threatened species, populations or communities. The works are not likely to directly harm protected fauna but may cause a localised impact to native and protected fauna from the vegetation removal. The native fauna identified occupying the site, or likely to occur at the site, are all considered to be urban tolerant, woodland associated animals that are common to abundant throughout their distribution ranges. The localised impact from the vegetation removal is not likely to significantly impact these species. No significant impacts are likely. The potential for impacts on any habitat of threatened or protected fauna would be minimised by implementation of the mitigation measures identified in this REF. Mitigation measures include pre-clearance vegetation inspections by appropriate ecologist/s, retaining plants where possible, translocating and replanting suitable native species away from the embankment clearance zone, installation of habitat boxes targeting native bird and bat species and collaborating with local council to undertake offset plantings within the wider, surrounding area. The impacts of the proposal would be very localised and not significant. No species of animal, plant or other life form would be endangered by the proposal.
Any long-term effects on the environment	The proposal would result in the removal of some vegetation within structural embankment and toe areas of the reservoir (dam). This may decrease vegetation available for native fauna habitat as well as decreasing visual screening for surrounding residential properties. The vegetation removal is required to ensure Sydney Water can assess, maintain and operate this dam in a safe and competent manner. Vegetation can impact and destabilise the engineered embankment structure leading to dam safety risks. Vegetation can also harbour fossorial (ground burrowing or digging) animals that may also impact and threatened the safety of the embankment. Not removing vegetation and managing the dam appropriately could lead to a dam failure incident with very significant environmental, public health and property impacts. The site contains critical water supply infrastructure and this is supported by the designation as infrastructure landuse zoning under the *Randwick Local Environment Plan 2012*. The potential long-term impacts on the environment would be minimised by implementation of the mitigation measures outlined in this REF. Mitigation measures include (but not limited to) retaining plants where possible,

Section 171 checklist	REF finding
	translocating and replanting suitable native species away from the embankment clearance zone, installation of habitat boxes targeting native bird and bat species and collaborating with local council to undertake offset plantings within the wider, surrounding area.
Any degradation of the quality of the environment	The proposed vegetation removal is limited to the structural areas of the reservoir embankment and toe area. The embankment is a component of existing water supply infrastructure. The safeguards outlined in this REF can adequately minimise and mitigate impact of the proposal that may lead to degradageiotion Provided the mitigation measures identified in Section 6.2 of this REF are implemented, the environment would not be significantly degraded as a result of the proposed works. Appropriate maintenance of the dam embankment and toe structure is required to ensure the future operation minimises the risks associated with dam safety and such as a dam failure incident with very significant environmental, public health and property impacts.
Any risk to the safety of the environment	The proposed works would reduce the safety risk associated with the presence of vegetation within the dam's (reservoir) embankment and toe. The removal of vegetation would support Sydney Water to be able to undertake effective condition assessments of the embankment structure. Presence of vegetation can impact and destabilise the embankment leading to dam safety risks. Not removing vegetation and managing the dam appropriately could lead to a dam failure incident with significant environmental, public health and property impacts. The need to remove vegetation from the embankment and toe is driven individually and collectively by legislative obligations under the *Dams Safety Act 2015* and its Regulation as well as various parts of Sydney Water's Dam Safety Management System, including dam risk assessment, the operations and maintenance plans and the consideration of relevant guidelines such as *Operations and maintenance plan guideline* (Dams Safety NSW, 2020) and other industry guidelines such as published by the Australian National Committee on Large Dams (ANCOLD). The current proposal reflects a reduced footprint and vegetation removal impact following additional technical investigations, consultation with dam safety engineer and community feedback on the proposal. Sydney Water has considered the locations of these plants and deemed these individual plants are of lower risk to be affecting the integrity of the reservoirs wall. However, it is acknowledged that following technical review of the visual inspection and geotechnical reports by the specialist dam safety

Section 171 checklist	REF finding
	engineer, additional vegetation may be identified for removal. As such, this REF also assesses the removal of a larger footprint of vegetation (subject of the previous proposal). Overall, the proposal would not have a significant negative impact on the safety of the environment but rather be a positive action to ensure appropriate management of risk associated with the safety of the dam asset.
Any reduction in the range of beneficial uses of the environment	Section 6.2 assesses diverse environmental impacts associated with this proposal. The proposed works would not significantly impact the range of beneficial uses of the environment. The potential impacts would be mitigated or minimised through the implementation of the mitigation measures identified in this REF.
Any pollution of the environment	The works have potential risk related to pollution from aspects such as leaks or spills from fuel driven machinery and the use and application of herbicides. Provided the mitigation measures prescribed in this REF are implemented, the proposed works are not expected or likely to cause any pollution of the environment.
Any environmental problems associated with the disposal of waste	With adherence to the mitigation measures prescribed in this REF (Section 6.2) there would not be any significant environmental problems associated with generation, re-use and disposal of waste resulting from the proposed project.
Any increased demands on resources (natural or otherwise) that are, or are likely to become, in short supply	The proposed activity would not lead to a significant impact on or create a demand for resources, which are or are likely to become in short supply.
Any cumulative environmental effect with other existing or likely future activities	At the time of preparation this REF, Sydney Water is not aware of any other relevant or notable works concurrently occurring in the area that could lead to cumulative impacts. The Maroubra Reservoir is an operational water supply asset and therefore, various maintenance and construction activities occur from time to time. The vegetation removal and dam condition assessment activities may identify additional maintenance and corrective actions needed to ensure the safety, integrity and compliance of the dam asset. For example, observations and evidence of fox dens within the embankment are a known aspect needing corrective action. Overall, the proposal would not result in any significant adverse long-term cumulative effects with other existing or planned activities. Delivery of the proposal would ensure the safe ongoing operation of the reservoir. Provided the mitigation measures identified this REF are implemented, cumulative adverse effects with other existing or likely future activities are unlikely. However,

Section 171 checklist	REF finding
	potential cumulative impacts related to the corrective actions identified during the condition assessment would be assessed as part of the environmental assessment and planning approval for the delivery of those actions (once such actions and their scope are identified). Overall, no significant cumulative impacts are likely.
Any impact on coastal processes and coastal hazards, including those under projected climate change conditions	No impact on coastal processes and coastal hazards, including those under projected climate change conditions are envisaged.
Any applicable local strategic planning statements, regional strategic plans or district strategic plans made under the EP&A Act, Division 3.1	The proposed works align with the Greater Sydney Regional strategic plan *A Metropolis of Three Cities, Greater Sydney Commission 2018.* The applicable objectives include: • Objective 1: Infrastructure supports the three cities • Objective 6: Services and infrastructure meet communities' changing needs. The proposed works align with the Eastern District strategic plan *Eastern District Plan Greater Sydney Commission, 2018*. The applicable planning priorities include: • Planning Priority E1 – *Planning for a city supported by infrastructure*. • Planning Priority E12 - *Retaining and managing industrial and urban services land.*
Any other relevant environmental factors.	There are no additional environmental factors identified for the proposal.

Appendix 4 Consideration of TISEPP consultation

TISEPP section	Yes	No
Section 2.10, council related infrastructure or services – consultation with council		
Would the work:		
Potentially have a substantial impact on stormwater management services provided by council?		√
Be likely to generate traffic that would strain the capacity of the road system in the LGA?		√
Connect to, and have a substantial impact on, the capacity of a council owned sewerage system?		√
Connect to, and use a substantial volume of water from a council owned water supply system?		√
Require temporary structures on, or enclose, a public space under council's control that would disrupt pedestrian or vehicular traffic that is not minor or inconsequential?		√
Excavate a road, or a footpath adjacent to a road, for which the council is the roads authority, that is not minor or inconsequential?		√
Section 2.11, local heritage – consultation with council		
Is the work likely to affect the heritage significance of a local heritage item, or of a heritage conservation area (not also a State heritage item) more than a minor or inconsequential amount?		√
Section 2.12, flood liable land – consultation with council		
Would the work be on flood liable land (land that is susceptible to flooding by the probable maximum flood event) and would works alter flood patterns other than to a minor extent?		√
Section 2.13, flood liable land – consultation with State Emergency Services		
Would 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)?		√
Section 2.14, development with impacts on certain land within the coastal zone– council consultation		
Is the work on land mapped as coastal vulnerability area and inconsistent with a certified coastal management program?		√
Section 2.15, consultation with public authorities other than councils		
Would the proposal be on land adjacent to land reserved under the *National Parks and Wildlife Act 1974* or land acquired under Part 11 of that Act*? If so, consult with DPE (NPWS).*		√
Would the proposal be on land in Zone C1 National Parks and Nature Reserves or on a land use zone that is equivalent to that zone? *If so, consult with DPE (NPWS).*		√
Would the proposal include a fixed or floating structure in or over navigable waters? *If so, consult TfNSW.*		√
Would the proposal be on land in a mine subsidence district within the meaning of the *Coal Mine Subsidence Compensation Act 2017*? *If so, consult with Subsidence Advisory NSW.*		√
Would the proposal be on land in a Western City operational area specified in *the Western Parkland City Authority Act 2018,* Schedule 2 and have a capital investment value of $30 million or more? *If so, consult the Western Parkland City Authority*.		√
Would the proposal clear native vegetation on land that is not subject land (ie non-certified land)? *If so, notify DPE at least 21 days prior to work commencing. (Requirement under s3.24 Chapter 3*		√

Sydney Region Growth Centres - of the SEPP (Precincts – Central River City) 2021).		

Appendix 5 Environmental Risk Assessment

Risk assessment

For this proposal, the table below has been completed in accordance with the Sydney Water's Risk Management Framework (Doc. 81991), and associated risk ranking matrix (Doc 800991) and SWEMS0005 *Environmental Aspects Guideline*.

	Before application of environmental mitigation measures	Environmental mitigation measures	After application of environmental mitigation measures[i]		
Environmental aspects	**Potential exposure**		**Likelihood**	**Consequence**	**Risk**
1. Removal of vegetation	High	6.2.3	Very likely	Minimal	Medium
2. Disturbance to fauna	High	6.2.3	Very likely	Minimal	Medium
3. Chemical and fuel spill	Medium	6.2.2; 6.2.3	Unlikely	Minimal	Low
4. Noise generation	Medium	6.2.5	Unlikely	Minimal	Low
5. Dust generation	Low	6.2.1; 6.2.3	Very Unlikely	Minimal	Low
6. Soil and ground disturbance	Medium	6.2.1; 6.2.3	Possible	Minimal	Low
7. Vibration	Low	6.2.5	Very unlikely	Minimal	Low
8. Waste management and disposal	Medium	6.2.7; 6.2.3	Very unlikely	Moderate	Low
9. Emissions	Minimal	6.2.6	Very unlikely	Minimal	Low
10. Odour generation	Minimal	6.2.6	Rare	Minimal	Low

Overall risk and environmental auditing requirements

Overall environmental potential exposure before application of mitigation measures	High
Overall environmental risk after application of mitigation measures	Medium
Can risks be adequately mitigated?	Yes, the implementation of the mitigation measures outlined in Section 6.2 are considered adequate to mitigate and/or minimise the impacts from the environmental aspects and risks
Is environmental auditing during the proposal delivery phase required or recommended?	Yes, it is recommended environmental auditing occurs.

Appendix 6 Specialist studies – Lesryk (2022) ecological assessment

Mr Daniel Corben
Environmental Specialist
Sydney Water
Level 1, 20 William Holmes Street
POTTS HILL NSW 2143

22 December 2022

Dear Daniel,

Ecological investigation and assessment – proposed vegetation removal for a Sydney Water asset – Maroubra Reservoir [WS0067]

1. Introduction and project understanding

Lesryk Environmental Pty Ltd (Lesryk) was engaged to assess a Sydney Water proposal to remove vegetation that has been planted, or which has naturally regenerated, upon, and close to, the Maroubra Dam reservoir wall (Figure 1). To remove the vegetation, Sydney Water plans to either cut down, or poison, the trees and shrubs present, grinding their stumps to below or at ground level and possibly turf/grass the area post works.

The vegetation requires clearing as the root systems of the plants proposed for removal have been identified as having an adverse impact on the integrity of the reservoir's walls.

To assess these works and determine whether any State or Federally listed threatened species or ecological communities are present, the proposed clearing areas (as identified in Figure 1) were surveyed.

The objectives of the inspection were to:

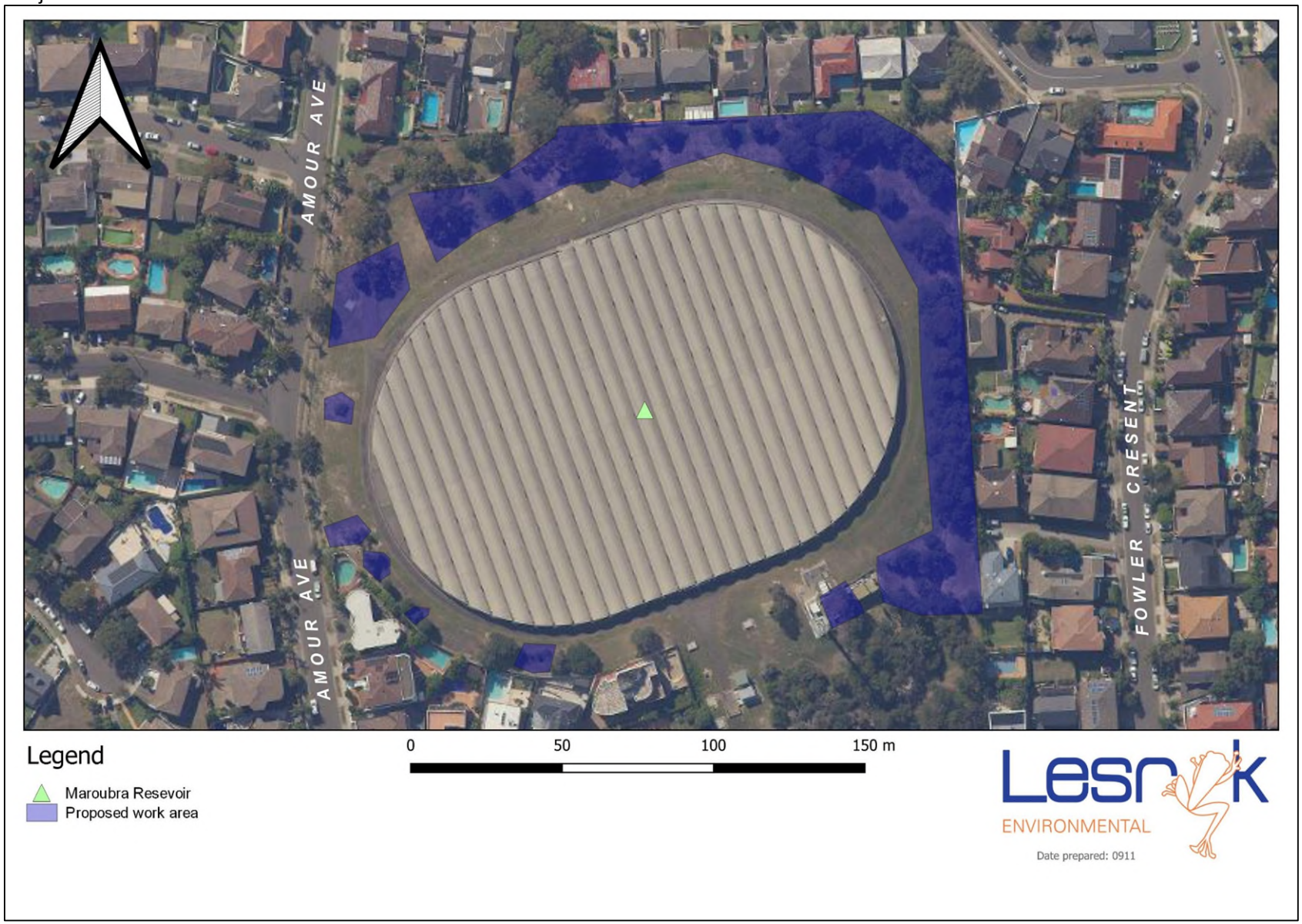
1) Determine the character of the vegetation community(ies) present within the proposed works area
2) Identify the species present and their conservation status
3) Consider and asses the impacts associated with the proposed works.

The assessment of possible impacts associated with the proposal is based on a field investigation of the proposal area (Figure 1), a literature review of previous studies carried out both at this site and within this portion of the Randwick City Council Local Government Area (LGA), a review of standard databases and a consideration of the objectives of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), NSW *Environmental Planning and Assessment Act 1979* (EPA Act), NSW *Biodiversity Conservation Act 2016* (BC Act), and any relevant State Environmental Planning Policy (SEPP).

Due to the reservoir's location atop a rise within a heavily urbanised setting, no drainage lines or natural waterbodies are present. As such, consideration of matters such as the NSW *Fisheries Management Act 1994*, are not required.

It is noted that this assessment is purely ecologically based, this being conducted in line with Part 1.3 [particularly item (f)] of the BC Act (being to assess the extinction risk of species and ecological communities, and identify key threatening processes, through an independent and rigorous scientific process), and does not consider matters such as the historical or amenity value of the plants present.

Figure 1. Subject site



Based on a worst-case estimate, it is expected that a total of 0.69 hectares (ha) (this being composed of the tree removal area, a 2 metres [m] disturbance area around each of these and a series of predicted access tracks) of native and exotic vegetation would require removal/temporary disturbance to permit the proposal, although it is expected the operational footprint would be much less than this.

2. Methods

2.1 Definitions

For the purpose of this assessment, the following definitions apply:

- **Subject site** is the area directly affected by the proposal, being the removal of vegetation on the existing reservoir's walls. The subject site includes the footprint of the proposal (as per the 'limits' indicated in Figure 1) and any ancillary works, compounds, stockpile sites, facilities, accesses or hazard reduction zones that support the operation of the activity (Office of Environment and Heritage [OEH] 2018).
- **Study area:** is the subject site and any additional areas that are likely to be affected by the proposal, either directly or indirectly (OEH 2018). For the purpose of this assessment, the study area includes the reservoir, and 10 m in either direction of the proposed clearing areas.
- **Study region:** is considered to include the lands that surround the subject site for a distance of 10 km (DECC 2007).

2.2 Field investigation

The study area was investigated by Paul Burcher (B.App.Sc) [Botanist], Itzel Gonzalez (B.Sc.HONS) [Ecologist] and Chelsea Tiller (B.Soc.Sc) [Field Ecologist] on 19 October 2022 between the hours of 9.30 am and 12:15 pm.

The aims of the survey were:

- the identification of those dominant plants within the areas of likely disturbance, including both direct and indirect impacts
- the identification of the structure of those vegetation communities and terrestrial fauna habitats present
- the identification of the number and species of trees within the areas of direct disturbance
    - a plant was considered to meet the definition of a tree if it complied with Clause 35 of the Electricity Supply (Safety and Network Management) Regulation 2014 (NSW Government 2014)
- the direct observation of those fauna species present within, or adjacent to, the subject site
- diurnal call identifications of fauna species, with all calls being identified in the field.

It should be noted that Lesryk did not consider the heritage, aesthetic, visual or landscape value of the trees present within the proposed clearing areas.

The field investigation broadly followed the 'Random Meander Method' (Cropper 1993). This method is suitable for covering large areas and for locating any rare species (and their associated vegetation communities/habitat types) that may occur within a particular site.

The weather conditions experienced during the site investigation were warm temperatures (~23 ˚C), clear skies and slight breeze.

To record the location of those trees that are to be cleared, a hand-held GPS was employed. In addition, the species of the trees being clear was noted.

By the completion of the field survey a total of 8.25 person hours of active searches had been accumulated.

No limitations, such as reduced site visibility, adverse weather conditions or reduced site access, to achieving the objectives of the ecological survey were encountered.

Considering the nature of the fauna habitats present, and the expected duration/extent of disturbance, combined with the outcomes of the diurnal survey and literature review process, it was not considered that any nocturnal work was required.

For reference, a photographic record of the area surveyed has been provided (Attachment 1).

2.3 Database searches and literature reviews

Prior to carrying out any fieldwork, previous studies conducted in the region and known databases were consulted to identify the diversity of ecological communities, flora and fauna species known for, or potentially occurring in, the study region. The identification of those known or potentially occurring native species and communities within this portion of the Randwick LGA, particularly those listed under the Schedules to the EPBC and BC Acts, thereby permits the tailoring of the field survey strategies to the detection of these plants and animals, their vegetation associations and/or necessary habitat requirements. By identifying likely species, particularly any threatened plants and animals, either the most appropriate species-specific survey techniques may be selected [should their associated vegetation communities/habitat requirements be present] or a precautionary approach to their presence adopted.

The carrying out of a literature search also ensures that the results from surveys conducted during different climatic, seasonal and date periods are considered and drawn upon as required. This approach therefore increases the probability of considering the presence of, and possible impacts on, all known and likely native species, particularly any plants and animals that are of State and/or national conservation concern. This approach avoids issues inherent with a one off 'snap-shot' study.

A list of all databases, the date these were accessed, and the search area employed is provided in Table 1.

Table 1. Database searches

Database	Date accessed	Search area
Department of Climate Change, Energy the Environment and Water (DCCEW) Protected Matters Search Tool (PMST) (DCCEW 2022)	October 2022	10-kilometre buffer
Department of Primary Industries (DPI) WeedWise Database (DPI 2022a)	October 2022	Greater Sydney Region
Department of Planning and Environment (DPE) 2022 BioNet database (Atlas of NSW Wildlife) (DPE 2022a)	October 2022	10-kilometre buffer
OEH Threatened Species website (OEH 2022)	October 2022	N/A
NSW Government BioNet Vegetation Classification database (NSW Government 2022)	October 2022	N/A
SEED NSW State Vegetation Type Map dataset (NSW Government and DPE 2022)	October 2022	N/A

In addition to the above, the following publications were consulted prior to, and during the course, of the project:

Eastern Suburbs Banksia Scrub (ESBS) Ecological Community Recovery Plan (NSW Department of Environment and Conservation 2004).

- ESBS is listed as critically endangered under the BC Act and endangered under the EPBC Act.
- The recovery plan states that the main threat to the loss of ESBS is clearing and development.
- Key findings of this study, that are applicable to the current ecological investigation, was the identification of 0.06 ha of poor condition ESBS within the south-eastern corner of the Maroubra Reservoir site.

Property Environment Management Plan (PEMP) Maroubra Water Filtration Plant (WT0075) and Reservoir (WS0067) (Sydney Water 2010)

- Applicable to the current study is:
  - the identification of ESBS, maintained and or garden vegetation and exotic grassland (mowed lawn)
  - ESBS recorded within the south-eastern corner of the property with some sections of reasonable quality and others degraded as per Actinotus Environmental Consultants 2005)
    - ESBS patch contains mowed grass underneath the canopy trees and lack understorey species. Planted native species and/or exotic species including noxious weeds exist within the patch
  - the recommendation of Vegetation Management Plan to manage and monitor the ESBS patch.

A Biodiversity Assessment Report, Maroubra Water Filtration Plant and Reservoir (Narla 2018)

- Key findings of this study applicable to the current ecological investigation were:
  - the recording of 0.47 ha of ESBS inclusive of the south-east corner and additional patch along eastern boundary of the Maroubra Reservoir site (Figure 2)
  - the recommendation that active bush regeneration be conducted to restore the ESBS community
  - the recording of the Eastern Bentwing (now known as Large Bent-winged Bat) Bat (*Miniopterus orianae oceanensis* formerly *Miniopterus schreibersii*) (listed as Vulnerable under the BC Act); though this species was only identified as foraging within/across the site, not roosting
  - the recording of a mature Lilly Pilly (*Syzygium spp.*). Due to the lack of fruits the specimen could not be distinguished from Bush Cherry (*Syzygium australl*) and the endangered Magenta Lilly Pilly (*Syzygium paniculatum*).

PEMP Maroubra Water Filtration Plant and Reservoir, Johnston Parade, WT0075 and WS0067 (Sydney Water 2021)

- Applicable to the current study is:
  - the revegetation of areas of ESBS and the management of weeds
  - assumed presence of Magenta Lilly Pilly (due to timing of this investigation, and the lack of flowers and fruits, the specific species of plant could not be identified) (Figure 2)
  - presence of the Eastern Bentwing Bat (Figure 2).

All the databases and reports listed above were reviewed and drawn upon where relevant. While reviewing these documents, particular attention was paid to identifying relevant ecological matters listed, or currently being considered for listing, under the Schedules of the EPBC and BC FM Acts, plants, animals and ecological communities that have been recorded in with the study area or surrounding region and which may occur within, or in the vicinity of, the subject site.

Nomenclature used within this report follows that presented in the EPBC and BC Acts.

Where applicable, any Threatened Ecological Communities were classified and named according to the NSW Scientific Committee's Final and Preliminary Determinations.

The conservation significance of ecological communities, plants and animals recorded is made with reference to:

- The EPBC and/or BC Acts
- The Plant Community Types (PCTs) as described in the BioNet Vegetation Classification database (NSW Government 2022).

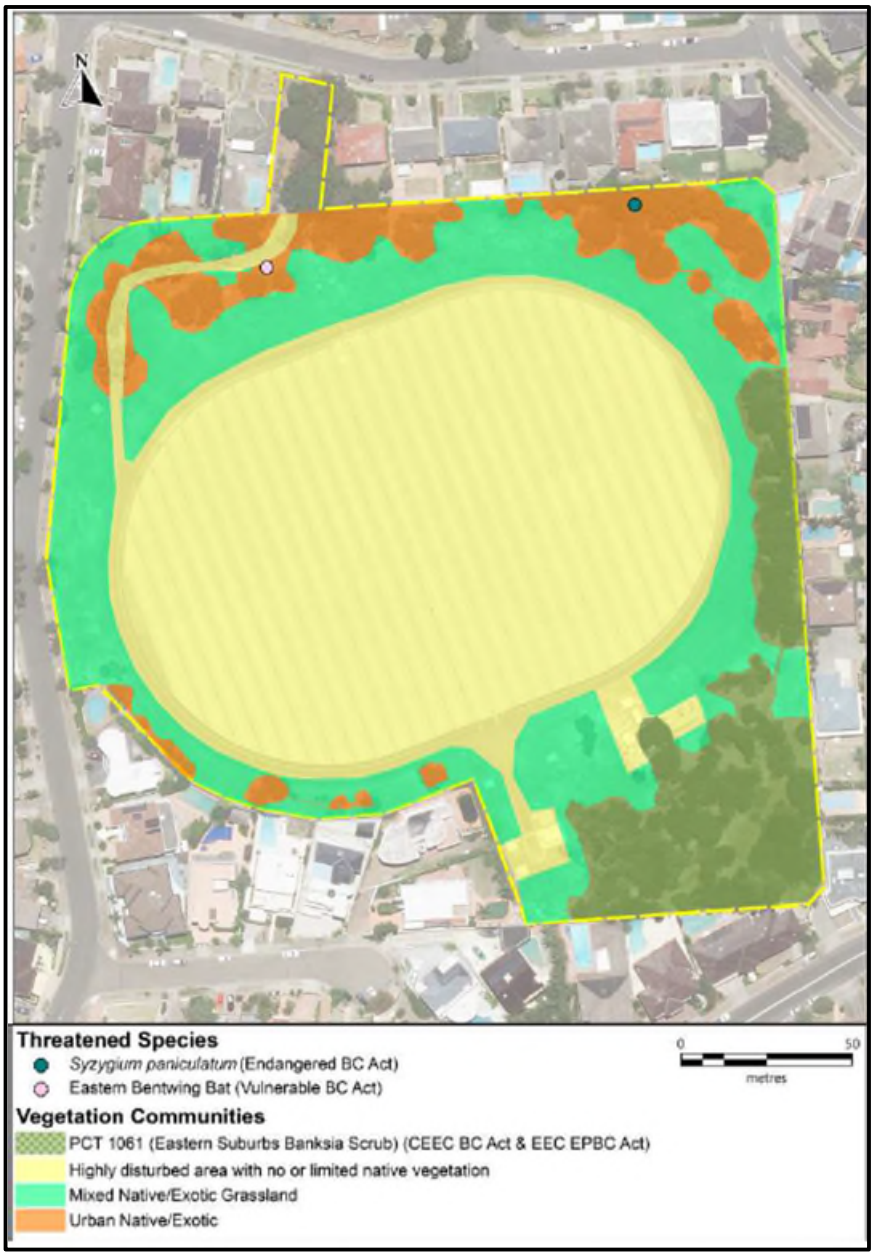


Figure 2: Previous vegetation mapping (Sydney Water 2021)

2.4 Vegetation mapping

Vegetation in the locality has been mapped at a broad scale in *NSW State Vegetation Type Map* (NSW Government and DPE 2022). The vegetation communities are described in terms of dominant species and understorey characteristics.

These communities are also related to the NSW vegetation formation and classes taken from Keith (2004) and the NSW PCTs assigned to the vegetation type in the Vegetation Information System database maintained by the NSW Government.

3. Results

3.1 Vegetation Communities

With reference to the State Vegetation Type map, the proposed works site is identified as PCT type 0 'Non-native vegetation' (Figure 3) (NSW Government and DPE 2022).

Vegetation at the site is characterized by regularly slashed lawns and bands of planted native trees above introduced shrubs and grasses with some remnant native species also present. The most common species is Coast Banksia (*Banksia integrifolia*) with Norfolk Island Hibiscus (*Lagunaria patersonia*), smaller Chinese Hackberry (*Celtis sinensis*) and remnant Old Man Banksia (*B.serrata*) to the east of the reservoir and planted eucalyptus, such as Bangalay (*Eucalyptus botryoides*), Swamp Mahogany (*E.robusta*) and River Peppermint (*E.elata*) to the north. Two Magenta Lilly Pilly (*Syzygium paniculatum*) are also present (in the north). Shrubs in the east include the weeds Lantana (*Lantana camara*) and Golden Wreath Wattle (*Acacia saligna*), and remnant native Coastal Tea-tree (*Leptospermum laevigatum*). Away from the regularly slashed areas which are dominated by Couch (*Cynodon dactylon*), the groundcover includes Panic Veldt Grass (*Ehrharta erecta*), Kikuyu Grass (*Cenchrus clandestinus*), African Lovegrass (*Eragrostis curvula*), Buffalo Grass (*Stenotaphrum secundatum*), Plantain (*Plantago lanceolata*) and Ground Asparagus (*Asparagus aethiopicus*).

The field survey confirmed the vegetation at the site is consistent with the mapping. Being dominated by planted and introduced species, the vegetation does not conform to any native vegetation PCT.

Contrary to mapping by Narla (2018), it is considered that the vegetation east of the reservoir affected by the current proposal does not comprise the BC Act and EPBC Act listed critically endangered ecological community Eastern Suburbs Banksia Scrub.

The Approved Conservation Advice for the listing of Eastern Suburbs Banksia Scrub as a CEEC on the EPBC Act (Threatened Species Scientific Committee 2021) includes key diagnostic features and minimum condition thresholds. The thresholds require a minimum patch size of 0.05 ha and no more than 70% perennial weed cover and the presence of at least five diagnostic species (which are presented in Appendix A Table A1 of the conservation advice). In the patch of vegetation affected the following species from the list in Appendix A - Table A1, five are present in the area to be cleared, namely *Acacia longifolia, Banksia serrata, Leptospermum laevigatum, Pittosporum undulatum* and *Kunzea ambigua*. Whilst there are five (or more) diagnostic species in the vegetation mapped by Narla as ESBS, were a series of 20 m x 20 m sampling quadrats deployed within the affected vegetation, five diagnostic species would not be present in any sampling quadrat. Although *Melaleuca armillaris* and *Banksia integrifolia* are also diagnostic species under the EPBC Act, those at the site were planted. More than 70% of the ground layer is composed of perennial weed species.

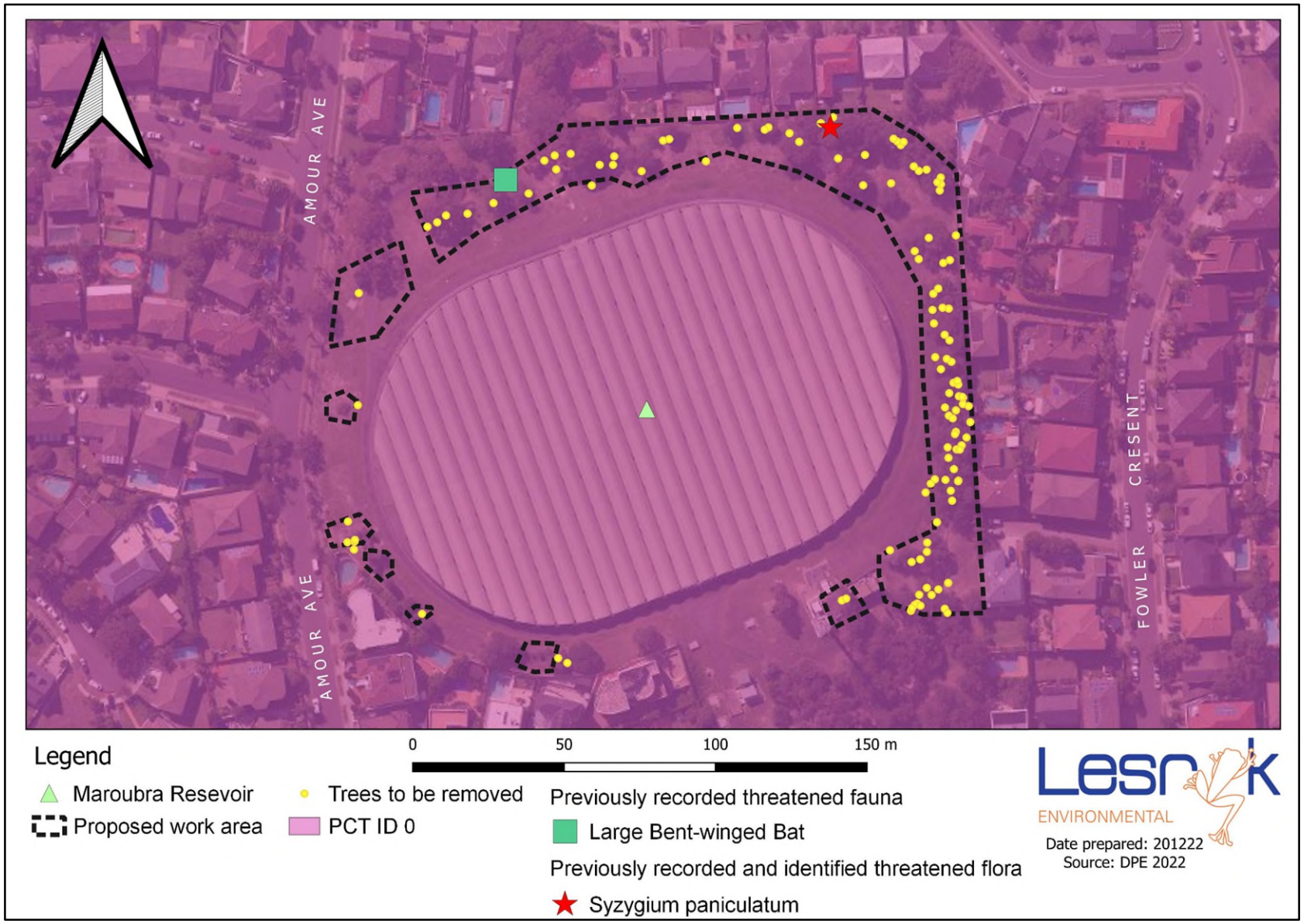
The final determination to list Eastern Suburbs Banksia Scrub as a CEEC by the NSW Scientific Committee (2017) states the community is dominated by:

- *Banksia aemula* on impoverished dunes
- *B. serrata* on those dunes less leached of nutrients
- occasionally dominated by low-growing multi-stemmed eucalypts such as *Angophora costata* (Smooth-barked Apple) and *Corymbia gummifera* (Red Bloodwood)
- or, as the canopy closes over time, the community may become dominated by a few large shrubs such as *Leptospermum laevigatum, Banksia ericifolia* and *Monotoca elliptica*.

Nowhere in the subject patch of vegetation to be removed are any of the scenarios evident.

Given the above. it is considered that in relation to the BC Act and EPBC Act definitions of the CEEC, Eastern Suburbs Banksia Scrub is not present at the subject site.

Figure 3: Vegetation mapping of the site, including previously recorded threatened species



With reference to Plates A to C, historical aerial photography provided by the NSW Government indicates the proposed site has been previously cleared on several occasions, the earliest being during the reservoir's construction in 1965 (Plate A) (NSW Government 2022b). With reference to Plate C [dated 2005], the vegetation on the site had a similar distribution and density to what was observed during the current investigation.

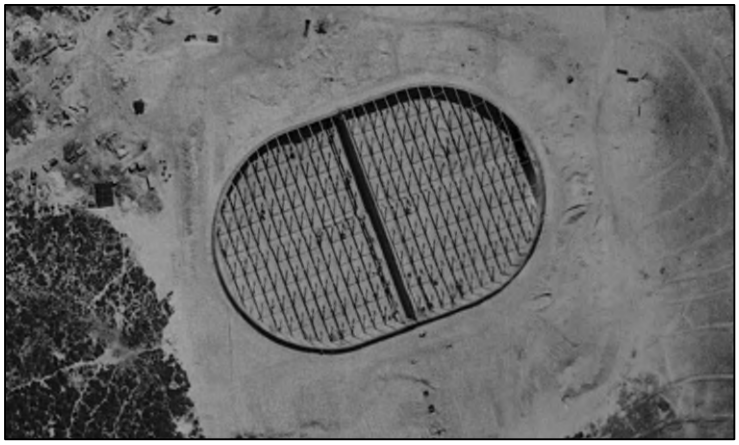


Plate A: Maroubra Reservoir under construction 1965

Plate B: Maroubra Reservoir 1987

Plate C: Maroubra Reservoir 2005

3.1.1 Trees being cleared

119 trees were located within the proposed clearing area, their locations being identified in Figure 4 with corresponding details provided in Table 2.

Table 2. Trees to be removed

Key
* – introduced species
P – planted native species
? – uncertain identification

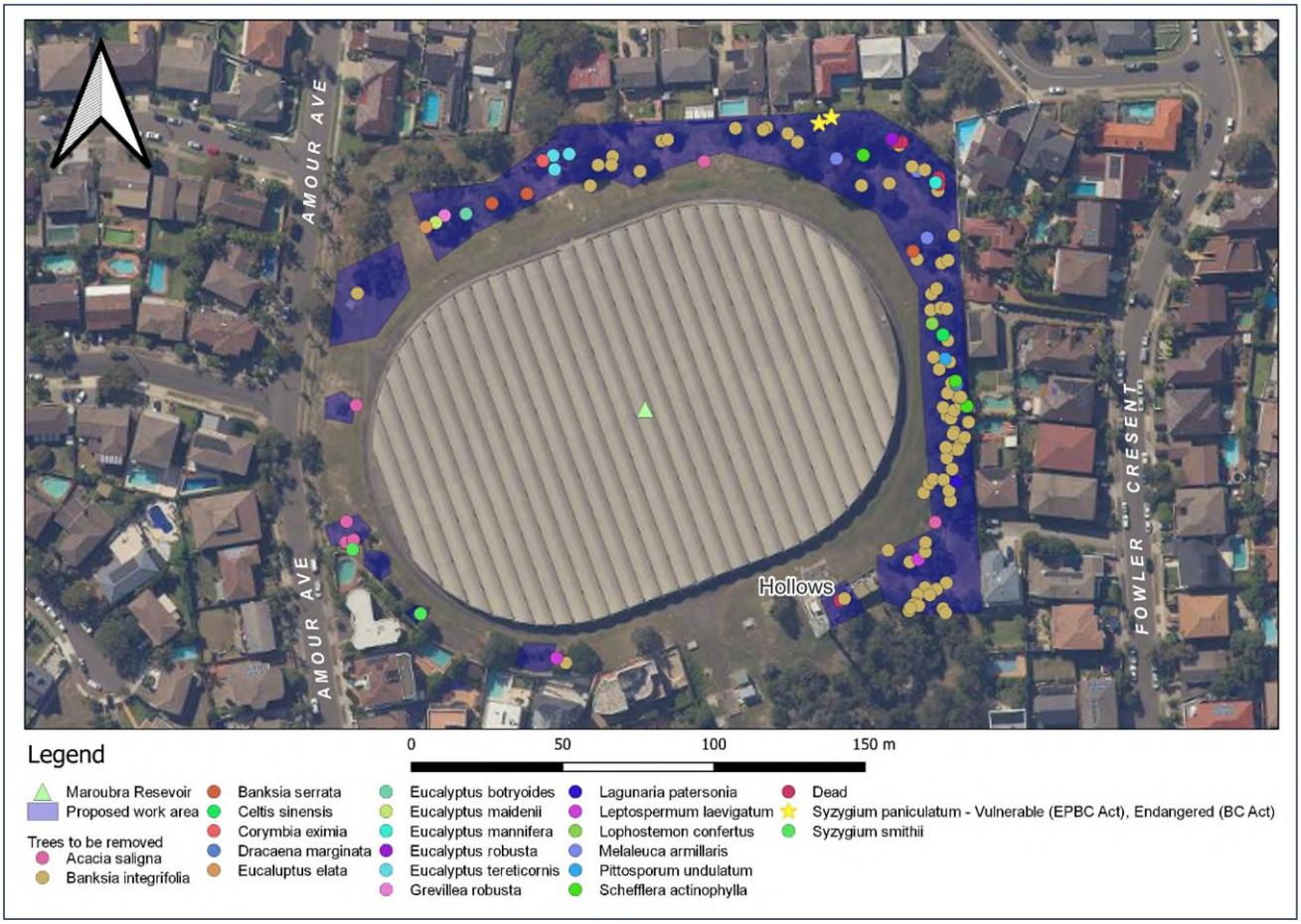
Scientific name	Common name	Count
Acacia saligna[P]	Golden Wreath Wattle	7
Banksia integrifolia[P]	Coast Banksia	76
Banksia serrata	Old-Man Banksia	3
*Celtis sinensis**	Japanese Hackberry	1
Corymbia eximia[P]	Yellow Bloodwood	1
Eucalyptus elata[P]	River Peppermint	1
Eucalyptus maidenii[P]	Maiden's Gum	1
Eucalyptus mannifera[P] ?	Brittle Gum	1
Eucalyptus robusta[P]	Swamp Mahogany	1
Eucalyptus tereticornis[P]	Forest Red Gum	3
Eucalyptus botryoides[P]	Bangalay	1
Grevillea robusta[P]	Silky Oak	1
*Lagunaria patersonia**	Norfolk Island Hibiscus	1
Leptospermum laevigatum	Coast Teatree	2
Lophostemon confertus[P]	Brush Box	1
Melaleuca armillaris[P]	Bracelet Honey-myrtle	3
Schefflera actinophylla *	Umbrella Tree	4
Syzygium paniculatum[P]	Magenta Lilly Pilly	2
Syzygium smithii[P]	Lilly Pilly	2
Pittosporum undulatum	Native Daphne	1
Stag	Stag	5
*Dracaena marginata**	Dragon Plant	1

117 of the tree species were positively identified as native species. The 5 dead trees seemed to be Golden Wreath Wattles or Coast Banksias.

When viewed from the ground, one of the dead plants (identified as a Banksia) that is present within the required clearing area, was identified as being hollow-bearing. Concurrent with the removal of this plant, it is recommended that an ecologist or similarly qualified person be present on-site to collect and relocate locally any sheltering animals.

If exotic species are present, these should be collected and taken to a local veterinarian for euthanising.

Figure 4. Tree species for removal



3.2 Flora species recorded during the field investigation

By the completion of the field survey a number of plants had been recorded (Attachment 2). It is noted that Attachment 2 is not intended to be a comprehensive list of all of the species present within the study area, and only represents those plants that were recorded whilst undertaking searches for:

- native species and ecological communities of State and/or national conservation concern that are known, or expected to occur, in the locality
- Schedule 3 weeds of the NSW Biosecurity Regulation 2017 that would require treatment.

Two specimens of Magenta Lilly Pilly, which is listed as endangered on the BC Act and vulnerable on the EPBC Act listed were recorded in the north of the site (Figure 3). These trees were planted by one of the neighbours to the north of the site some 40 years ago (local resident pers. comm.). The species is commonly used in landscaping in areas beyond its natural habitat (littoral rainforest and gallery rainforest). Using the precautionary approach the two specimens were assumed to be the threatened Magenta Lilly Pilly due to the previous findings and lack of characteristic fruits. Assessment of the likely impacts in relation to the EPBC Act and BC Act are presented Sections 3.4.1 and 3.4.2, respectively.

Whilst targeted searches for other threatened plants known to occur within the study region were conducted, none were recorded. Given the highly disturbed, modified and regularly maintained nature of the subject site, the area investigate is not considered to contain suitable habitat for any of the threatened plant species previously recorded within the surrounding region.

Considering the land use history of both the reservoir site and this portion of the Randwick LGA (refer to Plate C), it is highly unlikely that any viable seed of any threatened species previously recorded in this locality would be present within the soil seed bank.

Based on the results of the field investigation, it is considered unlikely that any listed threatened species other than stated above would be present within the proposed clearing zones.

3.3 Weeds

Under the NSW *Biosecurity Act 2015* 'all plants are regulated with a general biosecurity duty to prevent, eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable.'

Ground Asparagus was recorded as a relatively common groundcover plant in the east of the subject site. It is listed under Schedule 3 of the NSW *Biosecurity Act 2015* and as a Priority Weed for the Greater Sydney Region (which includes the Randwick LGA) (DPI 2022a). Ground Asparagus is also listed as a Weed of National Significance (WoNS) (DPI 2022a). Being present in the area proposed for vegetation clearing, the occurrences of Ground Asparagus would be removed as part of the vegetation removal activities. Care should be taken to ensure that it is removed prior to clearing should the cleared vegetation be chipped and used for mulch.

Golden Wreath Wattle is listed in Appendix 2 of the Greater Sydney Regional Strategic Weed Management Plan 2017- 2022 as being a threat to the environment (Greater Sydney Local Land Services 2019). Care should be taken to ensure that any ripe fruit is removed prior to clearing should the cleared vegetation be chipped and used for mulch.

Whilst beyond the scope of the proposal considered in this assessment report (i.e., the removal of vegetation impacting the reservoir wall), as part of Sydney Water's ongoing management of this site the presence of Ground Asparagus and Golden Wreath Wattle should be addressed.

3.4 Fauna species recorded during the field investigation

A number of native animals were recorded during the course of the site inspection, including the Australasian Figbird (*Sphecotheres vieilloti*) (Observed), Noisy Miner (*Manorina melanocephala*) (Observed), Australian Magpie (*Cracticus tibicen)* (Observed), Rainbow Lorikeet (*Trichoglossus haematodus*) (Observed), Australian White Ibis (*Threskiornis molucca*) (Observed), Sulphur-crested Cockatoo (*Cacatua galerita)* (observed), Grey Butcherbird (*Cracticus torquatus*) (heard calling) and Laughing Kookaburra (*Dacelo novaeguineae)* (heard calling) all of which are considered to be urban tolerant, woodland associated animals that are common to abundant throughout their distribution ranges.

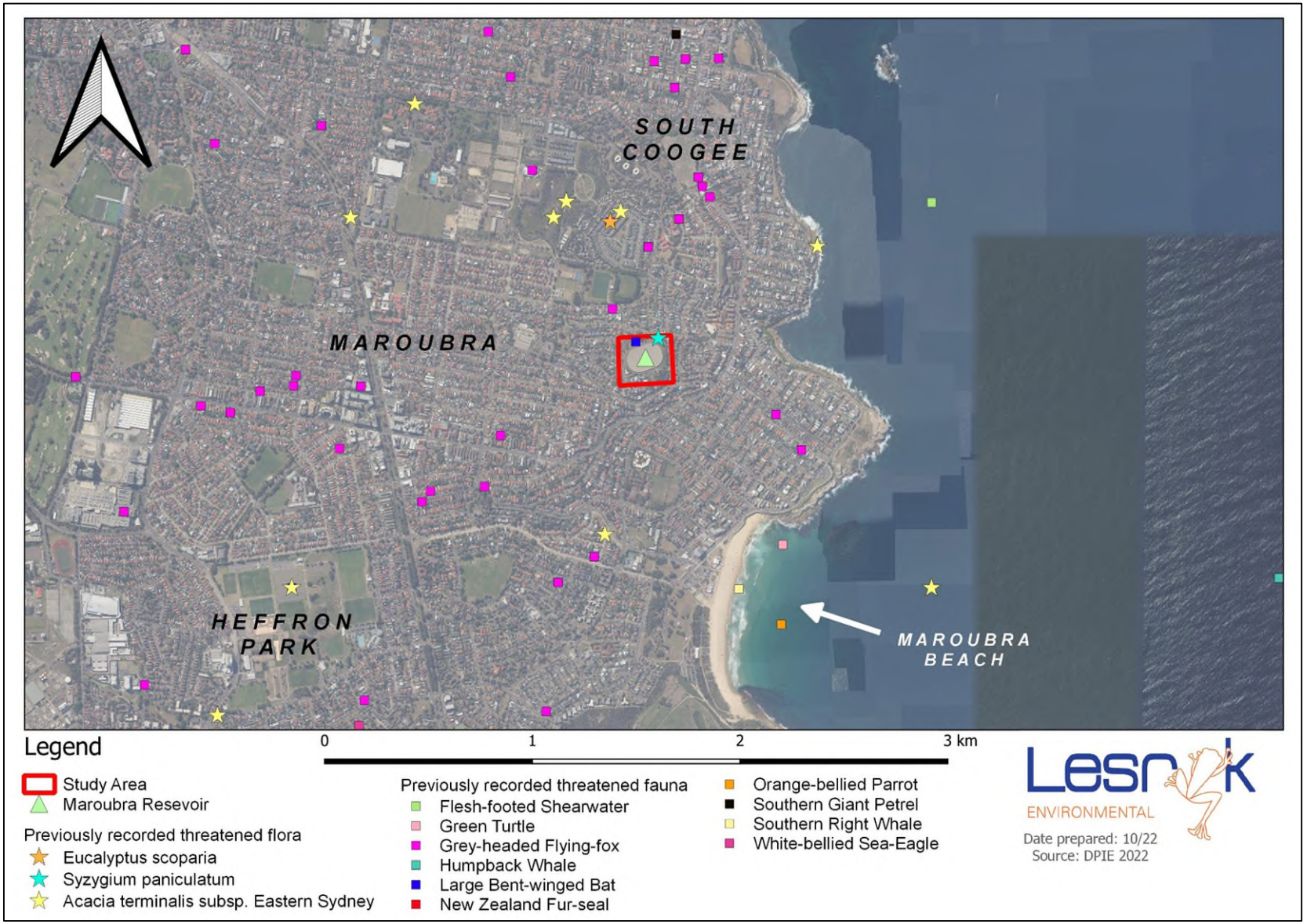
The works proposed would not affect the local presence of any of these animals. Nor would the activity remove any habitat(s) relied upon by these species. The works will not erect any barriers to their movement patterns, nor isolate any of their habitat areas.

During the site investigation, no species listed under the Schedules to the EPBC and/or BC Acts were recorded. Similarly, no habitats that would be occupied and relied by those threatened animals previously recorded, or predicted to be present in the surrounding region, were present within the activity footprint surveyed (including nests, caves or suitable cave-substitutes, developed woodlands or ephemeral drainage lines).

One hollow-bearing tree (a dead Coastal Banksia) will be cleared, the numerous cavities present being in the order of ≤ 50 millimetres wide. Species that could occupy this plant may include arboreal reptiles, frogs and species such as microbats. Hollow-dependent threatened microbats that have been previously recorded in the study region are the Yellow-bellied Sheathtail-bat (*Saccolaimus flaviventris*) and Southern Myotis (*Myotis macropus*), both of which are listed as Vulnerable under the BC Act (NSW Government 2022). No EPBC Act listed hollow-occupying bats have been recorded within the study region. The removal of the vegetation will reduce the extent of insect attracting plants, thereby reducing the foraging opportunities available to microbats.

As the works will require the clearing of a hollow-bearing tree, and as no targeted surveys were conducted, it is assumed that hollow-dependent bats are present. Therefore, in accordance with the assessment criteria provided under Section 7.3 of the BC Act (these commonly referred to as the five-part test), a consideration of the clearing of the hollow-bearing tree, and its impact on hollow-dependent threatened microbats, has been undertaken (Section 3.4.2).

Figure 5 – Previously recorded threatened species within 10km of the proposed works



3.4.1 Commonwealth *Environment Protection and Biodiversity Conservation Act*

One Matter of National Environmental Significance listed on the EPBC Act was recorded at the subject site. This was Magenta Lilly Pilly which is listed as a vulnerable species. The following Significant Impact Guidelines prepared under the Act (Department of the Environment 2013) are used to determine impacts on the species and whether the proposal is a controlled action requiring ministerial approval.

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:

- *lead to a long-term decrease in the size of an important population[1] of a species*

As the two specimens that would be removed are planted, they are not part of an important population.

- *reduce the area of occupancy of an important population*

An important population does not occur at the subject site.

- *fragment an existing important population into two or more populations*

An important population does not occur at the subject site.

- *adversely affect habitat critical to the survival of a species*

The plants that would be affected are not part of a naturally occurring populations.

- *disrupt the breeding cycle of an important population*

The nearest occurring natural metapopulation is at Botany Bay (OEH 2012). The removal of two plants from the subject site is unlikely to have any effect of the breeding cycle of plants in that population.

- *modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline*

The loss of the two planted specimens is unlikely to contribute to the decline of the species.

- *result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat*

The proposal would have no impact on the introduction of harmful species in the habitat of Magenta Lilly Pilly.

- *introduce disease that may cause the species to decline, or*

The proposal would have no impact on the introduction of diseases into the habitat of Magenta Lilly Pilly.

- *interfere substantially with the recovery of the species*

The proposal would have no impact on the recovery of the species.

<u>Expected impact on Magenta Lilly Pilly</u>

The proposal is not likely to have a significant impact on Magenta Lilly Pilly. Referral of the proposal to the Minister for the Environment as a controlled is not required.

[1] An 'important population' is a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are:

- key source populations either for breeding or dispersal
- populations that are necessary for maintaining genetic diversity, and/or
- populations that are near the limit of the species' range.

3.4.2 State *Biodiversity Conservation Act*

The Magenta Lilly Pilly, which is listed as vulnerable on the BC Act, occurs at the subject site. As they occupy hollows, and as one-hollow-bearing tree is to be removed, the Yellow-bellied Sheathtail-bat and Southern Myotis, which are also listed vulnerable, were considered (based on the adoption of the precautionary principle) likely to occur.

Under Section 7.3, the following are to be taken into account for the purposes of determining whether a proposed development or activity is likely to significantly affect threatened species or ecological communities, or their habitats:

(a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,

Magenta Lilly Pilly
The two Magenta Lilly Pilly at the site are not components of a local population. They are planted in an area that is unlikely to have ever been habitat for the species. The nearest natural population of the species is on the southern shores of Botany Bay some eight kilometres to the south-east (Department of Planning and Environment 2022a).

Yellow-bellied Sheathtail-bat and Southern Myotis
One hollow-bearing tree, that supports numerous 5 mm wide cavities, is present within the required clearing area. In addition, the proposed work will remove both native and exotic vegetation, this including insect attracting plants. Maroubra Reservoir is about 39.9 square metres in size, this supporting numerous similar insects attracting plants. Given the extent of suitable habitat being retained beyond the clearing limits within the remainder of Maroubra reservoir site, it is not considered that the proposal would have an adverse effect on the life cycle of these species such that viable local populations of these animals (if present) are likely to be placed at risk of extinction.

Considering the diversity of similar resources ion the surrounding region, the loss of one-hollow bearing tree is unlikely to affect the life cycle of the species (if present) such that its local population would be placed at risk of extinction.

(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

- *(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or*
- *(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction*

Not applicable to threatened species.

(c) in relation to the habitat of a threatened species, population or ecological community:

- *(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity,*

Magenta Lilly Pilly
The proposal will require the removal of two specimens that were planted some time ago by a neighbour. The area inhabited by the trees covers some 150m^2. However, this is not habitat that is naturally occupied by the species.

Yellow-bellied Sheathtail-bat and Southern Myotis
The proposal will require the removal of one hollow-bearing tree and a number of insect-attracting plants; however, similar habitat will be retained in the surrounding area.

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity,

Magenta Lilly Pilly
The proposal would not fragment or isolate area of Magenta Lilly Pilly habitat as it is not within the natural habitat of the species.

Yellow-bellied Sheathtail-bat and Southern Myotis
The two species can easily negotiate open areas and have been recorded flying over open spaces (author's field notes); as such, the loss of some native vegetation, this including one hollow-bearing tree and a number of insect attracting plants, is not expected to result in the disturbance to the Yellow-bellied Sheathtail-bat or Southern Myotis' dispersal or movement patterns; these species being able to easily negotiate/traverse the subject site post disturbance. Suitable habitat for these species would be retained within the study area and surrounding bushland area; as such, the proposal would not cause any further fragmentation of, or isolation to, any areas of habitat used by hollow-dependent microchiropterans.

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality,

Magenta Lilly Pilly
A review of BioNet (Department of Planning and Environment 2022a) indicates that there are no naturally occurring populations of Magenta Lilly Pilly in the locality. Therefore, the habitat that would be affected is not important to the species in the locality.

Yellow-bellied Sheathtail-bat and Southern Myotis
The proposal is not considered to remove, modify, fragment or isolate a significant amount of vegetation such that the long-term survival of the Yellow-bellied Sheathtail-bat, nor the Southern Myotis, would be jeopardised. Whilst one hollow-bearing tree does require removal, the habitats within the study area extend well beyond the limits of the proposal. Given that no major components of these species' habitat are to be further isolated or fragmented, it is not considered that the proposal would have an impact on the Yellow-bellied Sheathtail-bat nor the Southern Myotis such that the long-term survival of these species in the locality would be adversely affected.

(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),

No declared areas of outstanding biodiversity value would be directly or indirectly affected by the proposal. The subject site is not listed as a declared area of outstanding biodiversity value under Part 3 of the BC Regulation 2017.

(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process

Currently 35 KTP for mainland NSW are listed under Schedule 4 of the BC Act. Of these, the 'clearing of native vegetation' and 'loss of hollow-bearing trees' would be applicable to the proposal. While it is acknowledged that the proposal will result in the removal of some native vegetation, this including insect attracting plants and one hollow-bearing tree, it is not considered that this clearance would significantly contribute to this KTP such that the life cycle requirements of the Magenta Lilly Pilly, Yellow-bellied Sheathtail-bat nor Southern Myotis would be compromised.

Expected impact on Magenta Lilly Pilly

The undertaking of the proposed reservoir bank vegetation clearing works, this including the removal of two planted specimens of Magenta Lilly Pilly, would not place a local population of the species at risk of extinction. Nor would it isolate or fragment habitat or remove an important area of habitat. The proposal is unlikely to significantly affect the species, or its habitat.

Expected impact on Yellow-bellied Sheathtail-bat and Southern Myotis

The undertaking of the proposed reservoir bank vegetation clearing works would not disturb, remove, modify or fragment any habitats critical to the life cycle requirements of either species. Given the extent of suitable habitat being retained within both the study area and the surrounding locality, the removal of some vegetation, this including insect-attracting plants and one hollow-bearing tree, is not considered to significantly affect the Yellow-bellied Sheathtail-bat, the Southern Myotis or their habitats.

The preparation of a Species Impact Statement (or Biodiversity Development Assessment Report were Sydney Water to choose that option) is not required.

4. Conclusions

As part of a proposal to remove vegetation that is impacting the walls of a Sydney Water asset (reservoir WS0067) that occurs adjacent to Amour Ave, Maroubra, a flora and fauna investigation has been conducted.

By completion of the investigation, one threatened flora species was recorded, namely:

- Magenta Lilly Pilly (*Syzygium paniculatum*) – listed as Vulnerable (EPBC Act), Endangered (BC Act)

In relation to Section 7.3 of the BC Act, the removal of the two specimens of this species would not significantly affect the species, or its habitat. Nor would it significantly affect the species in relation to the significant impact guidelines prepared under the EPBC Act. Referral of the proposal to the Minister for the Environment as a controlled action is not required.

The vegetation to be removed consists of maintained exotic groundcover and native and exotic plantings with some remnant species. It does not conform to any communities listed, or currently being considered for listing, as endangered or critically endangered under the EPBC or BC Acts.

One hollow-bearing tree would be cleared, this potentially available for occupation by those hollow-dependent microbats that are listed as Vulnerable under the BC Act and that have been previously recorded in this portion of the Randwick LGA. With reference to the assessment criteria provided under Section 7.3 of the BC Act, it is considered that the vegetation clearing works would not significantly affect these threatened species, or their habitats.

A Species Impact Statement (or Biodiversity Development Assessment Report were Sydney Water to choose that option) need not be prepared.

Whilst clearing of native vegetation is identified as a Key Threatening Process under Schedule 3 of the BC Act, the suite of plants present is not considered to meet the definition of 'native vegetation' (this being *a plant community, comprising primarily indigenous species and includes canopy trees (where present), understorey, ground cover and below ground biomass (roots, bulbs and the seed bank*).

Provided the recommendations outlined below in Section 5 of this report are adopted, there are no ecological constraints to the proposed vegetation removal proceeding as planned.

5. Recommendations

Based on the principles of Ecologically Sustainable Development, as identified in Part 8 Division 5 of the Environmental Planning and Assessment Regulation 2021, the following recommendations are provided:

- An ecologist or similar qualified person should be present on site to supervise the clearing of the hollow-bearing tree.

- The removal of the hollow-bearing tree should be off-set through the erection of suitably designed habitat boxes. These should be made to cater for the sheltering requirements of hollow-dependent microbats, with 3 being erected to off-set the number of cavities within the one tree being removed.
    - The location of the boxes within the subject site should be determined based on the outcomes of discussions held the site manager (i.e. to ensure they are not removed or disturbed by future works within the reservoir site)
    - When erected, the boxes should be placed on the north to north-western side of trees, using the habisure system, at a height of 5 m to 6 m.
    - The boxes should be monitored for a period of three years, with any damaged boxes, or those occupied by exotic species (e.g. Bees) being replaced/repaired.

- If the vegetation to be removed is to be chipped and used for mulch, hand removal and appropriate disposal of crowns and/or fruit of Ground Asparagus and ripe Golden Wreath Wattle fruit should be undertaken prior to clearing to ensure dispersal of these weeds does not occur.

- Any animals injured during the clearing work are to be collected and taken to a local veterinarian for treatment.

- Where applicable, sedimentation fencing/structures (e.g., sandbags) should be erected prior to the commencement, and kept in place for the duration, of the proposed work.

- Whilst beyond the scope of the proposal considered in this assessment report (i.e., the removal vegetation impacting the dam wall), as part of Sydney Water's ongoing management of this site the presence of Ground Asparagus and Golden Wreath Wattle should be addressed.

If you require any further information on this matter, please do not hesitate to contact the undersigned on either (02) 9523 2016 or 0432 390 776.

Yours sincerely,

Deryk Engel
Director
Lesryk Environmental Pty Ltd

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Attachment 1. Photographic record of the subject site

	Character of vegetation present at the site, including the reservoir walls in the background of the image. Select trees to be removed are marked in yellow, seen on the first tree in the left of the image. Photograph taken looking east through the site.
	Yellow markings identify the select trees to be removed.
	Character of trees to be removed in proximity to adjacent residential properties. Photograph taken looking east through the site.

	Character of the south-eastern extent of the proposed tree removal area, photograph taken looking north.
	Character of the adjacent vegetation beyond the boundaries of the proposed works.
	The character of the ground cover (lawn) dominating the site.

Attachment 2. Flora species recorded

Key
* – introduced species
P – planted native species
? – uncertain identification
W – weed of national significance

Scientific Name	Common Name
Acacia longifolia	Sydney Golden Wattle
Acacia saligna[P]	Golden Wreath Wattle
Asparagus aethiopicus *[W]	Ground Asparagus
Banksia integrifolia[P]	Coast Banksia
Banksia serrata	Old-Man Banksia
Callistemon citrinus[P]	Crimson Bottlebrush
*Celtis sinensis**	Japanese Hackberry
*Cenchrus clandestinum **	Kikuyu Grass
Commelina cyanea	Scurvy Weed
Corymbia eximia[P]	Yellow Bloodwood
*Cynodon dactylon**	Couch
*Dracaena marginata**	Dragon Plant
*Ehrharta erecta **	Panic Veldtgrass
*Eragrostis curvula **	African Lovegrass
Eucalyptus elata[P]	River Peppermint
Eucalyptus maidenii[P]	Maiden's Gum
Eucalyptus ?mannifera[P]	Brittle Gum
Eucalyptus robusta[P]	Swamp Mahogany
Eucalyptus tereticornis[P]	Forest Red Gum
Eucalyptus botryoides[P]	Bangalay
Grevillea robusta[P]	Silky Oak
Grevillea sp[P]	Grevillea cultivar
*Hypochaeris radicata**	Catsear
Kunzea ambigua	Tickbush
*Lagunaria patersonia**	Norfolk Island Hibiscus
*Lantana camara**[W]	Lantana
Leptospermum laevigatum	Coast Teatree
Lophostemon confertus[P]	Brush Box
Microlaena stipoides	Weeping Grass
Melaleuca armillaris[P]	Bracelet Honey-myrtle
Muellerina celastroides	Banksia Mistletoe
*Paspalum dilatatum **	Paspalum
Pittosporum undulatum	Native Daphne
*Plantago lanceolata**	Plantain
*Schefflera actinophylla **	Umbrella Tree
*Solanum nigrum**	Blackberry Nightshade
*Stenotaphrum secundatum **	Buffalo Grass
*Strelitzia nicolai**	Bird of Paradise
Syzygium paniculatum[P]	Magenta Lilly Pilly
*Tradescantia fluminensis **	Trad

Appendix 7 Specialist studies – Lesryk (2024) ecological assessment

Addendum study: Ecological investigation and assessment – proposed vegetation removal for a Sydney Water asset – Maroubra Reservoir [WS0067]

In compliance with both the NSW *Dams Safety Act 2015* and Dams Safety Regulation 2019, Sydney Water is proposing to remove vegetation from the walls of Maroubra Reservoir. To assess the ecological impacts associated with the vegetation removal, an ecological study was undertaken by personnel from Lesryk Environmental Pty Ltd (Lesryk) in October 2022.

The objectives of the inspection were to:

1) Determine the character of the vegetation community(ies) present within the proposed works area
2) Identify the species present and their conservation status
3) Consider and asses the impacts associated with the proposed works.

At the completion of the October 2022 inspection:

- One threatened flora species, Magenta Lilly Pilly (*Syzygium paniculatum*), had been recorded, this species listed as Vulnerable under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and Endangered under the NSW *Biodiversity Conservation Act 2016* (BC Act). In regards to this plant, two individuals were identified, both of which are present in the north-east corner of the Reservoir site.
- Vegetation within the reservoir site did not comprise the BC Act and EPBC Act listed critically endangered ecological community Eastern Suburbs Banksia Scrub
- One hundred and nineteen plants (119) were identified as requiring removal
- No animals listed under the Schedules to the EPBC and/or BC Acts were recorded. Similarly, no habitats that would be occupied and relied by those threatened animals previously recorded, or predicted to be present in the surrounding region, were recorded within the activity footprint
- No ecological constraints to the proposed vegetation removal proceeding as planned were identified.

For reference, the plants proposed to be removed are identified in Table 1, these distributed throughout the Maroubra Reservoir site.

Subsequent to the initial inspections conducted by Sydney Water, it has been determined that a number of the plants initially identified for removal can be retained (Canopy Consulting 2024). Sydney Water and/or their arborist has considered the locations of these plants and deemed that their root systems are unlikely to be affecting the integrity of the reservoirs wall.

Table 1. Trees initially identified for removal

Key
* – introduced species
P – planted native species
? – uncertain identification

Scientific name	Common name	Count
Acacia saligna[P]	Golden Wreath Wattle	7
Banksia integrifolia[P]	Coast Banksia	76
Banksia serrata	Old-Man Banksia	3
*Celtis sinensis**	Japanese Hackberry	1
Corymbia eximia[P]	Yellow Bloodwood	1
Eucalyptus elata[P]	River Peppermint	1
Eucalyptus maidenii[P]	Maiden's Gum	1
Eucalyptus mannifera[P] ?	Brittle Gum	1
Eucalyptus robusta[P]	Swamp Mahogany	1
Eucalyptus tereticornis[P]	Forest Red Gum	3
Eucalyptus botryoides[P]	Bangalay	1
Grevillea robusta[P]	Silky Oak	1
*Lagunaria patersonia**	Norfolk Island Hibiscus	1
Leptospermum laevigatum	Coast Teatree	2
Lophostemon confertus[P]	Brush Box	1
Melaleuca armillaris[P]	Bracelet Honey-myrtle	3
Schefflera actinophylla *	Umbrella Tree	4
Syzygium paniculatum[P]	Magenta Lilly Pilly	2
Acmena smithii[P]	Lilly Pilly	2
Pittosporum undulatum	Native Daphne	1
Stag	Stag	5
*Dracaena marginata**	Dragon Plant	1

An on-site inspection conducted with Sydney Water representatives on 20 March 2024, determined that the revised scope of clearing works would result in the retention of:

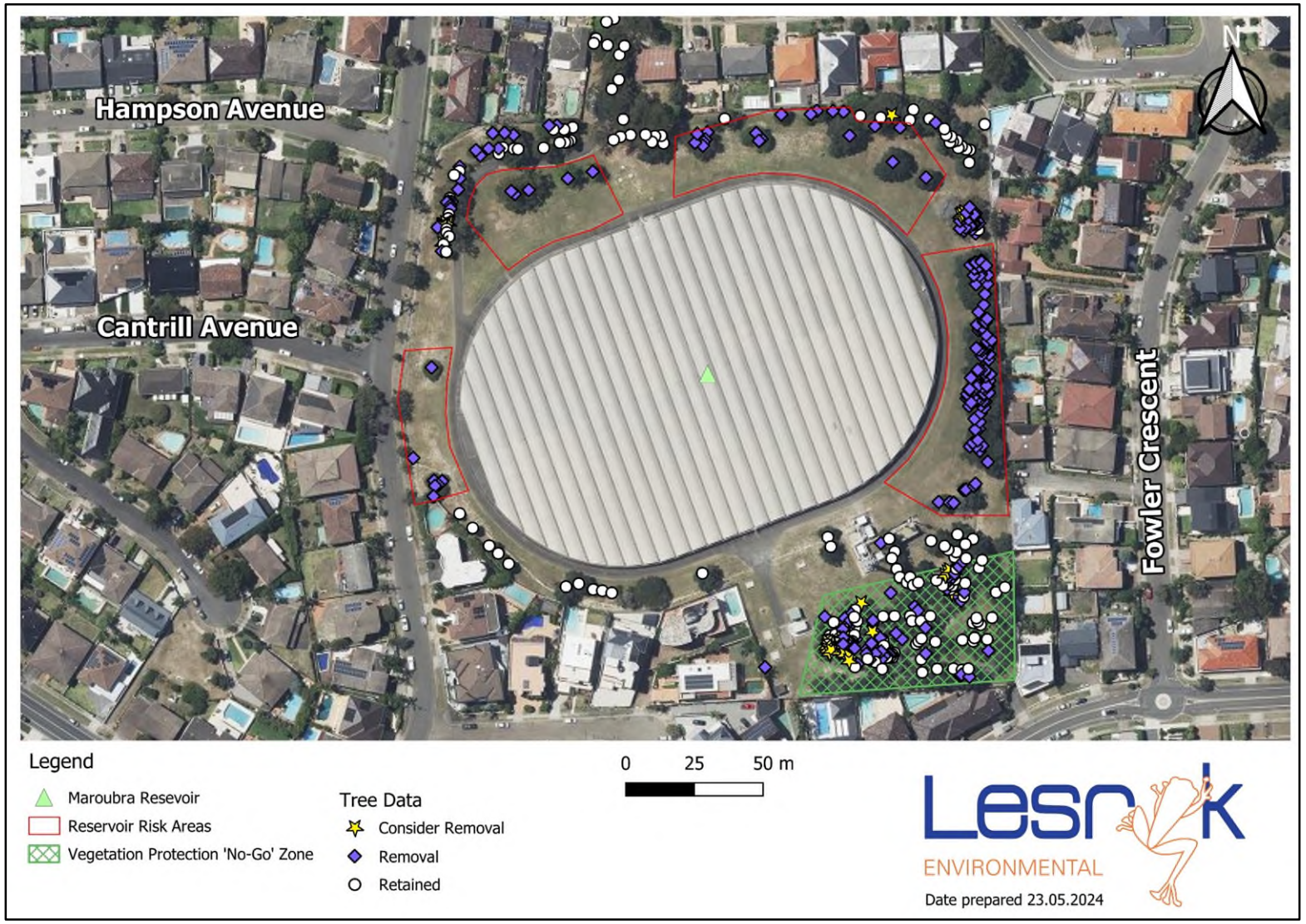
12 – Coast Banksia (*Banksia serrata*)
1 – Brittle Gum (*Eucalyptus mannifera*)
1 – Bracelet Honey-myrtle (*Melaleuca armillaris*)
1 – Coast Teatree (*Leptospermum laevigatum*)
1 – Lilly Pilly (*Acmena smithii*)
3 – Forest Red Gum (*Eucalyptus tereticornis*)
1 – Yellow Bloodwood (*Corymbia eximia*)
1 – Swamp Mahogany (*Eucalyptus robusta*)
4 – dead stags.

The two Magenta Lilly Pilly would also be retained.

It is noted that all of the living plants identified above are native species.

For reference, based on the work of Canopy Consulting (2024), Figure 1 identifies the locations of those plants being retained and those being cleared.

Figure 1. Location of those trees to be retained, and those requiring removal (per Canopy Consulting 2024)



Whilst retained, it is noted that several of the plants present, including the three Forest Red Gums, the Yellow Bloodwood and Lilly Pilly, will be trimmed.

Considering the revised scope of works, a total of 84 native plants, 7 exotic plants and one dead stag would require clearing to ensure compliance with the NSW *Dams Safety Act 2015* and Dams Safety Regulation 2019. The revised scope of works would result in a disturbance footprint of about 0.5 hectares (ha) as opposed to the original 0.69 ha that was considered.

None of the plants being removed are listed, or currently being considered for listing, under the EPBC Act or BC Acts. The revised scope of works will retain the two Magenta Lilly Pilly.

It is noted that, within the south-eastern and north-western 'corners' of the reservoir site, Sydney Water may consider undertaking revegetation works. The species that maybe established in these areas would be consistent with those locally occurring natives removed. Any revegetation works will be compliant with NSW *Dams Safety Act* 2015 and compliment and contribute to the existing plants present.

As concluded during the October 2022, the removal of the 91 living plants, and one dead stag, from the banks of the Maroubra Reservoir site would not have a significant effect on any species or ecological communities listed, or currently being considered for listing, under the EPBC or BC Acts. Similarly, the activity would not have an effect on the habitats of those species or ecological communities previously recorded in the surrounding region. The works will not fragment or isolate any habitat areas nor will they present a barrier to the dispersal patterns of plant propagules or those animals recorded or expected to occur.

The vegetation removal works will not trigger a Species Impact Statement nor, in relation to the EPBC Act, would there be a need for the matter to be referred to the Federal Minister for Environment and Water as a controlled action.

No further recommendations, beyond those included in October 2022 report are identified as requiring adoption.

Reference

Canopy Consulting (2024) *Risk Assessment Report, Maroubra Reservoir, 7-23W Amour Ave, Maroubra NSW 2035*. Report prepared for Sudney Water by Canopy Consulting.

Appendix 8 Specialist studies – Canopy Consulting (2024) arborist report

Risk Assessment Report

Version 2

Maroubra Reservoir
7-23W Amour Ave,
Maroubra NSW 2035

Inspection Date: 24 April to 2 May 2024

PREPARED FOR:

Sydney Water
Ground Floor, 20 Williams Holmes St,
Potts Hill NSW 2143

Document Information

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Project Name:	**Maroubra Reservoir**
Reference #:	**E-002081-24**
Client:	**Sydney Water**
Site:	**7-23 W Amour Ave, Maroubra NSW 2035**
Prepared by:	**Kane Hollstein** Senior Consulting Arborist Dip. Arb., AQF Level 5 ISA TRAQ | QTRA | VALID | IACA Accredited Member **Mark McHugh** Consulting Arborist Dip. Arb., AQF Level 5 ISA TRAQ | QTRA | VALID
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Document Status

Status	Date	Revision type
Version 1	17 May 2024	Draft
Version 2	28 May 2024	Issue

Review Register

Date	Reviewed By	Approved By
17 May 2024	MM	KH

Report Assumptions and Limitations

1. Information provided by the client or third party is assumed to be accurate.
2. All information has been sourced with care and verified to the best of the consultant's knowledge. Any opinions not duly researched are based on the consultant's experience and observations.
3. The consultant is not required to give testimony or attend court unless under a contractual agreement, subject to payment of additional fees.
4. Modifying or removing any key contextual elements will invalidate the report.
5. The report does not guarantee that future problems or deficiencies associated with the site or vegetation will not arise.
6. The report addresses the items outlined in the project brief or examined during site inspection and reflects the condition of these items at the time of inspection.
7. The inspection is limited to ground-based inspection of accessible areas and does not include dissection, excavation, or probing unless specified.
8. The report is an impartial assessment of the tree(s) and its condition based on available evidence and projected outcomes.

Abbreviation	Meaning
AA	Aerial Assessment
AQF	Australian Qualification Framework
AS	Australian Standard
BAM	Biodiversity Assessment Method
BC Act	*Biodiversity Conservation Act 2016*
BCSEPP	*State Environmental Planning Policy (Biodiversity and Conservation) 2021*
DBH	Diameter at Breast Height
DCP	Development Control Plan
EP&A Act	*Environmental Planning and Assessment Act 1979*
EPBC Act	*Commonwealth of Australia's Environmental Protection & Biodiversity Conservation Act 1999*
IACA	Institute of Australian Consulting Arboriculturists
ISA	International Society of Arboriculture
GIS	Geographic Information System
GPS	Global Positioning System
LEP	Local Environment Plans
NSW	New South Wales
PHC	Plant Health Care
RESI	IML RESI PD-400 electronic resistance drill
SEED	Sharing and Enabling Environmental Data
sp.	Species
STARS©	IACA Significance of a Tree, Assessment Rating System
TEC	Threatened Ecological Communities
TRAQ	Tree Risk Assessment Qualification
ULE	Useful Life Expectancy
VTA	Visual Tree Assessment

Executive Summary

Canopy Consulting was engaged to provide a comprehensive risk assessment of trees within Maroubra Reservoir at 7-23 W Amour Ave, Maroubra NSW 2035. The report was prepared in response to the client's obligations to the management of the reservoir, as dam operations and maintenance must comply with the Dams Safety Acts and Regulation.

This report includes:

- An evaluation of the client's specific requirements and objectives.
- An analysis of trees in relation to dam safety criteria.
- A risk assessment related to trees on the site and arboricultural recommendations to mitigate assessed risks.
- A projection of anticipated canopy loss.
- A comprehensive work plan to direct Sydney Water contractors on tree maintenance and removal procedures.

Hence, an inspection of the site and site trees was carried out 24 April to 2 May 2024, by consulting arborists Kane Hollstein and Mark McHugh. A total of 418 trees were assessed under 418 tree tags.

The risk site trees pose to persons/property has been determined using the ISA Tree Risk Assessment method (TRAQ). The application of these criteria is shown within the data tables in the appendices of the report. Due to rare target occupancy in the internal regions of the site, the tree risk assessments were limited to trees within fall distance of adjacent properties around the site's boundaries. A total of 101 trees within the site were included within the assessment.

Table 1 summarises the risk assessment.

Table 1. Risk assessment summary

Risk Summary			
Risk Rating	**No. of trees**	**Tree Numbers (* indicates group)**	**Risk Mitigation Timeline**
Extreme	0		Extreme-risk situations should be mitigated as soon as possible. Immediate action may be required to restrict access to the target zone.
High	1	184	High-risk situations should be mitigated as soon as practical
Moderate	5	93, 95, 178, 241, 307	Moderate-risk situations may not require mitigation but, if deemed necessary, could be mitigated when budget, work schedule, or pruning cycle allows. If the risk is acceptable to the client, the tree(s) could be retained and monitored.

Risk Summary			
Risk Rating	**No. of trees**	**Tree Numbers (* indicates group)**	**Risk Mitigation Timeline**
Low	95	86, 87, 90, 91, 92, 94, 96, 101, 106, 107, 108, 109, 110, 162, 176, 179, 180, 181, 182, 183, 186, 190, 192, 201, 206, 209, 210, 212, 217, 226, 229, 230, 235, 237, 238, 247, 248, 249, 253, 255, 256, 258, 259, 264, 266, 289, 292, 303, 304, 305, 308, 309, 310, 311, 312, 313, 314, 315, 316, 320, 321, 328, 331, 332, 333, 334, 335, 336, 338, 340, 341, 342, 343, 344, 350, 351, 352, 353, 354, 355, 356, 357, 362, 364, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 413	Low-risk trees should be retained and monitored (if appropriate) and/or mitigated, if desired, when the budget, work schedule or pruning cycle allows.
Total	**101**		

Some levels of risk must be accepted to experience the benefits trees provide, as no tree can be maintained completely free of risk (Dunster, 2017).

'Acceptable risk' is the degree of risk that is within a tree owner's or manager's tolerance or below a defined threshold.

The risk each tree poses has been determined using the ISA Tree Risk Assessment method (TRAQ). Works actions have been divided into two categories;

- Risk related works (Table 2) for works above a Low risk i.e., Extreme, High and Moderate.
- Proactive works (Table 3) for works that won't result in a lower risk rating following successful completion, but are aimed to:
    - Reduce the potential of future risk e.g., formative pruning, remedial pruning
    - Complete general arboricultural maintenance e.g., deadwood pruning.
    - Remove undesirable tree species e.g., environmental weeds
    - Remove dead or fallen trees that have a negative influence on the site.
    - Remove trees in locations that are not permitted per Dams Safety Acts and Regulations.

By categorising the necessary actions based on the level of risk associated with each tree, these tables serve as a useful reference for prioritising maintenance, pruning, removal, or other interventions to effectively manage the tree population. This approach helps ensure that resources are allocated efficiently, with a focus on addressing the most urgent and high-risk situations first.

Table 2: Risk Related Works

Risk Related Works				
		Tree Numbers & Risk Rating (* indicates group)		
Works Action	Count of Works Actions	Extreme	High	Moderate
Removal	5		184	93, 95, 178, 241, 307
Consider Removal	1			307
Selective branch prune	1			307
Total	**7**			

Trees categorised as 'Not Risk Assessed' in Table 3 are those that require removal due to dam stabilisation works. This equates to 200 trees of varying landscape significance.

Table 3: Proactive Works

Proactive Works			
		Tree Numbers & Risk Rating (* indicates group)	
Works Action	Count of Works Actions	Low	Not Risk Assessed
Removal	220	94, 176, 179, 180, 181, 182, 183, 186, 190, 192, 201, 206, 209, 210, 212, 217, 226, 229, 230, 235, 237, 238, 247, 248, 249, 253, 255, 256, 258, 259, 264, 309, 311, 312, 313, 314, 315, 316, 321, 352, 354, 355, 356, 357, 400, 401, 402	3, 5, 6, 8, 11, 13, 15, 18, 19, 24, 25, 26, 27, 32, 33, 34, 35, 37, 42, 44, 45, 46, 47, 48, 49, 53, 54, 55, 56, 57, 58, 59, 61, 63, 69, 70, 71, 73, 74, 75, 76, 78, 79, 81, 83, 84, 88, 100, 111, 112, 115, 116, 126, 127, 135, 136, 137, 139, 141, 143, 146, 147, 151, 152, 153, 154, 155, 156, 158, 160, 169, 170, 171, 172, 173, 174, 175, 177, 185, 187, 188, 189, 191, 193, 194, 195, 196, 197, 198, 199, 200, 202, 203, 204, 205, 207, 208, 211, 213, 214, 215, 216, 218, 219, 220, 221, 222, 223, 224, 225, 227, 228, 231, 232, 233, 234, 236, 239, 240, 242, 243, 244, 245, 246, 250, 251, 252, 254, 257, 260, 261, 262, 263, 265, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 290, 291, 306, 317, 318, 319, 322, 323, 324, 325, 326, 345, 346, 347, 348, 349, 366, 367, 368, 369, 370, 372, 374, 376, 377, 378, 379, 380, 381, 384, 385, 386, 387, 388, 389, 393, 395, 397, 398, 399, 414, 415, 416, 418

Proactive Works			
		Tree Numbers & Risk Rating (* indicates group)	
Works Action	**Count of Works Actions**	**Low**	**Not Risk Assessed**
Apply herbicide to cut stump	132	94, 226, 238, 249, 352, 354, 355, 356, 357, 400, 401, 402	3, 5, 8, 11, 15, 18, 19, 25, 26, 35, 37, 42, 44, 45, 46, 47, 48, 49, 54, 55, 58, 61, 69, 70, 71, 73, 74, 76, 78, 81, 83, 100, 135, 136, 137, 139, 141, 143, 146, 147, 150, 151, 152, 153, 154, 155, 156, 158, 160, 175, 185, 189, 191, 193, 194, 195, 196, 197, 198, 200, 202, 203, 204, 208, 211, 213, 214, 216, 219, 222, 223, 224, 225, 227, 231, 233, 236, 240, 243, 244, 245, 246, 251, 252, 254, 257, 260, 267, 270, 273, 275, 278, 280, 281, 285, 286, 287, 306, 317, 318, 319, 323, 326, 349, 367, 369, 372, 381, 384, 385, 386, 387, 388, 389, 393, 397, 398, 399, 415, 418
Consider Removal	27		3, 11, 26, 35, 42, 44, 45, 46, 47, 48, 49, 54, 55, 83, 141, 153, 154, 155, 285, 286, 287, 384, 385, 386, 387, 388, 393
Crown Reduce	6	308, 320, 352, 405, 406, 407	
Crown Raise	2	304, 310	
Reduce end weight	2	217, 331	
Deadwood prune >10cm diameter	1	334	
Deadwood prune >3cm diameter	1	315	
Total	**391**		

Any work applied as a result of this report should be undertaken on a priority basis. Whereby trees of a higher risk category are addressed first, and trees of lower risk levels are to be worked on as budget allows.

It should be noted that the current risk of the trees is based on the current site conditions. Should the occupancy or usage of the site change, the risk profile is also likely to change.

Table Of Contents

1. Introduction

1.1. Background

Sydney Water commissioned this report to investigate trees within the Maroubra Reservoir located at 7-23 W Amour Ave, Maroubra NSW 2035.

Between 24 April to 2 May 2024 Canopy Consulting undertook 418 individual VTA on the subject tree population.

The purpose of this report is to:

- Identify trees within the study area.
- Provide a comprehensive Tree Inventory of all trees within the site.
- Complete a risk assessment of trees along the site's boundary, using the International Society of Arboriculture Tree Risk Assessment Qualification (TRAQ) method based on the current site conditions.
- Provide relevant geospatial mapping regarding tree locations and data, designated areas of geotechnical concern and existing canopy cover.
- Provide a schedule of trees requiring works based on current site conditions.

1.2. Site Information

Table 4. Site Information

Allotment Type	Government
Address	7-23W Amour Ave, Maroubra NSW
Local Government Area (LGA)	Randwick City Council
Lot & DP Number	9/-/DP519241 & 9/-/DP771879
Zoning and Local Environment Plan (LEP)	R2 - Low Density Residential & SP2 - Infrastructure under the Randwick Local Environmental Plan 2012
Site Description	The Sydney Water Reservoir is centrally located. The site is accessible from the northern boundary via a single asphalt road running from 73-77 Johnston Parade, circling the reservoir. Residential properties surround the site's north, south, and east boundaries, while Amour Avenue marks the western boundary. The southwestern area rests level on a rock shelf, while steeply sloped sand banks characterise the rest of the site.

2. Scope

2.1. Overview

- Evaluate the client's requirements and objectives as outlined in the brief.
- Assessment of trees with considerations towards dam safety criteria.
- Assess tree-related risk within the site and provide arboricultural recommendations to manage that risk.
- Provide a detailed work package to guide Sydney Water contractors in regards to tree maintenance and removal.
- Report on projected canopy loss as a result of arboricultural works.

2.2. Tree Inventory

Prepare a comprehensive Tree Inventory by undertaking an arboricultural assessment of all trees (including live, dead and fallen) within the site and their growing environment.

As an outcome of the assessments, provide within the Tree Inventory, the following:

- Identification, location and description of the trees
- Arboricultural observations
- ULE
- Landscape significance based on heritage, environmental and arboricultural principles.

2.3. Site Analysis

- Arboricultural analysis and commentary, including -
    - Tree location and whether they are permitted by Dam Safety Considerations (DSC) policy to remain *in situ*.
    - Positive or potential impacts the trees are having on the surrounding infrastructure
    - Tree health decline and structural defects
    - Invasive weed status
    - Potential future risk concerns
- Recommendations for proactive, remedial or other works to manage the tree population, if and where appropriate.

Analyse in consultation with Sydney Water, the site-specific conditions, including *in situ* soils, both natural and manufactured and above and below-ground impediments.

2.4. Tree Risk Assessment

Undertake an industry-recognised tree risk assessment (TRAQ) on each tree along the boundary of the site and evaluate for potential risks, considering:

- Likelihood of failure (overall tree and major parts)
- Potential targets (people, property, infrastructure)
- Site factors (slope, soil conditions, exposure)

Assign a risk rating for each tree (e.g., low, moderate, high, extreme)

2.5. Site Canopy Coverage

- Undertake an analysis of the site's existing canopy coverage and projected canopy loss as a result of the recommended works.

3. Method

3.1. Data Collection

To record the above-ground health and condition of each tree, a Visual Tree Assessment (VTA), adapted from (Lonsdale, 2013), was undertaken from ground level over five days between 24 April to 2 May 2024, by AQF Level 5 consulting arborists Kane Hollstein and Mark McHugh.

This involved an inspection of:

- Physical and biological traits
- Tree health and structural condition
- Tree location within the site
- ULE
- Site conditions
- Amenity value
- Heritage value
- Habitat value
- Environmental value

No foliage or soil samples were taken. No below-ground investigation was performed.

All height, Diameter at Breast Heights (DBH) and canopy spread values were estimated. Any offset measurements were measured with a tape measure.

Data was collected using GIS software linked to a Trimble Catalyst DA-2 GPS antenna with 1cm-2cm accuracy in optimal GPS conditions. Where trees were located on the survey plan, these locations were used. Where absent from the survey, the GPS location was used. Using this method; locations may be ∓ 1m due to tree canopies and GPS interference.

3.2. Useful Life Expectancy

Estimated remaining Useful Life Expectancy (ULE) has been derived using a modified version of the TreeAZ SULE method (Barrell, 2009). An explanation of attributes required to achieve each category can be found in Appendix A.

3.3. Landscape Significance Rating

The trees have been allocated a Landscape Significance rating as determined by using the Tree Significance - Assessment Criteria of the IACA Significance of a Tree, Assessment Rating System (STARS)© (IACA, 2010). An explanation of attributes required to achieve each category can be found in Appendix C.

3.4. Risk Assessment

This tree risk assessment was conducted using the Tree Risk Assessment Qualification (TRAQ) methodology developed by the International Society of Arboriculture (Dunster, 2017). For definitions of relevant risk assessment terms, please refer to Appendix B. This assessment is valid for a 12-month period, assuming normal weather conditions, and reflects the state of the trees at the time of inspection.

Risk Calculation Methodology

Tree risk is determined in two steps:

Part 1: Likelihood of Failure and Impact

1. **Likelihood of Failure:** The likelihood of structural tree failure.
2. **Likelihood of Impact:** The likelihood that the failure will strike a specified target.

These likelihoods are combined using the Likelihood Matrix (Table 5).

Table 5. Likelihood Matrix

	Likelihood of Impacting Target			
Likelihood of Failure	**Very Low**	**Low**	**Medium**	**High**
Imminent	Unlikely	Somewhat Likely	Likely	Very Likely
Probable	Unlikely	Unlikely	Somewhat Likely	Likely
Possible	Unlikely	Unlikely	Unlikely	Somewhat Likely
Improbable	Unlikely	Unlikely	Unlikely	Unlikely

Part 2: Risk Assessment

- The overall risk rating is determined by referencing the Risk Assessment Matrix (Table 5), considering both the combined likelihood of failure and impact (from Part 1) and the consequences of failure.

- Consequences consider factors such as part size, potential fall distance, target protection, and severity of potential damage or injury.

The Risk Assessment Matrix (Table 6) is used to determine the final risk rating.

Table 6. Risk Assessment Matrix

Likelihood of Failure & Impact	Likelihood of Impacting Target			
	Negligible	Minor	Significant	Severe
Very Likely	Low	Moderate	High	Extreme
Likely	Low	Moderate	High	High
Somewhat Likely	Low	Low	Moderate	Moderate
Unlikely	Low	Low	Low	Low

4. Legislative Context

The Commonwealth of Australia manages nationally significant ecological communities and heritage items regulated under the Commonwealth Environmental Protection & Biodiversity Conservation Act 1999 (EPBC Act).

The EPBC Act delegates to the NSW Biodiversity Conservation Act 2016 (BC Act), allowing state and local authorities to manage ecological and heritage matters of state or regional significance. The BC Act repealed the NSW Threatened Species Conservation Act 1995 but still has some transitional arrangements. The BC Act may require Species Impact Statement and Biodiversity Banking and Offset Scheme agreements determined by the Biodiversity Assessment Method (BAM).

NSW state planning legislation is regulated under the NSW Environmental Planning and Assessment Act 1979 (EP&A Act), which manages significant development and infrastructure in NSW. The EP&A Act utilises Environmental Planning Instruments (EPI). These instruments include State Environment Planning Policies (SEPP) that deal with matters of state or regional environmental planning significance and Local Environmental Plans (LEP) that provide local Councils with a framework for land usage.

The operation and maintenance of Dams within NSW are undertaken in accordance with Dams Safety Act 2015 and Dams Safety Regulation 2019. Regulation Clause 9 of the Dams Safety Regulation 2019 sets out requirements that must be addressed in operations and maintenance plans. Hence, Sydney Water must implement operations and maintenance plans to meet these regulatory requirements.

4.1. Planning & Tree Management Controls

Table 7: Applicable Planning & Tree Management Controls

Local Environment Plan	Randwick Local Environmental Plan 2012 (RLEP)
Development Control Plan	Randwick Development Control Plan 2013 (RDCP)
Tree Management Controls	Prescribed trees within the Randwick City Council local government area (LGA) are protected under Part C5 of the RDCP made pursuant to Chapter 2 of the State Environmental Planning Policy (Biodiversity and Conservation) 2021 (the BCSEPP). The RDCP generally protects all trees and vegetation that meet the following: • any palm tree, cycad or tree fern of any size; • any tree on 'public land' (as defined in the Local Government Act 1993) by any persons not authorised by Council;

- any hollow-bearing trees; or
- any other tree with:
  - a height equal to or exceeding 6 metres;
  - a canopy width equal to or exceeding 4 metres;
  - for a single trunk tree species, a trunk circumference equal to or exceeding one (1) metre at a height of one (1) metre above ground level; or
  - for a multi-trunk tree species, a combined trunk circumference (measured around the outer girth of the group of trunks) equal to or exceeding one (1) metre at a height of one (1) metre above ground level.

4.2. Additional Legislative Protections

The following relevant Government environmental and heritage mapping and overlays have been reviewed (SEED - NSW Government, 2024). Table 8 indicates the presence of the items on site.

Table 8. Applicable Planning Layers

NSW OEH	Present on Site	Relevance
Threatened Ecological Communities (TEC) Greater Sydney	☐	Not present on site. No relevance
State Heritage Register	☐	Not present on site. No relevance
Biodiversity Values	☐	Not present on site. No relevance
DCP/LEP		
Heritage	☐	Not present on site. No relevance
Terrestrial Biodiversity	☑	Present on site. Located in two areas. One in the south and one in the southeastern region of the site. The RDCP has outlined the following controls for development and landscaping works in or adjacent to areas of biodiversity significance. i) must not impact on the environmental processes of natural areas, such as: a) erosion of soils b) siltation of streams and waterways c) overland flows and stormwater runoff d) overshadowing e) removal or degradation of existing vegetation. ii) must consider and undertake appropriate protective measures during the design, construction and operation phases, such as: a) adequate buffer areas between any building structures and the natural areas b) ongoing management arrangements to control invasive species and maintain natural features

		c) silt/protective fencing d) erosion and run off controls e) appropriate site access points to prevent offsite disturbances, and f) clear and informative signage iii) must select suitable plant species for landscape works with consideration of the following general criteria: a) Species shall not directly or indirectly jeopardise the functioning of remnant bushland areas, ie. having potential to create monocultures, affect the local native gene pool, impact on the hydrology or alter light levels; b) Species should improve on the ecological, cultural and aesthetic values of existing native plant communities and aim to link bushland remnants.
Environmentally Sensitive Land	☐	Not present on site. No relevance

5. Site and Tree Population Analysis

5.1. Site Conditions

This coastal site is located at an elevated position in the surrounding area. The southern and eastern boundaries of the site are within 1km of the coastal heath. The site's boundaries are within 1km of the coastal headlands. The site is most regularly·is exposed to westerly winds; however, moderate to fresh winds are most common from the south.

The reservoir is centrally located. Except for the southwestern corner, which is positioned on a rock shelf, sandy embankments, some of which are steep, are located on all other sides.

5.2. Site Usage

The site functions as a dam which supplies water to around 27,000 residents. Due to the critical function of this asset, the boundaries are fenced off, and only Sydney Water employees and contractors are expected to use the site.

As such, occupancy within the internal regions is expected to have ‘rare occupancy’ with a ‘very low’ likelihood of impact, should a tree part fail. Hence, a risk assessment was not conducted on internal trees.

On the trees along the boundary, residents using their rear yards was considered ‘occasional occupancy’ with a ‘low’ likelihood of impact. Depending on the architecture of the assessed trees, static structures, including buildings, boundary fences and infrastructure, were considered to have a ‘medium’ or ‘high’ likelihood of impact.

5.3. Summary of Tree Observations

A total of 418 trees were assessed across the site, including all live, dead, and fallen trees. Tree species within the site were primarily indigenous to the Plant Community Type (PCT) Sydney Coastal Sandstone Headland (ID 3812) and Sydney Coastal Sand Mantle Heath (ID 3806), which comprised the original vegetation in the local area prior to clearing.

Due to the site's disturbed nature, highly adaptable Australian native and exotic weed species were common throughout.

On the site's exposed southern and eastern-facing sides, *Banksia integrifolia*, with a maximum height of 10 to 12 metres, was the dominant tree species. In the sheltered northern area, taller *Banksia integrifolia* and larger *Eucalyptus* species, most commonly *Eucalyptus haematoma*, comprised the canopy.

An aerial image of the site taken in 1971 shows that the site was clear of larger trees at that time. This observation highlights that the tree population within the site's boundaries has a maximum age of 53 years.

Figure 1: 1971 Aerial photograph of the site showing only small pockets of vegetation within the boundaries of the site (NSW Spatial Services, 2022)

Photos and a subset of observations can be accessed using these links:

- Maroubra Reservoir - Part-1
- Maroubra Reservoir - Part-2
- Maroubra Reservoir - Part-3
- Maroubra Reservoir - Part-4
- Maroubra Reservoir - Part-5

5.4. Tree Health

Assessing tree health is crucial for maintaining a thriving tree population. Healthy trees provide greater environmental benefits, contribute to the aesthetic value of the landscape and are less likely to pose risks to public safety. Monitoring tree health enables managers to detect early signs of decline, pest infestations, or disease outbreaks, allowing for timely intervention and treatment to prevent further damage or loss of trees.

Refer to Figure 2 for a chart showing the spread of health classes across the site.

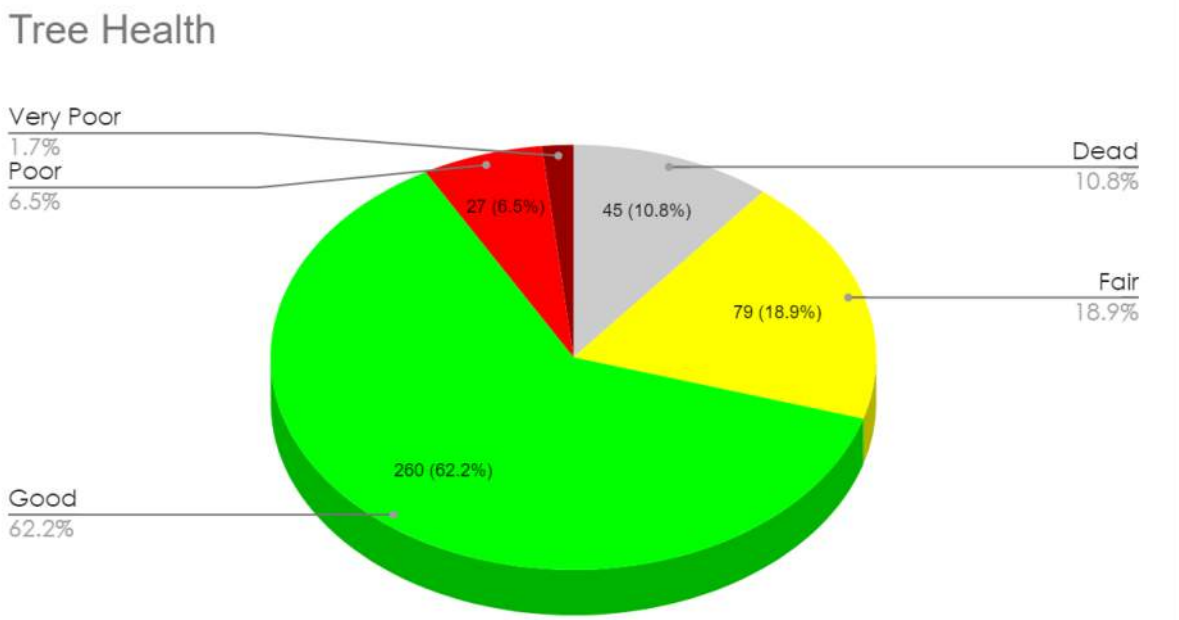


Figure 2: Tree Health Chart

The vast majority of trees within the site had good to fair health. Approximately 13% of the tree population was assessed as either in very poor health or dead. Trends in the dead tree population include:

- Most dead trees were *Melaleuca armillaris* and *Leptospermum laevigatum*. Anecdotally, these are not long-lived, and it is common for both species to develop multiple leaders close to ground level with tight junctions, which tend to break apart in their maturity.
- *Acacia saligna* also comprised much of the dead tree population. Acacias are generally pioneer tree species and short-lived.
- In most cases, *Banksia serrata* was assessed as dead and had trunk dimensions that indicated they had reached their full genetic potential *in situ* before declining.

5.5. Species Composition

Understanding the species composition of a tree population is essential for maintaining diversity and overall ecosystem health. A diverse tree population provides better resistance to pests and diseases, ensures resilience against climate change, and supports a wide variety of wildlife habitats. Monitoring the species composition enables managers to identify any imbalances or over-representation of certain species, which can inform future planting and management strategies to promote a more balanced and sustainable urban forest.

Figure 3 shows the top ten species identified within the site.

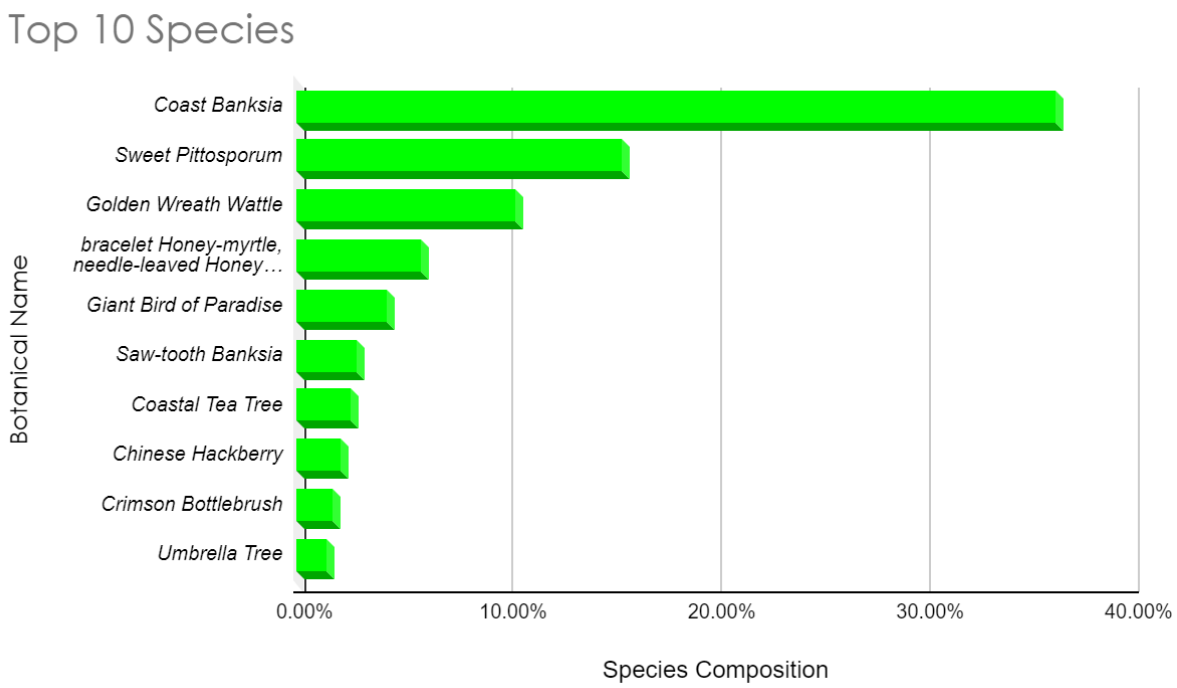


Figure 3: Species composition

Trends identified in the species composition include:

- *Banksia integrifolia* has been extensively planted throughout the site, representing around 35% of the total tree population.
- *Pittosporum undulatum*, *Celtis sinensis* and *Heptapleurum actinophyllum* comprised approximately 20% of the tree population. All three tree species are classified as weeds by the NSW Department of Primary Industries (DPI) and are regulated by a *General Biosecurity Duty*[1].

[1] *"All pest plants are regulated with a **general biosecurity duty** to prevent, eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable"* (NSW Department of Primary Industries, 2024).

- *Acacia saligna* represented 10.5% of the assessed tree population. While not identified as a weed by the DPI. This tree species is native to Western Australia and has naturalised in many locations with sandy soil along the east coast of Australia. Furthermore, this species is recognised as being very adaptable within disturbed sites and its seeds can remain viable within the seed bank after long periods of dormancy (Identic Pty Ltd, 2016).

5.6. Culvert Damage

A total of six trees, including Trees 134, 162, 176, 178, 226 and 314, were assessed as being within close proximity to the concrete culvert which runs along the northern, eastern and southern boundaries of the site. Regarding infrastructure damage, the following was observed:

- The culvert adjacent to Tree 134 was absent of damage
- Minor displacement was noted on sections of the culvert adjacent to Trees 162, 176, 178 and 226. These sections of the culvert can likely be repaired with the trees remaining *in situ*
- A surface root from Tree 314 was observed displacing the adjacent culvert.

Figure 4: Tree 162 - Within proximity to displaced culvert

Figure 5: Tree 314 - Structural surface root displacing the adjacent culvert

5.7. Dam Safety Requirements

Subsequent multiple risk assessments, Sydney Water has identified specific areas surrounding the reservoir where trees and vegetation is prohibited. To remain compliant with DSC's policy concerning trees near embankment dams, a total of 127 trees located in these designated zones will need to be removed. These include Tree 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 2, 09, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 290, 291, 306, 309, 311, 312, 313, 314, 315, 316, 317, 318, 319, 321, 322, 323, 324, 325, 326, 345, 346, 347, 348, 349, 397, 398, 399, 400, 401, 402, 414 and 418.

Figure 6: Embankment on the eastern side of the reservoir with non-permitted vegetation (Canopy Consulting, 2024)

Figure 7: Embankment on the northern side of the reservoir with non-permitted vegetation (Canopy Consulting, 2024)

5.8. Proactive Tree Works for Low-Risk Trees or Unassessed Trees

95 trees were assessed as having a 'low' risk rating per the TRAQ risk assessment method. When trees have this risk rating, arboricultural intervention is generally not required. However, in some instances across the site, proactive works have been recommended on low-risk trees, either to mitigate conflicts with built structures or to address structural features that may pose a future risk. Some examples of this include:

- Nine trees, including Trees 304, 307, 308, 310, 320, 352, 405, 406 and 407 have been recommended either a crown reduction, crown raised or selective branch removal to mitigate conflicts within private properties in the northern region of the site.
- Trees 217 and 331 were identified to have structural features of arboricultural concern. While still presenting a 'low' risk, a reduction in the end-weight of individual branches within their crown has been recommended to reduce the likelihood of failure over the long term.

- Trees 126 and 127 were identified to have serious structural faults which have a 'probable' likelihood of failure in the short-term and are unlikely to self-optimise over the long-term. Hence, both trees have been recommended for proactive removal.
- Deadwood overhanging residential yards was identified in Trees 315 and 334. Deadwood removal is regularly included in tree maintenance, as some deadwood can be large enough to cause damage or injury. Hence, in both instances, it was recommended for removal.

Figure 8: Tree 126 - Shear crack with decay on a first-order leader (Canopy Consulting, 2024)

Figure 9: Tree 127 - Using the adjacent tree (Tree 126) for support. This tree is likely not self-supporting (Canopy Consulting, 2024)

5.9. Moderate Risk Trees

Five trees presented a 'moderate' risk rating per the TRAQ risk method. All trees were located around the site's boundary. The recommendations are based on the risk assessment findings and are independent of other site considerations within the scope of works.

Trees 93 and 95 are *Banksia integrifolia,* located along the south-eastern boundary of the site. These trees have previously been 'topped', signified by multiple elongated leaders originating from the same location on the trunk at a consistent height. 'Topping' is regarded as an unacceptable arboricultural practice in *AS 4273-2007 Pruning of amenity trees*, as it may:

- Result in epicormic stem production. This type of growth is produced from dormant buds beneath the tree's bark layer. They generally have rapid elongation and growth rate and are more weakly attached when compared to a typical branch.
- Produce large and abundant pruning wounds that can be susceptible to decay.
- Permanently alter the natural form of a tree.
- Reduce the overall lifespan of a tree.

Considering the above, the ULE of both trees is assessed as 'short'. Regarding risk, the likelihood of one of the mature epicormic stems failing over the assessment period was considered 'probable', with a 'high' likelihood of striking the adjacent building. Reduction pruning was considered; however, this cannot be achieved per the guidelines of *AS 4373-2007 Pruning of amenity trees* and will likely result in ongoing maintenance for low-quality trees. Hence, both trees should be removed proactively.

Tree 178 is a *Banksia integrifolia* located along the sites eastern boundary. The trunk of this tree is over-extended with a poor taper and an asymmetrical crown with a low live crown ratio[2] (LCR) coupled with a high Height to Diameter Ratio[3] (H/D). This is likely a result of phototropism, as this tree was previously suppressed by an adjacent tree which has been removed. Lonsdale (1999) explains that over-extension of stems can be a structural concern, as branches and trunks with this architecture tend to have a non-uniform stress distribution when they sway in the wind. This tree has been recommended for removal.

[2] **Live Crown Ratio (LCR)**: the total percentage of tree height that supports live foliage. This measurement is used to indicate a tree's vigour and/or ability to respond to mechanical strain associated with static and dynamic stressors (Stancioiu et al., 2021). The overall length of live crown can be species-specific, depending on the species' overall shade tolerance.

[3] **Height to Diameter Ratio (H/D)**: the relationship between tree height and trunk diameter; this assessment calculates the ratio between the abovementioned tree measurements to determine 'slenderness' (Mattheck, 2007). Empirical arboricultural research has found that when H/D > 50, the likelihood of tree failure increases. However, additional factors, including site-specific biotic and abiotic conditions, tree age, overall size and structure, must be considered concurrent to this assessment.

Tree 241 is a *Banksia integrifolia* located along the site's eastern boundary. This tree exhibits poor structure as it bifurcates at ground level, forming a tight ranch junction with embedded bark. Decay is also present within the junction. Additionally, long canker wounds are present on leaders within the crown. It is recommended this tree is removed.

Figure 10: Tree 241 - Included junction at base

Figure 11: Canker wounds on leaders

Tree 307 is a mature *Eucalyptus botryoides* located on the site's northern boundary. This tree is exhibiting poor health, as the entire southern side of the crown is declining. Positive indicators of decay (fungal fruiting bodies) were observed on a first-order branch in the lower southern crown. Potential indicators of decay were noted on the trunk in the form of successive wounding with response growth.

The residual crown to the north entirely overhangs the rear yard of 87 Johnston Parade.

Tree 307 is one of the larger trees on site and still contributes high amenity and ecological benefits to the site. However, considering its foreseeable decline over a short timeframe and the 'moderate' risk rating, it is recommended that the client consider this tree for proactive removal.

5.10. High Risk Trees

Tree 184 was assessed as High risk due to hazard beam[4] and transverse[5] cracks being present on the tension side of the trunk. Transverse cracks can indicate "near complete failure" and often constitute an immediate hazard (Lonsdale, 2013, p.50). The reason this tree has not failed in both tension and compression is that this tree is currently propped up by an adjacent semi-mature *Lagunaria patersonia.*

The likelihood of failure was considered 'probable', with a 'high' likelihood of impacting the residential property.

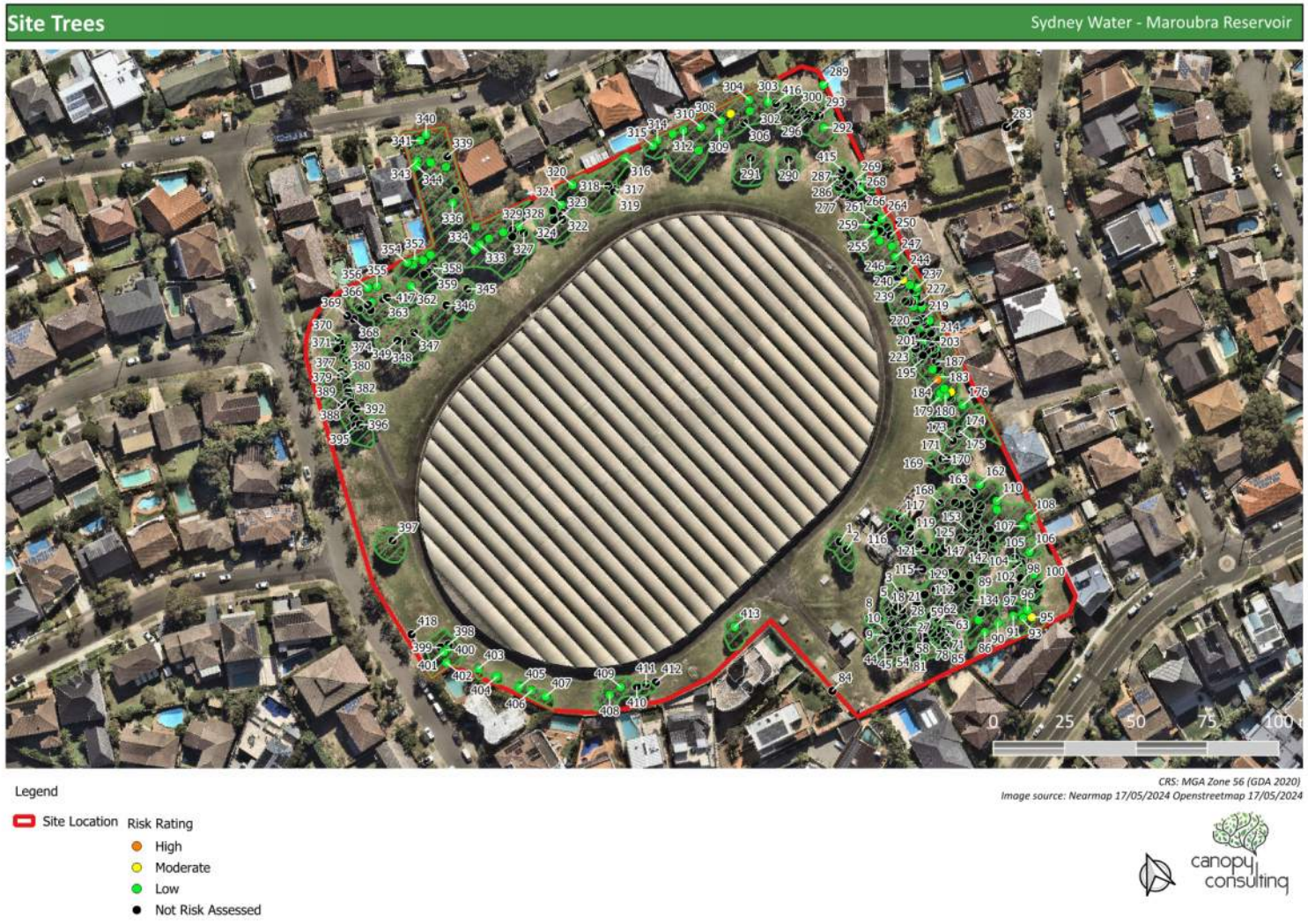
For the above reasons, this tree should be prioritised for removal.

Figure 12: Tree 241 - Longitudinal and transverse crack on the tension side of the trunk

[4] A separation of fibres occurring in the transitional zone between where tension and compression forces act on a branch or trunk (Dunster, 2017, p.114).
[5] A separation of fibres along their axes. Transverse cracks tend to be complete, as "forces that are strong enough to overcome the tensile strength of wood will also overcome its compressive strength" (Lonsdale, 2013, p.50)

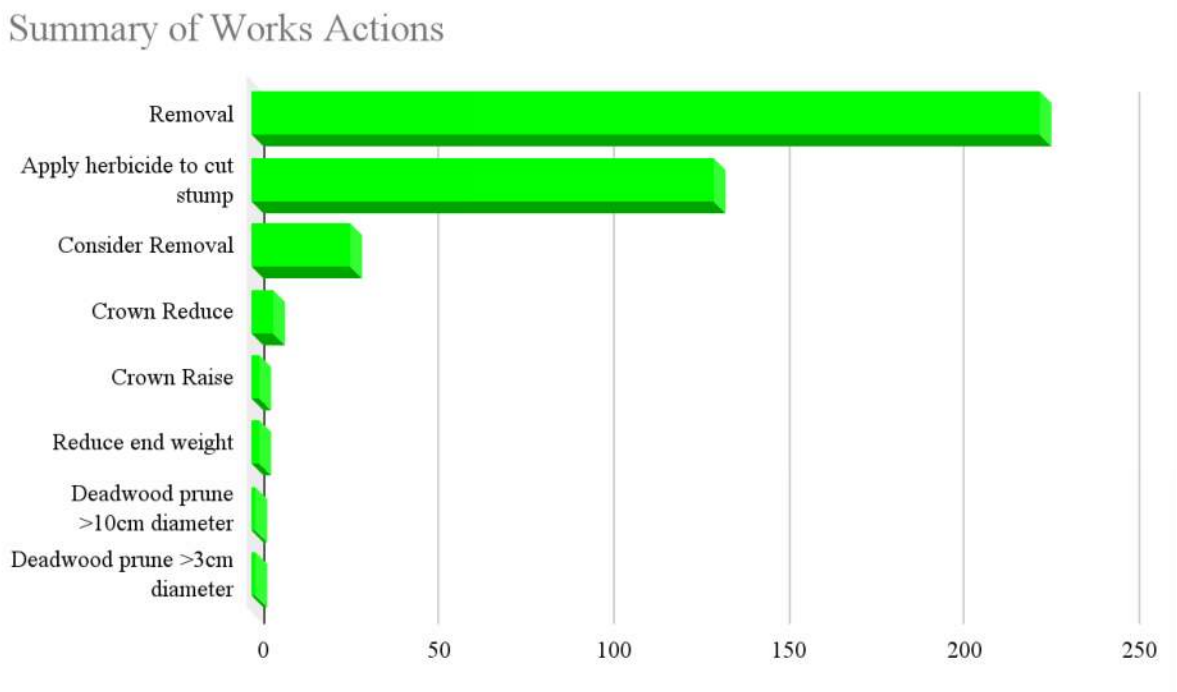
5.11. Tree Map and Risk Rating

5.12. Map Showing All Trees



5.13. Summary of Works Actions and Risk Rating

A comprehensive list of trees with recommended work actions are included in Appendix D – Contractor Works Package.



The summary of works actions chart provides an overview of the necessary maintenance, pruning, planting, and removal activities required to manage the tree population. By visualising the scope and scale of these actions, managers can allocate resources, prioritise tasks, and develop schedules for the ongoing care and management of the urban forest. This information is vital for ensuring the long-term health, safety, and sustainability of the tree population.

The risk assessment has been applied considering the persons and physical structures within the site.

Some levels of risk must be accepted to experience the benefits trees provide as no tree can be maintained completely free of risk (Dunster, 2017).

'Acceptable risk' is the degree of risk that is within a tree owner's or manager's tolerance or below a defined threshold.

The risk that each feature poses has been determined using the ISA Tree Risk Assessment method (TRAQ). Works actions have been divided into two categories;

- Risk related works (Table 9) for works above a Low risk i.e., Extreme, High and Moderate.
- Proactive works (Table 10) for works that won't result in a lower risk rating following successful completion, but may be enacted to reduce the potential of future risk e.g., formative pruning, or be related to general maintenance e.g., deadwood pruning.

By categorising the necessary actions based on the level of risk associated with each tree, these tables serve as a useful reference for prioritising maintenance, pruning, removal, or other interventions to effectively manage the tree population. This approach helps ensure that resources are allocated efficiently, with a focus on addressing the most urgent and high-risk situations first.

Table 9: Risk Related Works

Risk Related Works				
		Tree Numbers & Risk Rating (* indicates group)		
Works Action	Count of Works Actions	Extreme	High	Moderate
Removal	5		184	93, 95, 178, 241
Consider Removal	1			307
Selective branch prune	1			307
Total	**7**			

Table 10: Proactive Works

Proactive Works		
		Tree Numbers & Risk Rating (* indicates group)
Works Action	Count of Works Actions	Low
Removal	47	94, 176, 179, 180, 181, 182, 183, 186, 190, 192, 201, 206, 209, 210, 212, 217, 226, 229, 230, 235, 237, 238, 247, 248, 249, 253, 255, 256, 258, 259, 264, 309, 311, 312, 313, 314, 315, 316, 321, 352, 354, 355, 356, 357, 400, 401, 402
Apply herbicide to cut stump	12	94, 226, 238, 249, 352, 354, 355, 356, 357, 400, 401, 402
Crown Reduce	6	308, 320, 352, 405, 406, 407
Crown Raise	2	304, 310
Reduce end weight	2	217, 331
Deadwood prune >10cm diameter	1	334
Deadwood prune >3cm diameter	1	315
Total	**71**	

Table 11 details the risk rating of all trees on site.

Table 11. Risk Assessment Summary

Risk Summary			
Risk Rating	**No. of trees**	**Tree Numbers (* indicates group)**	**Risk Mitigation Timeline**
Extreme	0		Extreme-risk situations should be mitigated as soon as possible. Immediate action may be required to restrict access to the target zone.
High	1	184	High-risk situations should be mitigated as soon as practical
Moderate	5	93, 95, 178, 241, 307	Moderate-risk situations may not require mitigation but, if deemed necessary, could be mitigated when budget, work schedule, or pruning cycle allows. If the risk is acceptable to the client, the tree(s) could be retained and monitored.
Low	95	86, 87, 90, 91, 92, 94, 96, 101, 106, 107, 108, 109, 110, 162, 176, 179, 180, 181, 182, 183, 186, 190, 192, 201, 206, 209, 210, 212, 217, 226, 229, 230, 235, 237, 238, 247, 248, 249, 253, 255, 256, 258, 259, 264, 266, 289, 292, 303, 304, 305, 308, 309, 310, 311, 312, 313, 314, 315, 316, 320, 321, 328, 331, 332, 333, 334, 335, 336, 338, 340, 341, 342, 343, 344, 350, 351, 352, 353, 354, 355, 356, 357, 362, 364, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 413	Low-risk trees should be retained and monitored (if appropriate) and/or mitigated, if desired, when the budget, work schedule or pruning cycle allows.
Total	**101**		

5.14. Canopy Cover Analysis

An analysis of current and residual canopy cover of the site has been undertaken using geospatial software and aerial imagery sourced from 7 April 2024 (Nearmap, 2024).

The analysis indicates the current canopy cover is approximately 8122 sqm (Figure 13). Following removal of trees on site with a removal action, not considering trees with a consider removal action, the canopy cover will be 5054 sqm (Figure 14). This equates to a 38% site loss. Of this, the primary areas are along the eastern boundary and set back from the northern boundary. The visual amenity impact is expected to be from the eastern and northern aspects. Other areas of the locality will be less visually affected.

Figure 13: Current Canopy Cover. (Nearmap, 7 April 2024)

Should trees categorised as environmental weeds also be removed, additional canopy loss will be realised in the polygon area shown in Figure 14. It should be noted that these trees are unlikely to significantly contribute to the amenity or environment of the local area.

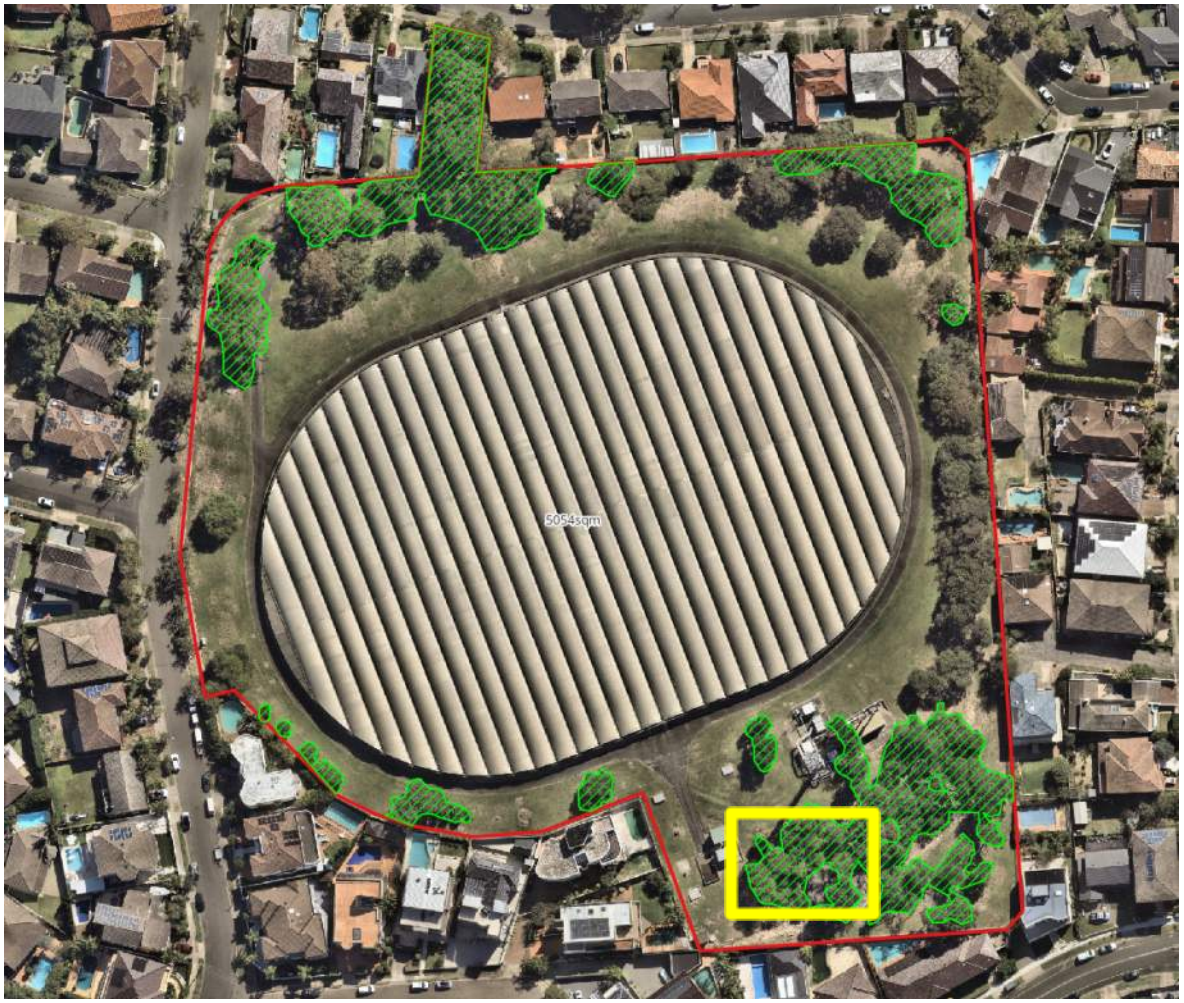


Figure 14: Projected Canopy Cover. (Nearmap, 7 April 2024)

6. Recommendations

6.1. Tree Works

In accordance with Part 5 approval under EP&A Act - Consent is not required to undertake the following works.

Undertake recommended works and pruning of trees as per Appendix C – Contractor Works Package. Works should be prioritised by risk rating.

The following trees are recommended for removal. Trees categorised as 'Not Risk Assessed' are those that require removal due to dam stabilisation works.

Table 12. Tree Removal Summary

Tree Removals					
	Tree Numbers & Risk Rating (* indicates group)				
Count of Removals	Extreme	High	Moderate	Low	Not Risk Assessed
247		184	93, 95, 178, 241, 307	94, 176, 179, 180, 181, 182, 183, 186, 190, 192, 201, 206, 209, 210, 212, 217, 226, 229, 230, 235, 237, 238, 247, 248, 249, 253, 255, 256, 258, 259, 264, 309, 311, 312, 313, 314, 315, 316, 321, 352, 354, 355, 356, 357, 400, 401, 402	3, 5, 6, 8, 11, 13, 15, 18, 19, 24, 25, 26, 27, 32, 33, 34, 35, 37, 42, 44, 45, 46, 47, 48, 49, 53, 54, 55, 56, 57, 58, 59, 61, 63, 69, 70, 71, 73, 74, 75, 76, 78, 79, 81, 83, 84, 88, 100, 111, 112, 115, 116, 126, 127, 135, 136, 137, 139, 141, 143, 146, 147, 151, 152, 153, 154, 155, 156, 158, 160, 169, 170, 171, 172, 173, 174, 175, 177, 185, 187, 188, 189, 191, 193, 194, 195, 196, 197, 198, 199, 200, 202, 203, 204, 205, 207, 208, 211, 213, 214, 215, 216, 218, 219, 220, 221, 222, 223, 224, 225, 227, 228, 231, 232, 233, 234, 236, 239, 240, 242, 243, 244, 245, 246, 250, 251, 252, 254, 257, 260, 261, 262, 263, 265, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 290, 291, 306, 317, 318, 319, 322, 323, 324, 325, 326, 345, 346, 347, 348, 349, 366, 367, 368, 369, 370, 372, 374, 376, 377, 378, 379, 380, 381, 384, 385, 386, 387, 388, 389, 393, 395, 397, 398, 399, 414, 415, 416, 418
247					

6.2. Quality of Works

Where possible, retain deadwood greater than 5 cm diameter at lengths of 20 cm measured from the branch collar to reduce the likelihood of failure but conserve some environmental benefit.

Any works applied due to this report should be undertaken on a priority basis; whereby trees of a higher risk category are worked on before those of lower-risk levels as budget allows.

Trees are to be pruned in accordance with AS 4373-2007: *Pruning of Amenity Trees* (Standards Australia, 2007).

Trees are to be dismantled and/or removed in such a manner as to avoid damage to adjacent or understory vegetation and structures.

All pruning and/or removal works should be completed by a minimum AQF Level 3 Arborist or under direct supervision thereof.

6.3. Offset Planting - Tube Stock Specification

Trees authorised for removal, including those that are dead, should be replaced by a similar species native to the Local Government Area (LGA) where feasible. The replacement tree should be planted as close as possible to the original tree's location, grown to full size, and substituted if it does not survive. Where possible, trees are to be replanted using tube stock at a ratio of 4:1.

The trees must be procured from a reputable nursery, with stock that meets both NATSPEC and the Australian Standard AS 2303:2018 for *Tree Stock for Landscape Use* (Standards Australia Limited, 2018).

Trees should be planted as follows:

- The planting area should be at least 5 meters away from the shared, residential boundary fence.
- The planting must occur outside the Tree Protection Zone (TPZ) of any preserved trees, typically extending to the canopy drip line.
- The soil in the planting area should be tilled to a depth between 30-50 cm, avoiding intrusion into the TPZ of any retained trees.
- Dig a hole 2-3 times the root ball's size for the tree. For larger species, space the holes 3-4 meters apart. If the soil has not been deeply ripped, prevent glazing of the hole sides by forking or barring them to loosen the surrounding soil.
- Before planting, ensure seedlings are hydrated. Add water-saving crystals and slow-release fertiliser to the hole's base, avoiding direct contact with the root ball. Following the planting details (see Figure 15), place the tree in the hole and backfill with loose topsoil. Water thoroughly to promote deep root growth.
- The cultivated area should be covered with a 75-100 mm layer of organic, woody mulch, avoiding the trunk of new plantings.
- Water the newly planted trees weekly for the first month and then fortnightly for the next six months, especially during or before summer. Keep the mulched areas weed-free for 12 months.

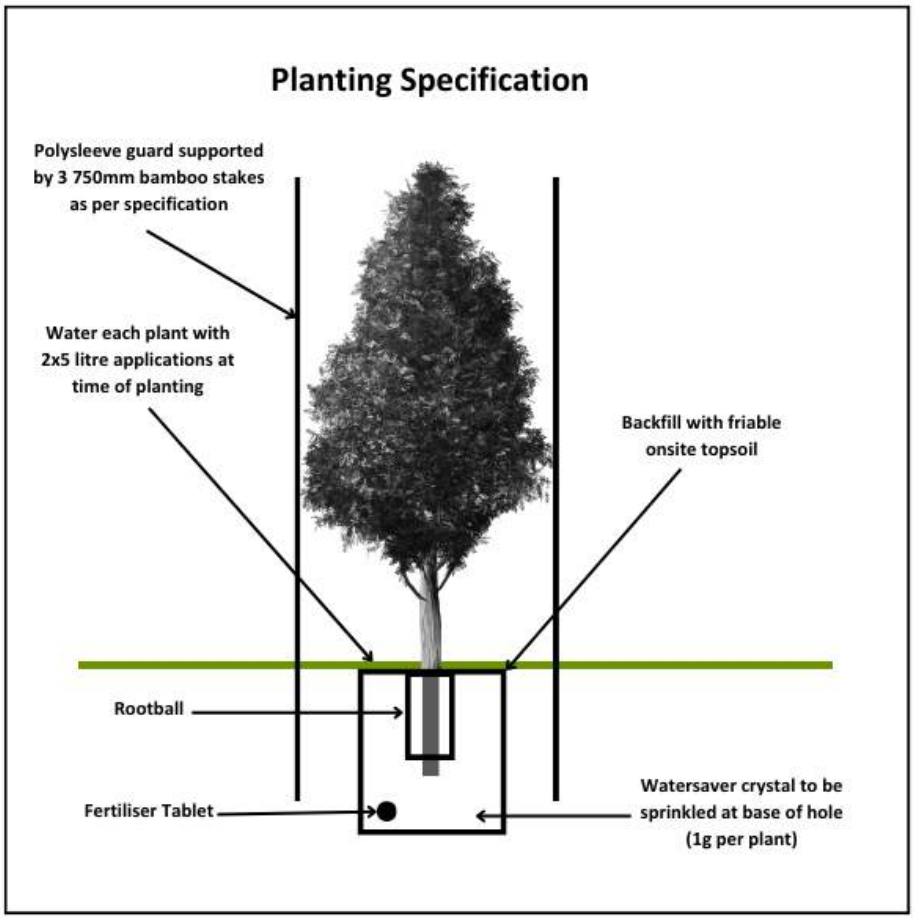


Figure 15: Recommended tube stock planting

6.4. Offset Planting - Advanced Tree Specification

Where feasible, trees should be replaced with more advanced specimens.

Trees should be sourced from a reputable nursery with stock grown to NATSPEC and Australian Standard AS 2303:2018 *Tree Stock for Landscape Use* criteria (Standards Australia Limited, 2018).

Trees should be at least 25L pot size at the time of planting.

The trees should be planted and mulched with suitably composted, natural, hardwood mulch as per Figure 16.

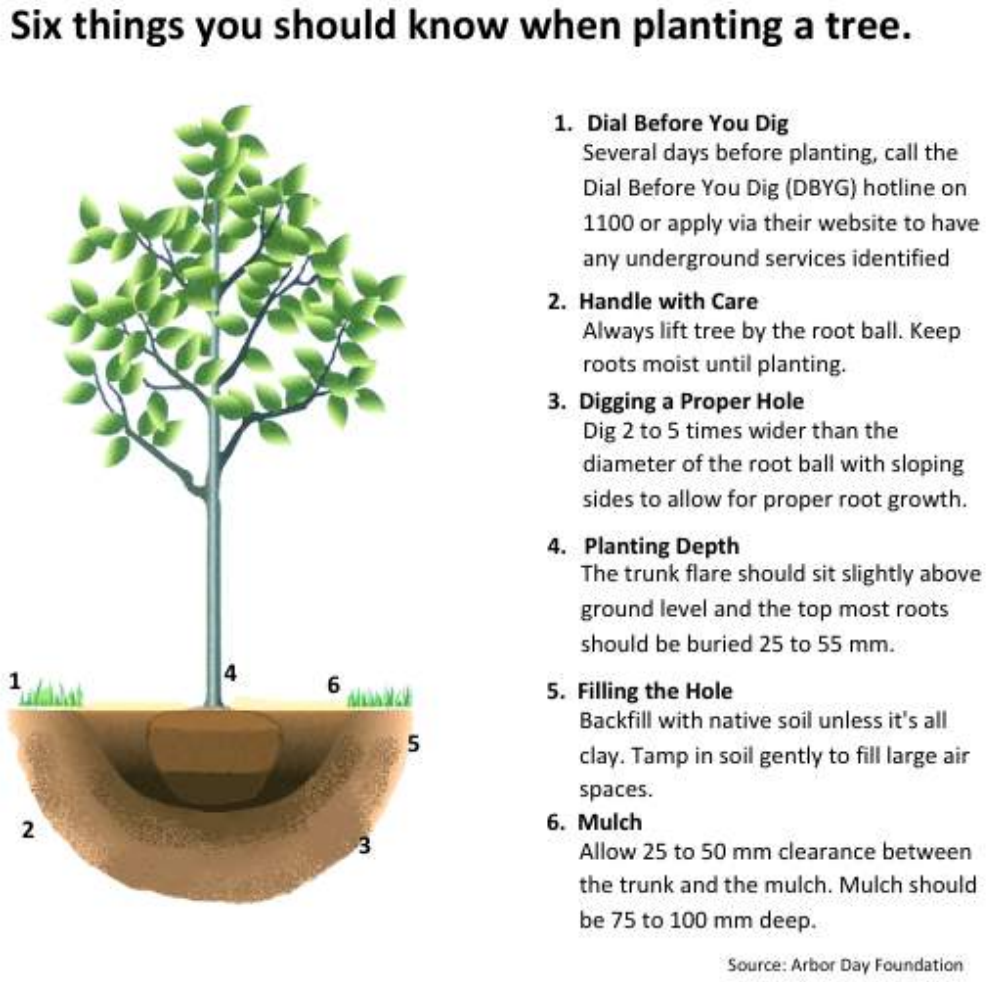


Figure 16: Recommended tree planting process. (Arbor Day Foundation, 2019)

6.5. Suggested Replacement Species

Suggested replacement species suitable for the site include:

- *Angophora costata* subsp. *costata* (Sydney Red Gum)
- *Acacia longifolia (*Sydney Golden Wattle*)*
- *Banksia integrifolia* (Coast Banksia)
- *Banksia serrata* (Old Man Banksia)
- *Corymbia gummifera* (Red Bloodwood)
- *Eucalyptus botryoides* (Southern Mahogany)

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8. Appendix A – Tree Assessment Definitions

HEALTH:

Relates to the vigour and vitality of the tree.

Descriptor	Definition
Good	The tree is demonstrating good or exceptional growth and/or vigour. The tree exhibits a full canopy with good extension growth and may have only minor pest or disease issues.
Fair	The tree demonstrates reasonable condition and/or vigour. The tree exhibits an adequate canopy of foliage and may have reduced extension growth.
Poor	The tree demonstrates reduced growth and may have a thinning or sparse canopy. Large amounts of deadwood and dieback may be present throughout the crown. Significant pest or disease problems may be evident.
Dead	No live or functional plant tissue present.

STRUCTURE:

Relates to the structural condition of the tree from roots to shoots.

Descriptor	Definition
Good	The tree has a well-balanced and defined crown with well-formed unions and branch taper. No visible structural defects.
Fair	The tree has minor structural problems which may include wounds, or minor damage. The tree is producing good growth responses to noted defects.
Poor	The tree has moderate to significant structural defects with poor or nil response growth response.
Has Failed	The tree or large tree part has failed.

AGE CLASS:

Refers to the status of the tree life cycle

Descriptor	Definition
Young	The tree is a small example of the species which has recently been planted.
Juvenile	The tree is a small example of the species which has not yet reached its full reproductive capacity for the taxa in *situ*.
Semi-mature	The tree is in an active growth phase, may be reproducing, but has not yet reached its full genetic potential for the taxa in *situ*.
Mature	The tree has reached its maximum physical size for the taxa in situ.
Senescent	The tree is reaching the end of its life cycle and may be exhibiting a reduction in vigour or show evidence of crown retrenchment.

Tree Landscape Significance - Assessment Criteria

1. High Significance in landscape	2. Medium Significance in landscape	3. Low Significance in landscape
The tree is in good condition and good vigour; The tree has a form typical for the species; The tree is a remnant or is a planted locally indigenous specimen and/or is rare or uncommon in the local area or of botanical interest or of substantial age; The tree is listed as a Heritage Item, Threatened Species or part of an Endangered ecological community or listed on Councils significant Tree Register; The tree is visually prominent and visible from a considerable distance when viewed from most directions within the landscape due to its size and scale and makes a positive contribution to the local amenity; The tree supports social and cultural sentiments or spiritual associations, reflected by the broader population or community group or has commemorative values; The tree's growth is unrestricted by above and below ground influences, supporting its ability to reach dimensions typical for the taxa *in situ* - tree is appropriate to the site conditions.	The tree is in fair-good condition and good or low vigour; The tree has form typical or atypical of the species; The tree is a planted locally indigenous or a common species with its taxa commonly planted in the local area The tree is visible from surrounding properties, although not visually prominent as partially obstructed by other vegetation or buildings when viewed from the street, The tree provides a fair contribution to the visual character and amenity of the local area, The tree's growth is moderately restricted by above or below ground influences, reducing its ability to reach dimensions typical for the taxa *in situ*.	The tree is in fair-poor condition and good or low vigour; The tree has form atypical of the species; The tree is not visible or is partly visible from surrounding properties as obstructed by other vegetation or buildings, The tree provides a minor contribution or has a negative impact on the visual character and amenity of the local area, The tree is a young specimen which may or may not have reached dimension to be protected by local Tree Preservation orders or similar protection mechanisms and can easily be replaced with a suitable specimen, The tree's growth is severely restricted by above or below ground influences, unlikely to reach dimensions typical for the taxa *in situ* - tree is inappropriate to the site conditions, The tree is listed as exempt under the provisions of the local Council Tree Preservation Order or similar protection mechanisms, The tree has a wound or defect that has potential to become structurally unsound. **Environmental Pest / Noxious Weed Species** The tree is an Environmental Pest Species due to its invasiveness or poisonous/ allergenic properties, The tree is a declared noxious weed by legislation. **Hazardous/Irreversible Decline** The tree is structurally unsound and/or unstable and is considered potentially dangerous, The tree is dead, or is in irreversible decline, or has the potential to fail or collapse in full or part in the immediate to short term.

The tree is to have a minimum of three (3) criteria in a category to be classified in that group. Note: The assessment criteria are for individual trees only, however, can be applied to a monocultural stand in its entirety e.g. hedge.

Estimated Life Expectancy

1. Long	2. Medium	3. Short	4. Remove
Trees that appear to be retainable with an acceptable level of risk for more than 40 years. Structurally sound trees located in positions that can accommodate future growth. Storm damaged or defective trees that could be made suitable for retention in the long term by remedial tree surgery. Trees of special significance for historical, commemorative, or rarity reasons that would warrant extraordinary efforts to secure their long-term retention.	Trees that appear to be retainable with an acceptable level of risk for 15-40 years. Trees that may only live between 15 and 40 more years. Trees that may live for more than 40 years but would be removed to allow the safe development of more suitable individuals. Trees that may live for more than 40 years but would be removed during the course of normal management for safety or nuisance reasons. Storm damaged or defective trees that require substantial remedial work to make safe and are only suitable for retention in the short term.	Trees that appear to be retainable with an acceptable level of risk for 5-15 years. Trees that may only live between 5 and 15 more years. Trees that may live for more than 15 years but would be removed to allow the safe development of more suitable individuals. Trees that may live for more than 15 years but would be removed during the course of normal management for safety or nuisance reasons. Storm damaged or defective trees that require substantial remedial work to make safe and are only suitable for retention in the short term.	Trees with a high level of risk that would need removing within the next 5 years. Dead trees. Trees that should be removed within the next 5 years. Dying or suppressed or declining trees through disease or inhospitable conditions. Dangerous trees through instability or recent loss of adjacent trees. Dangerous trees through structural defects, including cavities, decay, included bark, wounds, or poor form. Damaged trees that were considered unsafe to retain. Trees that could live for more than 5 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting. Trees that will become dangerous after removal of trees for other reasons.

9. Appendix B – Tree Risk Assessment Definitions

The tree risk assessment has been completed using the following definitions to categorise each element of the risk assessment matrix as per the ISA Tree Risk Assessment Qualification (TRAQ) manual – Second Edition (International Society of Arboriculture, 2017).

LIKELIHOOD OF FAILURE

Descriptor	Likelihood of failure
	Definition
Imminent	Failure has started or is most likely to occur in the near future, even if there is no significant wind or increased load.
Probable	Failure may be expected under normal weather conditions within the specified timeframe.
Possible	Failure may be expected in extreme weather conditions but is unlikely to occur during normal weather conditions within the specified timeframe.
Improbable	The tree or tree part is not likely to fail during normal weather conditions and may not fail in extreme weather conditions within the specified timeframe.

LIKELIHOOD OF IMPACTING TARGET

Descriptor	Likelihood of impact
	Definition
High	The failed tree or tree part is likely to impact the target. This is the case where there is a constant target with no protection factors, and the direction of fall is towards the target.
Medium	The failed tree or tree part could impact the target but is not expected to do so. This is the case for people in a frequently used area where the direction of fall may or may not be toward the target.
Low	There is a slight chance that the failed tree or tree part will impact the target. This is the case for people in an occasionally used area with no protection factors, a no predictable direction of fall; a frequently used area that is partially protected; or a constant target that is well protected from the assessed tree.
Very low	The chance of the failed tree or tree part impacting the specified target is remote. Likelihood of impact could be rated very low if the target is outside the anticipated target zone or if occupancy is rare.

CONSEQUENCES OF FAILURE

Descriptor	Consequences of failure
	Definition
Severe	Are consequences that could involve serious personal injury or death, high-value property damage, or major disruption of important activities.
Significant	Are consequences that involve substantial personal injury, moderate to high-value property damage, or considerable disruption of activities.
Minor	Are consequences that involve minor personal injury, low to moderate-value property damage, or small disruption of activities.
Negligible	Are consequences that do not result in personal injury, involve low-value property damage, or disruptions that can be replaced or repaired.

Estimated Life Expectancy

1. Long	2. Medium	3. Short	4. Remove
Trees that appear to be retainable with an acceptable level of risk for more than 40 years. Structurally sound trees located in positions that can accommodate future growth. Storm damaged or defective trees that could be made suitable for retention in the long term by remedial tree surgery. Trees of special significance for historical, commemorative, or rarity reasons that would warrant extraordinary efforts to secure their long-term retention.	Trees that appear to be retainable with an acceptable level of risk for 15-40 years. Trees that may only live between 15 and 40 more years. Trees that may live for more than 40 years but would be removed to allow the safe development of more suitable individuals. Trees that may live for more than 40 years but would be removed during the course of normal management for safety or nuisance reasons. Storm damaged or defective trees that require substantial remedial work to make safe and are only suitable for retention in the short term.	Trees that appear to be retainable with an acceptable level of risk for 5-15 years. Trees that may only live between 5 and 15 more years. Trees that may live for more than 15 years but would be removed to allow the safe development of more suitable individuals. Trees that may live for more than 15 years but would be removed during the course of normal management for safety or nuisance reasons. Storm damaged or defective trees that require substantial remedial work to make safe and are only suitable for retention in the short term.	Trees with a high level of risk that would need removing within the next 5 years. Dead trees. Trees that should be removed within the next 5 years. Dying or suppressed or declining trees through disease or inhospitable conditions. Dangerous trees through instability or recent loss of adjacent trees. Dangerous trees through structural defects, including cavities, decay, included bark, wounds, or poor form. Damaged trees that were considered unsafe to retain. Trees that could live for more than 5 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting. Trees that will become dangerous after removal of trees for other reasons.

10. Appendix C – Tree Inventory

Tree Number (* indicates group)	Botanical Name	Common Name	Height (m)	DBH (cm)	Canopy Spread (m)	Health	Structure	Status	Age Class	Origin	Useful Life Expectancy (ULE)	STARS© Landscape Significance Rating	Number of trees in group	Observations	Observation Comments	Works Actions	Works Comments	Risk Rating
1	*Banksia integrifolia*	Coast Banksia	8	45	5	Fair	Fair	Alive	Mature	Indigenous	Short (5-15)	2 (Medium)	1	Co-dominant stems, Deadwood major (>10cm diameter), Dieback, Mistletoe				
2	*Banksia integrifolia*	Coast Banksia	9	50	7	Good	Good	Alive	Mature	Indigenous	Medium (15-40)	1 (High)	1	Deadwood moderate (3-10cm diameter), Poor pruning, Wound(s)				
3	*Acacia salicina*	Sally Wattle	4	25	7	Good	Fair	Alive	Mature	Native	Short (5-15)	4 (Environmental Pest / Noxious Weed)	1	Asymmetrical crown, Broken Limb, Deadwood moderate (3-10cm diameter), Included bark, Wound(s)	Marked for removal (Blue)	Apply herbicide to cut stump, Consider Removal	Whole tree removal - environmental weed	
4	*Banksia serrata*	Saw-tooth Banksia	6	60	9	Poor	Fair	Alive	Mature	Indigenous	Short (5-15)	2 (Medium)	1	Asymmetrical crown, Co-dominant stems, Deadwood major (>10cm diameter), Dieback, Epicormic shoots, Excessively thin crown density, Mistletoe				
5	*Pittosporum undulatum*	Sweet Pittosporum	3	9	2	Good	Good	Alive	Juvenile	Indigenous	Medium (15-40)	4 (Environmental Pest / Noxious Weed)	1	Deadwood moderate (3-10cm diameter)		Apply herbicide to cut stump, Removal	Whole tree removal - weed species with General Biosecurity Duty (NSW DPI)	
6	*Melaleuca armillaris*	bracelet Honey-myrtle, needle-leaved Honey-myrtle	5	43.3	6	Dead	Has failed	Dead	Mature	Dead or other	Dead Or Hazardous/Remove (0-5)	5 (Hazardous / Irreversible Decline)	1	Significant fault - standing dead tree	Marked for removal (blue paint)	Removal	Dead tree removal	
7	*Melaleuca armillaris*	bracelet Honey-myrtle, needle-leaved Honey-myrtle	8	30	3	Fair	Poor	Alive	Mature	Indigenous	Short (5-15)	3 (Low)	1	Broken Limb, Crack or split, Deadwood major (>10cm diameter), Previous failure(s), Significant fault - cracked/split branches				
8	*Pittosporum undulatum*	Sweet Pittosporum	3	10	2	Good	Fair	Alive	Juvenile	Indigenous	Medium (15-40)	4 (Environmental Pest / Noxious Weed)	1	Broken Limb, Co-dominant stems, Environmental/Declared Weed, Previous failure(s)		Apply herbicide to cut stump, Removal	Whole tree removal - weed species with General Biosecurity Duty (NSW DPI)	
9	*Banksia integrifolia*	Coast Banksia	2	3	1	Good	Good	Alive	Young	Indigenous	Long (>40)	3 (Low)	1	Suppressed				
10	*Banksia integrifolia*	Coast Banksia	2	2	1	Good	Good	Alive	Young	Indigenous	Medium (15-40)	3 (Low)	1	Suppressed				
11	*Acacia saligna*	Golden Wreath Wattle	7	20	4	Good	Fair	Alive	Semi-mature	Native	Short (5-15)	4 (Environmental Pest / Noxious Weed)	1	Crossing/rubbing branches, Deadwood minor (<3cm diameter), Included bark		Apply herbicide to cut stump, Consider Removal	Whole tree removal - environmental weed	
12	*Homalanthus populifolius*	Bleeding heart	2	4	1	Fair	Fair	Alive	Young	Indigenous	Short (5-15)	3 (Low)	1	Deadwood moderate (3-10cm diameter), Dieback, Previous failure(s), Wound(s)				
13	*Melaleuca armillaris*	bracelet Honey-myrtle, needle-leaved Honey-myrtle	3	30	7	Dead	Has failed	Dead	Mature	Dead or other	Dead Or Hazardous/Remove (0-5)	5 (Hazardous / Irreversible Decline)	1	Hanger(s), Significant fault - standing dead tree	Fallen dead tree.	Removal	Dead tree removal	
14	*Banksia serrata*	Saw-tooth Banksia	7	40	7	Poor	Good	Alive	Mature	Indigenous	Short (5-15)	2 (Medium)	1	Asymmetrical crown, Deadwood major (>10cm diameter), Dieback, Included bark, Mistletoe				
15	*Pittosporum undulatum*	Sweet Pittosporum	3	3	2	Fair	Good	Alive	Juvenile	Indigenous	Short (5-15)	4 (Environmental Pest / Noxious Weed)	1	Environmental/Declared Weed, Suppressed		Apply herbicide to cut stump, Removal	Whole tree removal - weed species with General Biosecurity Duty (NSW DPI)	
16	*Strelitzia nicolai*	Giant Bird of Paradise	7	20	3	Good	Good	Alive	Mature	Exotic	Long (>40)	3 (Low)	1					
17	*Banksia serrata*	Saw-tooth Banksia	5	30	6	Fair	Poor	Alive	Mature	Indigenous	Medium (15-40)	2 (Medium)	1	Asymmetrical crown, Deadwood moderate (3-10cm diameter), Wound(s)				
18	*Pittosporum undulatum*	Sweet Pittosporum	4	4	1	Good	Good	Alive	Juvenile	Indigenous	Medium (15-40)	4 (Environmental Pest / Noxious Weed)	1	Plant pathogen, Suppressed		Apply herbicide to cut stump, Removal	Whole tree removal - weed species with General Biosecurity Duty (NSW DPI)	
19	*Pittosporum undulatum*	Sweet Pittosporum	4	6	2	Good	Good	Alive	Juvenile	Indigenous	Medium (15-40)	4 (Environmental Pest / Noxious Weed)	1	Environmental/Declared Weed, Included bark		Apply herbicide to cut stump, Removal	Whole tree removal - weed species with General Biosecurity Duty (NSW DPI)	
20	*Banksia serrata*	Saw-tooth Banksia	7	45	7	Fair	Fair	Alive	Mature	Indigenous	Short (5-15)	2 (Medium)	1	Asymmetrical crown, Co-dominant stems, Deadwood major (>10cm diameter), Dieback, Mistletoe				
21	*Strelitzia nicolai*	Giant Bird of Paradise	4	20	2	Good	Good	Alive	Semi-mature	Exotic	Long (>40)	3 (Low)	1	Deadwood moderate (3-10cm diameter)				
22	*Strelitzia nicolai*	Giant Bird of Paradise	4	20	2	Good	Good	Alive	Semi-mature	Exotic	Long (>40)	3 (Low)	1	Deadwood moderate (3-10cm diameter)				
23	*Hakea sp.*	Hakea	2	7	7	Good	Poor	Alive	Semi-mature	Indigenous	Short (5-15)	3 (Low)	1	Asymmetrical crown, Previous failure(s)	Appears to have previously failed at the root plate			
24	*Melaleuca armillaris*	bracelet Honey-myrtle, needle-leaved Honey-myrtle	5	40	5	Dead	Has failed	Dead	Mature	Dead or other	Dead Or Hazardous/Remove (0-5)	5 (Hazardous / Irreversible Decline)	1	Previous failure(s), Significant fault - standing dead tree	Fallen dead tree. Marked for removal.	Removal	Dead tree removal	
25	*Pittosporum undulatum*	Sweet Pittosporum	3	3	1	Good	Good	Alive	Young	Indigenous	Long (>40)	4 (Environmental Pest / Noxious Weed)	1	Environmental/Declared Weed		Apply herbicide to cut stump, Removal	Whole tree removal - weed species with General Biosecurity Duty (NSW DPI)	
26	*Acacia saligna*	Golden Wreath Wattle	6	15	7	Fair	Fair	Alive	Semi-mature	Native	Short (5-15)	4 (Environmental Pest / Noxious Weed)	1	Asymmetrical crown, Over-extended branch(es)		Apply herbicide to cut stump, Consider Removal	Whole tree removal - environmental weed	
27	*Melaleuca armillaris*	bracelet Honey-myrtle, needle-leaved Honey-myrtle	3	30	3	Dead	Has failed	Dead	Mature	Dead or other	Dead Or Hazardous/Remove (0-5)	5 (Hazardous / Irreversible Decline)	1	Broken Limb, Significant fault - standing dead tree		Removal	Dead tree removal	

Tree Number (* indicates group)	Botanical Name	Common Name	Height (m)	DBH (cm)	Canopy Spread (m)	Health	Structure	Status	Age Class	Origin	Useful Life Expectancy (ULE)	STARS© Landscape Significance Rating	Number of trees in group	Observations	Observation Comments	Works Actions	Works Comments	Risk Rating
1	*Banksia integrifolia*	Coast Banksia	8	45	5	Fair	Fair	Alive	Mature	Indigenous	Short (5-15)	2 (Medium)	1	Co-dominant stems, Deadwood major (>10cm diameter), Dieback, Mistletoe				
28	*Strelitzia nicolai*	Giant Bird of Paradise	6	20	4	Good	Good	Alive	Mature	Exotic	Long (>40)	2 (Medium)	1					
29	*Strelitzia nicolai*	Giant Bird of Paradise	2	10	2	Good	Good	Alive	Juvenile	Exotic	Long (>40)	3 (Low)	1	Deadwood minor (<3cm diameter)				
30	*Cupaniopsis anacardioides*	Tuckeroo	4	4	1	Fair	Good	Alive	Juvenile	Native	Long (>40)	3 (Low)	1	Co-dominant stems				
31	*Cupaniopsis anacardioides*	Tuckeroo	4	2	1	Good	Good	Alive	Young	Native	Short (5-15)	3 (Low)	1	Suppressed				
32	*Melaleuca armillaris*	bracelet Honey-myrtle, needle-leaved Honey-myrtle	6	15	1	Dead	Poor	Dead	Semi-mature	Dead or other	Dead Or Hazardous/Remove (0-5)	5 (Hazardous / Irreversible Decline)	1	Significant fault - standing dead tree		Removal	Dead tree removal	
33	*Melaleuca armillaris*	bracelet Honey-myrtle, needle-leaved Honey-myrtle	1	15	1	Dead	Has failed	Dead	Semi-mature	Dead or other	Dead Or Hazardous/Remove (0-5)	5 (Hazardous / Irreversible Decline)	1	Significant fault - standing dead tree	Fallen dead tree	Removal	Dead tree removal	
34	*Melaleuca armillaris*	bracelet Honey-myrtle, needle-leaved Honey-myrtle	1	30	2	Dead	Has failed	Dead	Semi-mature	Dead or other	Dead Or Hazardous/Remove (0-5)	5 (Hazardous / Irreversible Decline)	1	Previous failure(s)	Fallen dead tree	Removal	Dead tree removal	
35	*Acacia saligna*	Golden Wreath Wattle	7	20	4	Fair	Good	Alive	Semi-mature	Native	Medium (15-40)	4 (Environmental Pest / Noxious Weed)	1	Deadwood moderate (3-10cm diameter)	Marked for removal	Apply herbicide to cut stump, Consider Removal	Whole tree removal - environmental weed	
36	*Banksia integrifolia*	Coast Banksia	2	2	1	Good	Good	Alive	Young	Indigenous	Long (>40)	3 (Low)	1	Asymmetrical crown, Suppressed				
37	*Pittosporum undulatum*	Sweet Pittosporum	2	5	2	Good	Fair	Alive	Juvenile	Indigenous	Short (5-15)	4 (Environmental Pest / Noxious Weed)	1	Asymmetrical crown, Co-dominant stems, Environmental/Declared Weed		Apply herbicide to cut stump, Removal	Whole tree removal - weed species with General Biosecurity Duty (NSW DPI)	
38	*Banksia integrifolia*	Coast Banksia	1	2	1	Good	Fair	Alive	Young	Indigenous	Short (5-15)	3 (Low)	1	Asymmetrical crown, Suppressed				
39	*Banksia integrifolia*	Coast Banksia	1	2	1	Good	Good	Alive	Young	Indigenous	Short (5-15)	3 (Low)	1	Suppressed				
40	*Banksia integrifolia*	Coast Banksia	2	4	1	Good	Fair	Alive	Juvenile	Indigenous	Medium (15-40)	3 (Low)	1	Suppressed				
41	*Banksia integrifolia*	Coast Banksia	2	3	1	Good	Fair	Alive	Juvenile	Indigenous	Short (5-15)	3 (Low)	1	Asymmetrical crown, Suppressed				
42	*Acacia saligna*	Golden Wreath Wattle	7	25	4	Good	Good	Alive	Mature	Native	Medium (15-40)	4 (Environmental Pest / Noxious Weed)	1	Deadwood moderate (3-10cm diameter)		Apply herbicide to cut stump, Consider Removal	Whole tree removal - environmental weed	
43	*Leptospermum laevigatum*	Coastal Tea Tree	2	6	3	Good	Fair	Alive	Semi-mature	Indigenous	Medium (15-40)	3 (Low)	1	Broken Limb, Co-dominant stems, Deadwood minor (<3cm diameter)				
44	*Acacia saligna*	Golden Wreath Wattle	8	25	4	Good	Good	Alive	Mature	Native	Medium (15-40)	4 (Environmental Pest / Noxious Weed)	1	Crossing/rubbing branches, Deadwood moderate (3-10cm diameter)		Apply herbicide to cut stump, Consider Removal	Whole tree removal - environmental weed	
45	*Acacia saligna*	Golden Wreath Wattle	8	25	5	Good	Good	Alive	Mature	Native	Medium (15-40)	4 (Environmental Pest / Noxious Weed)	1	Deadwood minor (<3cm diameter)		Apply herbicide to cut stump, Consider Removal	Whole tree removal - environmental weed	
46	*Acacia saligna*	Golden Wreath Wattle	2	3	1	Fair	Fair	Alive	Juvenile	Native	Short (5-15)	4 (Environmental Pest / Noxious Weed)	1	Asymmetrical crown, Previous failure(s), Suppressed		Apply herbicide to cut stump, Consider Removal	Whole tree removal - environmental weed	
47	*Acacia saligna*	Golden Wreath Wattle	4	3	1	Fair	Poor	Alive	Juvenile	Native	Short (5-15)	4 (Environmental Pest / Noxious Weed)	1	Asymmetrical crown, Crossing/rubbing branches, Deadwood moderate (3-10cm diameter), Weak attachments		Apply herbicide to cut stump, Consider Removal	Whole tree removal - environmental weed	
48	*Acacia saligna*	Golden Wreath Wattle	3	3	2	Fair	Fair	Alive	Juvenile	Native	Short (5-15)	4 (Environmental Pest / Noxious Weed)	1	Included bark, Plant pathogen, Wound(s)		Apply herbicide to cut stump, Consider Removal	Whole tree removal - environmental weed	
49	*Acacia saligna*	Golden Wreath Wattle	6	8	2	Good	Fair	Alive	Juvenile	Native	Medium (15-40)	4 (Environmental Pest / Noxious Weed)	1	Broken Limb, Deadwood moderate (3-10cm diameter), Hanger(s)		Apply herbicide to cut stump, Consider Removal	Whole tree removal - environmental weed	
50	*Banksia integrifolia*	Coast Banksia	2	1	1	Good	Good	Alive	Young	Indigenous	Long (>40)	3 (Low)	1					
51	*Banksia integrifolia*	Coast Banksia	3	3	2	Good	Good	Alive	Juvenile	Indigenous	Long (>40)	3 (Low)	1	Asymmetrical crown, Co-dominant stems, Suppressed				
52	*Banksia integrifolia*	Coast Banksia	3	2	1	Good	Good	Alive	Juvenile	Indigenous	Long (>40)	3 (Low)	1	Suppressed				
53	*Melaleuca armillaris*	bracelet Honey-myrtle, needle-leaved Honey-myrtle	3	25	5	Dead	Has failed	Dead	Mature	Dead or other	Dead Or Hazardous/Remove (0-5)	5 (Hazardous / Irreversible Decline)	1	Significant fault - standing dead tree		Removal	Dead tree removal	
54	*Acacia saligna*	Golden Wreath Wattle	6	22	4	Good	Good	Alive	Semi-mature	Native	Medium (15-40)	4 (Environmental Pest / Noxious Weed)	1	Asymmetrical crown, Deadwood moderate (3-10cm diameter), Suppressed		Apply herbicide to cut stump, Consider Removal	Whole tree removal - environmental weed	
55	*Acacia saligna*	Golden Wreath Wattle	4	10	4	Good	Fair	Alive	Juvenile	Native	Short (5-15)	4 (Environmental Pest / Noxious Weed)	1	Asymmetrical crown, Broken Limb, Deadwood moderate (3-10cm diameter), Previous failure(s)		Apply herbicide to cut stump, Consider Removal	Whole tree removal - environmental weed	
56	*Melaleuca armillaris*	bracelet Honey-myrtle, needle-leaved Honey-myrtle	3	12	4	Dead	Has failed	Dead	Mature	Dead or other	Dead Or Hazardous/Remove (0-5)	5 (Hazardous / Irreversible Decline)	1	Significant fault - standing dead tree	Fallen dead tree	Removal	Dead tree removal	
57	*Melaleuca armillaris*	bracelet Honey-myrtle, needle-leaved Honey-myrtle	6	35	2	Dead	Has failed	Dead	Mature	Dead or other	Dead Or Hazardous/Remove (0-5)	5 (Hazardous / Irreversible Decline)	1	Significant fault - standing dead tree	Fallen dead tree	Removal	Dead tree removal	

Tree Number (* indicates group)	Botanical Name	Common Name	Height (m)	DBH (cm)	Canopy Spread (m)	Health	Structure	Status	Age Class	Origin	Useful Life Expectancy (ULE)	STARS© Landscape Significance Rating	Number of trees in group	Observations	Observation Comments	Works Actions	Works Comments	Risk Rating
1	*Banksia integrifolia*	Coast Banksia	8	45	5	Fair	Fair	Alive	Mature	Indigenous	Short (5-15)	2 (Medium)	1	Co-dominant stems, Deadwood major (>10cm diameter), Dieback, Mistletoe				
58	*Pittosporum undulatum*	Sweet Pittosporum	4	5	3	Good	Good	Alive	Juvenile	Indigenous	Medium (15-40)	4 (Environmental Pest / Noxious Weed)	1	Environmental/Declared Weed		Apply herbicide to cut stump, Removal	Whole tree removal - weed species with General Biosecurity Duty (NSW DPI)	
59	*Melaleuca armillaris*	bracelet Honey-myrtle, needle-leaved Honey-myrtle	8	25	3	Dead	Poor	Dead	Semi-mature	Dead or other	Dead Or Hazardous/Remove (0-5)	5 (Hazardous / Irreversible Decline)	1	Significant fault - standing dead tree		Removal	Dead tree removal	
60	*Banksia integrifolia*	Coast Banksia	8	42.43	6	Fair	Good	Alive	Mature	Indigenous	Long (>40)	2 (Medium)	1	Co-dominant stems, Deadwood moderate (3-10cm diameter), Mistletoe				
61	*Pittosporum undulatum*	Sweet Pittosporum	4	6	4	Good	Fair	Alive	Juvenile	Indigenous	Medium (15-40)	4 (Environmental Pest / Noxious Weed)	1	Co-dominant stems, Deadwood minor (<3cm diameter), Suppressed		Apply herbicide to cut stump, Removal	Whole tree removal - weed species with General Biosecurity Duty (NSW DPI)	
62	*Strelitzia nicolai*	Giant Bird of Paradise	6	30	4	Good	Good	Alive	Mature	Exotic	Long (>40)	3 (Low)	1	Deadwood moderate (3-10cm diameter)				
63	*Leptospermum laevigatum*	Coastal Tea Tree	6	13	1	Dead	Poor	Dead	Semi-mature	Dead or other	Dead Or Hazardous/Remove (0-5)	5 (Hazardous / Irreversible Decline)	1	Significant fault - standing dead tree		Removal	Dead tree removal	
64	*Leptospermum laevigatum*	Coastal Tea Tree	7	32.02	3	Very Poor	Fair	Alive	Semi-mature	Indigenous	Dead Or Hazardous/Remove (0-5)	5 (Hazardous / Irreversible Decline)	1	Co-dominant stems, Deadwood major (>10cm diameter), Dieback, Included bark				
65	*Leptospermum laevigatum*	Coastal Tea Tree	6	20	5	Very Poor	Fair	Alive	Semi-mature	Indigenous	Dead Or Hazardous/Remove (0-5)	5 (Hazardous / Irreversible Decline)	1	Asymmetrical crown, Deadwood major (>10cm diameter), Dieback, Excessively thin crown density, Suppressed				
66	*Banksia integrifolia*	Coast Banksia	1	3	1	Fair	Poor	Alive	Young	Indigenous	Short (5-15)	3 (Low)	1	Crossing/rubbing branches				
67	*Banksia integrifolia*	Coast Banksia	7	13	1	Good	Fair	Alive	Semi-mature	Indigenous	Short (5-15)	3 (Low)	1	Asymmetrical crown, Suppressed				
68	*Banksia integrifolia*	Coast Banksia	1	4	1	Good	Poor	Alive	Young	Indigenous	Short (5-15)	3 (Low)	1	Asymmetrical crown, Suppressed				
69	*Pittosporum undulatum*	Sweet Pittosporum	2	4	1	Good	Good	Alive	Young	Indigenous	Short (5-15)	4 (Environmental Pest / Noxious Weed)	1	Environmental/Declared Weed		Apply herbicide to cut stump, Removal	Whole tree removal - weed species with General Biosecurity Duty (NSW DPI)	
70	*Pittosporum undulatum*	Sweet Pittosporum	2	4	1	Good	Good	Alive	Young	Indigenous	Short (5-15)	4 (Environmental Pest / Noxious Weed)	1	Environmental/Declared Weed		Apply herbicide to cut stump, Removal	Whole tree removal - weed species with General Biosecurity Duty (NSW DPI)	
71	*Pittosporum undulatum*	Sweet Pittosporum	2	3	1	Good	Good	Alive	Young	Indigenous	Short (5-15)	4 (Environmental Pest / Noxious Weed)	1	Environmental/Declared Weed		Apply herbicide to cut stump, Removal	Whole tree removal - weed species with General Biosecurity Duty (NSW DPI)	
72	*Banksia integrifolia*	Coast Banksia	5	7	2	Poor	Fair	Alive	Juvenile	Indigenous	Short (5-15)	3 (Low)	1	Asymmetrical crown, Deadwood moderate (3-10cm diameter), Dieback, Mistletoe, Suppressed				
73	*Pittosporum undulatum*	Sweet Pittosporum	2	4	1	Good	Good	Alive	Young	Indigenous	Short (5-15)	4 (Environmental Pest / Noxious Weed)	1	Environmental/Declared Weed, Suppressed		Apply herbicide to cut stump, Removal	Whole tree removal - weed species with General Biosecurity Duty (NSW DPI)	
74	*Pittosporum undulatum*	Sweet Pittosporum	2	4.12	3	Good	Fair	Alive	Young	Indigenous	Short (5-15)	4 (Environmental Pest / Noxious Weed)	1	Environmental/Declared Weed, Suppressed		Apply herbicide to cut stump, Removal	Whole tree removal - weed species with General Biosecurity Duty (NSW DPI)	
75	*Leptospermum laevigatum*	Coastal Tea Tree	6	23.26	6	Dead	Has failed	Dead	Mature	Dead or other	Dead Or Hazardous/Remove (0-5)	5 (Hazardous / Irreversible Decline)	1	Significant fault - standing dead tree		Removal	Dead tree removal	
76	*Pittosporum undulatum*	Sweet Pittosporum	4	6	3	Good	Good	Alive	Juvenile	Indigenous	Medium (15-40)	4 (Environmental Pest / Noxious Weed)	1	Environmental/Declared Weed		Apply herbicide to cut stump, Removal	Whole tree removal - weed species with General Biosecurity Duty (NSW DPI)	
77	*Banksia integrifolia*	Coast Banksia	4	6	2	Fair	Good	Alive	Juvenile	Indigenous	Short (5-15)	3 (Low)	1	Asymmetrical crown, Deadwood minor (<3cm diameter), Suppressed				
78	*Pittosporum undulatum*	Sweet Pittosporum	3	2.83	2	Good	Good	Alive	Juvenile	Indigenous	Medium (15-40)	4 (Environmental Pest / Noxious Weed)	1	Environmental/Declared Weed		Apply herbicide to cut stump, Removal	Whole tree removal - weed species with General Biosecurity Duty (NSW DPI)	
79	*Melaleuca armillaris*	bracelet Honey-myrtle, needle-leaved Honey-myrtle	7	40.62	5	Dead	Poor	Dead	Mature	Dead or other	Dead Or Hazardous/Remove (0-5)	5 (Hazardous / Irreversible Decline)	1	Significant fault - standing dead tree		Removal	Dead tree removal	
80	*Brachychiton acerifolius*	Illawarra Flame Tree	4	3	1	Fair	Good	Alive	Juvenile	Native	Short (5-15)	3 (Low)	1	Deadwood minor (<3cm diameter), Suppressed				
81	*Pittosporum undulatum*	Sweet Pittosporum	5	13	3	Good	Good	Alive	Semi-mature	Indigenous	Medium (15-40)	4 (Environmental Pest / Noxious Weed)	1	Deadwood minor (<3cm diameter), Environmental/Declared Weed		Apply herbicide to cut stump, Removal	Whole tree removal - weed species with General Biosecurity Duty (NSW DPI)	
82	*Cupaniopsis anacardioides*	Tuckeroo	2	2	1	Fair	Fair	Alive	Young	Native	Short (5-15)	3 (Low)	1	Suppressed				
83	*Acacia saligna*	Golden Wreath Wattle	4	5	3	Good	Good	Alive	Juvenile	Native	Short (5-15)	3 (Low)	1	Asymmetrical crown, Suppressed, Wound(s)		Apply herbicide to cut stump, Consider Removal	Whole tree removal - environmental weed	
84	*Ficus rubiginosa*	Port Jackson Fig	5	15.26	4	Good	Fair	Alive	Semi-mature	Indigenous	Dead Or Hazardous/Remove (0-5)	3 (Low)	1	Asymmetrical crown, Inappropriate location, Leaf feeding insect, Self-sown and inappropriately located	Growing on the boundary fence. Inappropriate location.	Removal	Whole tree removal - Inappropriate location	

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1	*Banksia integrifolia*	Coast Banksia	8	45	5	Fair	Fair	Alive	Mature	Indigenous	Short (5-15)	2 (Medium)	1	Co-dominant stems, Deadwood major (>10cm diameter), Dieback, Mistletoe				
85	*Banksia integrifolia*	Coast Banksia	8	56.57	8	Fair	Poor	Alive	Mature	Indigenous	Medium (15-40)	2 (Medium)	1	Asymmetrical crown, Co-dominant stems, Crossing/rubbing branches, Deadwood moderate (3-10cm diameter), Included bark, Root scalping, Wound(s)				
86	*Banksia integrifolia*	Coast Banksia	5	20	4	Good	Fair	Alive	Semi-mature	Indigenous	Medium (15-40)	3 (Low)	1	Asymmetrical crown, Co-dominant stems, Deadwood minor (<3cm diameter), Decay, Previous failure(s), Recent changes - wind loading, Wound(s)				Low
87	*Banksia integrifolia*	Coast Banksia	8	30	5	Good	Fair	Alive	Semi-mature	Indigenous	Medium (15-40)	2 (Medium)	1	Asymmetrical crown, Deadwood moderate (3-10cm diameter), Hanger(s), Recent changes - wind loading, Root scalping, Wound(s)				Low
88	*Banksia integrifolia*	Coast Banksia	0	30	0	Dead	Has failed	Dead	Mature	Dead or other	Dead Or Hazardous/Remove (0-5)	5 (Hazardous / Irreversible Decline)	1		Fallen tree which was removed during the assessment	Removal	Dead tree removal	
89	*Banksia integrifolia*	Coast Banksia	9	36.06	7	Good	Good	Alive	Semi-mature	Indigenous	Long (>40)	2 (Medium)	1	Asymmetrical crown, Co-dominant stems, Deadwood moderate (3-10cm diameter), Recent changes - wind loading				
90	*Banksia integrifolia*	Coast Banksia	10	20	4	Good	Fair	Alive	Semi-mature	Indigenous	Short (5-15)	2 (Medium)	1	Asymmetrical crown, Co-dominant stems, Deadwood moderate (3-10cm diameter), Wound(s)				Low
91	*Banksia integrifolia*	Coast Banksia	8	32.7	4	Fair	Poor	Alive	Semi-mature	Indigenous	Short (5-15)	3 (Low)	1	Asymmetrical crown, Co-dominant stems, Crossing/rubbing branches, Epicormic shoots, Over-extended branch(es), Poor pruning, Previous failure(s), Weak attachments, Wound(s)	Site note: These trees were historically topped by the previous owner of the adjacent property. Epicormic growth that was developed at that time has now matured into endocormic growth.			Low
92	*Banksia integrifolia*	Coast Banksia	8	45.34	7	Good	Poor	Alive	Mature	Indigenous	Short (5-15)	2 (Medium)	1	Asymmetrical crown, Co-dominant stems, Crossing/rubbing branches, Deadwood moderate (3-10cm diameter), Epicormic shoots, Over-extended branch(es), Poor pruning, Recent changes - wind loading, Weak attachments, Wound(s)	Site note: These trees were historically topped by the previous owner of the adjacent property. Epicormic growth that was developed at that time has now matured into endocormic growth.			Low
93	*Banksia integrifolia*	Coast Banksia	8	27.02	5	Good	Poor	Alive	Semi-mature	Indigenous	Short (5-15)	3 (Low)	1	Asymmetrical crown, Co-dominant stems, Crossing/rubbing branches, Deadwood moderate (3-10cm diameter), Epicormic shoots, Over-extended branch(es), Poor pruning, Recent changes - wind loading, Weak attachments	Site note: These trees were historically topped by the previous owner of the adjacent property. Epicormic growth that was developed at that time has now matured into endocormic growth.	Removal		Moderate
94	*Pittosporum undulatum*	Sweet Pittosporum	5	5	2	Good	Good	Alive	Juvenile	Indigenous	Medium (15-40)	4 (Environmental Pest / Noxious Weed)	1	Environmental/Declared Weed, Suppressed		Apply herbicide to cut stump, Removal	Whole tree removal - weed species with General Biosecurity Duty (NSW DPI)	Low
95	*Banksia integrifolia*	Coast Banksia	10	50	8	Good	Poor	Alive	Mature	Indigenous	Medium (15-40)	3 (Low)	1	Co-dominant stems, Deadwood moderate (3-10cm diameter), Over-extended branch(es), Poor pruning, Recent changes - wind loading, Resin/kino/sap flow, Weak attachments, Wound(s)	Site note: These trees were historically topped by the previous owner of the adjacent property. Epicormic growth that was developed at that time has now matured into endocormic growth.	Removal		Moderate
96	*Banksia integrifolia*	Coast Banksia	6	30	4	Good	Good	Alive	Semi-mature	Indigenous	Medium (15-40)	3 (Low)	1	Asymmetrical crown, Deadwood moderate (3-10cm diameter), Suppressed				Low
97	*Araucaria heterophylla*	Norfolk Island Pine	2	5	1	Fair	Poor	Alive	Juvenile	Native	Dead Or Hazardous/Remove (0-5)	3 (Low)	1	Co-dominant stems, Dieback, Epicormic shoots, Wound(s)	Marked for removal			
98	*Banksia integrifolia*	Coast Banksia	7	30	6	Fair	Fair	Alive	Semi-mature	Indigenous	Short (5-15)	2 (Medium)	1	Asymmetrical crown, Deadwood moderate (3-10cm diameter), Dieback, Poor pruning, Wound(s)				
99	*Banksia integrifolia*	Coast Banksia	10	40	6	Good	Good	Alive	Mature	Indigenous	Long (>40)	2 (Medium)	1	Co-dominant stems, Deadwood moderate (3-10cm diameter)				
100	*Pittosporum undulatum*	Sweet Pittosporum	9	30	7	Good	Good	Alive	Mature	Indigenous	Medium (15-40)	4 (Environmental Pest / Noxious Weed)	1	Co-dominant stems, Deadwood minor (<3cm diameter), Environmental/Declared Weed, Hanger(s), Included bark		Apply herbicide to cut stump, Removal	Whole tree removal - weed species with General Biosecurity Duty (NSW DPI)	

Tree Number (* indicates group)	Botanical Name	Common Name	Height (m)	DBH (cm)	Canopy Spread (m)	Health	Structure	Status	Age Class	Origin	Useful Life Expectancy (ULE)	STARS© Landscape Significance Rating	Number of trees in group	Observations	Observation Comments	Works Actions	Works Comments	Risk Rating
1	*Banksia integrifolia*	Coast Banksia	8	45	5	Fair	Fair	Alive	Mature	Indigenous	Short (5-15)	2 (Medium)	1	Co-dominant stems, Deadwood major (>10cm diameter), Dieback, Mistletoe				
101	*Banksia integrifolia*	Coast Banksia	10	31.62	6	Fair	Fair	Alive	Semi-mature	Indigenous	Medium (15-40)	2 (Medium)	1	Broken Limb, Crossing/rubbing branches, Deadwood major (>10cm diameter)				Low
102	*Banksia integrifolia*	Coast Banksia	9	40	6	Poor	Fair	Alive	Mature	Indigenous	Short (5-15)	2 (Medium)	1	Co-dominant stems, Deadwood moderate (3-10cm diameter), Previous failure(s), Wound(s)				
103	*Leptospermum laevigatum*	Coastal Tea Tree	2	8	2	Poor	Poor	Alive	Semi-mature	Indigenous	Short (5-15)	3 (Low)	1	Asymmetrical crown, Deadwood moderate (3-10cm diameter), Dieback				
104	*Banksia integrifolia*	Coast Banksia	3	4	1	Good	Good	Alive	Juvenile	Indigenous	Medium (15-40)	3 (Low)	1	Wound(s)				
105	*Banksia integrifolia*	Coast Banksia	4	6	1	Fair	Poor	Alive	Juvenile	Indigenous	Short (5-15)	3 (Low)	1	Asymmetrical crown, Epicormic shoots, Poor pruning, Suppressed, Wound(s)				
106	*Banksia integrifolia*	Coast Banksia	11	45	5	Good	Fair	Alive	Mature	Indigenous	Long (>40)	2 (Medium)	1	Deadwood moderate (3-10cm diameter), Resin/kino/sap flow, Wound(s)				Low
107	*Banksia integrifolia*	Coast Banksia	11	45	5	Good	Good	Alive	Mature	Indigenous	Long (>40)	1 (High)	1	Asymmetrical crown, Deadwood moderate (3-10cm diameter), Recent changes - wind loading, Root scalping				Low
108	*Banksia integrifolia*	Coast Banksia	12	60	8	Good	Fair	Alive	Mature	Indigenous	Long (>40)	2 (Medium)	1	Asymmetrical crown, Bacterial infection, Co-dominant stems, Deadwood moderate (3-10cm diameter), Mistletoe, Recent changes - wind loading, Wound(s)				Low
109	*Banksia integrifolia*	Coast Banksia	6	25	4	Fair	Fair	Alive	Semi-mature	Indigenous	Short (5-15)	3 (Low)	1	Asymmetrical crown, Crack or split, Deadwood moderate (3-10cm diameter), Mistletoe, Over-extended branch(es), Significant fault - cracked/split branches, Suppressed, Wound(s)				Low
110	*Banksia integrifolia*	Coast Banksia	9	50	8	Good	Poor	Alive	Mature	Indigenous	Short (5-15)	2 (Medium)	1	Co-dominant stems, Crack or split, Deadwood moderate (3-10cm diameter), Mistletoe, Previous failure(s), Significant fault - cracked/split branches, Wound(s)				Low
111	*Leptospermum laevigatum*	Coastal Tea Tree	7	42.43	7	Dead	Fair	Dead	Mature	Dead or other	Dead Or Hazardous/Remove (0-5)	5 (Hazardous / Irreversible Decline)	1	Significant fault - standing dead tree		Removal	Dead tree removal	
112	*Leptospermum laevigatum*	Coastal Tea Tree	6	18	2	Dead	Poor	Dead	Semi-mature	Dead or other	Dead Or Hazardous/Remove (0-5)	5 (Hazardous / Irreversible Decline)	1	Significant fault - standing dead tree		Removal	Dead tree removal	
113	*Banksia integrifolia*	Coast Banksia	6	20	3	Fair	Fair	Alive	Semi-mature	Indigenous	Short (5-15)	2 (Medium)	1	Asymmetrical crown, Deadwood moderate (3-10cm diameter), Suppressed, Wound(s)				
114	*Banksia integrifolia*	Coast Banksia	8	30	5	Good	Good	Alive	Mature	Indigenous	Long (>40)	2 (Medium)	1	Deadwood moderate (3-10cm diameter), Mistletoe				
115	*Melaleuca armillaris*	bracelet Honey-myrtle, needle-leaved Honey-myrtle	6	35	5	Dead	Fair	Dead	Mature	Dead or other	Dead Or Hazardous/Remove (0-5)	5 (Hazardous / Irreversible Decline)	1	Significant fault - standing dead tree		Removal	Dead tree removal	
116	*Banksia integrifolia*	Coast Banksia	6	55	3	Dead	Poor	Dead	Mature	Dead or other	Dead Or Hazardous/Remove (0-5)	5 (Hazardous / Irreversible Decline)	1	Significant fault - standing dead tree		Removal	Dead tree removal	
117	*Banksia integrifolia*	Coast Banksia	12	56.57	7	Good	Good	Alive	Mature	Indigenous	Medium (15-40)	1 (High)	1	Asymmetrical root plate, Co-dominant stems, Deadwood moderate (3-10cm diameter), Wound(s)				
118	*Banksia integrifolia*	Coast Banksia	7	25	4	Good	Fair	Alive	Semi-mature	Indigenous	Short (5-15)	2 (Medium)	1	Deadwood moderate (3-10cm diameter), Over-extended branch(es), Wound(s)				
119	*Banksia integrifolia*	Coast Banksia	7	28.28	4	Good	Fair	Alive	Semi-mature	Indigenous	Medium (15-40)	2 (Medium)	1	Co-dominant stems, Deadwood moderate (3-10cm diameter), Wound(s)				
120	*Banksia integrifolia*	Coast Banksia	9	35	5	Good	Fair	Alive	Semi-mature	Indigenous	Medium (15-40)	2 (Medium)	1	Co-dominant stems, Deadwood moderate (3-10cm diameter), Mistletoe, Wound(s)				
121	*Banksia integrifolia*	Coast Banksia	8	30	3	Fair	Poor	Alive	Semi-mature	Indigenous	Short (5-15)	2 (Medium)	1	Asymmetrical crown, Deadwood moderate (3-10cm diameter), Decay, Mistletoe, Previous failure(s), Wound(s)				
122	*Banksia integrifolia*	Coast Banksia	6	20	3	Good	Fair	Alive	Semi-mature	Indigenous	Medium (15-40)	2 (Medium)	1	Deadwood moderate (3-10cm diameter), Wound(s)				
123	*Banksia integrifolia*	Coast Banksia	6	18	2	Very Poor	Good	Alive	Semi-mature	Indigenous	Dead Or Hazardous/Remove (0-5)	5 (Hazardous / Irreversible Decline)	1	Deadwood moderate (3-10cm diameter), Dieback, Excessively thin crown density, Mistletoe				

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1	*Banksia integrifolia*	Coast Banksia	8	45	5	Fair	Fair	Alive	Mature	Indigenous	Short (5-15)	2 (Medium)	1	Co-dominant stems, Deadwood major (>10cm diameter), Dieback, Mistletoe				
124	*Banksia integrifolia*	Coast Banksia	9	36.06	7	Fair	Fair	Alive	Mature	Indigenous	Medium (15-40)	2 (Medium)	1	Cankers, Co-dominant stems, Deadwood moderate (3-10cm diameter), Mistletoe, Wound(s)				
125	*Banksia integrifolia*	Coast Banksia	4	11	2	Fair	Fair	Alive	Semi-mature	Indigenous	Short (5-15)	3 (Low)	1	Asymmetrical crown, Deadwood minor (<3cm diameter), Mistletoe, Suppressed, Wound(s)				
126	*Banksia integrifolia*	Coast Banksia	10	45	5	Good	Poor	Alive	Mature	Indigenous	Short (5-15)	3 (Low)	1	Asymmetrical crown, Co-dominant stems, Crack or split, Crossing/rubbing branches, Deadwood moderate (3-10cm diameter), Mistletoe, Significant fault - cracked/split branches, Wound(s)	Shear crack on 1st order branch growing in a westerly direction. This limb is in contact and likely supporting the adjacent tree.	Removal	Whole tree removal. Significant structural faults.	
127	*Banksia integrifolia*	Coast Banksia	9	39.6	11	Fair	Poor	Alive	Mature	Indigenous	Short (5-15)	3 (Low)	1	Asymmetrical crown, Co-dominant stems, Crossing/rubbing branches, Deadwood moderate (3-10cm diameter), Root plate movement, Suppressed	Likely supported by the adjacent tree.	Removal	Whole tree removal. Significant structural faults.	
128	*Banksia integrifolia*	Coast Banksia	8	40	7	Good	Fair	Alive	Mature	Indigenous	Medium (15-40)	2 (Medium)	1	Asymmetrical crown, Deadwood moderate (3-10cm diameter), Decay, Mistletoe, Over-extended branch(es), Wound(s)				
129	*Banksia integrifolia*	Coast Banksia	8	50	6	Good	Fair	Alive	Mature	Indigenous	Medium (15-40)	2 (Medium)	1	Asymmetrical crown, Crack or split, Deadwood moderate (3-10cm diameter), Over-extended branch(es), Suppressed, Wound(s)				
130	*Banksia integrifolia*	Coast Banksia	9	69.64	9	Good	Good	Alive	Mature	Indigenous	Long (>40)	1 (High)	1	Co-dominant stems, Deadwood moderate (3-10cm diameter), Hanger(s)				
131	*Banksia integrifolia*	Coast Banksia	9	40	6	Fair	Poor	Alive	Mature	Indigenous	Short (5-15)	2 (Medium)	1	Asymmetrical crown, Deadwood moderate (3-10cm diameter), Decay, Previous failure(s), Wound(s)				
132	*Banksia integrifolia*	Coast Banksia	2	3	1	Fair	Good	Alive	Juvenile	Indigenous	Short (5-15)	3 (Low)	1	Deadwood minor (<3cm diameter), Dieback, Suppressed	Marked for removal			
133	*Banksia integrifolia*	Coast Banksia	3	4.24	1	Good	Fair	Alive	Juvenile	Indigenous	Medium (15-40)	3 (Low)	1	Deadwood minor (<3cm diameter), Suppressed, Wound(s)	Marked for removal			
134	*Leptospermum laevigatum*	Coastal Tea Tree	5	18	4	Very Poor	Fair	Alive	Semi-mature	Indigenous	Dead Or Hazardous/Remove (0-5)	5 (Hazardous / Irreversible Decline)	1	Asymmetrical crown, Broken Limb, Deadwood major (>10cm diameter), Excessively thin crown density, Suppressed, Wound(s)	Within close proximity to concrete culvert, no discernible damage noted.			
135	*Pittosporum undulatum*	Sweet Pittosporum	4	5	2	Good	Good	Alive	Semi-mature	Indigenous	Short (5-15)	4 (Environmental Pest / Noxious Weed)	1	Environmental/Declared Weed		Apply herbicide to cut stump, Removal	Whole tree removal - weed species with General Biosecurity Duty (NSW DPI)	
136	*Pittosporum undulatum*	Sweet Pittosporum	3	3	1	Good	Good	Alive	Juvenile	Indigenous	Short (5-15)	4 (Environmental Pest / Noxious Weed)	1	Environmental/Declared Weed, Suppressed		Apply herbicide to cut stump, Removal	Whole tree removal - weed species with General Biosecurity Duty (NSW DPI)	
137	*Pittosporum undulatum*	Sweet Pittosporum	1	1	1	Good	Good	Alive	Young	Indigenous	Medium (15-40)	4 (Environmental Pest / Noxious Weed)	1	Environmental/Declared Weed		Apply herbicide to cut stump, Removal	Whole tree removal - weed species with General Biosecurity Duty (NSW DPI)	
138	*Leptospermum laevigatum*	Coastal Tea Tree	5	25.46	7	Very Poor	Fair	Alive	Semi-mature	Indigenous	Dead Or Hazardous/Remove (0-5)	5 (Hazardous / Irreversible Decline)	1	Asymmetrical crown, Deadwood major (>10cm diameter), Excessively thin crown density, Poor pruning				
139	*Senna pendula*	Easter cassia	3	7.07	6	Good	Fair	Alive	Semi-mature	Exotic	Short (5-15)	4 (Environmental Pest / Noxious Weed)	1	Asymmetrical crown, Epicormic shoots, Suppressed		Apply herbicide to cut stump, Removal	Whole tree removal - weed species with General Biosecurity Duty (NSW DPI)	
140	*Strelitzia nicolai*	Giant Bird of Paradise	10	80	12	Good	Good	Alive	Mature	Exotic	Long (>40)	3 (Low)	1	Co-dominant stems, Deadwood moderate (3-10cm diameter)				
141	*Acacia saligna*	Golden Wreath Wattle	3	3	2	Poor	Good	Alive	Juvenile	Native	Short (5-15)	3 (Low)	1	Dieback, Suppressed, Wound(s)		Apply herbicide to cut stump, Consider Removal	Whole tree removal - environmental weed	
142	*Banksia integrifolia*	Coast Banksia	9	36.06	6	Fair	Fair	Alive	Mature	Indigenous	Short (5-15)	2 (Medium)	1	Asymmetrical crown, Cavity, Co-dominant stems, Deadwood major (>10cm diameter), Decay, Dieback, Over-extended branch(es), Previous failure(s), Wound(s)				
143	*Pittosporum undulatum*	Sweet Pittosporum	2	2	1	Good	Good	Alive	Juvenile	Indigenous	Short (5-15)	4 (Environmental Pest / Noxious Weed)	1	Environmental/Declared Weed, Suppressed		Apply herbicide to cut stump, Removal	Whole tree removal - weed species with General Biosecurity Duty (NSW DPI)	
144	*Strelitzia nicolai*	Giant Bird of Paradise	9	30.07	5	Good	Good	Alive	Mature	Exotic	Long (>40)	3 (Low)	1	Co-dominant stems				

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1	*Banksia integrifolia*	Coast Banksia	8	45	5	Fair	Fair	Alive	Mature	Indigenous	Short (5-15)	2 (Medium)	1	Co-dominant stems, Deadwood major (>10cm diameter), Dieback, Mistletoe				
145	*Banksia integrifolia*	Coast Banksia	11	40	7	Good	Fair	Alive	Mature	Indigenous	Medium (15-40)	2 (Medium)	1	Asymmetrical crown, Deadwood moderate (3-10cm diameter), Wound(s)				
146	*Pittosporum undulatum*	Sweet Pittosporum	6	10.72	7	Good	Poor	Alive	Semi-mature	Indigenous	Short (5-15)	4 (Environmental Pest / Noxious Weed)	1	Co-dominant stems, Deadwood minor (<3cm diameter), Decay, Environmental/Declared Weed, Growing from cut stump, Suppressed		Apply herbicide to cut stump, Removal	Whole tree removal - weed species with General Biosecurity Duty (NSW DPI)	
147	*Pittosporum undulatum*	Sweet Pittosporum	2	2	1	Good	Good	Alive	Juvenile	Indigenous	Short (5-15)	4 (Environmental Pest / Noxious Weed)	1	Environmental/Declared Weed, Suppressed		Apply herbicide to cut stump, Removal	Whole tree removal - weed species with General Biosecurity Duty (NSW DPI)	
148	*Banksia integrifolia*	Coast Banksia	10	71.06	10	Good	Fair	Alive	Mature	Indigenous	Medium (15-40)	2 (Medium)	1	Asymmetrical crown, Co-dominant stems, Deadwood major (>10cm diameter), Included bark, Over-extended branch(es), Previous failure(s), Wound(s)				
149	*Banksia integrifolia*	Coast Banksia	6	50	4	Good	Poor	Alive	Mature	Indigenous	Short (5-15)	2 (Medium)	1	Asymmetrical crown, Deadwood moderate (3-10cm diameter), Included bark, Mistletoe, Root plate movement, Wound(s)				
150	*Heptapleurum actinophyllum*	Umbrella Tree	7	6.4	3	Good	Good	Alive	Juvenile	Native	Medium (15-40)	4 (Environmental Pest / Noxious Weed)	1	Co-dominant stems, Environmental/Declared Weed, Suppressed		Apply herbicide to cut stump		
151	*Pittosporum undulatum*	Sweet Pittosporum	5	6	2	Good	Fair	Alive	Juvenile	Indigenous	Short (5-15)	4 (Environmental Pest / Noxious Weed)	1	Crossing/rubbing branches, Deadwood minor (<3cm diameter), Environmental/Declared Weed, Suppressed		Apply herbicide to cut stump, Removal	Whole tree removal - weed species with General Biosecurity Duty (NSW DPI)	
152	*Pittosporum undulatum*	Sweet Pittosporum	2	2.83	1	Good	Good	Alive	Juvenile	Indigenous	Short (5-15)	4 (Environmental Pest / Noxious Weed)	1	Environmental/Declared Weed, Suppressed		Apply herbicide to cut stump, Removal	Whole tree removal - weed species with General Biosecurity Duty (NSW DPI)	
153	*Acacia saligna*	Golden Wreath Wattle	9	11	1	Poor	Good	Alive	Semi-mature	Native	Short (5-15)	3 (Low)	1	Deadwood moderate (3-10cm diameter), Hanger(s)		Apply herbicide to cut stump, Consider Removal	Whole tree removal - environmental weed	
154	*Acacia longifolia*	Sydney Golden Wattle	3	6.93	4	Poor	Fair	Alive	Semi-mature	Indigenous	Short (5-15)	2 (Medium)	1	Asymmetrical crown, Deadwood minor (<3cm diameter), Plant pathogen, Suppressed, Wood borer, Wound(s)		Apply herbicide to cut stump, Consider Removal	Whole tree removal - environmental weed	
155	*Acacia longifolia*	Sydney Golden Wattle	2	3.61	2	Poor	Fair	Alive	Juvenile	Indigenous	Short (5-15)	3 (Low)	1	Asymmetrical crown, Plant pathogen, Poor pruning, Suppressed		Apply herbicide to cut stump, Consider Removal	Whole tree removal - environmental weed	
156	*Pittosporum undulatum*	Sweet Pittosporum	3	3.61	1	Good	Good	Alive	Juvenile	Indigenous	Short (5-15)	4 (Environmental Pest / Noxious Weed)	1	Environmental/Declared Weed, Suppressed		Apply herbicide to cut stump, Removal	Whole tree removal - weed species with General Biosecurity Duty (NSW DPI)	
157	*Strelitzia nicolai*	Giant Bird of Paradise	8	21.21	2	Good	Good	Alive	Mature	Exotic	Long (>40)	3 (Low)	1	Co-dominant stems, Deadwood moderate (3-10cm diameter)				
158	*Pittosporum undulatum*	Sweet Pittosporum	7	19.49	4	Good	Fair	Alive	Semi-mature	Indigenous	Medium (15-40)	4 (Environmental Pest / Noxious Weed)	1	Deadwood minor (<3cm diameter), Included bark		Apply herbicide to cut stump, Removal	Whole tree removal - weed species with General Biosecurity Duty (NSW DPI)	
159	*Banksia integrifolia*	Coast Banksia	10	18	6	Good	Fair	Alive	Semi-mature	Indigenous	Medium (15-40)	2 (Medium)	1	Asymmetrical crown, Deadwood moderate (3-10cm diameter), Included bark, Previous failure(s)				
160	*Celtis sinensis*	Chinese Hackberry	7	9	5	Fair	Good	Alive	Juvenile	Exotic	Medium (15-40)	4 (Environmental Pest / Noxious Weed)	1	Environmental/Declared Weed, Wound(s)		Apply herbicide to cut stump, Removal	Whole tree removal per General Biosecurity Duty (NSW DPI)	
161	*Banksia integrifolia*	Coast Banksia	5	9	2	Fair	Poor	Alive	Semi-mature	Indigenous	Short (5-15)	3 (Low)	1	Asymmetrical crown, Decay, Previous failure(s), Wound(s)				
162	*Banksia integrifolia*	Coast Banksia	10	50	11	Good	Fair	Alive	Mature	Indigenous	Long (>40)	2 (Medium)	1	Co-dominant stems, Damaging infrastructure, Deadwood moderate (3-10cm diameter), Mistletoe, Resin/kino/sap flow	Within close proximity to the displaced concrete culvert.			Low
163	*Banksia integrifolia*	Coast Banksia	9	20	4	Good	Fair	Alive	Semi-mature	Indigenous	Short (5-15)	2 (Medium)	1	Deadwood moderate (3-10cm diameter), Mistletoe, Wound(s)				
164	*Banksia integrifolia*	Coast Banksia	9	20	5	Good	Fair	Alive	Semi-mature	Indigenous	Short (5-15)	2 (Medium)	1	Asymmetrical crown, Deadwood moderate (3-10cm diameter), Mistletoe, Wound(s)				
165	*Banksia integrifolia*	Coast Banksia	10	42.72	4	Good	Good	Alive	Mature	Indigenous	Long (>40)	2 (Medium)	1	Co-dominant stems, Deadwood moderate (3-10cm diameter), Mistletoe, Wound(s)				
166	*Banksia integrifolia*	Coast Banksia	9	40	4	Good	Good	Alive	Mature	Indigenous	Long (>40)	1 (High)	1	Bacterial infection, Deadwood moderate (3-10cm diameter), Mistletoe, Resin/kino/sap flow				
167	*Banksia integrifolia*	Coast Banksia	7	28	6	Good	Fair	Alive	Semi-mature	Indigenous	Medium (15-40)	2 (Medium)	1	Asymmetrical crown, Deadwood moderate (3-10cm diameter), Mistletoe				

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1	*Banksia integrifolia*	Coast Banksia	8	45	5	Fair	Fair	Alive	Mature	Indigenous	Short (5-15)	2 (Medium)	1	Co-dominant stems, Deadwood major (>10cm diameter), Dieback, Mistletoe				
168	*Banksia integrifolia*	Coast Banksia	9	55.44	8	Good	Fair	Alive	Mature	Indigenous	Long (>40)	2 (Medium)	1	Co-dominant stems, Deadwood moderate (3-10cm diameter), Hanger(s), Over-extended branch(es), Previous failure(s)				
169	*Melaleuca armillaris*	bracelet Honey-myrtle, needle-leaved Honey-myrtle	6	32.39	5	Poor	Poor	Alive	Mature	Indigenous	Short (5-15)	3 (Low)	1	Asymmetrical crown, Co-dominant stems, Deadwood moderate (3-10cm diameter), Included bark, Weak attachments	Marked for removal	Removal	Whole tree removal in accordance with DSC policy	
170	*Banksia integrifolia*	Coast Banksia	8	35	4	Good	Fair	Alive	Mature	Indigenous	Medium (15-40)	2 (Medium)	1	Deadwood moderate (3-10cm diameter), Mistletoe, Previous failure(s)	Marked for removal	Removal	WWhole tree removal in accordance with DSC policy	
171	*Leptospermum laevigatum*	Coastal Tea Tree	7	32.22	7	Poor	Poor	Alive	Mature	Indigenous	Short (5-15)	3 (Low)	1	Asymmetrical crown, Co-dominant stems, Deadwood major (>10cm diameter), Dieback, Excessively thin crown density, Included bark, Previous failure(s)	Marked for removal	Removal	Whole tree removal in accordance with DSC policy	
172	*Banksia integrifolia*	Coast Banksia	7	40	6	Good	Fair	Alive	Mature	Indigenous	Medium (15-40)	2 (Medium)	1	Asymmetrical crown, Deadwood moderate (3-10cm diameter), Included bark, Previous failure(s)	Marked for removal	Removal	Whole tree removal in accordance with DSC policy	
173	*Banksia integrifolia*	Coast Banksia	8	40	6	Good	Fair	Alive	Mature	Indigenous	Medium (15-40)	2 (Medium)	1	Asymmetrical crown, Broken Limb, Co-dominant stems, Deadwood moderate (3-10cm diameter), Included bark, Previous failure(s)	Marked for removal	Removal	Whole tree removal in accordance with DSC policy	
174	*Banksia integrifolia*	Coast Banksia	2	2.24	2	Fair	Poor	Alive	Juvenile	Indigenous	Short (5-15)	3 (Low)	1	Asymmetrical crown, Deadwood minor (<3cm diameter), Previous failure(s), Wound(s)		Removal	Whole tree removal in accordance with DSC policy	
175	*Acacia saligna*	Golden Wreath Wattle	6	18.03	5	Good	Fair	Alive	Semi-mature	Native	Short (5-15)	3 (Low)	1	Co-dominant stems, Crossing/rubbing branches, Included bark		Apply herbicide to cut stump, Removal	Whole tree removal in accordance with DSC policy	
176	*Banksia integrifolia*	Coast Banksia	11	45	5	Good	Good	Alive	Mature	Indigenous	Long (>40)	1 (High)	1	Co-dominant stems, Deadwood moderate (3-10cm diameter), Wound(s)	Within close proximity to the displaced concrete culvert. Marked for removal.	Removal	Whole tree removal in accordance with DSC policy	Low
177	*Banksia integrifolia*	Coast Banksia	3	11	3	Fair	Poor	Alive	Semi-mature	Indigenous	Short (5-15)	3 (Low)	1	Asymmetrical crown, Mistletoe, Poor pruning, Suppressed	Marked for removal	Removal	Whole tree removal in accordance with DSC policy	
178	*Banksia integrifolia*	Coast Banksia	11	18	1	Good	Poor	Alive	Semi-mature	Indigenous	Short (5-15)	3 (Low)	1	Asymmetrical crown, Mistletoe, Over-extended branch(es), Recent changes - wind loading, Wound(s)	Within close proximity to displaced concrete culvert. Marked for removal	Removal	Whole tree removal in accordance with DSC policy	Moderate
179	*Banksia integrifolia*	Coast Banksia	10	60	9	Good	Good	Alive	Mature	Indigenous	Medium (15-40)	1 (High)	1	Deadwood moderate (3-10cm diameter), Mistletoe	Marked for removal	Removal	Whole tree removal in accordance with DSC policy	Low
180	*Banksia integrifolia*	Coast Banksia	11	40	7	Good	Good	Alive	Semi-mature	Indigenous	Medium (15-40)	2 (Medium)	1	Deadwood major (>10cm diameter), Mistletoe, Wound(s)	Marked for removal	Removal	Whole tree removal in accordance with DSC policy	Low
181	*Banksia integrifolia*	Coast Banksia	10	45	7	Good	Fair	Alive	Mature	Indigenous	Medium (15-40)	2 (Medium)	1	Asymmetrical crown, Co-dominant stems, Deadwood moderate (3-10cm diameter)	Marked for removal	Removal	Whole tree removal in accordance with DSC policy	Low
182	*Banksia integrifolia*	Coast Banksia	11	56.57	9	Good	Good	Alive	Mature	Indigenous	Medium (15-40)	2 (Medium)	1	Co-dominant stems, Deadwood moderate (3-10cm diameter), Decay	Marked for removal	Removal	Whole tree removal in accordance with DSC policy	Low
183	*Lagunaria patersonii*	Pyramid Tree	11	24.76	6	Good	Fair	Alive	Semi-mature	Native	Short (5-15)	3 (Low)	1	Co-dominant stems, Crossing/rubbing branches, Deadwood minor (<3cm diameter), Over-extended branch(es), Suppressed, Wound(s)	Acting as a prop for the adjacent tree.	Removal	Whole tree removal in accordance with DSC policy	Low
184	*Banksia integrifolia*	Coast Banksia	10	55	5	Good	Poor	Alive	Mature	Indigenous	Dead Or Hazardous/Remove (0-5)	5 (Hazardous / Irreversible Decline)	1	Asymmetrical crown, Crack or split, Deadwood moderate (3-10cm diameter), Over-extended branch(es), Significant fault - cracked/split branches, Suppressed	Shear and transverse crack present on the tension side of the trunk. Marked for removal	Removal	Whole tree removal in accordance with DSC policy	High
185	*Pittosporum undulatum*	Sweet Pittosporum	1	2	1	Good	Good	Alive	Young	Indigenous	Short (5-15)	4 (Environmental Pest / Noxious Weed)	1	Environmental/Declared Weed		Apply herbicide to cut stump, Removal	Whole tree removal in accordance with DSC policy	
186	*Banksia integrifolia*	Coast Banksia	9	55	9	Fair	Good	Alive	Mature	Indigenous	Medium (15-40)	2 (Medium)	1	Bacterial infection, Deadwood moderate (3-10cm diameter), Mistletoe, Poor pruning, Wound(s)	Marked for removal	Removal	Whole tree removal in accordance with DSC policy	Low
187	*Banksia integrifolia*	Coast Banksia	4	20	11	Fair	Poor	Alive	Semi-mature	Indigenous	Short (5-15)	3 (Low)	1	Asymmetrical crown, Deadwood moderate (3-10cm diameter), Decay, Poor pruning, Suppressed, Wound(s)	Marked for removal	Removal	Whole tree removal in accordance with DSC policy	
188	*Banksia integrifolia*	Coast Banksia	4	12	7	Poor	Poor	Alive	Semi-mature	Indigenous	Short (5-15)	3 (Low)	1	Asymmetrical crown, Bacterial infection, Deadwood minor (<3cm diameter), Decay, Dieback, Suppressed	Marked for removal	Removal	Whole tree removal in accordance with DSC policy	

Tree Number (* indicates group)	Botanical Name	Common Name	Height (m)	DBH (cm)	Canopy Spread (m)	Health	Structure	Status	Age Class	Origin	Useful Life Expectancy (ULE)	STARS© Landscape Significance Rating	Number of trees in group	Observations	Observation Comments	Works Actions	Works Comments	Risk Rating
1	*Banksia integrifolia*	Coast Banksia	8	45	5	Fair	Fair	Alive	Mature	Indigenous	Short (5-15)	2 (Medium)	1	Co-dominant stems, Deadwood major (>10cm diameter), Dieback, Mistletoe				
189	*Pittosporum undulatum*	Sweet Pittosporum	3	3.46	2	Good	Good	Alive	Juvenile	Indigenous	Medium (15-40)	4 (Environmental Pest / Noxious Weed)	1	Environmental/Declared Weed, Suppressed		Apply herbicide to cut stump, Removal	Whole tree removal in accordance with DSC policy	
190	*Banksia integrifolia*	Coast Banksia	11	60	7	Good	Fair	Alive	Mature	Indigenous	Medium (15-40)	2 (Medium)	1	Bacterial infection, Deadwood moderate (3-10cm diameter), Mistletoe, Poor pruning, Resin/kino/sap flow, Wound(s)	Marked for removal	Removal	Whole tree removal in accordance with DSC policy	Low
191	*Pittosporum undulatum*	Sweet Pittosporum	3	2.24	1	Good	Good	Alive	Juvenile	Indigenous	Short (5-15)	4 (Environmental Pest / Noxious Weed)	1	Environmental/Declared Weed, Suppressed		Apply herbicide to cut stump, Removal	Whole tree removal in accordance with DSC policy	
192	*Banksia integrifolia*	Coast Banksia	11	24.04	5	Fair	Poor	Alive	Semi-mature	Indigenous	Short (5-15)	3 (Low)	1	Asymmetrical crown, Crossing/rubbing branches, Deadwood major (>10cm diameter), Decay, Dieback, Over-extended branch(es), Suppressed	Northern leader has failed and is caught up. No fall potential on property. Marked for removal.	Removal	Whole tree removal in accordance with DSC policy	Low
193	*Pittosporum undulatum*	Sweet Pittosporum	2	2	1	Good	Good	Alive	Juvenile	Indigenous	Medium (15-40)	4 (Environmental Pest / Noxious Weed)	1	Environmental/Declared Weed		Apply herbicide to cut stump, Removal	Whole tree removal in accordance with DSC policy	
194	*Pittosporum undulatum*	Sweet Pittosporum	2	1.73	1	Good	Good	Alive	Juvenile	Indigenous	Medium (15-40)	4 (Environmental Pest / Noxious Weed)	1	Environmental/Declared Weed		Apply herbicide to cut stump, Removal	Whole tree removal in accordance with DSC policy	
195	*Celtis sinensis*	Chinese Hackberry	3	3	3	Good	Fair	Alive	Juvenile	Exotic	Medium (15-40)	4 (Environmental Pest / Noxious Weed)	1	Environmental/Declared Weed, Suppressed, Wound(s)		Apply herbicide to cut stump, Removal	Whole tree removal in accordance with DSC policy	
196	*Celtis sinensis*	Chinese Hackberry	2	2.83	3	Good	Good	Alive	Juvenile	Exotic	Short (5-15)	4 (Environmental Pest / Noxious Weed)	1	Environmental/Declared Weed, Suppressed		Apply herbicide to cut stump, Removal	Whole tree removal in accordance with DSC policy	
197	*Celtis sinensis*	Chinese Hackberry	4	4.24	3	Good	Good	Alive	Juvenile	Exotic	Short (5-15)	4 (Environmental Pest / Noxious Weed)	1	Co-dominant stems, Environmental/Declared Weed, Suppressed		Apply herbicide to cut stump, Removal	Whole tree removal in accordance with DSC policy	
198	*Pittosporum undulatum*	Sweet Pittosporum	3	4.12	2	Good	Good	Alive	Juvenile	Indigenous	Short (5-15)	4 (Environmental Pest / Noxious Weed)	1	Environmental/Declared Weed, Suppressed		Apply herbicide to cut stump, Removal	Whole tree removal in accordance with DSC policy	
199	*Banksia integrifolia*	Coast Banksia	6	30	5	Fair	Fair	Alive	Semi-mature	Indigenous	Short (5-15)	3 (Low)	1	Asymmetrical crown, Deadwood moderate (3-10cm diameter), Over-extended branch(es)	Marked for removal	Removal	Whole tree removal in accordance with DSC policy	
200	*Celtis sinensis*	Chinese Hackberry	4	5	3	Good	Good	Alive	Juvenile	Exotic	Short (5-15)	4 (Environmental Pest / Noxious Weed)	1	Environmental/Declared Weed, Suppressed		Apply herbicide to cut stump, Removal	Whole tree removal in accordance with DSC policy	
201	*Banksia integrifolia*	Coast Banksia	10	50.73	7	Poor	Fair	Alive	Mature	Indigenous	Short (5-15)	2 (Medium)	1	Bacterial infection, Co-dominant stems, Deadwood major (>10cm diameter), Excessively thin crown density, Mistletoe, Wound(s)	Marked for removal	Removal	Whole tree removal in accordance with DSC policy	Low
202	*Pittosporum undulatum*	Sweet Pittosporum	3	2.83	1	Good	Good	Alive	Juvenile	Indigenous	Medium (15-40)	4 (Environmental Pest / Noxious Weed)	1	Co-dominant stems, Environmental/Declared Weed		Apply herbicide to cut stump, Removal	Whole tree removal in accordance with DSC policy	
203	*Pittosporum undulatum*	Sweet Pittosporum	2	1.41	1	Good	Good	Alive	Young	Indigenous	Medium (15-40)	4 (Environmental Pest / Noxious Weed)	1	Environmental/Declared Weed		Apply herbicide to cut stump, Removal	Whole tree removal in accordance with DSC policy	
204	*Pittosporum undulatum*	Sweet Pittosporum	1	2	1	Good	Good	Alive	Young	Indigenous	Medium (15-40)	4 (Environmental Pest / Noxious Weed)	1	Environmental/Declared Weed		Apply herbicide to cut stump, Removal	Whole tree removal in accordance with DSC policy	
205	*Strelitzia nicolai*	Giant Bird of Paradise	5	15	2	Good	Good	Alive	Semi-mature	Exotic	Long (>40)	3 (Low)	1	Deadwood moderate (3-10cm diameter)		Removal	Whole tree removal in accordance with DSC policy	
206	*Banksia integrifolia*	Coast Banksia	10	22	3	Fair	Poor	Alive	Semi-mature	Indigenous	Short (5-15)	3 (Low)	1	Asymmetrical crown, Crack or split, Crossing/rubbing branches, Deadwood moderate (3-10cm diameter), Growing from cut stump, Over-extended branch(es), Weak attachments, Wound(s)	Rubbing against the adjacent tree canopy. Poor form and structure. Marked for removal.	Removal	Whole tree removal in accordance with DSC policy	Low
207	*Strelitzia nicolai*	Giant Bird of Paradise	2	3.74	1	Good	Good	Alive	Juvenile	Exotic	Long (>40)	3 (Low)	1			Removal	Whole tree removal in accordance with DSC policy	
208	*Pittosporum undulatum*	Sweet Pittosporum	3	2	1	Good	Good	Alive	Juvenile	Indigenous	Medium (15-40)	4 (Environmental Pest / Noxious Weed)	1	Environmental/Declared Weed		Apply herbicide to cut stump, Removal	Whole tree removal in accordance with DSC policy	
209	*Banksia integrifolia*	Coast Banksia	10	52.36	6	Fair	Fair	Alive	Mature	Indigenous	Medium (15-40)	2 (Medium)	1	Asymmetrical crown, Bacterial infection, Climbing vine, Co-dominant stems, Deadwood moderate (3-10cm diameter), Mistletoe, Significant fault - standing dead tree, Wound(s)	Marked for removal	Removal	Whole tree removal in accordance with DSC policy	Low
210	*Banksia integrifolia*	Coast Banksia	9	50	6	Good	Good	Alive	Mature	Indigenous	Medium (15-40)	1 (High)	1	Bacterial infection, Deadwood moderate (3-10cm diameter), Wound(s)		Removal	Whole tree removal in accordance with DSC policy	Low
211	*Pittosporum undulatum*	Sweet Pittosporum	3	3	1	Good	Good	Alive	Juvenile	Indigenous	Medium (15-40)	4 (Environmental Pest / Noxious Weed)	1	Environmental/Declared Weed		Apply herbicide to cut stump, Removal	Whole tree removal in accordance with DSC policy	
212	*Banksia integrifolia*	Coast Banksia	9	39.05	4	Fair	Fair	Alive	Semi-mature	Indigenous	Short (5-15)	3 (Low)	1	Asymmetrical crown, Co-dominant stems, Mistletoe, Poor pruning, Wound(s)	Significant crown reduction. Marked for removal.	Removal	Whole tree removal in accordance with DSC policy	Low
213	*Pittosporum undulatum*	Sweet Pittosporum	2	4	2	Good	Good	Alive	Juvenile	Indigenous	Medium (15-40)	4 (Environmental Pest / Noxious Weed)	1	Environmental/Declared Weed		Apply herbicide to cut stump, Removal	Whole tree removal in accordance with DSC policy	
214	*Pittosporum undulatum*	Sweet Pittosporum	2	1.41	2	Good	Good	Alive	Juvenile	Indigenous	Short (5-15)	4 (Environmental Pest / Noxious Weed)	1	Environmental/Declared Weed, Suppressed		Apply herbicide to cut stump, Removal	Whole tree removal in accordance with DSC policy	
215	*Syagrus romanzoffiana*	Cocos Palm	2	1	1	Fair	Good	Alive	Young	Exotic	Long (>40)	4 (Environmental Pest / Noxious Weed)	1	Environmental/Declared Weed		Removal	Whole tree removal in accordance with DSC policy	
216	*Pittosporum undulatum*	Sweet Pittosporum	1	2	1	Good	Good	Alive	Juvenile	Indigenous	Short (5-15)	4 (Environmental Pest / Noxious Weed)	1	Environmental/Declared Weed, Suppressed		Apply herbicide to cut stump, Removal	Whole tree removal in accordance with DSC policy	

Tree Number (* indicates group)	Botanical Name	Common Name	Height (m)	DBH (cm)	Canopy Spread (m)	Health	Structure	Status	Age Class	Origin	Useful Life Expectancy (ULE)	STARS© Landscape Significance Rating	Number of trees in group	Observations	Observation Comments	Works Actions	Works Comments	Risk Rating
1	*Banksia integrifolia*	Coast Banksia	8	45	5	Fair	Fair	Alive	Mature	Indigenous	Short (5-15)	2 (Medium)	1	Co-dominant stems, Deadwood major (>10cm diameter), Dieback, Mistletoe				
217	*Banksia integrifolia*	Coast Banksia	11	57.01	6	Good	Fair	Alive	Mature	Indigenous	Medium (15-40)	2 (Medium)	1	Bacterial infection, Co-dominant stems, Crossing/rubbing branches, Deadwood major (>10cm diameter), Mistletoe, Poor pruning, Wound(s)	Marked for removal	Reduce end weight, Removal	End weight reduction on branch growing over the privately owned shed. Whole tree removal in accordance with DSC policy	Low
218	*Banksia integrifolia*	Coast Banksia	3	6	2	Very Poor	Fair	Alive	Semi-mature	Indigenous	Dead Or Hazardous/Remove (0-5)	5 (Hazardous / Irreversible Decline)	1	Asymmetrical crown, Deadwood moderate (3-10cm diameter), Excessively thin crown density, Suppressed	Marked for removal	Removal	Whole tree removal in accordance with DSC policy	
219	*Pittosporum undulatum*	Sweet Pittosporum	2	1.41	1	Good	Good	Alive	Juvenile	Indigenous	Short (5-15)	4 (Environmental Pest / Noxious Weed)	1	Environmental/Declared Weed, Suppressed		Apply herbicide to cut stump, Removal	Whole tree removal in accordance with DSC policy	
220	*Banksia integrifolia*	Coast Banksia	6	27.59	5	Very Poor	Fair	Alive	Semi-mature	Indigenous	Dead Or Hazardous/Remove (0-5)	5 (Hazardous / Irreversible Decline)	1	Asymmetrical crown, Co-dominant stems, Deadwood moderate (3-10cm diameter), Dieback, Suppressed	Marked for removal	Removal	Whole tree removal in accordance with DSC policy	
221	*Banksia integrifolia*	Coast Banksia	7	28.86	6	Fair	Poor	Alive	Semi-mature	Indigenous	Short (5-15)	3 (Low)	1	Asymmetrical crown, Bacterial infection, Deadwood moderate (3-10cm diameter), Epicormic shoots, Growing from cut stump, Over-extended branch(es), Suppressed, Wound(s)	Marked for removal	Removal	Whole tree removal in accordance with DSC policy	
222	*Pittosporum undulatum*	Sweet Pittosporum	3	2.83	1	Good	Good	Alive	Juvenile	Indigenous	Short (5-15)	4 (Environmental Pest / Noxious Weed)	1	Environmental/Declared Weed, Suppressed		Apply herbicide to cut stump, Removal	Whole tree removal in accordance with DSC policy	
223	*Celtis sinensis*	Chinese Hackberry	2	3	1	Good	Good	Alive	Juvenile	Exotic	Short (5-15)	4 (Environmental Pest / Noxious Weed)	1	Environmental/Declared Weed, Suppressed		Apply herbicide to cut stump, Removal	Whole tree removal in accordance with DSC policy	
224	*Celtis sinensis*	Chinese Hackberry	3	2.83	1	Good	Good	Alive	Juvenile	Exotic	Short (5-15)	4 (Environmental Pest / Noxious Weed)	1	Environmental/Declared Weed, Suppressed		Apply herbicide to cut stump, Removal	Whole tree removal in accordance with DSC policy	
225	*Pittosporum undulatum*	Sweet Pittosporum	3	3	2	Good	Good	Alive	Juvenile	Indigenous	Short (5-15)	4 (Environmental Pest / Noxious Weed)	1	Environmental/Declared Weed, Suppressed		Apply herbicide to cut stump, Removal	Whole tree removal in accordance with DSC policy	
226	*Heptapleurum actinophyllum*	Umbrella Tree	7	30	5	Good	Fair	Alive	Mature	Native	Medium (15-40)	4 (Environmental Pest / Noxious Weed)	1	Co-dominant stems, Crossing/rubbing branches, Environmental/Declared Weed, Included bark, Wound(s)	Within close proximity to displaced concrete culvert. Marked for removal	Apply herbicide to cut stump, Removal	Whole tree removal in accordance with DSC policy	Low
227	*Heptapleurum actinophyllum*	Umbrella Tree	6	10.39	3	Fair	Fair	Alive	Semi-mature	Native	Short (5-15)	4 (Environmental Pest / Noxious Weed)	1	Asymmetrical crown, Crossing/rubbing branches, Suppressed, Wound(s)	Crossing rubbing with the adjacent tree.	Apply herbicide to cut stump, Removal	Whole tree removal in accordance with DSC policy	
228	*Banksia integrifolia*	Coast Banksia	3	19.1	5	Fair	Poor	Alive	Semi-mature	Indigenous	Short (5-15)	3 (Low)	1	Asymmetrical crown, Crossing/rubbing branches, Deadwood moderate (3-10cm diameter), Over-extended branch(es), Suppressed, Wound(s)	Marked for removal	Removal	Whole tree removal in accordance with DSC policy	
229	*Banksia integrifolia*	Coast Banksia	8	24.21	5	Fair	Poor	Alive	Semi-mature	Indigenous	Short (5-15)	3 (Low)	1	Asymmetrical crown, Crossing/rubbing branches, Deadwood moderate (3-10cm diameter), Over-extended branch(es), Suppressed, Wound(s)	Marked for removal	Removal	Whole tree removal in accordance with DSC policy	Low
230	*Banksia integrifolia*	Coast Banksia	7	17.8	3	Fair	Poor	Alive	Semi-mature	Indigenous	Short (5-15)	3 (Low)	1	Asymmetrical crown, Co-dominant stems, Crossing/rubbing branches, Deadwood moderate (3-10cm diameter), Over-extended branch(es), Suppressed, Wound(s)	Likely using the adjacent tree for support. Marked for removal	Removal	Whole tree removal in accordance with DSC policy	Low
231	*Celtis sinensis*	Chinese Hackberry	3	2	2	Good	Good	Alive	Juvenile	Exotic	Short (5-15)	4 (Environmental Pest / Noxious Weed)	1	Environmental/Declared Weed, Suppressed	Marked for removal	Apply herbicide to cut stump, Removal	Whole tree removal in accordance with DSC policy	
232	*Banksia integrifolia*	Coast Banksia	6	7	2	Fair	Fair	Alive	Semi-mature	Indigenous	Short (5-15)	3 (Low)	1	Asymmetrical crown, Deadwood moderate (3-10cm diameter), Decay, Suppressed, Wound(s)	Marked for removal	Removal	Whole tree removal in accordance with DSC policy	
233	*Pittosporum undulatum*	Sweet Pittosporum	1	1	1	Good	Good	Alive	Young	Indigenous	Short (5-15)	4 (Environmental Pest / Noxious Weed)	1	Environmental/Declared Weed, Suppressed		Apply herbicide to cut stump, Removal	Whole tree removal in accordance with DSC policy	
234	*Banksia integrifolia*	Coast Banksia	8	50	8	Good	Good	Alive	Mature	Indigenous	Long (>40)	1 (High)	1	Co-dominant stems, Deadwood moderate (3-10cm diameter), Mistletoe	Marked for removal	Removal	Whole tree removal in accordance with DSC policy	
235	*Banksia integrifolia*	Coast Banksia	9	29.15	4	Poor	Fair	Alive	Mature	Indigenous	Short (5-15)	2 (Medium)	1	Asymmetrical crown, Co-dominant stems, Deadwood major (>10cm diameter), Dieback, Included bark, Mistletoe, Poor pruning		Removal	Whole tree removal in accordance with DSC policy	Low
236	*Pittosporum undulatum*	Sweet Pittosporum	1	3	1	Good	Good	Alive	Young	Indigenous	Medium (15-40)	4 (Environmental Pest / Noxious Weed)	1	Environmental/Declared Weed		Apply herbicide to cut stump, Removal	Whole tree removal in accordance with DSC policy	
237	*Dracaena marginata*	Dragon Tree	6	22.78	5	Good	Fair	Alive	Mature	Exotic	Long (>40)	3 (Low)	1	Co-dominant stems, Crossing/rubbing branches, Included bark	Marked for removal	Removal	Whole tree removal in accordance with DSC policy	Low
238	*Heptapleurum actinophyllum*	Umbrella Tree	7	17.35	3	Good	Fair	Alive	Semi-mature	Native	Long (>40)	4 (Environmental Pest / Noxious Weed)	1	Co-dominant stems, Included bark	Marked for removal	Apply herbicide to cut stump, Removal	Whole tree removal in accordance with DSC policy	Low

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1	*Banksia integrifolia*	Coast Banksia	8	45	5	Fair	Fair	Alive	Mature	Indigenous	Short (5-15)	2 (Medium)	1	Co-dominant stems, Deadwood major (>10cm diameter), Dieback, Mistletoe				
239	*Banksia integrifolia*	Coast Banksia	8	34.99	6	Good	Fair	Alive	Mature	Indigenous	Medium (15-40)	2 (Medium)	1	Asymmetrical crown, Deadwood moderate (3-10cm diameter), Included bark, Previous failure(s), Wound(s)	Marked for removal	Removal	Whole tree removal in accordance with DSC policy	
240	*Pittosporum undulatum*	Sweet Pittosporum	8	28.67	6	Good	Poor	Alive	Mature	Indigenous	Medium (15-40)	4 (Environmental Pest / Noxious Weed)	1	Co-dominant stems, Deadwood moderate (3-10cm diameter), Epicormic shoots, Growing from cut stump, Weak attachments	Marked for removal	Apply herbicide to cut stump, Removal	Whole tree removal in accordance with DSC policy	
241	*Banksia integrifolia*	Coast Banksia	9	38.95	5	Fair	Poor	Alive	Mature	Indigenous	Short (5-15)	3 (Low)	1	Asymmetrical crown, Co-dominant stems, Deadwood moderate (3-10cm diameter), Decay, Included bark, Significant fault - bark inclusion(s), Weak attachments, Wound(s)	Included branch junction with poor limited holding wood and decay within. Tree marked for removal	Removal	Whole tree removal in accordance with DSC policy	Moderate
242	*Banksia integrifolia*	Coast Banksia	3	12	4	Good	Poor	Alive	Semi-mature	Indigenous	Short (5-15)	3 (Low)	1	Asymmetrical crown, Deadwood minor (<3cm diameter), Decay, Over-extended branch(es), Suppressed, Wound(s)	Marked for removal	Removal	Whole tree removal in accordance with DSC policy	
243	*Pittosporum undulatum*	Sweet Pittosporum	3	2	1	Fair	Good	Alive	Juvenile	Indigenous	Medium (15-40)	4 (Environmental Pest / Noxious Weed)	1	Environmental/Declared Weed, Plant pathogen		Apply herbicide to cut stump, Removal	Whole tree removal in accordance with DSC policy	
244	*Pittosporum undulatum*	Sweet Pittosporum	1	1.41	1	Good	Good	Alive	Young	Indigenous	Medium (15-40)	4 (Environmental Pest / Noxious Weed)	1	Environmental/Declared Weed		Apply herbicide to cut stump, Removal	Whole tree removal in accordance with DSC policy	
245	*Pittosporum undulatum*	Sweet Pittosporum	2	3	2	Good	Fair	Alive	Juvenile	Indigenous	Medium (15-40)	4 (Environmental Pest / Noxious Weed)	1	Co-dominant stems, Environmental/Declared Weed		Apply herbicide to cut stump, Removal	Whole tree removal in accordance with DSC policy	
246	*Olea europaea subsp. cuspidata*	African Olive	2	2.83	3	Good	Poor	Alive	Juvenile	Exotic	Short (5-15)	4 (Environmental Pest / Noxious Weed)	1	Environmental/Declared Weed, Growing from cut stump		Apply herbicide to cut stump, Removal	Whole tree removal in accordance with DSC policy	
247	*Banksia integrifolia*	Coast Banksia	10	71.06	8	Good	Fair	Alive	Mature	Indigenous	Medium (15-40)	2 (Medium)	1	Bacterial infection, Co-dominant stems, Deadwood major (>10cm diameter), Mistletoe, Poor pruning, Previous failure(s), Recent change - crown architecture, Wound(s)	Marked for removal	Removal	Whole tree removal in accordance with DSC policy	Low
248	*Banksia integrifolia*	Coast Banksia	10	45	7	Good	Fair	Alive	Mature	Indigenous	Short (5-15)	3 (Low)	1	Asymmetrical crown, Deadwood moderate (3-10cm diameter), Girdling roots, Previous failure(s), Suppressed, Wound(s)	Marked for removal	Removal	Whole tree removal in accordance with DSC policy	Low
249	*Celtis sinensis*	Chinese Hackberry	9	60	13	Good	Good	Alive	Semi-mature	Exotic	Long (>40)	4 (Environmental Pest / Noxious Weed)	1	Co-dominant stems, Deadwood moderate (3-10cm diameter), Environmental/Declared Weed	Marked for removal	Apply herbicide to cut stump, Removal	Whole tree removal in accordance with DSC policy	Low
250	*Cupaniopsis anacardioides*	Tuckeroo	2	2	1	Good	Good	Alive	Young	Native	Short (5-15)	3 (Low)	1	Suppressed		Removal	Whole tree removal in accordance with DSC policy	
251	*Pittosporum undulatum*	Sweet Pittosporum	4	3	2	Good	Good	Alive	Juvenile	Indigenous	Medium (15-40)	4 (Environmental Pest / Noxious Weed)	1	Environmental/Declared Weed		Apply herbicide to cut stump, Removal	Whole tree removal in accordance with DSC policy	
252	*Pittosporum undulatum*	Sweet Pittosporum	2	2	1	Fair	Good	Alive	Juvenile	Indigenous	Short (5-15)	4 (Environmental Pest / Noxious Weed)	1	Climbing vine, Environmental/Declared Weed		Apply herbicide to cut stump, Removal	Whole tree removal in accordance with DSC policy	
253	*Banksia integrifolia*	Coast Banksia	8	38.04	14	Fair	Fair	Alive	Mature	Indigenous	Medium (15-40)	2 (Medium)	1	Co-dominant stems, Deadwood moderate (3-10cm diameter), Mistletoe, Poor pruning	Marked for removal	Removal	Whole tree removal in accordance with DSC policy	Low
254	*Heptapleurum actinophyllum*	Umbrella Tree	2	4.24	1	Good	Fair	Alive	Juvenile	Native	Short (5-15)	4 (Environmental Pest / Noxious Weed)	1	Co-dominant stems, Environmental/Declared Weed, Included bark, Suppressed	Marked for removal	Apply herbicide to cut stump, Removal	Whole tree removal in accordance with DSC policy	
255	*Banksia integrifolia*	Coast Banksia	9	54.28	6	Good	Fair	Alive	Mature	Indigenous	Medium (15-40)	2 (Medium)	1	Asymmetrical crown, Co-dominant stems, Deadwood moderate (3-10cm diameter), Decay, Included bark, Poor pruning, Wound(s)	Marked for removal	Removal	Whole tree removal in accordance with DSC policy	Low
256	*Banksia integrifolia*	Coast Banksia	9	41.23	5	Fair	Fair	Alive	Mature	Indigenous	Medium (15-40)	2 (Medium)	1	Co-dominant stems, Deadwood moderate (3-10cm diameter), Hanger(s), Mistletoe, Wound(s)	Marked for removal	Removal	Whole tree removal in accordance with DSC policy	Low
257	*Pittosporum undulatum*	Sweet Pittosporum	4	5.74	3	Good	Good	Alive	Juvenile	Indigenous	Medium (15-40)	4 (Environmental Pest / Noxious Weed)	1	Co-dominant stems, Environmental/Declared Weed, Suppressed		Apply herbicide to cut stump, Removal	Whole tree removal in accordance with DSC policy	
258	*Strelitzia nicolai*	Giant Bird of Paradise	6	50	6	Good	Good	Alive	Mature	Exotic	Long (>40)	3 (Low)	1	Co-dominant stems, Deadwood moderate (3-10cm diameter)		Removal	Whole tree removal in accordance with DSC policy	Low
259	*Banksia integrifolia*	Coast Banksia	8	53.09	7	Good	Fair	Alive	Mature	Indigenous	Medium (15-40)	2 (Medium)	1	Co-dominant stems, Deadwood moderate (3-10cm diameter), Over-extended branch(es), Previous failure(s)	Marked for removal	Removal	Whole tree removal in accordance with DSC policy	Low
260	*Pittosporum undulatum*	Sweet Pittosporum	4	4.24	2	Good	Good	Alive	Juvenile	Indigenous	Medium (15-40)	4 (Environmental Pest / Noxious Weed)	1	Co-dominant stems, Environmental/Declared Weed		Apply herbicide to cut stump, Removal	Whole tree removal in accordance with DSC policy	

Tree Number (* indicates group)	Botanical Name	Common Name	Height (m)	DBH (cm)	Canopy Spread (m)	Health	Structure	Status	Age Class	Origin	Useful Life Expectancy (ULE)	STARS© Landscape Significance Rating	Number of trees in group	Observations	Observation Comments	Works Actions	Works Comments	Risk Rating
1	*Banksia integrifolia*	Coast Banksia	8	45	5	Fair	Fair	Alive	Mature	Indigenous	Short (5-15)	2 (Medium)	1	Co-dominant stems, Deadwood major (>10cm diameter), Dieback, Mistletoe				
261	*Banksia integrifolia*	Coast Banksia	7	26.91	5	Good	Fair	Alive	Semi-mature	Indigenous	Short (5-15)	3 (Low)	1	Asymmetrical crown, Climbing vine, Co-dominant stems, Deadwood moderate (3-10cm diameter), Over-extended branch(es), Suppressed		Removal	Whole tree removal in accordance with DSC policy	
262	*Banksia integrifolia*	Coast Banksia	4	20	4	Fair	Has failed	Alive	Semi-mature	Indigenous	Dead Or Hazardous/Remove (0-5)	5 (Hazardous / Irreversible Decline)	1	Asymmetrical crown, Poor pruning, Previous failure(s)	Failed at the root plate. Marked for removal	Removal	Whole tree removal in accordance with DSC policy	
263	*Melaleuca armillaris*	bracelet Honey-myrtle, needle-leaved Honey-myrtle	6	25	0	Dead	Poor	Dead	Semi-mature	Dead or other	Dead Or Hazardous/Remove (0-5)	5 (Hazardous / Irreversible Decline)	1	Significant fault - standing dead tree		Removal	Whole tree removal in accordance with DSC policy	
264	*Melaleuca armillaris*	bracelet Honey-myrtle, needle-leaved Honey-myrtle	5	25.46	2	Dead	Poor	Dead	Mature	Dead or other	Dead Or Hazardous/Remove (0-5)	5 (Hazardous / Irreversible Decline)	1	Significant fault - standing dead tree		Removal	Whole tree removal in accordance with DSC policy	Low
265	*Strelitzia nicolai*	Giant Bird of Paradise	7	24.88	3	Good	Good	Alive	Semi-mature	Exotic	Long (>40)	3 (Low)	1	Co-dominant stems, Deadwood moderate (3-10cm diameter)		Removal	Whole tree removal to facilitate future reservoir maintenance inspections	
266	*Banksia integrifolia*	Coast Banksia	8	25	4	Good	Fair	Alive	Semi-mature	Indigenous	Long (>40)	2 (Medium)	1	Deadwood minor (<3cm diameter), Included bark				Low
267	*Phoenix canariensis*	Canary Island Date Palm	1	2	1	Good	Good	Alive	Young	Exotic	Long (>40)	3 (Low)	1		Tag located on adjacent stump.	Apply herbicide to cut stump, Removal	Whole tree removal to facilitate future reservoir maintenance inspections	
268	*Strelitzia nicolai*	Giant Bird of Paradise	2	4	1	Good	Good	Alive	Juvenile	Exotic	Long (>40)	3 (Low)	1			Removal	Whole tree removal to facilitate future reservoir maintenance inspections	
269	*Strelitzia nicolai*	Giant Bird of Paradise	6	23.45	5	Good	Good	Alive	Semi-mature	Exotic	Long (>40)	3 (Low)	1	Co-dominant stems, Deadwood moderate (3-10cm diameter)		Removal	Whole tree removal to facilitate future reservoir maintenance inspections	
270	*Pittosporum undulatum*	Sweet Pittosporum	6	10	2	Good	Good	Alive	Juvenile	Indigenous	Medium (15-40)	4 (Environmental Pest / Noxious Weed)	1	Co-dominant stems, Environmental/Declared Weed		Apply herbicide to cut stump, Removal	Whole tree removal - environmental weed	
271	*Strelitzia nicolai*	Giant Bird of Paradise	2	4.47	2	Good	Good	Alive	Juvenile	Exotic	Long (>40)	3 (Low)	1	Suppressed		Removal	Whole tree removal to facilitate future reservoir maintenance inspections	
272	*Banksia serrata*	Saw-tooth Banksia	2	11	1	Dead	Poor	Dead	Semi-mature	Dead or other	Dead Or Hazardous/Remove (0-5)	5 (Hazardous / Irreversible Decline)	1	Significant fault - standing dead tree		Removal	Dead tree removal	
273	*Pittosporum undulatum*	Sweet Pittosporum	6	10.49	3	Good	Fair	Alive	Juvenile	Indigenous	Medium (15-40)	4 (Environmental Pest / Noxious Weed)	1	Co-dominant stems, Suppressed		Apply herbicide to cut stump, Removal	Whole tree removal - environmental weed	
274	*Melaleuca armillaris*	bracelet Honey-myrtle, needle-leaved Honey-myrtle	4	35.36	4	Poor	Has failed	Alive	Mature	Indigenous	Dead Or Hazardous/Remove (0-5)	5 (Hazardous / Irreversible Decline)	1	Co-dominant stems, Deadwood moderate (3-10cm diameter), Previous failure(s)	Fallen tree. Marked for removal.	Removal	Dead tree removal	
275	*Pittosporum undulatum*	Sweet Pittosporum	6	11	3	Good	Fair	Alive	Juvenile	Indigenous	Medium (15-40)	4 (Environmental Pest / Noxious Weed)	1	Environmental/Declared Weed, Included bark, Previous failure(s)		Apply herbicide to cut stump, Removal	Whole tree removal - environmental weed	
276	*Banksia serrata*	Saw-tooth Banksia	2	35	0	Dead	Has failed	Dead	Mature	Dead or other	Dead Or Hazardous/Remove (0-5)	5 (Hazardous / Irreversible Decline)	1	Significant fault - standing dead tree	Habitat snag	Removal	Dead tree removal	
277	*Banksia serrata*	Saw-tooth Banksia	5	25	4	Dead	Poor	Dead	Mature	Dead or other	Dead Or Hazardous/Remove (0-5)	5 (Hazardous / Irreversible Decline)	1	Significant fault - standing dead tree	Marked for removal	Removal	Dead tree removal	
278	*Pittosporum undulatum*	Sweet Pittosporum	3	3	2	Good	Good	Alive	Juvenile	Indigenous	Medium (15-40)	4 (Environmental Pest / Noxious Weed)	1	Environmental/Declared Weed		Apply herbicide to cut stump, Removal	Whole tree removal - environmental weed	
279	*Banksia serrata*	Saw-tooth Banksia	6	61.03	4	Dead	Poor	Dead	Mature	Dead or other	Dead Or Hazardous/Remove (0-5)	5 (Hazardous / Irreversible Decline)	1	Significant fault - standing dead tree	Marked for removal	Removal	Dead tree removal	
280	*Syagrus romanzoffiana*	Cocos Palm	4	13.42	3	Good	Good	Alive	Juvenile	Exotic	Long (>40)	4 (Environmental Pest / Noxious Weed)	1	Environmental/Declared Weed		Apply herbicide to cut stump, Removal	Whole tree removal - weed species with General Biosecurity Duty (NSW DPI)	
281	*Acacia saligna*	Golden Wreath Wattle	4	40	5	Dead	Has failed	Dead	Mature	Dead or other	Dead Or Hazardous/Remove (0-5)	5 (Hazardous / Irreversible Decline)	1	Previous failure(s), Significant fault - standing dead tree	Marked for removal.	Apply herbicide to cut stump, Removal	Dead tree removal	
282	*Banksia serrata*	Saw-tooth Banksia	4	25	0	Dead	Has failed	Dead	Mature	Dead or other	Dead Or Hazardous/Remove (0-5)	5 (Hazardous / Irreversible Decline)	1	Previous failure(s), Significant fault - standing dead tree		Removal	Dead tree removal	
283	*Strelitzia nicolai*	Giant Bird of Paradise	6	20.62	3	Good	Good	Alive	Semi-mature	Exotic	Long (>40)	3 (Low)	1	Co-dominant stems, Deadwood moderate (3-10cm diameter)		Removal	Whole tree removal to facilitate future reservoir maintenance inspections	
284	*Strelitzia nicolai*	Giant Bird of Paradise	6	22.91	3	Good	Good	Alive	Semi-mature	Exotic	Long (>40)	3 (Low)	1	Co-dominant stems, Deadwood moderate (3-10cm diameter)		Removal	Whole tree removal to facilitate future reservoir maintenance inspections	
285	*Acacia saligna*	Golden Wreath Wattle	4	9.43	2	Fair	Good	Alive	Juvenile	Native	Short (5-15)	3 (Low)	1	Asymmetrical crown, Deadwood minor (<3cm diameter), Mistletoe, Suppressed	Marked for removal	Apply herbicide to cut stump, Consider Removal	Whole tree removal - environmental weed	
286	*Acacia saligna*	Golden Wreath Wattle	3	15	3	Good	Fair	Alive	Semi-mature	Native	Short (5-15)	3 (Low)	1	Asymmetrical crown, Deadwood minor (<3cm diameter), Previous failure(s), Suppressed	Marked for removal	Apply herbicide to cut stump, Consider Removal	Whole tree removal - environmental weed	
287	*Acacia saligna*	Golden Wreath Wattle	5	16	2	Fair	Good	Alive	Semi-mature	Native	Short (5-15)	3 (Low)	1	Asymmetrical crown, Deadwood moderate (3-10cm diameter), Dieback	Marked for removal	Apply herbicide to cut stump, Consider Removal	Whole tree removal - environmental weed	
288	*Banksia serrata*	Saw-tooth Banksia	3	20	1	Dead	Has failed	Dead	Semi-mature	Dead or other	Dead Or Hazardous/Remove (0-5)	5 (Hazardous / Irreversible Decline)	1	Significant fault - standing dead tree	Fallen dead tree Marked for removal	Removal	Dead tree removal	

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1	*Banksia integrifolia*	Coast Banksia	8	45	5	Fair	Fair	Alive	Mature	Indigenous	Short (5-15)	2 (Medium)	1	Co-dominant stems, Deadwood major (>10cm diameter), Dieback, Mistletoe				
289	*Olea europaea*	Olive	5	29.02	3	Poor	Fair	Alive	Mature	Exotic	Short (5-15)	3 (Low)	1	Co-dominant stems, Deadwood major (>10cm diameter), Dieback, Epicormic shoots, Poor pruning				Low
290	*Banksia integrifolia*	Coast Banksia	8	55.45	8	Good	Good	Alive	Mature	Indigenous	Long (>40)	1 (High)	1	Bacterial infection, Co-dominant stems, Deadwood moderate (3-10cm diameter), Root scalping	Marked for removal	Removal	Whole tree removal in accordance with DSC policy	
291	*Banksia integrifolia*	Coast Banksia	8	88.32	14	Good	Fair	Alive	Mature	Indigenous	Long (>40)	2 (Medium)	1	Co-dominant stems, Deadwood moderate (3-10cm diameter), Galls, Included bark, Root scalping	Marked for removal	Removal		
292	*Banksia integrifolia*	Coast Banksia	7	50	11	Poor	Fair	Alive	Mature	Indigenous	Short (5-15)	2 (Medium)	1	Co-dominant stems, Deadwood moderate (3-10cm diameter), Excessively thin crown density				Low
293	*Melaleuca armillaris*	bracelet Honey-myrtle, needle-leaved Honey-myrtle	5	30.3	3	Poor	Poor	Alive	Mature	Indigenous	Short (5-15)	3 (Low)	1	Asymmetrical crown, Co-dominant stems, Deadwood moderate (3-10cm diameter), Included bark, Suppressed	Marked for removal			
294	*Melaleuca armillaris*	bracelet Honey-myrtle, needle-leaved Honey-myrtle	6	42.25	6	Poor	Poor	Alive	Mature	Indigenous	Short (5-15)	3 (Low)	1	Asymmetrical crown, Co-dominant stems, Crossing/rubbing branches, Deadwood moderate (3-10cm diameter), Included bark, Suppressed, Weak attachments	Marked for removal			
295	*Banksia integrifolia*	Coast Banksia	7	20	3	Fair	Fair	Alive	Semi-mature	Indigenous	Short (5-15)	3 (Low)	1	Asymmetrical crown, Deadwood moderate (3-10cm diameter), Suppressed				
296	*Eucalyptus haemastoma*	Scribbly Gum	12	30	5	Good	Fair	Alive	Semi-mature	Indigenous	Medium (15-40)	2 (Medium)	1	Crossing/rubbing branches, Deadwood moderate (3-10cm diameter), Dieback, Previous failure(s)				
297	*Melaleuca armillaris*	bracelet Honey-myrtle, needle-leaved Honey-myrtle	4	27.31	4	Poor	Poor	Alive	Mature	Indigenous	Short (5-15)	3 (Low)	1	Asymmetrical crown, Co-dominant stems, Deadwood moderate (3-10cm diameter), Included bark, Over-extended branch(es), Suppressed, Weak attachments	Marked for removal			
298	*Banksia integrifolia*	Coast Banksia	11	30	4	Good	Fair	Alive	Semi-mature	Indigenous	Medium (15-40)	2 (Medium)	1	Co-dominant stems, Crossing/rubbing branches, Deadwood moderate (3-10cm diameter), Previous failure(s), Wound(s)	Marked for removal			
299	*Banksia integrifolia*	Coast Banksia	11	47.43	8	Good	Good	Alive	Mature	Indigenous	Medium (15-40)	1 (High)	1	Asymmetrical crown, Co-dominant stems, Crossing/rubbing branches, Deadwood moderate (3-10cm diameter), Wound(s)				
300	*Melaleuca nodosa*	Prickly-leaved Paperbark	3	5.66	3	Fair	Fair	Alive	Juvenile	Indigenous	Short (5-15)	3 (Low)	1	Asymmetrical crown, Co-dominant stems, Crossing/rubbing branches, Suppressed				
301	*Banksia integrifolia*	Coast Banksia	11	30	5	Good	Good	Alive	Semi-mature	Indigenous	Medium (15-40)	1 (High)	1	Deadwood major (>10cm diameter)				
302	*Banksia integrifolia*	Coast Banksia	12	55	7	Good	Fair	Alive	Mature	Indigenous	Medium (15-40)	1 (High)	1	Asymmetrical crown, Crack or split, Deadwood major (>10cm diameter), Previous failure(s)				
303	*Eucalyptus robusta*	Swamp Mahogany	13	45	9	Good	Good	Alive	Mature	Indigenous	Long (>40)	1 (High)	1	Crossing/rubbing branches, Deadwood moderate (3-10cm diameter)				Low
304	*Banksia integrifolia*	Coast Banksia	11	40	6	Good	Good	Alive	Mature	Indigenous	Medium (15-40)	2 (Medium)	1	Asymmetrical crown, Co-dominant stems, Deadwood moderate (3-10cm diameter)		Crown Raise	Uplift crown over primate property to 3m. Maximum pruning wound to be no greater than 60mm.	Low
305	*Banksia integrifolia*	Coast Banksia	13	63.64	8	Good	Good	Alive	Mature	Indigenous	Long (>40)	1 (High)	1	Co-dominant stems, Deadwood moderate (3-10cm diameter), Root scalping				Low
306	*Heptapleurum actinophyllum*	Umbrella Tree	7	30	4	Good	Fair	Alive	Semi-mature	Native	Long (>40)	4 (Environmental Pest / Noxious Weed)	1	Co-dominant stems, Included bark	Marked for removal (Blue)	Apply herbicide to cut stump, Removal	Whole tree removal in accordance with DSC policy	
307	*Eucalyptus botryoides*	Mahogany Gum	16	75	11	Poor	Poor	Alive	Mature	Indigenous	Short (5-15)	3 (Low)	1	Asymmetrical crown, Cankers, Cavity, Deadwood major (>10cm diameter), Decay, Dieback, Fungal fruiting body(s), Over-extended branch(es), Previous failure(s), Wound(s)	This tree is displaying potential indicators of decay on the trunk. It is displaying positive indicators of decay (fruiting bodies) on declining limbs)	Selective branch prune, Consider Removal	Selective prune second order branch in the lower northern crown.	Moderate
308	*Syzygium paniculatum*	Brush Cherry	7	25	5	Good	Good	Alive	Semi-mature	Native	Medium (15-40)	2 (Medium)	1	Co-dominant stems, Deadwood moderate (3-10cm diameter), Weak attachments		Crown Reduce	Reduce crown to create a 1.5m gap away from the boundary fence. Maximum pruning wound 50mm.	Low

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1	*Banksia integrifolia*	Coast Banksia	8	45	5	Fair	Fair	Alive	Mature	Indigenous	Short (5-15)	2 (Medium)	1	Co-dominant stems, Deadwood major (>10cm diameter), Dieback, Mistletoe				
309	*Corymbia eximia*	Yellow Bloodwood	15	35	7	Good	Good	Alive	Semi-mature	Indigenous	Long (>40)	2 (Medium)	1	Deadwood moderate (3-10cm diameter)	Marked for removal (blue)	Removal	Whole tree removal in accordance with DSC policy	Low
310	*Syzygium paniculatum*	Brush Cherry	11	85.15	8	Good	Fair	Alive	Mature	Native	Medium (15-40)	2 (Medium)	1	Co-dominant stems, Crossing/rubbing branches, Deadwood moderate (3-10cm diameter), Included bark, Over-extended branch(es)		Crown Raise	Crown raise over the private property to 3m. Maximum pruning wound 100mm.	Low
311	*Banksia integrifolia*	Coast Banksia	10	100	11	Good	Good	Alive	Mature	Indigenous	Medium (15-40)	1 (High)	1	Co-dominant stems, Deadwood moderate (3-10cm diameter), Mistletoe	Marked for removal (Blue)	Removal	Whole tree removal in accordance with DSC policy	Low
312	*Banksia integrifolia*	Coast Banksia	10	36.06	4	Good	Fair	Alive	Mature	Indigenous	Medium (15-40)	2 (Medium)	1	Co-dominant stems, Crossing/rubbing branches, Deadwood moderate (3-10cm diameter), Epicormic shoots, Over-extended branch(es), Poor pruning, Previous failure(s), Wound(s)	Marked for removal (Blue)	Removal	Whole tree removal in accordance with DSC policy	Low
313	*Banksia integrifolia*	Coast Banksia	10	35	4	Good	Poor	Alive	Mature	Indigenous	Short (5-15)	2 (Medium)	1	Asymmetrical crown, Deadwood moderate (3-10cm diameter), Previous failure(s)	Marked for removal (Blue)	Removal	Whole tree removal in accordance with DSC policy	Low
314	*Banksia integrifolia*	Coast Banksia	10	50	6	Good	Fair	Alive	Mature	Indigenous	Medium (15-40)	2 (Medium)	1	Bacterial infection, Co-dominant stems, Damaging infrastructure, Deadwood moderate (3-10cm diameter), Poor pruning, Wound(s)	Surface root can be visually seen displacing concrete culvert. Marked for removal (Blue)	Removal	Whole tree removal in accordance with DSC policy	Low
315	*Banksia integrifolia*	Coast Banksia	8	35	5	Good	Good	Alive	Semi-mature	Indigenous	Medium (15-40)	3 (Low)	1	Asymmetrical crown, Co-dominant stems, Deadwood moderate (3-10cm diameter), Dieback, Previous failure(s), Wound(s)	Marked for removal (Blue)	Deadwood prune >3cm diameter, Removal	Whole tree removal in accordance with DSC policy	Low
316	*Banksia integrifolia*	Coast Banksia	10	55	4	Good	Fair	Alive	Mature	Indigenous	Medium (15-40)	2 (Medium)	1	Deadwood moderate (3-10cm diameter), Poor pruning, Wound(s)	Marked for removal (Blue)	Removal	Whole tree removal in accordance with DSC policy	Low
317	*Acacia saligna*	Golden Wreath Wattle	2	30	2	Dead	Has failed	Dead	Mature	Dead or other	Dead Or Hazardous/Remove (0-5)	5 (Hazardous / Irreversible Decline)	1	Significant fault - standing dead tree	Fallen dead tree Marked for removal (Blue)	Apply herbicide to cut stump, Removal	Whole tree removal in accordance with DSC policy	
318	*Acacia saligna*	Golden Wreath Wattle	5	47.96	13	Good	Poor	Alive	Mature	Native	Short (5-15)	3 (Low)	1	Climbing vine, Co-dominant stems, Crack or split, Deadwood moderate (3-10cm diameter), Decay, Included bark, Wound(s)		Apply herbicide to cut stump, Removal	Whole tree removal in accordance with DSC policy	
319	*Acacia saligna*	Golden Wreath Wattle	3	25	6	Good	Has failed	Alive	Mature	Native	Dead Or Hazardous/Remove (0-5)	5 (Hazardous / Irreversible Decline)	1	Asymmetrical crown, Climbing vine, Previous failure(s), Wound(s)		Apply herbicide to cut stump, Removal	Whole tree removal in accordance with DSC policy	
320	*Banksia integrifolia*	Coast Banksia	10	45	8	Good	Good	Alive	Mature	Indigenous	Long (>40)	1 (High)	1	Co-dominant stems, Deadwood moderate (3-10cm diameter)		Crown Reduce	Reduce the crown to create a 1m gap from the fence.	Low
321	*Banksia integrifolia*	Coast Banksia	6	35	6	Good	Fair	Alive	Semi-mature	Indigenous	Short (5-15)	3 (Low)	1	Asymmetrical crown, Crossing/rubbing branches, Deadwood moderate (3-10cm diameter), Poor pruning, Suppressed, Wound(s)	Marked for removal (Blue)	Removal	Whole tree removal in accordance with DSC policy	Low
322	*Banksia integrifolia*	Coast Banksia	2	12.25	3	Fair	Fair	Alive	Semi-mature	Indigenous	Short (5-15)	3 (Low)	1	Asymmetrical crown, Deadwood minor (<3cm diameter), Suppressed	Marked for removal (Blue)	Removal	Whole tree removal in accordance with DSC policy	
323	*Acacia saligna*	Golden Wreath Wattle	4	5	4	Good	Fair	Alive	Juvenile	Native	Short (5-15)	3 (Low)	1	Suppressed, Wound(s)		Apply herbicide to cut stump, Removal	Whole tree removal in accordance with DSC policy	
324	*Banksia integrifolia*	Coast Banksia	9	70	6	Fair	Poor	Alive	Mature	Indigenous	Short (5-15)	2 (Medium)	1	Deadwood major (>10cm diameter), Decay, Dieback, Previous failure(s), Wood borer, Wound(s)	Marked for removal (Blue)	Removal	Whole tree removal in accordance with DSC policy	
325	*Banksia integrifolia*	Coast Banksia	7	40	6	Good	Fair	Alive	Semi-mature	Indigenous	Medium (15-40)	2 (Medium)	1	Asymmetrical crown, Deadwood moderate (3-10cm diameter), Over-extended branch(es), Recent changes - wind loading	Marked for removal (Blue)	Removal	Whole tree removal in accordance with DSC policy	
326	*Acacia saligna*	Golden Wreath Wattle	2	9.8	3	Good	Fair	Alive	Juvenile	Native	Short (5-15)	3 (Low)	1	Co-dominant stems, Crossing/rubbing branches	Marked for removal (Blue)	Apply herbicide to cut stump, Removal	Whole tree removal in accordance with DSC policy	
327	*Banksia integrifolia*	Coast Banksia	5	40	8	Fair	Fair	Alive	Mature	Indigenous	Short (5-15)	3 (Low)	1	Asymmetrical crown, Co-dominant stems, Deadwood major (>10cm diameter), Previous failure(s), Suppressed	Marked for removal (Blue)			
328	*Banksia integrifolia*	Coast Banksia	7	40	4	Good	Good	Alive	Semi-mature	Indigenous	Medium (15-40)	2 (Medium)	1	Deadwood moderate (3-10cm diameter), Suppressed, Wound(s)				Low
329	*Banksia integrifolia*	Coast Banksia	5	25	5	Fair	Fair	Alive	Semi-mature	Indigenous	Medium (15-40)	2 (Medium)	1	Crack or split, Deadwood moderate (3-10cm diameter), Suppressed, Wound(s)	Shear crack on a 60mm branch in the southern crown.			
330	*Banksia integrifolia*	Coast Banksia	8	35	6	Good	Poor	Alive	Semi-mature	Indigenous	Medium (15-40)	2 (Medium)	1	Asymmetrical crown, Cavity, Deadwood moderate (3-10cm diameter), Decay, Suppressed	Potential indicators of decay on the southern side of the trunk.			

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1	*Banksia integrifolia*	Coast Banksia	8	45	5	Fair	Fair	Alive	Mature	Indigenous	Short (5-15)	2 (Medium)	1	Co-dominant stems, Deadwood major (>10cm diameter), Dieback, Mistletoe				
331	*Eucalyptus bicostata*	Eurabbie	20	105	13	Fair	Fair	Alive	Mature	Native	Medium (15-40)	1 (High)	1	Crack or split, Deadwood major (>10cm diameter), Over-extended branch(es), Poor pruning, Wound(s)	Body language suggesting a crack in a third order branch in the northern canopy.	Reduce end weight	Reduce end weight on the branch with a hazard beam crack in the upper northeastern crown.	Low
332	*Eucalyptus tereticornis*	Forest Red Gum	15	25	5	Poor	Good	Alive	Semi-mature	Indigenous	Short (5-15)	3 (Low)	1	Co-dominant stems, Deadwood moderate (3-10cm diameter), Suppressed				Low
333	*Eucalyptus camaldulensis*	River Red Gum	45	36.06	7	Fair	Fair	Alive	Semi-mature	Native	Medium (15-40)	2 (Medium)	1	Asymmetrical crown, Co-dominant stems, Deadwood major (>10cm diameter), Dieback				Low
334	*Eucalyptus elata*	River Peppermint	10	75	10	Fair	Fair	Alive	Mature	Native	Medium (15-40)	2 (Medium)	1	Asymmetrical crown, Deadwood major (>10cm diameter), Over-extended branch(es), Previous failure(s), Wound(s)		Deadwood prune >10cm diameter	Prune large deadwood over the roadway	Low
335	*Corymbia ficifolia*	Flowering Gum	8	20	5	Good	Good	Alive	Semi-mature	Native	Medium (15-40)	2 (Medium)	1	Co-dominant stems, Deadwood moderate (3-10cm diameter), Suppressed				Low
336	*Eucalyptus sp.*	Eucalypt	15	30	6	Good	Fair	Alive	Semi-mature	Native	Medium (15-40)	2 (Medium)	1	Asymmetrical crown, Mechanical damage, Over-extended branch(es), Wound(s)				Low
337	*Murraya paniculata*	Mock Orange	4	27.39	4	Fair	Fair	Alive	Mature	Native	Medium (15-40)	3 (Low)	1	Co-dominant stems, Dieback, Included bark, Suppressed, Weak attachments				
338	*Eucalyptus microcorys*	Tallowood	15	40	8	Fair	Good	Alive	Mature	Native	Medium (15-40)	1 (High)	1	Asymmetrical crown, Deadwood moderate (3-10cm diameter)				Low
339	*Murraya paniculata*	Mock Orange	6	19.13	7	Good	Fair	Alive	Mature	Native	Medium (15-40)	3 (Low)	1	Co-dominant stems, Crossing/rubbing branches, Deadwood minor (<3cm diameter), Weak attachments				
340	*Melaleuca armillaris*	bracelet Honey-myrtle, needle-leaved Honey-myrtle	5	25.46	2	Poor	Poor	Alive	Mature	Indigenous	Dead Or Hazardous/Remove (0-5)	5 (Hazardous / Irreversible Decline)	1	Co-dominant stems, Deadwood major (>10cm diameter), Dieback				Low
341	*Lophostemon confertus*	Brushbox	11	40	7	Good	Good	Alive	Semi-mature	Native	Long (>40)	2 (Medium)	1	Co-dominant stems, Deadwood moderate (3-10cm diameter)				Low
342	*Eucalyptus microcorys*	Tallowood	14	50	8	Good	Fair	Alive	Mature	Native	Medium (15-40)	1 (High)	1	Co-dominant stems, Deadwood major (>10cm diameter), Included bark				Low
343	*Callistemon viminalis*	Weeping Bottlebrush	4	6.32	2	Good	Poor	Alive	Semi-mature	Native	Short (5-15)	3 (Low)	1	Co-dominant stems, Growing from cut stump, Weak attachments				Low
344	*Callistemon viminalis*	Weeping Bottlebrush	5	16	2	Good	Fair	Alive	Semi-mature	Native	Short (5-15)	3 (Low)	1	Epicormic shoots, Poor pruning, Weak attachments				Low
345	*Grevillea robusta*	Silky Oak	11	10	6	Good	Good	Alive	Semi-mature	Native	Long (>40)	2 (Medium)	1	Deadwood moderate (3-10cm diameter)	Marked for removal (Blue)	Removal	Whole tree removal in accordance with DSC policy	
346	*Grevillea robusta*	Silky Oak	11	45	7	Fair	Fair	Alive	Semi-mature	Native	Long (>40)	2 (Medium)	1	Deadwood moderate (3-10cm diameter), Root scalping, Weak attachments	Marked for removal (Blue)	Removal	Whole tree removal in accordance with DSC policy	
347	*Eucalyptus botryoides*	Mahogany Gum	12	60	14	Good	Fair	Alive	Mature	Indigenous	Long (>40)	1 (High)	1	Asymmetrical crown, Co-dominant stems, Deadwood major (>10cm diameter), Included bark, Over-extended branch(es)	Marked for removal (Blue)	Removal	Whole tree removal in accordance with DSC policy	
348	*Eucalyptus tereticornis*	Forest Red Gum	15	55	11	Good	Fair	Alive	Mature	Indigenous	Long (>40)	1 (High)	1	Co-dominant stems, Crossing/rubbing branches, Deadwood moderate (3-10cm diameter), Included bark, Wound(s)	Marked for removal (Blue)	Removal	Whole tree removal in accordance with DSC policy	
349	*Acacia saligna*	Golden Wreath Wattle	6	35.36	8	Dead	Poor	Dead	Mature	Dead or other	Dead Or Hazardous/Remove (0-5)	5 (Hazardous / Irreversible Decline)	1	Significant fault - standing dead tree	Marked for removal (Blue)	Apply herbicide to cut stump, Removal	Dead tree removal	
350	*Banksia serrata*	Saw-tooth Banksia	8	35	4	Good	Fair	Alive	Mature	Indigenous	Medium (15-40)	2 (Medium)	1	Asymmetrical root plate, Co-dominant stems, Crossing/rubbing branches, Deadwood moderate (3-10cm diameter), Included bark, Wound(s)				Low
351	*Banksia serrata*	Saw-tooth Banksia	10	25	6	Good	Good	Alive	Mature	Indigenous	Medium (15-40)	2 (Medium)	1	Co-dominant stems, Deadwood moderate (3-10cm diameter)				Low
352	*Pittosporum undulatum*	Sweet Pittosporum	5	25	4	Fair	Fair	Alive	Semi-mature	Indigenous	Medium (15-40)	4 (Environmental Pest / Noxious Weed)	1	Co-dominant stems, Deadwood moderate (3-10cm diameter), Environmental/Declared Weed, Included bark, Suppressed		Crown Reduce, Apply herbicide to cut stump, Removal	Reduce epicormic growth away from the boundary fence.	Low
353	*Melaleuca quinquenervia*	Broad-leaved Paperbark	10	40	6	Good	Fair	Alive	Mature	Indigenous	Medium (15-40)	2 (Medium)	1	Co-dominant stems, Deadwood moderate (3-10cm diameter), Mistletoe, Root scalping				Low

Tree Number (* indicates group)	Botanical Name	Common Name	Height (m)	DBH (cm)	Canopy Spread (m)	Health	Structure	Status	Age Class	Origin	Useful Life Expectancy (ULE)	STARS© Landscape Significance Rating	Number of trees in group	Observations	Observation Comments	Works Actions	Works Comments	Risk Rating
1	*Banksia integrifolia*	Coast Banksia	8	45	5	Fair	Fair	Alive	Mature	Indigenous	Short (5-15)	2 (Medium)	1	Co-dominant stems, Deadwood major (>10cm diameter), Dieback, Mistletoe				
354	*Pittosporum undulatum*	Sweet Pittosporum	5	26.87	6	Fair	Poor	Alive	Mature	Indigenous	Dead Or Hazardous/Remove (0-5)	4 (Environmental Pest / Noxious Weed)	1	Co-dominant stems, Deadwood moderate (3-10cm diameter), Decay, Environmental/Declared Weed, Included bark, Previous failure(s), Wound(s)	A leader has previously failed in the northern crown.	Apply herbicide to cut stump, Removal	Whole tree removal - weed species with General Biosecurity Duty (NSW DPI)	Low
355	*Acacia saligna*	Golden Wreath Wattle	6	20	4	Dead	Poor	Dead	Semi-mature	Dead or other	Dead Or Hazardous/Remove (0-5)	5 (Hazardous / Irreversible Decline)	1	Significant fault - standing dead tree	Marked for removal (Blue)	Apply herbicide to cut stump, Removal	Dead tree removal	Low
356	*Acacia saligna*	Golden Wreath Wattle	6	22.83	4	Dead	Poor	Dead	Semi-mature	Dead or other	Dead Or Hazardous/Remove (0-5)	5 (Hazardous / Irreversible Decline)	1	Significant fault - standing dead tree	Marked for removal (Blue)	Apply herbicide to cut stump, Removal	Dead tree removal	Low
357	*Syagrus romanzoffiana*	Cocos Palm	11	45	7	Good	Good	Alive	Mature	Exotic	Long (>40)	4 (Environmental Pest / Noxious Weed)	1	Deadwood moderate (3-10cm diameter)	Blue	Apply herbicide to cut stump, Removal	Whole tree removal - weed species with General Biosecurity Duty (NSW DPI)	Low
358	*Callistemon viminalis*	Weeping Bottlebrush	3	5	1	Fair	Fair	Alive	Juvenile	Native	Short (5-15)	3 (Low)	1	Asymmetrical crown, Co-dominant stems, Deadwood minor (<3cm diameter), Suppressed				
359	*Callistemon viminalis*	Weeping Bottlebrush	7	25.46	5	Good	Fair	Alive	Mature	Native	Medium (15-40)	2 (Medium)	1	Co-dominant stems, Deadwood moderate (3-10cm diameter), Included bark, Suppressed				
360	*Grevillea banksii*	Red Silky Oak	6	12	3	Good	Poor	Alive	Semi-mature	Native	Short (5-15)	3 (Low)	1	Asymmetrical root plate, Deadwood minor (<3cm diameter), Decay, Previous failure(s), Suppressed				
361	*Grevillea banksii*	Red Silky Oak	2	12	3	Poor	Poor	Alive	Semi-mature	Native	Dead Or Hazardous/Remove (0-5)	3 (Low)	1	Asymmetrical crown, Deadwood major (>10cm diameter), Poor pruning				
362	*Eucalyptus haemastoma*	Scribbly Gum	11	43.28	7	Good	Good	Alive	Semi-mature	Indigenous	Long (>40)	1 (High)	1	Co-dominant stems, Deadwood moderate (3-10cm diameter)				Low
363	*Melaleuca nodosa*	Prickly-leaved Paperbark	4	21.1	4	Fair	Fair	Alive	Semi-mature	Indigenous	Short (5-15)	3 (Low)	1	Asymmetrical crown, Deadwood moderate (3-10cm diameter), Included bark, Suppressed				
364	*Eucalyptus haemastoma*	Scribbly Gum	16	80	13	Good	Fair	Alive	Mature	Indigenous	Long (>40)	1 (High)	1	Cankers, Co-dominant stems, Deadwood moderate (3-10cm diameter), Previous failure(s), Wound(s)				Low
365	*Casuarina glauca*	Swamp Sheoak	10	30	3	Good	Good	Alive	Semi-mature	Indigenous	Medium (15-40)	2 (Medium)	1	Asymmetrical crown, Co-dominant stems, Deadwood moderate (3-10cm diameter), Hanger(s), Suppressed				
366	*Melaleuca nodosa*	Prickly-leaved Paperbark	3	4.24	2	Dead	Poor	Dead	Semi-mature	Dead or other	Dead Or Hazardous/Remove (0-5)	5 (Hazardous / Irreversible Decline)	1	Significant fault - standing dead tree	Marked for removal (Blue)	Removal	Dead tree removal	
367	*Acacia saligna*	Golden Wreath Wattle	4	13	2	Dead	Poor	Dead	Semi-mature	Dead or other	Dead Or Hazardous/Remove (0-5)	5 (Hazardous / Irreversible Decline)	1	Significant fault - standing dead tree	Marked for removal (Blue)	Apply herbicide to cut stump, Removal	Dead tree removal	
368	*Melaleuca nodosa*	Prickly-leaved Paperbark	4	13	1	Dead	Fair	Dead	Semi-mature	Dead or other	Dead Or Hazardous/Remove (0-5)	5 (Hazardous / Irreversible Decline)	1	Significant fault - standing dead tree	Marked for removal (Blue)	Removal	Dead tree removal	
369	*Acacia saligna*	Golden Wreath Wattle	6	20	5	Dead	Fair	Dead	Mature	Dead or other	Dead Or Hazardous/Remove (0-5)	5 (Hazardous / Irreversible Decline)	1	Significant fault - standing dead tree	Marked for removal (Blue)	Apply herbicide to cut stump, Removal	Dead tree removal	
370	*Melaleuca armillaris*	bracelet Honey-myrtle, needle-leaved Honey-myrtle	2	22.8	1	Dead	Has failed	Dead	Semi-mature	Dead or other	Dead Or Hazardous/Remove (0-5)	5 (Hazardous / Irreversible Decline)	1	Significant fault - standing dead tree	Marked for removal (Blue)	Removal	Dead tree removal	
371	*Melaleuca armillaris*	bracelet Honey-myrtle, needle-leaved Honey-myrtle	5	32.02	3	Fair	Fair	Alive	Mature	Indigenous	Short (5-15)	3 (Low)	1	Asymmetrical crown, Co-dominant stems, Deadwood moderate (3-10cm diameter), Included bark, Recent changes - wind loading, Suppressed				
372	*Pittosporum undulatum*	Sweet Pittosporum	3	6.4	3	Good	Good	Alive	Juvenile	Indigenous	Medium (15-40)	4 (Environmental Pest / Noxious Weed)	1	Co-dominant stems, Environmental/Declared Weed		Apply herbicide to cut stump, Removal	Whole tree removal - weed species with General Biosecurity Duty (NSW DPI)	
373	*Banksia integrifolia*	Coast Banksia	6	25	3	Good	Fair	Alive	Semi-mature	Indigenous	Medium (15-40)	3 (Low)	1	Asymmetrical crown, Deadwood moderate (3-10cm diameter), Poor pruning, Previous failure(s), Recent changes - wind loading, Wound(s)				
374	*Syagrus romanzoffiana*	Cocos Palm	1	2	1	Good	Good	Alive	Young	Exotic	Long (>40)	4 (Environmental Pest / Noxious Weed)	1	Environmental/Declared Weed, Self-sown and inappropriately located		Removal	Whole tree removal - weed species with General Biosecurity Duty (NSW DPI)	
375	*Eucalyptus haemastoma*	Scribbly Gum	10	65	12	Fair	Fair	Alive	Mature	Indigenous	Medium (15-40)	2 (Medium)	1	Crossing/rubbing branches, Deadwood moderate (3-10cm diameter), Decay, Wound(s)				
376	*Callistemon citrinus*	Crimson Bottlebrush	1	6.56	3	Dead	Poor	Dead	Juvenile	Dead or other	Dead Or Hazardous/Remove (0-5)	5 (Hazardous / Irreversible Decline)	1	Significant fault - standing dead tree	Marked for removal (Blue)	Removal	Dead tree removal	
377	*Callistemon citrinus*	Crimson Bottlebrush	2	2	1	Dead	Poor	Dead	Juvenile	Dead or other	Dead Or Hazardous/Remove (0-5)	5 (Hazardous / Irreversible Decline)	1	Significant fault - standing dead tree	Marked for removal (Blue)	Removal	Dead tree removal	

Tree Number (* indicates group)	Botanical Name	Common Name	Height (m)	DBH (cm)	Canopy Spread (m)	Health	Structure	Status	Age Class	Origin	Useful Life Expectancy (ULE)	STARS© Landscape Significance Rating	Number of trees in group	Observations	Observation Comments	Works Actions	Works Comments	Risk Rating
1	*Banksia integrifolia*	Coast Banksia	8	45	5	Fair	Fair	Alive	Mature	Indigenous	Short (5-15)	2 (Medium)	1	Co-dominant stems, Deadwood major (>10cm diameter), Dieback, Mistletoe				
378	*Callistemon citrinus*	Crimson Bottlebrush	1	3.61	2	Dead	Has failed	Dead	Juvenile	Dead or other	Dead Or Hazardous/Remove (0-5)	5 (Hazardous / Irreversible Decline)	1	Significant fault - standing dead tree	Fallen dead tree. Marked for removal (Blue)	Removal	Dead tree removal	
379	*Syagrus romanzoffiana*	Cocos Palm	2	2	1	Good	Good	Alive	Young	Exotic	Long (>40)	4 (Environmental Pest / Noxious Weed)	1	Environmental/Declared Weed	Marked for removal (Blue)	Removal	Whole tree removal - weed species with General Biosecurity Duty (NSW DPI)	
380	*Callistemon citrinus*	Crimson Bottlebrush	2	5	2	Dead	Poor	Dead	Juvenile	Dead or other	Dead Or Hazardous/Remove (0-5)	5 (Hazardous / Irreversible Decline)	1	Significant fault - standing dead tree	Marked for removal (Blue)	Removal	Dead tree removal	
381	*Pittosporum undulatum*	Sweet Pittosporum	4	3	1	Good	Good	Alive	Juvenile	Indigenous	Medium (15-40)	4 (Environmental Pest / Noxious Weed)	1	Environmental/Declared Weed		Apply herbicide to cut stump, Removal	Whole tree removal - weed species with General Biosecurity Duty (NSW DPI)	
382	*Callistemon citrinus*	Crimson Bottlebrush	2	6.71	2	Good	Fair	Alive	Semi-mature	Native	Medium (15-40)	3 (Low)	1	Co-dominant stems, Included bark				
383	*Callistemon citrinus*	Crimson Bottlebrush	3	6.48	2	Good	Fair	Alive	Semi-mature	Native	Medium (15-40)	3 (Low)	1	Co-dominant stems, Deadwood moderate (3-10cm diameter), Included bark				
384	*Acacia saligna*	Golden Wreath Wattle	4	12	2	Fair	Good	Alive	Juvenile	Native	Short (5-15)	3 (Low)	1	Asymmetrical crown, Suppressed		Apply herbicide to cut stump, Consider Removal	Whole tree removal - environmental weed	
385	*Acacia saligna*	Golden Wreath Wattle	4	15.26	4	Good	Good	Alive	Semi-mature	Native	Short (5-15)	3 (Low)	1	Asymmetrical crown, Suppressed		Apply herbicide to cut stump, Consider Removal	Whole tree removal - environmental weed	
386	*Acacia saligna*	Golden Wreath Wattle	5	8	2	Good	Good	Alive	Juvenile	Native	Short (5-15)	3 (Low)	1	Asymmetrical crown, Deadwood minor (<3cm diameter), Suppressed		Apply herbicide to cut stump, Consider Removal	Whole tree removal - environmental weed	
387	*Acacia saligna*	Golden Wreath Wattle	4	8.49	2	Good	Fair	Alive	Juvenile	Native	Short (5-15)	3 (Low)	1	Asymmetrical crown, Co-dominant stems, Included bark, Suppressed		Apply herbicide to cut stump, Consider Removal	Whole tree removal - environmental weed	
388	*Acacia saligna*	Golden Wreath Wattle	5	5	1	Good	Good	Alive	Juvenile	Native	Medium (15-40)	3 (Low)	1	Deadwood minor (<3cm diameter), Suppressed		Apply herbicide to cut stump, Consider Removal	Whole tree removal - environmental weed	
389	*Pittosporum undulatum*	Sweet Pittosporum	3	5.1	4	Good	Poor	Alive	Juvenile	Indigenous	Short (5-15)	4 (Environmental Pest / Noxious Weed)	1	Co-dominant stems, Epicormic shoots, Growing from cut stump, Weak attachments		Apply herbicide to cut stump, Removal	Whole tree removal - weed species with General Biosecurity Duty (NSW DPI)	
390	*Banksia integrifolia*	Coast Banksia	6	27.62	5	Good	Fair	Alive	Semi-mature	Indigenous	Medium (15-40)	2 (Medium)	1	Co-dominant stems, Suppressed				
391	*Callistemon citrinus*	Crimson Bottlebrush	2	4.47	2	Good	Good	Alive	Juvenile	Native	Medium (15-40)	3 (Low)	1	Asymmetrical crown, Co-dominant stems, Suppressed				
392	*Eucalyptus haemastoma*	Scribbly Gum	14	85	15	Poor	Fair	Alive	Mature	Indigenous	Medium (15-40)	2 (Medium)	1	Deadwood major (>10cm diameter), Decay, Dieback, Fungal fruiting body(s), Previous failure(s), Wound(s)				
393	*Acacia saligna*	Golden Wreath Wattle	5	20.71	4	Good	Poor	Alive	Semi-mature	Native	Short (5-15)	3 (Low)	1	Co-dominant stems, Deadwood moderate (3-10cm diameter), Included bark, Previous failure(s), Wound(s)		Apply herbicide to cut stump, Consider Removal	Whole tree removal - environmental weed	
394	*Banksia integrifolia*	Coast Banksia	4	9.9	2	Poor	Fair	Alive	Juvenile	Indigenous	Short (5-15)	3 (Low)	1	Asymmetrical crown, Deadwood major (>10cm diameter), Dieback, Suppressed				
395	*Banksia integrifolia*	Coast Banksia	4	6	1	Dead	Poor	Dead	Juvenile	Dead or other	Dead Or Hazardous/Remove (0-5)	5 (Hazardous / Irreversible Decline)	1	Significant fault - standing dead tree		Removal	Dead tree removal	
396	*Banksia integrifolia*	Coast Banksia	8	35	4	Good	Good	Alive	Semi-mature	Indigenous	Long (>40)	2 (Medium)	1	Co-dominant stems, Deadwood moderate (3-10cm diameter)				
397	*Acacia saligna*	Golden Wreath Wattle	5	50	10	Good	Fair	Alive	Mature	Native	Short (5-15)	3 (Low)	1	Co-dominant stems, Crossing/rubbing branches, Deadwood moderate (3-10cm diameter), Included bark	Blue	Apply herbicide to cut stump, Removal	Whole tree removal in accordance with DSC policy	
398	*Acacia saligna*	Golden Wreath Wattle	6	35.36	8	Good	Fair	Alive	Mature	Native	Short (5-15)	3 (Low)	1	Co-dominant stems, Deadwood moderate (3-10cm diameter), Included bark	Marked for removal (Blue)	Apply herbicide to cut stump, Removal	Whole tree removal in accordance with DSC policy	
399	*Acacia saligna*	Golden Wreath Wattle	6	32.4	7	Good	Poor	Alive	Mature	Native	Short (5-15)	3 (Low)	1	Asymmetrical crown, Co-dominant stems, Included bark, Suppressed	Marked for removal (Blue)	Apply herbicide to cut stump, Removal	Whole tree removal in accordance with DSC policy	
400	*Acacia saligna*	Golden Wreath Wattle	6	28.28	7	Good	Poor	Alive	Mature	Native	Short (5-15)	3 (Low)	1	Co-dominant stems, Deadwood moderate (3-10cm diameter), Included bark, Previous failure(s)	Marked for removal (Blue)	Apply herbicide to cut stump, Removal	Whole tree removal in accordance with DSC policy	Low
401	*Acacia saligna*	Golden Wreath Wattle	6	17	4	Good	Poor	Alive	Semi-mature	Native	Short (5-15)	3 (Low)	1	Asymmetrical crown, Deadwood moderate (3-10cm diameter), Included bark		Apply herbicide to cut stump, Removal	Whole tree removal in accordance with DSC policy	Low
402	*Acacia saligna*	Golden Wreath Wattle	5	25	4	Good	Fair	Alive	Semi-mature	Native	Short (5-15)	3 (Low)	1	Co-dominant stems, Deadwood moderate (3-10cm diameter), Included bark, Poor pruning	Marked for removal (Blue)	Apply herbicide to cut stump, Removal	Whole tree removal in accordance with DSC policy	Low
403	*Syzygium australe*	Lilly Pilly	5	12	3	Good	Good	Alive	Semi-mature	Native	Long (>40)	3 (Low)	1	Deadwood minor (<3cm diameter), Leaf feeding insect, Wound(s)				Low
404	*Syzygium australe*	Lilly Pilly	6	20	3	Good	Good	Alive	Semi-mature	Native	Long (>40)	2 (Medium)	1					Low
405	*Syzygium australe*	Lilly Pilly	7	25	4	Good	Good	Alive	Semi-mature	Native	Long (>40)	2 (Medium)	1	Co-dominant stems, Root scalping		Crown Reduce	Reduce canopy away from the boundary fence.	Low
406	*Syzygium australe*	Lilly Pilly	5	13.93	3	Good	Fair	Alive	Semi-mature	Native	Medium (15-40)	3 (Low)	1	Co-dominant stems, Included bark		Crown Reduce	Reduce the crown away from the boundary fence.	Low

Tree Number (* indicates group)	Botanical Name	Common Name	Height (m)	DBH (cm)	Canopy Spread (m)	Health	Structure	Status	Age Class	Origin	Useful Life Expectancy (ULE)	STARS© Landscape Significance Rating	Number of trees in group	Observations	Observation Comments	Works Actions	Works Comments	Risk Rating
1	*Banksia integrifolia*	Coast Banksia	8	45	5	Fair	Fair	Alive	Mature	Indigenous	Short (5-15)	2 (Medium)	1	Co-dominant stems, Deadwood major (>10cm diameter), Dieback, Mistletoe				
407	*Syzygium australe*	Lilly Pilly	7	25	3	Good	Fair	Alive	Semi-mature	Native	Medium (15-40)	2 (Medium)	1	Co-dominant stems, Deadwood moderate (3-10cm diameter), Included bark, Root scalping		Crown Reduce	Reduce the crown away from the boundary fence.	Low
408	*Banksia integrifolia*	Coast Banksia	7	55	6	Good	Fair	Alive	Mature	Indigenous	Long (>40)	2 (Medium)	1	Bacterial infection, Deadwood moderate (3-10cm diameter), Over-extended branch(es)				Low
409	*Banksia integrifolia*	Coast Banksia	8	59.37	8	Good	Good	Alive	Mature	Indigenous	Long (>40)	2 (Medium)	1	Co-dominant stems, Deadwood moderate (3-10cm diameter), Mechanical damage, Wound(s)				Low
410	*Grevillea banksii*	Red Silky Oak	4	12	4	Good	Good	Alive	Semi-mature	Native	Medium (15-40)	3 (Low)	1	Asymmetrical crown, Deadwood moderate (3-10cm diameter), Hanger(s), Suppressed				
411	*Grevillea banksii*	Red Silky Oak	3	8	4	Good	Good	Alive	Semi-mature	Native	Medium (15-40)	3 (Low)	1	Deadwood minor (<3cm diameter)				
412	*Hakea sp.*	Hakea	2	2	2	Poor	Poor	Alive	Semi-mature	Native	Short (5-15)	3 (Low)	1	Broken Limb, Deadwood minor (<3cm diameter), Dieback				
413	*Banksia integrifolia*	Coast Banksia	8	63.83	9	Good	Fair	Alive	Mature	Indigenous	Long (>40)	2 (Medium)	1	Bacterial infection, Co-dominant stems, Deadwood moderate (3-10cm diameter), Included bark, Previous failure(s), Weak attachments				Low
414	*Banksia integrifolia*	Coast Banksia	4	5.66	2	Fair	Fair	Alive	Juvenile	Indigenous	Short (5-15)	3 (Low)	1	Asymmetrical crown, Co-dominant stems, Suppressed		Removal	Whole tree removal in accordance with DSC policy	
415	*Acacia saligna*	Golden Wreath Wattle	5	18	2	Dead	Poor	Dead	Semi-mature	Dead or other	Dead Or Hazardous/Remove (0-5)	5 (Hazardous / Irreversible Decline)	1	Significant fault - standing dead tree		Apply herbicide to cut stump, Removal	Dead tree removal	
416	*Melaleuca armillaris*	bracelet Honey-myrtle, needle-leaved Honey-myrtle	2	6	0	Dead	Has failed	Dead	Juvenile	Dead or other	Dead Or Hazardous/Remove (0-5)	5 (Hazardous / Irreversible Decline)	1	Significant fault - standing dead tree	Marked for removal	Removal	Dead tree removal	
417	*Melaleuca nodosa*	Prickly-leaved Paperbark	3	12.73	2	Fair	Fair	Alive	Juvenile	Indigenous	Short (5-15)	3 (Low)	1	Asymmetrical crown, Co-dominant stems, Deadwood minor (<3cm diameter), Suppressed				
418	*Acacia saligna*	Golden Wreath Wattle	4	11	2	Dead	Fair	Dead	Juvenile	Dead or other	Dead Or Hazardous/Remove (0-5)	5 (Hazardous / Irreversible Decline)	1	Self-sown and inappropriately located, Significant fault - standing dead tree		Apply herbicide to cut stump, Removal	Whole tree removal in accordance with DSC policy	

11. Appendix D – Contractor Works Package

SW 67 05/24