WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

Flora and Fauna Assessment for New High School for Medowie

Department of Education

31 January 2025

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ACKNOWLEDGEMENT OF COUNTRY

The Board and employees of Water Technology acknowledge and respect the Aboriginal and Torres Strait Islander Peoples as the Traditional Custodians of Country throughout Australia. We specifically acknowledge the Traditional Custodians of the land on which our offices reside and where we undertake our work.

We respect the knowledge, skills and lived experiences of Aboriginal and Torres Strait Islander Peoples, who we continue to learn from and collaborate with. We also extend our respect to all First Nations Peoples, their cultures and to their Elders, past and present.

Artwork by Maurice Goolagong 2023. This piece was commissioned by Water Technology and visualises the important connections we have to water, and the cultural significance of journeys taken by traditional custodians of our land to meeting places, where communities connect with each other around waterways.

The symbolism in the artwork includes:

- *Seven circles representing each of the States and Territories in Australia where we do our work*
- *Blue dots between each circle representing the waterways that connect us*
- *The animals that rely on healthy waterways for their home*
- *Black and white dots representing all the different communities that we visit in our work*
- *Hands that are for the people we help on our journey*

ACRONYMS AND DEFINITIONS

Acronym	Definition
BC Act	*Biodiversity Conservation Act 2016*
BV	Biodiversity Values
DCP	Development Control Plan
EP&A Act	*Environmental Planning and Assessment Act 1979*
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
FM Act	*Fisheries Management Act 1994*
LEP	Local Environment Plan
LGA	Local Government Area
MNES	Matter of National Environmental Significance
PCT	Plant Community Type
FFA	Flora and Fauna Assessment
SINSW	School Infrastructure New South Wales
TEC	Threatened Ecological Community
WM Act	*Water Management Act 2000*

EXECUTIVE SUMMARY

This Fauna and Flora Assessment (FFA) has been prepared to identify areas that may have biodiversity constraints for the proposed activity of a new High school at 6 Abundance Road, Medowie (New High School for Medowie). The purpose of this plan is to be suitable for submission to Department of Education (DoE) to satisfy their construction conditions as part of their Review of Environmental Factors (REF) report.

This report documents the findings of the biodiversity assessment for the site, which identified any potential biodiversity constraints that may be relevant to the proposed activity under Part 5 of the *Environmental Planning and Assessment Act 1979*, *NSW Biodiversity Conservation Act 2016* (BC Act), *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), and the *NSW Fisheries Management Act 1994* (FM Act).

The site largely comprises of a large proportion of the site that is currently unused and vacant. A small, shed structure and caravan are located adjacent to the northern boundary. A cluster of buildings including a single storey dwelling, an outhouse/shed structure and temporary greenhouse are located within the south eastern corner. The site contains a largely vegetated area to the south west corner. The site is relatively flat with a gradual fall from west to east toward Abundance Road.

The site assessment found sections of the vegetation present are in good condition, with few weed species present. Other sections of the subject site were large, grazed paddocks that did not possess significant ecological value. The site assessment also discovered multiple large piles of dumped rubbish within the TEC area which will need to be removed as a recommendation.

Plant Community Type (PCT) mapping using the NSW State Vegetation Mapping has indicated that PCT 3995 – Hunter Coast Paperbark-Swamp Mahogany Forest was found on site. The areas mapped as PCT also correlates to the biodiversity values (BV) mapped areas.

The area mapped as PCT 3995 should be classified as a sensitive area considering it is a Threatened Ecological Community (TEC) being associated to the Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions TEC, which is listed as Endangered under the Biodiversity Conservation Act 2016.

The Likelihood of Occurrence analysis and desktop assessment found the Koala (*Phascolarctos cinereus*) (Endangered - EPBC Act and BC Act), Squirrel Glider (*Petaurus norfolcensis*) (Vulnerable – BC Act), Grey-headed Flying Fox (*Pteropus poliocephalus*) (Vulnerable - EPBC Act and BC Act); and the Greater Broad-nosed Bat (*Scoteanax rueppellii*) (Vulnerable – BC Act) all have a high likelihood to occur within the site as there is suitable foraging habitat, there are numerous recordings within a 10km radius, and these species were previously recorded in proximity to the site.

A site inspection was conducted on 15th-17th October 2024 by Senior Ecologist Michael Aberton, Ecologist Caroline Weller and Ecologist Petra Arola. The site assessment found a threatened established Wallangarra White Gum (*Eucalyptus scoparia*) was found on site along Ferodale Road in the top corner and will need to have mitigation measures including an arborist on site to monitor any construction work in proximity during the construction period.

The night-time survey was also conducted which consisted of a walkthrough of the bushland patch with spotlights to spot any nocturnal fauna on the site. Special focus was put on Squirrel Gliders, Koalas, Bats and other threatened species, however none of these were recorded at the time of assessment nor was there evidence of scats and tree markings. Fauna species observed during the survey were two Common Ringtail Possums (*Pseudocheirus peregrinus*) and a Long-nosed Bandicoot (*Perameles nasuta*).

A bat survey was also conducted which consisted of putting out an Audiomoth device to record from dusk to dawn each day for the survey period. Result included multiple bat recordings which include the Eastern Coastal

Freetail-bat (*Micronomus norfolkensis)*, Little Bent-winged Bat (*Miniopterus australis)* and the Yellow-bellied Sheathtail-bat (*Saccolaimus flaviventris)* which are all species listed under the Biodiversity Conservation Act 2016.

The desktop and site assessments concluded that there will be no significant impacts on biodiversity as a result of the activity, provided mitigation measures are adhered to. Therefore, this Flora and Fauna Assessment is the appropriate report for a Part 5 activity.

No Key Fish habitat is present within the subject site.

No further biodiversity constraints are considered relevant to the subject site.

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1 INTRODUCTION

This Flora and Fauna Assessment (FFA) is also known as an Ecological Assessment which has been prepared to support a Review of Environmental Factors (REF) for the proposed New High School for Medowie (the activity). The purpose of the REF is to assess the potential environmental impacts of the activity prescribed by State Environmental Planning Policy (Transport and Infrastructure) 2021 (T&I SEPP) as "development permitted without consent" on land carried out by or on behalf of a public authority under Part 5 of the Environmental Planning and Assessment Act 1979 (EP&A Act). This document has been prepared in accordance with the Guidelines for Division 5.1 assessments by the Department of Planning, Housing and Infrastructure (formerly the Department of Planning and Environment, June 2022) and recent addendum for schools. This can be accessed here: Development without consent | Planning (nsw.gov.au).

The activity is to be undertaken pursuant to Chapter 3, Part 3.4, Section 3.37A of the T&I SEPP. The activity will be carried out at 6 Abundance Road, Medowie (the site). The purpose of this report is to outline the flora and fauna features of the site and its immediate surrounds and to determine if impacts (direct, indirect) are likely to occur.

1.1 Assessment Requirements

The FFA deliverable requirements from Department of Education (DoE), along with the location of the considered requirements in this report, have been listed in Table 1-1 below.

Table 1-1 FFA Assessment Requirements

Item	Requirement	Relevant Section of Report
1.	Address all relevant legislation, environmental planning instruments (EPIs) (including drafts), plans, policies, guidelines and planning circulars.	See Section 3
2.	Trees and Landscaping: Assess the number, location, condition and significance of trees to be removed and retained and note any existing canopy coverage to be retained on-site.	See Appendix F
3.	Ecologically Sustainable Development (ESD)	Throughout report.
4.	Biodiversity: Assess any biodiversity impacts associated with the development in accordance with the *Biodiversity Conservation Act 2016* and the Biodiversity Assessment Method 2020 (BAM), including the preparation of a Biodiversity Development Assessment Report (BDAR) if required under the BAM, unless a waiver is granted, or the site is on biodiversity certified land.	See Section 6 for Biodiversity Impact Assessment

In relation to item number 4 above, triggers for a BDAR under the BOS may include biodiversity impacts within Biodiversity Values mapped areas, significant impacts to threatened species or threatened ecological communities (TECs), or native vegetation clearing above the threshold under the BAM.

Thanks to careful consideration of the placement of the proposed school buildings and infrastructure the biodiversity impacts are expected to be low, and the Biodiversity Offset Scheme (BOS) will not be triggered.

The biodiversity impacts will be further detailed within this report.

1.2 Consideration of Ecologically Sustainable Development

This project has been undertaken keeping in mind the principles of Ecologically Sustainable Development (ESD). In this report we will assess the ESD of the project from a biodiversity perspective based on the potential impacts the proposed activity may have on the local flora and fauna. Project specific mitigation measures will be provided for implementation in the design, construction and operational stages to avoid or minimise the impacts to the degree possible.

2 SITE DESCRIPTION

2.1 Site Location and Background

The site has a street address of 6 Abundance Road, Medowie. It is 6.51ha in area, and comprises 1 allotment, legally described as Lot 3 in DP788451.

A large proportion of the site is currently being used for horses to graze within the fenced off paddock areas while the house is vacant. A bushland PCT area is fenced off so the horses cannot enter. A small, shed structure and caravan are located adjacent to the northern boundary. A cluster of buildings including a single storey dwelling, an outhouse/shed structure and temporary greenhouse are located within the south eastern corner.

The site contains a largely vegetated area to the south west corner. The site is relatively flat with a gradual fall from west to east toward Abundance Road.

The site has a primary frontage to Abundance Road to the east and Ferodale Road to the north. Abundance Road and Ferodale Road are both classified Local Roads. Medowie Road, approximately 1km east of the site, is a classified Regional Road.

The area surrounding the site mostly consists of industrial, rural residential, educational, and agricultural lands. Adjacent to the north western boundary is a Shell petrol station and mechanic garage. Adjacent to the north eastern boundary is a medical health clinic. Across Abundance Road along the eastern boundary are a number of warehouse and light industrial

s. Directly north of the site across Ferodale Road are large lots used for agricultural purposes. Medowie Public School is located on Ferodale Road, to the north west of the site, opposite the Shell petrol station.

Refer to Figure 2-1 for an aerial image of the site.

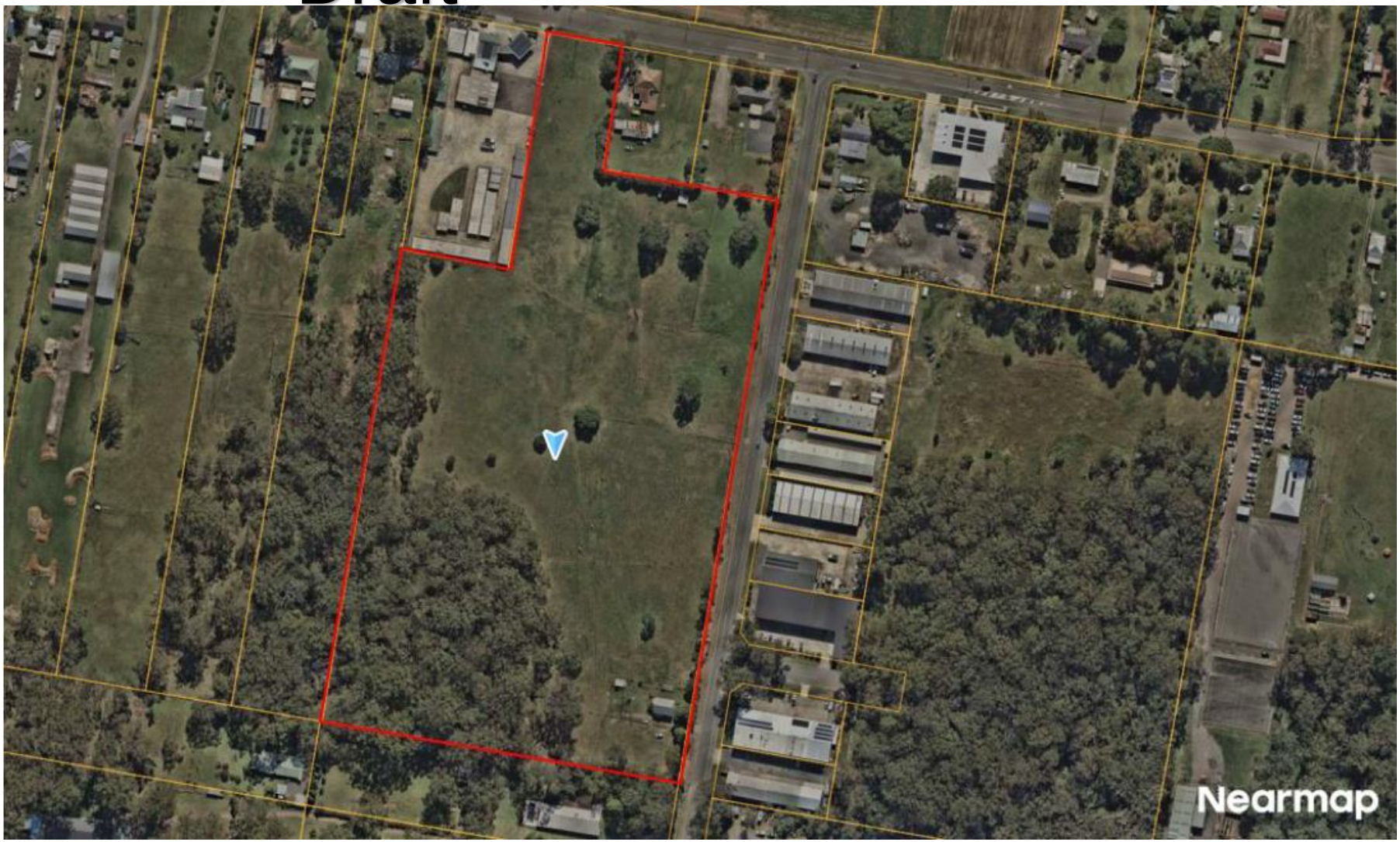

Figure 2-1 Aerial Image of the Site

2.2 Project Description

The proposed activity involves the construction of school facilities on the site for the purpose of the New High School for Medowie. Several sites have been assessed for their suitability and this site was the preferred location.

The site contains a densely vegetated area to the southwest corner which is identified as land with high biodiversity values corresponding to the areas of remnant native vegetation (PCT 3995 – Hunter Coast Paperbark-Swamp Mahogany Forest). The existing dwelling house and other structures on the site will be demolished as part of the works. No other works are proposed within this area. The proposed new school will accommodate 640 students in 29 permanent teaching spaces including 3 support teaching spaces across 3-storeys of buildings on the site. The proposed activity be delivered across 1 stage, and will consist of the following:

- 29 permanent teaching spaces including 3 support teaching spaces, to accommodate 640 students, and school hall to accommodate 1,000 students. Approximately 10,500 sqm of GFA is proposed.
- Main vehicular ingress and egress to Ferodale Road to the north, with a new pedestrian and vehicle crossing proposed.
- Main pedestrian access to Abundance Road.
- Kiss and ride, and bus drop and pick up areas to Abundance Road (6 x parallel spaces).
- New pedestrian wombat crossing to Abundance Road
- Approximately 55 x car parking spaces and 3 x accessible car parking spaces.
- Approximately 70 x bicycle parking spaces.
- Block A (Admin) consisting of administration and learning spaces.
- Block B (Foodtech/Workshop) consisting of food technology rooms and workshops.
- Block C (Hall) consisting of school hall to accommodate 1,000 students.
- Central quad, 1 playing field, and 1 sports courtyard.

The proposed school activity will include the following spaces; general learning spaces, General support learning spaces, administrative services, staff areas, gym and canteen, library areas for science, wood and metal, food and textiles, health PE, performing arts, additional learning spaces, student amenities, storage, movement (stairs and covered walkways). Refer to Figure 2-2 for draft plan.

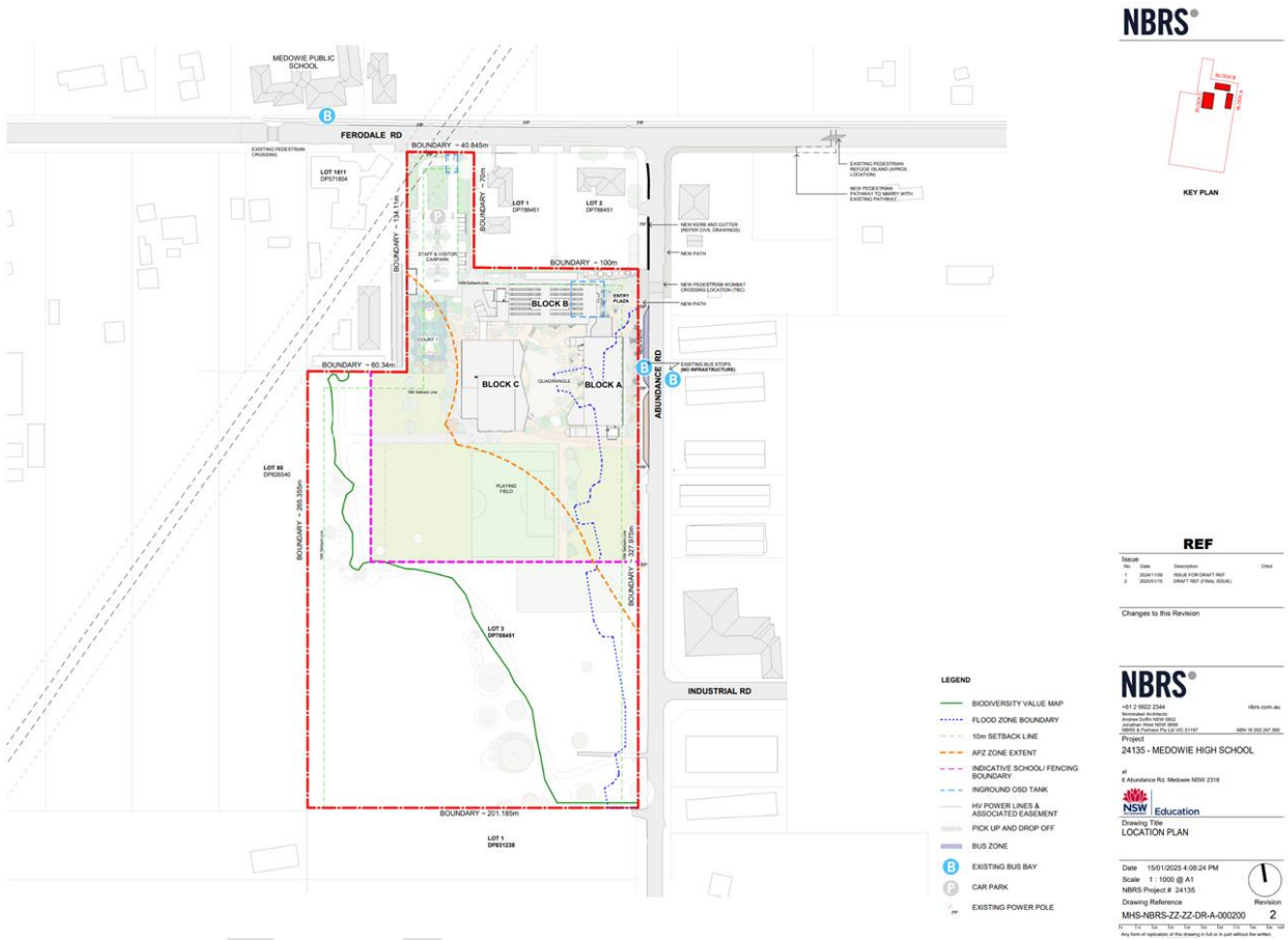

Figure 2-2 Draft Site Plan

A bushfire protection zone has been prepared by Eco Logical 2025). This indicates that there is sufficient area surrounding the infrastructure and between the protected PCT in the south west that the bushfire asset protection zone (APZ) does not impinge on the bushland. See Figure 2-3 below.

Figure 2-3 Bushfire Hazard Assessment

3 RELEVANT LEGISLATION

Legislation and policy relevant to the biodiversity component of works within the subject site are outlined below.

3.1 Environmental Planning, Assessment Act 1979

Planning and development within NSW are regulated by the Environmental Planning & Assessment Act 1979 (EP&A Act).

The proposed works are permitted without consent under the State Environmental Planning Policy (Transport and Infrastructure) 2021 (TISEPP) as per below. Where works do not require development consent but require approval by a public authority under any legislation they are defined as an activity under Part 5 of the EP&A Act. Division 5.1 and Section 5.7 of the EP&A Act requires any such Government body to determine whether the impacts of the activity are likely to be significant. An FFA contributes to that determination.

This FFA is prepared to inform the assessment of biodiversity impacts in the REF, as per the requirements of Clause 171 of the *Environmental Planning and Assessment Regulation 2021*.

3.2 State Environmental Planning Policy (Transport and Infrastructure) 2021

The State Environmental Planning Policy (Transport and Infrastructure) 2021 (TISEPP) provides for the efficient provision of public infrastructure in NSW. The aim of this Policy is to facilitate the effective delivery of infrastructure across the State.

Under the T&I SEPP the new high school at Medowie is “development permitted without consent” as the development is conducted by or on behalf of a public authority under Part 5 of the Environmental Planning and Assessment Act 1979 (EP&A Act).

3.3 Water Management Act 2000

The *Water Management Act 2000* (WM Act) provides for the sustainable and integrated management of the water sources of the State for the benefit of both present and future generations. The WM Act defines principles of water management, sets out water licensing laws and environmental water provisions.

Section 91 (2) states that: *waterfront land means—…where the prescribed distance is 40 metres or (if the regulations prescribe a lesser distance, either generally or in relation to a particular location or class of locations) that lesser distance.*

This project is being conducted further than 40 metres away for any waterways and is exempt from requiring a Controlled Activity Approval in accordance with the WM Act.

3.4 Biodiversity Conservation Act 2016

The *Biodiversity Conservation Act 2016* (BC Act) includes the Biodiversity Offsets Scheme (BOS) that governs how biodiversity offsets will be used to ensure they offset all losses to biodiversity due to development and deliver conservation outcomes. The BC Act and Regulations also govern the Biodiversity Assessment Method (BAM) as a scientific method that assesses biodiversity losses from impacts at development sites and gains from conserving land at stewardship sites.

Some public authorities seeking to undertake an activity under Part 5 of the EP&A Act can voluntarily opt-in to the BOS and BAM scheme or alternatively can elect to undertake an Assessment of Significance and proceed with Part 5 approval. It will be required to:

- take serious and irreversible impacts into consideration; and

- determine if there are any additional and appropriate measures that will minimise the impact if the activity is to be carried out or approved.

Significant impacts on threatened entities trigger the need for a Species Impact Statement (SIS) and/or BDAR for Part 5 projects. The individual Tests of Significance for all potentially impacted threatened species and ecological communities are included in Appendix B.

The potential ecological impacts of the proposal are discussed in Section 6 of this FFA.

3.5 Fisheries Management Act 1994

The provisions of the *Fisheries Management Act 1994* (FM Act) relating to project development and approval processes operate similarly to the BC Act. The Act identifies threatened aquatic species, populations, and ecological communities, as well as Key Fish Habitat.

Significant impacts trigger the need for a Species Impact Statement for Part 5 projects. The potential ecological impacts of the proposal are discussed in Section 6 of this FFA report. It is concluded that the proposal is not likely to have a significant impact on any threatened aquatic species, populations or communities, or Key Fish Habitat.

3.6 Environment Protection and Biodiversity Conservation Act 1999

Under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), Commonwealth approval is required for certain actions which have, may have or are likely to have a significant impact on Matters of National Environmental Significance (MNES). MNES includes nationally threatened species or endangered ecological communities. Under the EPBC Act an assessment of the impact of a proposal on an MNES must be undertaken to determine whether there is likely to be a significant impact. If the assessment concludes there is a significant impact, then it will become a controlled action under the EPBC Act, and the proposal must be referred to the Commonwealth. Approval from the relevant Federal Minister is also required for any actions that may have a significant impact on MNES, except in circumstances which are set out in the EPBC Act.

Approval from the Commonwealth is in addition to any approvals under NSW legislation.

The potential ecological impacts of the proposal are discussed in Section 6 of this FFA. It is concluded that the proposal is not likely to have a significant impact on any EPBC listed threatened species, populations or communities nor is it likely to impact on any MNES, and so it does not require referral to the Commonwealth under the EPBC Act.

3.7 Port Stephens Local Environmental Plan 2013

The Port Stephens Local Environmental Plan 2013 (LEP) came into effect in December 2013. This Plan aims to make local environmental planning provisions for land in the Port Stephens region in accordance with the relevant standard environmental planning instrument.

The works are to be conducted in RU2 - Rural Landscape zoned land. The objectives of this zone include:

- To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.
- To maintain the rural landscape character of the land.
- To provide for a range of compatible land uses, including extensive agriculture.
- To facilitate a variety of tourist and visitor-orientated land uses that complement and promote a stronger rural sector appropriate for the area.

The proposed works involves the construction of new school facilities. This is not consistent with the objectives outlined in the LEP. The activity is defined as an educational establishment which are usually prohibited in the RU2 Rural Landscape zone pursuant to the PSLEP. However, Section 3.36(1) of the T%I SEPP permits the school in a prescribed zone. A prescribed zone is defined in Section 3.34 of the T&I SEPP and includes the RU2 zone.

3.8 Port Stephens Development Control Plan 2014

The Port Stephens Development Control Plan 2014 accompanies the LEP to prescribe detailed guidelines and environmental standards for new development within the Port Stephens region. The aim of this Plan is to explain the legislative planning requirements for development activity in the Port Stephens local government area.

3.9 Port Stephens Comprehensive Koala Plan of Management (CKPoM)

The Port Stephens CKPoM was developed by Port Stephens Council and legislated under the LEP in 2002. The provisions within the CKPoM concern development approvals and is required as part of this assessment to inform the REF. A Koala Plan of Management (KPoM) has been prepared as a separate report and is included in Appendix D.

4 EXISTING ENVIRONMENT

The subject site encompasses an area of approximately 6.51ha in area that has been partially cleared and is currently grazed by horses. The site contains a densely vegetated area in the southwest corner which is identified as remnant native vegetation (PCT 3995 – Hunter Coast Paperbark-Swamp Mahogany Forest). This vegetation is also mapped as Biodiversity Values under the BOS and any impacts on this vegetation would likely require offsetting. The existing dwelling house in the southeast corner and other structures on the site will be demolished as part of the works. No other works are proposed within this area. The proposed new school will accommodate 640 students in 29 permanent teaching spaces including 3 support teaching spaces across 3-storeys of buildings on the site.

Prior to undertaking the ecological field survey, a desktop search were conducted to provide a context of the surrounding environment. Refer to Section 4.1 and 4.2.

A previous biodiversity due diligence assessment prepared by Water Technology in 2023 and a preliminary tree assessment by Arborist Joseph Pidutti (2023) were also reviewed as part of the desktop assessment.

4.1 Vegetation Communities

A review of the vegetation mapping databases using the SEED portal (NSW Government's central resource for Sharing and Enabling Environmental Data in NSW) was undertaken to identify Plant Community Types (PCTs) present within the area. Most of the site has been cleared of native vegetation and the remaining vegetation has been mapped as PCT 3995: Hunter Coast Paperbark-Swamp Mahogany Forest. Refer to Figure 4-1 below.

PCT 3995 is a part fit with the Threatened Ecological Community (TEC) *Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions* which is listed as Endangered under the BC Act. It is also part fit with the *Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland* listed as Endangered under the EPBC Act.

Draft

Figure 4-1 PCT Mapping of the Site

4.2 Threatened Species

The NSW BioNet database was searched for records of threatened flora species from within 10 km of the subject site over the past 10 years, with 456 records of 38 species returned (Appendix A).

Analysis of the NSW OEH SEED mapping (see Figure 4-2) indicates there are only a few threatened species that have been previously recorded on or within close proximity to the site. These include:

- Koala (*Phascolarctos cinereus*) (Endangered - EPBC Act and BC Act);
- Squirrel Glider (*Petaurus norfolcensis*) (Vulnerable – BC Act);
- Grey-headed Flying Fox (*Pteropus poliocephalus*) (Vulnerable - EPBC Act and BC Act); and
- Greater Broad-nosed Bat (*Scoteanax rueppellii*) (Vulnerable – BC Act).

These species' likelihood of occurrence is considered high (Appendix A).

Several other threatened species have previously been recorded within 10 km of the subject site; however, these are not expected to be present within the immediate activity site due to a lack of suitable or connective habitat.

Species that have potentially suitable habitat on site but have not previously been recorded in very close proximity to the subject site and have a higher number of sightings in the local area, are considered to have a moderate likelihood of occurrence.

A Wallangarra White Gum (*Eucalyptus scoparia)* was recorded on the site in the preliminary tree assessment (Pidutti 2023). The species is listed as Endangered under the BC Act and Vulnerable under the EPBC Act. It is likely that the species is planted as the species' NSW distribution is limited to an area northwest of Grafton. Regardless of whether the tree is planted or not, it should be protected during the works and any impact on the tree avoided.

Koala assessment and accompanying reporting *Koala Plan of Management for New High School in Medowie* (Water Technology 2024b) has been prepared concurrently with this document and assesses any potential impacts on koalas and their habitat from the proposed activity.

Figure 4-2 Threatened Species Recorded in the Local Area

5 FIELD SURVEYS

5.1 Methods

During the period of 15 to 17 October 2024, three Water Technology ecologists; Dr Michael Aberton, Caroline Weller and Petra Arola, undertook a biodiversity filed survey of the site, involving thorough assessment of the proposed location for infrastructure and any vegetation on the site that may be impacted by the proposed works. Additionally, the accompanying native vegetation which will be retained was also assessed.

The field surveys were undertaken during daytime on 15, 16 and 17 October, and a nighttime survey was undertaken on 15 October from dusk (approximately 7pm) until 10pm. The following surveys were carried out:

- On the 15th, the paddock area was surveyed in detail focusing on the location of the proposed activity footprint and all vegetation within that area. The nighttime survey the same day focused on fauna detection through spotlighting and other fauna observation techniques.
- On the 16th, a more detailed survey of the bushland patch was undertaken as a random walkthrough of most areas of the site. The survey included vegetation species identification and habitat surveys, both in trees and on ground level. Multiple Biodiversity Assessment Method (BAM) Plots were undertaken to assess vegetation type and quality within the forested area in case a Biodiversity Development Assessment Report (BDAR) was required.
- Additional accompanying site at 28 Ferodale Road was assessed from over the fence line.
- On the 17th, field assessment was completed and equipment collected.

During the course of the assessment an Audiomoth was deployed for three nights to record forest bats. The outcomes of the bat survey are discussed in Sections 5.2 and 6 below. The full survey is included in Appendix C.

A previous assessment was also performed by ecologist Clayton Woods on Friday 17th November 2023 for the preliminary assessment component of the project (Water Technology, 2023).

A koala survey was also carried out concurrently with the vegetation and other assessments. The results of this survey are discussed in 5.2 and the KPoM is included in Appendix D.

Additionally, a Native Vegetation Management Plan (NVMP) was prepared for the site to outline future vegetation management practices for the site. The NVMP included in Appendix E contains a detailed description of the vegetation on the site and a full flora species list, including the bushland patch which will not be disturbed as part of this project.

5.2 Results

Below are descriptions of each of the field survey components for this FFA.

5.2.1 Paddock Area

5.2.1.1 Flora Survey

A walkthrough of the paddock area was undertaken to survey flora species present within the activity footprint and identify any native species present. The area is exotic dominant with some native tree and shrub species present as well as a limited number of groundcover species. The trees within the proposed activity footprint and presumably proposed for removal include a mix of native and exotic species. This includes approximately 10 trees of native species: Silky Oaks (*Grevillea robusta*), Native Daphnes (*Pittosporum undulatum*), Cheese Trees (*Glochidion fernandii*) and a White Cedar (*Melia azedarach*). The groundcover flora was dominated by

exotic weeds with occasional areas near gates where Couch grass (*Cynodon dactylon*) has naturalised and formed a monoculture of the only native grass species surrounded by weeds. The majority of weeds occur in the proposed activity site which is primarily paddock areas with few planted natives in the activity envelope. Other weeds occur around the house that is still being used by the caretakers of the horses onsite that are being leased on agistment. The dominant exotic canopy trees found include Camphor Laurel (*Cinnamomum camphora*) and Large-leaved Privet (*Lingustrum lucidium*). The dominant shrub layer includes African Olive (*Olea europaea subsp. cuspidata*), Lantana (*Lantana camara*) and Small-leaved Privet (*Lingustrum sinense*), Swan Plant (*Gomphocarpus fruticosus*) and Evergreen Ash (*Fraxinus griffithii*). Dominant ground cover includes species such as Pattersons Curse (*Echium plantagineum*), Brome Grass (*Bromus sp*), Fireweed (*Senecio madagascariensis*), Quaking Grass (*Briza sp*) and Rye Grass (*Lolium perenne).*

The additional area assessed 28 Ferodale Road was a cleared block with no native vegetation. Planted exotic trees surround the outer perimeter of this block on 6 Abundance Road site.

5.2.1.2 Fauna Survey

All paddock trees, mainly Silky Oaks, within the activity footprint were assessed for fauna habitat. No hollows were noted and the species marked for removal do not generally have a strong tendency to form hollows. However, the bushy canopies of these trees provide good refuge for birds, and some of the trees may have birds nesting in them as lots of bird noise was heard (Noisy Miner, *Manorina melanocephal*) but no nest was spotted. Some Yellow-tailed Black Cockatoos (*Zanda funereal*) were observed feeding on the Silky Oak flowers. The Silky Oaks were planted farm trees and do not form part of the known PCT's in the area.

The shrubs on the site provide good hiding places for both birds, mammals and reptiles. The vegetation covers any burrow entries and provides protection for fauna nests and resting spots. The site had a sizable rabbit (*Oryctolagus cuniculus*) population, and any good habitat appeared to be occupied by rabbits. There were a large number of burrows across the paddock area and also a large number of rabbit sightings during the field survey. Rabbits are a pest species and eradication is recommended, detailed in the NVMP (WaterTech 2024a).

Other fauna observed in the paddocks include two Eastern Grey Kangaroos (*Macropus giganteus*) one with a joey in its pouch. The paddock treed area would be unlikely to form habitat for Gliders as distance between trees and to the main patch of bushland (detailed below) is too far to glide and predators on the ground layer such as European Fox (*Vulpes vulpes*) are likely to use the site.

5.2.2 Bushland Patch

5.2.2.1 Flora Survey

A walkthrough of the bushland patch and detailed assessment verified the vegetation PCT 3995 is part fit with the Threatened Ecological Community (TEC) *Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions.* An assessment of the vegetation was undertaken to cover as much of the area as possible. Vegetation species were identified, and any habitat features were noted. A survey was undertaken simultaneously for the NVMP, and a detailed description of the vegetation is found in the NVMP report included in Appendix E. This was followed by a more detailed BAM Plot within the bushland patch and on the edge of the patch where trees have been partially cleared. The edge of the future APZ zone for the school buildings stops at the forested zone and therefore no native tree clearing in this section is to be expected. Sections along the Abundance Road fence boundary also had native species of all stratum levels. Therefore, if revegetation occurs as indicated by the proposed trees in the site plan it is recommended to use native koala feed trees which are indicative of the PCT found on site which will also be used as a screen/ windbreak. This would also be greatly beneficial in re-establishing the koala habitat and connectivity within the Port Stephens ARKS zones. A threatened established Wallangarra White Gum (*Eucalyptus scoparia*) was found on site along Ferodale Road in the top corner and will need to have protection measures in place during the construction period.

The dominant native trees found on site include Swamp Mahogany (*Eucalyptus robusta*), Smooth-barked Apple (*Angophora costata*), and Blackbutt (*E. pilularis*). The dominant shrub layer includes Sweet Pittosporum (*Pittosporum undulatum*), Sydney Wattle (*Acacia longifolia*) and Prickly Beard-heath (*Leucopogon juniperinus*). The dominant native groundcover includes Kidney Weed (*Dichondra repens*), Blady Grass (*Imperata cylindrica)* and Right-angle Grass (*Entolasia stricta*). The majority of the natives were found within the dense forested section that was confirmed to be PCT 3995 - Hunter Coast Paperbark – Swamp Mahogany Forest.

A comprehensive flora list of the vegetation occurring on the property at the time of this assessment is provided in Table 5-1 and Table 5-2.

Tree species were identified and assessments of habitat value carried out, however many of the trees were young and did not yet have a significant canopy or hollows. However, the smaller trees formed smaller clusters of bushy vegetation in some locations.

Table 5-1 Comprehensive List of Native Flora Species associated with the Project Site

NATIVE SPECIES	
Scientific Name	**Common Name**
Canopy Species	
Angophora costata	Sydney Red Gum, Smooth-barked Apple
Eucalyptus sp.	Stringybark
Eucalyptus globoidea	White Stringybark
Eucalyptus haemastoma	Scribbly Gum
Eucalyptus parramattensis	Parramatta Red Gum
Eucalyptus pilularis	Blackbutt
Eucalyptus robusta	Swamp Mahogany
Eucalyptus scoparia	Wallangarra White Gum
Eucalyptus tereticornis	Forest Red Gum
Glochidion ferdinandi	Cheese Tree
Grevillea robusta	Silky Oak
Melia azedarach	White Cedar
Mid-storey Species	
Acacia longifolia	Wattle
Breynia oblongifolia	Coffee Bush
Bursaria spinosa	Blackthorn
Exocarpos cupressiformis	Cherry Ballart, Native Cherry
Hakea salicifolia	Willow-leaved Hakea
Leucopogon juniperinus	Prickly Beard-heath
Melaleuca bracteata	‘Revolution Gold’
Persoonia linearis	Narrow-leaved Geebung
Pittosporum undulatum	Native Daphne, Sweet Pittosporum
Climbers/Scramblers	
Eustrephus latifolius	Wombat Berry
Glycine sp.	Glycine

NATIVE SPECIES	
Glycine microphylla	Small-leaf glycine
Hardenbergia violacea	Purple Coral Pea, False Sarsaparilla
Hibbertia scandens	Climbing Guinea Flower
Kennedia rubicunda	Dusky Coral Pea
Parsonsia straminea	Monkey Rope, Common Silkpod
Passiflora sp	Native Passionfruit
Rubus parvifolius	Native Raspberry
Groundcover Species	
Carex sp.	Sedge
Dianella caerulea	Blue Flax-lily
Dichondra repens	Kidney Weed
Entolasia stricta	Wiry Panic, Right-angle Grass
Geranium solanderi	Native Geranium
Hydrocotyle sp.	Pennywort
Imperata cylindrica	Blady Grass
Lobelia purpurescens	Pratia
Lomandra filiformis	Wattle Mat-rush
Lomandra longifolia	Spiny-headed Mat-rush
Microlaena stipoides	Weeping Grass
Microtis unifolia	Common Onion Orchid
Oplismenus imbecillis	Creeping Beard Grass, Basket Grass
Oxalis perennans	Grassland Wood-sorrel
Poa labillardierei	Poa
Pratia purpurascens	Pratia
Pteridium esculentum	Common Bracken
Viola hederacea	Ivy-leaved Violet

Table 5-2 Exotic Species Observed on the Site

WEED SPECIES		
Scientific Name	**Common Name**	**WONS WEED (*)**
Canopy Species		
Cinnamomum camphora	Camphor Laurel	
Fraxinus griffithii	Evergreen Ash	
Jacaranda mimosifolia	Jacaranda	
Lingustrum lucidium	Large-leaved Privet	
Pinus radiata	Radiata Pine	
Populus sp	Poplar	
Platanus x acerifolia	London Plane, Maple-leaved Plane	
Mid-storey Species		
Abelia grandifola	Abelia	
Brunfelsia pauciflora	Yesterday-Today-Tomorrow	

WEED SPECIES		
Gomphocarpus fruticosus	Cotton Ballon Bush, Swan Plant	
Lantana camara	Lantana	*
Lingustrum sinense	Small-leaved Privet	
Nerium oleander	Oleander	
Ochna serrulata	Mickey Mouse Plant	
Olea europaea subsp. cuspidata	African Olive	
Opuntia stricta	Common Pear, Cactus	*
Photinia × fraseri	Photinia 'Red Robin'	
Phytolacca octandra	Inkweed	
Pyracantha angustifolia	Orange Firethorn	
Ricinus communis	Castor Oil Plant	
Sida rhombifolia	Paddy's Lucerne	
Solanum mauritianum	Tobacco bush	
Climbers/Scramblers		
Araujia sericifera	Moth Vine	
Cardiospermum grandiflorum	Balloon Vine	
Lonicera japonica	Japanese Honeysuckle	
Groundcover Species		
Agapanthus praecox. subsp.orientalis	Agapanthus, Lily of the Nile	
Anagallis arvensis	Scarlet Pimpernel, Red Chickweed	
Andropogon virginicus	Whiskey Grass	
Bidens pilosa	Cobbler's Peg, Farmer's Fiend	
Briza maxima	Quaking Grass, Giant Shivery Grass	
Briza minor	Quaking Grass, Small Shivery Grass	
Bromus sp	Brome Grass	
Cirsium vulgare	*Spear Thistle*	
Hyparrhenia hirta	Coolatai grass	
Conyza bonariensis	Fleabane	
Cordyline sp	Cordyline	
Cynodon dactylon	Couch	
Echium plantagineum	Patterson's Curse	
Ehrharta calycina	Veldt Grass	
Hypochaeris radicata	Cat's ear. Flat Weed	
Lolium perenne	Ryegrass	
Medicago murex	Medick	
Oryzopsis sp	Rice Grass	
Paspalum dilatatum	Paspalum	
Pennisetum clandestinum	Kikuyu grass	
Plantago lanceolata	Ribwort	
Poa sp	Poa	

WEED SPECIES		
Ranunculus sp.	Buttercup	
Rumex sp.	Dock, Sorrel	
Senecio madagascariensis	Fireweed	*
Soliva sessilis	Bindyi, Lawn Burweed	
Sonchus oleraceus	Common Sow Thistle	
Sporobolus sp.	Rats Tail Grass	
Stellaria media	Chickweed	
Taraxacum officinale	Dandelion, Pissabed	
Trifolium sp.	Clover	
Trifolium repens	White Clover	
Urtica urens	Small Nettle	
Verbena bonariensis	Purpletop	
Veronica filiformis	Speedwell	
Vicia sativa	Vetch	

5.2.2.2 Night-time Fauna Survey

The night-time survey consisted of a walkthrough of the bushland patch with spotlights to spot any nocturnal fauna on the site. Fauna species observed during the survey were two Common Ringtail Possums (*Pseudocheirus peregrinus*) and a Long-nosed Bandicoot (*Perameles nasuta*).

Special focus was put on Squirrel Gliders, Koalas, Bats and other threatened species, however none of these were recorded at the time of assessment nor was there evidence of scats and tree markings. The spotlight survey was only brief and opportunistic; therefore, a precautionary principle will be implemented and presence of these species assumed unless proven differently. This will not impact on the proposed activity as the area will not be impacted by the proposed activity and subsequent buffers will be established.

5.2.2.3 Bat Survey

The Audiomoth for the bat survey was deployed at the start of the assessment before dusk on 15 October and collected after dawn of 18 October. The data files were sent to Impact Ecology for analysis. Results are summarised below and shown in detail in Appendix C.

Five species of insectivorous bat were positively recorded during the survey period, including: *Miniopterus australis* (Little Bent-winged Bat) and *Micronomus norfolkensis* (Eastern Coastal Free-tailed Bat), both listed Vulnerable under the Biodiversity Conservation Act 2016. An additional call profile was possibly identified as *Saccolaimus flaviventris* (also listed vulnerable under the BC Act), however positive identification could be made due to the low quality of the call with less than three pulses.

The following table summarises bat analysis of five species detected during the survey duration at dusk between 15 to 17 November.

- White-striped Freetail-bat *Austronomus australis*
- Gould's Wattled Bat *Chalinolobus gouldi*
- Ride's Free-tailed Bat *Ozimops ridei*
- # Eastern Coastal Freetail-bat *Micronomus norfolkensis*
- # Little Bent-winged Bat *Miniopterus australis*
- # Yellow-bellied Sheathtail-bat 1P *Saccolaimus flaviventris*

Species listed under the Biodiversity Conservation Act 2016

P = Probable record

All bats were recorded from one Audiomoth (Figure 5-1) at the edge of the bushland patch to have the greatest recovery of calls by assessing both forest dwelling microbats and any that are flying through the site. The vegetation consisted of Eucalyptus dominated bushland and open grassy paddocks.

Figure 5-1 Recorded Location of Bat and Anabat Location

6 BIODIVERSITY IMPACT ASSESSMENT

Native flora and fauna identified on the site was generally in the area of native bushland associated with the remnant PCT 3995 - Hunter Coast Paperbark – Swamp Mahogany Forest. No evidence of threatened species were associated with the remainder of the site where the proposed school and infrastructure will be built. This includes the area of bushfire protection zone as shown in (EcoLogical 2023). However, we have taken the precautionary approach and provide a Test of Significance on the following species:

- Koala
- Eastern Coastal Free-tailed Bat
- Little Bent-winged Bat
- Yellow-bellied Sheathtail-bat
- Squirrel Glider
- Grey-headed Flying-fox
- Greater Broad-nosed Bat
- Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions TEC

The Tests of Significance are included in Appendix B.

7 POTENTIAL IMPACTS

7.1 Construction Impacts

The following is a summary of the direct and indirect impacts to the biodiversity potentially persisting onsite.

7.1.1 Trees

The preliminary arborist report (Assurance Trees, Jan 2025) states that out of the 95 trees assessed, 36 trees will require removal, of which 25 are listed as weeds and should be removed as part of the regional weed program. The report also states that a single threatened tree in the form of a Wallangarra White Gum (*Eucalyptus scoparia*) (endangered in NSW under BC Act 2016, Vulnerable under EPBC Act 1999 was sighted in the northeast corner of the site along Ferodale Road. The arborist report indicates this tree will not be removed, and protection methods should be prioritised during the construction stage. It is important to note that activities are scheduled to take place within the Tree Protection Zone (TPZ) of the trees designated for retention. The Eucalyptus trees should be protected to avoid them being damaged. As the construction takes place in an area of the TPZ precautions should be taken.

It is recommended that a qualified arborist is to attend to the pruning and the removal of any trees. Also, if roots greater than 50mm are encountered or if any trees are to be removed or significantly pruned, an arborist will monitor and evaluate the remaining trees. An arborist will be engaged prior to construction to provide a Tree Protection Plan.

All tree protection measures during construction should be adhered to, as described by the Joseph Pidutti Consulting Arborist, Nov 2023, in Appendix F.

7.1.2 Nests and Hollows

Prior to the commencement of the construction, all trees and vegetation should be inspected for hollows and nests. If fauna is discovered inhabiting hollows or nests, an ecologist may be required to remove and relocate any fauna if the tree or vegetation is to be removed.

Potential habitat was present on-site in the form of large shrubs that may house nesting birds.

No evidence of hollows was observed within the trees designated for removal. However, hollows within the bushland area in the south west of the site were mapped and will be protected (refer to NVMP, WaterTech 2024).

7.1.3 Contractors and Staff Inductions

Induction of all contractors and staff outlining the ecological sensitivity of the site, no-go areas, the need to minimise ecological impact, and all other required mitigation measures is to be undertaken.

7.1.4 Hygiene

Basic hygiene protocols would be implemented for construction personnel and machinery on site to reduce the potential for invasion by plant pathogens including *Phytopthora cinnamomi*, the fungus myrtle rust *Uredo rangelli* and amphibian chytrid fungus.

7.2 Operational Impacts

Operational impacts to fauna that are anticipated as a result of the proposal can be limited providing the following mitigation measures are carried out. It is expected that the school will utilise the native bushland patch in the south west for educational purposes and it will not be actively accessed during operation of the

school. Subject to implementing the mitigation measures identified in Section 8 below, the impacts on biodiversity are not considered to be significant. Further, the activity will not significantly affect threatened species and therefore a SIS and BDAR are not required to be prepared to support the REF for the project (ref Cl. 7.8 of the BC Act).

8 MITIGATION MEASURES

The following recommendations are made to suitably mitigate the potential negative impact on the local biodiversity from the proposed activity, or where possible have a positive impact. Measures that will be implemented to address potential pre-construction impacts are listed in Table 8-1 and construction impacts are listed in Table 8-2. Detailed tree mitigation measures during pre-construction and construction should be adhered to, as described in Table 8-3.

Table 8-1 Site Mitigation Measures Pre-construction Impacts (PI)

Table 8-1 Site Mitigation Measures Pre-construction Impacts (PI)FFA	Mitigation Measure	Timing
PI1	Tree protection must be approved by a Consulting Arborist AQF Level 5. No materials, mixing, parking, disposal, repairs, refuelling, fires, stockpiling, or backfilling is allowed near remaining trees. Removal or lopping of trees needs written permission from the Superintendent.	Pre-construction
PI2	All trees to be protected shall be clearly identified and all TPZs surveyed. Particularly the Wallangarra White Gum (Threatened species) and trees within PCT 3995 - Hunter Coast Paperbark – Swamp Mahogany Forest part fit with the Threatened Ecological Community (TEC) to be preserved. Provide NO GO areas to clearly delineate the area of bushland to be protected.	Pre-construction
PI3	Protective fencing around existing trees and within TPZs must be installed before any site work begins. The fence must be 1800mm high chain wire mesh fixed to Galvanised steel posts, enclosing an area to prevent damage as defined in the Tree Protection Plan. No storage inside fenced area.	Pre-construction
PI4	Use AS 4454 leaf mulch with 90% recycled content for tree protection fencing. Chip trees marked for removal and use mulch 100mm deep. Avoid soil, weeds, sticks, and stones. Comply with AS 4454 (1999) and AS 4419 (1998).	Pre-construction
PI5	Tree protection signage must be attached to tree protection zones before works begin. Signs should be displayed prominently and repeated at 10m intervals or closer when the fence changes direction. Signs must include information about the tree protection zone, access restrictions, developer's contact details, and Site Arborist information.	Pre-construction
PI6	Inspect all trees and shrubs for hollows and nests. If fauna is discovered an ecologist may be required to remove and relocate any fauna if the tree or vegetation is to be removed.	Pre-construction
PI7	Induction of all contractors and staff outlining the ecological sensitivity of the site, no-go areas, the need to minimise ecological impact, and all other required mitigation measures is to be undertaken.	Pre-construction

Table 8-2 Mitigation measures for construction impacts (CI)

FFA	Mitigation Measure	Timing
CI1	Tree Protection Zones (TPZs) will be maintained around vegetation to be retained. TPZs will be maintained in accordance with Australian Standard 4970 (2009) Protection of Trees on Development Sites (AS-4970). No activities are to take place within the Structural Root Zones (SRZs) of mature trees. The threatened tree located near the proposed car park requires additional measures, including attendance by a Level 5 arborist during excavation and construction works to ensure no impact on the tree root zone.	Construction
CI2	No pedestrian or plant access is permissible to the TPZ.	Construction
CI3	Avoid storing bulk or harmful materials near trees. Keep spoil from excavations away from TPZs. Ensure wind-blown materials like cement don't harm trees. Contaminants stored properly with spill measures.	Construction
CI4	Protect the tree from harm. Avoid tying ropes, cables, or similar items to trees. No staff members. No plant machinery, or materials can enter the tree protection fencing.	Construction
CI5	Do not fill or compact soil above tree roots enclosed by protection fencing during construction near trees. Guidelines must be followed to prevent soil compaction in these areas. Protection includes using elevated planks attached to scaffolding to prevent ground compression.	Construction
CI6	Trenching is not allowed in TPZs or tree protection fencing. Approval needed for trenching, must be done by hand with arborist supervision.	Construction
CI7	Contractors are to maintain plants are watered. Apply water at an appropriate rate suitable for the plant species during periods of little or no rainfall.	Construction
CI8	All site facilities must be located outside of TPZ. Chemicals and contaminants must be stored properly in an enclosed area with a spill bund to prevent runoff in case of accidents.	Construction
CI9	Basic hygiene protocols would be implemented for construction personnel and machinery on site to reduce the potential for invasion by plant pathogens including *Phytopthora cinnamomi*, the fungus myrtle rust *Uredo rangelli* and amphibian chytrid fungus.	Construction
CI10	Any fauna finding its way to construction site to be relocated by a trained professional, to the nearest available habitat (out of the construction area)	Construction
CI11	Works to be carried out in daylight and no unnecessary vehicular movements (including lights) to be performed at night	Construction
CI12	All lighting to face away from bushland area and vegetation clusters. The lights can attract predatory species.	Construction

Table 8-3 Mitigation measures for operational impacts (OI)

FFA	Mitigation Measure	Timing
PI1	Fencing to allow the movement of fauna (particularly Koalas) through the site and reduce contamination into the threatened PCT zone	Operational
PI2	Cleanup of household rubbish and old vehicles from bushland area to reduce the harbour for foxes and rabbits	Operational
PI3	Weed management control through the use of qualified bush regenerators	Operational
PI4	Prevent security lighting and sporting lighting from facing towards bushland and accompanying habitat	Operational
PI5	Pest management Control through the use of qualified pest control experts	Operational
PI6	Manage for fire control as per fire management consultants (Eco Logical Australia 2023)	Operational
PI7	Follow NVMP (Water Tech 2024a)	Operational

9 RECOMMENDATIONS

9.1 Determination

The site is suitable to build school infrastructure for a New High School for Medowie. Impacts to flora and fauna have been avoided by maintaining and enhancing the native vegetation associated with south west part of the site. This vegetation was verified as PCT 3995 is part fit with the Threatened Ecological Community (TEC) *Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions.* The remainder of the site consists of cleared paddock with minimal native vegetation and fauna habitat. The paddock site is currently used for horse grazing and is dominated by weedy species with occasional natives.

The construction and operational stages are anticipated to have minimal impacts providing mitigation is carried out.

9.2 Statement of Significance

There is not likely to be a significant effect on a threatened species, the PCT 3995 TEC due to careful consideration of placement of the infrastructure and the placement of APZ within the property bordering the existing native vegetation.

10 REFERENCES

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APPENDIX A
LIKELIHOOD OF OCCURRENCE TABLE

Likelihood Criteria	
Recorded	The species was observed in the study area during the current survey.
High	It is highly likely that a species inhabits the study area and is dependent on identified suitable habitat (i.e. for breeding or important life cycle periods such as winter flowering resources), has been recorded recently in the locality (10km) and is known or likely to maintain resident populations in the study area. Also includes species known or likely to visit the study area during regular seasonal movements or migration.
Moderate	Potential habitat is present in the study area. Species unlikely to maintain sedentary populations, however, may seasonally use resources within the study area opportunistically or during migration. The species is unlikely to be dependent (i.e. for breeding or important life cycle periods such as winter flowering resources) on habitat within the study area, or habitat is in a modified or degraded state. Includes cryptic flowering flora species that were not seasonally targeted by surveys and that have not been recorded.
Low	It is unlikely that the species inhabits the study area and has not been recorded recently in the locality (10km). It may be an occasional visitor, but habitat similar to the study area is widely distributed in the local area, meaning that the species is not dependent (i.e. for breeding or important life cycle periods such as winter flowering resources) on available habitat. Specific habitat is not present in the study area, or the species are a non-cryptic perennial flora species that were specifically targeted by surveys and not recorded.
None	Suitable habitat is absent from the study area.

Table A-1 Likelihood of Occurrence

Family	Scientific Name	Common Name	NSW status	Comm. status	Records	Comment	Likelihood of Occurrence
Myobatrachidae	*Crinia tinnula*	Wallum Froglet	V,P		3	Wallum Froglets are found along the coastal margin from Litabella National Park in south-east Queensland to Kurnell in Sydney. Wallum Froglets are found in a wide range of habitats, usually associated with acidic swamps on coastal sand plains. They typically occur in sedgelands and wet heathlands. They can also be found along drainage lines within other vegetation communities and disturbed areas, and occasionally in swamp sclerophyll forests.	Low
Myobatrachidae	*Uperoleia mahonyi*	Mahony's Toadlet	E1,P	E	24	Mahony's Toadlet is endemic to the mid-north coast of New South Wales (NSW) and to date has been found between Kangy Angy and Seal Rocks. Current observations indicate Mahony's Toadlet inhabits ephemeral and semi-permanent swamps and swales on the coastal fringe of its range. Known records occur in heath or wallum habitats almost exclusively associated with leached (highly nutrient impoverished) white sand. Commonly associated with acid paperbark swamps, Mahony's Toadlet also is known to occur in wallum heath, swamp mahogany-paperbark swamp forest, heath shrubland and Sydney red gum woodland. Recent studies suggest intact vegetation adjacent to and within water bodies is an important habitat feature for this species. Known records are associated with shallow ephemeral/semi-permanent water bodies with limited flow of water. Aquatic vegetation at breeding sites includes sedges (Shoenoplectus spp., Baumea spp. and Lepironia articulata) and Broadleaf Cumbungi (Typha orientalis).	Moderate

Family	Scientific Name	Common Name	NSW status	Comm. status	Records	Comment	Likelihood of Occurrence
Casuariidae	*Dromaius novaehollandiae*	Emu population in the New South Wales North Coast Bioregion and Port Stephens local government area	E2,P		3	Distributed broadly but patchily through New South Wales and elsewhere in Australia. It occupies a range of predominantly open habitats, including plains, grasslands, woodlands and shrubs, and may occur occasionally in forest. An isolated population of Emus occurs in the NSW North Coast Bioregion and Port Stephens Local Government Area (LGA). The population is disjunct from other populations in the Sydney Basin and New England Tableland Bioregion. The population of Emus in the NSW North Coast Bioregion and Port Stephens LGA represents the north-eastern limit of the species in NSW. The majority of recent records are concentrated between Coffs Harbour and Ballina, with occasional records inland of the coastal ranges.	Low
Anatidae	*Oxyura australis*	Blue-billed Duck	V,P		1	The Blue-billed Duck is endemic to south-eastern and south-western Australia. It is widespread in NSW, but most common in the southern Murray-Darling Basin area. Birds disperse during the breeding season to deep swamps up to 300 km away. It is generally only during summer or in drier years that they are seen in coastal areas.	Low
Anatidae	*Stictonetta naevosa*	Freckled Duck	V,P		1	The Freckled Duck is found primarily in south-eastern and south-western Australia, occurring as a vagrant elsewhere. It breeds in large temporary swamps created by floods in the Bulloo and Lake Eyre basins and the Murray-Darling system, particularly along the Paroo and Lachlan Rivers, and other rivers within the Riverina. The duck is forced to disperse during extensive inland droughts when wetlands in the Murray River basin provide important habitat. The species may also occur as far as coastal NSW and Victoria during such times.	Low
Apodidae	*Hirundapus caudacutus*	White-throated Needletail	P	V,C,J,K	2	In eastern Australia, it is recorded in all coastal regions of Queensland and NSW, extending inland to the western slopes of the Great Divide and occasionally onto the adjacent inland plains.	Low
Procellariidae	*Ardenna pacifica*	Wedge-tailed Shearwater	P	J	3	In tropical zones the species may feed over cool nutrient-rich waters. The species has been recorded in offshore waters of eastern Victoria and southern NSW, mostly over continental slope with sea-surface temperatures of 13.9–24.4 °C	Low
Ciconiidae	*Ephippiorhynchus asiaticus*	Black-necked Stork	E1,P		2	In NSW, the species becomes increasingly uncommon south of the Clarence Valley and rarely occurs south of Sydney. Since 1995, breeding has been recorded as far south as Buladelah. Floodplain wetlands (swamps, billabongs, watercourses and dams) of the major coastal rivers are the key habitat in NSW for the Black-necked Stork. Secondary habitat includes minor floodplains, coastal sandplain wetlands and estuaries.	Low

Family	Scientific Name	Common Name	NSW status	Comm. status	Records	Comment	Likelihood of Occurrence
Ardeidae	*Ixobrychus flavicollis*	Black Bittern	V,P	-	1	The Black Bittern has a wide distribution, from southern NSW north to Cape York and along the north coast to the Kimberley region. The species also occurs in the south-west of Western Australia. In NSW, records of the species are scattered along the east coast, with individuals rarely being recorded south of Sydney or inland. Inhabits both terrestrial and estuarine wetlands, generally in areas of permanent water and dense vegetation. Where permanent water is present, the species may occur in flooded grassland, forest, woodland, rainforest and mangroves.	Low
Accipitridae	*Haliaeetus leucogaster*	White-bellied Sea-Eagle	V,P	-	4	In New South Wales it is widespread along the east coast, and along all major inland rivers and waterways. Habitats are characterised by the presence of large areas of open water including larger rivers, swamps, lakes, and the sea. Occurs at sites near the sea or seashore, such as around bays and inlets, beaches, reefs, lagoons, estuaries and mangroves; and at, or in the vicinity of freshwater swamps, lakes, reservoirs, billabongs and saltmarsh. Terrestrial habitats include coastal dunes, tidal flats, grassland, heathland, woodland, and forest (including rainforest). Breeding habitat consists of mature tall open forest, open forest, tall woodland, and swamp sclerophyll forest close to foraging habitat. Nest trees are typically large emergent eucalypts and often have emergent dead branches or large dead trees nearby which are used as 'guard roosts.' Nests are large structures built from sticks and lined with leaves or grass.	Low
Accipitridae	*Lophoictinia isura*	Square-tailed Kite	V,P,3	-	1	The Square-tailed Kite ranges along coastal and subcoastal areas from south-western to northern Australia, Queensland, NSW and Victoria. In NSW, scattered records of the species throughout the state indicate that the species is a regular resident in the north, north-east and along the major west-flowing river systems. It is a summer breeding migrant to the south-east, including the NSW south coast, arriving in September and leaving by March.	Low
Scolopacidae	*Gallinago hardwickii*	Latham's Snipe	P	J,K	2	The distribution of Latham's Snipe is naturally fragmented (although, because of the mobility of the species, this is unlikely to have any effect on survival). The distribution is fragmented because the preferred habitat (i.e., freshwater wetlands) occurs in patches throughout the non-breeding grounds.	Low
Cacatuidae	*Calyptorhynchus lathami lathami*	South-eastern Glossy Black-Cockatoo	V,P,2	V	1	Inhabits open forest and woodlands of the coast and the Great Dividing Range where stands of Sheoak occur. Black Sheoak (Allocasuarina littoralis) and Forest Sheoak (A. torulosa) are important foods. Inland populations feed on a wide range of Sheoaks, including Drooping Sheoak, Allocasuaraina diminuta, and A. gymnathera. Belah is also utilised and may be a critical food source for some populations. In the Riverina, birds are associated with hills and rocky rises supporting Drooping Sheoak but also recorded in open woodlands dominated by Belah (Casuarina cristata).	Low

Family	Scientific Name	Common Name	NSW status	Comm. status	Records	Comment	Likelihood of Occurrence
Psittacidae	*Glossopsitta pusilla*	Little Lorikeet	V,P	-	3	Forages primarily in the canopy of open Eucalyptus Forest and woodland, yet also finds food in Angophora, Melaleuca and other tree species. Riparian habitats are particularly used, due to higher soil fertility and hence greater productivity. Isolated flowering trees in open country, e.g., paddocks, roadside remnants and urban trees also help sustain viable populations of the species. Feeds mostly on nectar and pollen, occasionally on native fruits such as mistletoe, and only rarely in orchards	Low
Psittacidae	*Lathamus discolor*	Swift Parrot	E1,P,3	CE	2	On the mainland they occur in areas where eucalypts are flowering profusely or where there are abundant lerp (from sap-sucking bugs) infestations.	Low
Strigidae	*Ninox strenua*	Powerful Owl	V,P,3	-	8	The Powerful Owl inhabits a range of vegetation types, from woodland and open sclerophyll forest to tall open wet forest and rainforest. The Powerful Owl requires large tracts of forest or woodland habitat but can occur in fragmented landscapes as well. The species breeds and hunts in open or closed sclerophyll forest or woodlands and occasionally hunts in open habitats. It roosts by day in dense vegetation comprising species such as Turpentine Syncarpia glomulifera, Black She-oak Allocasuarina littoralis, Blackwood Acacia melanoxylon, Rough-barked Apple Angophora floribunda, Cherry Ballart Exocarpus cupressiformis and a number of eucalypt species.	Moderate
Tytonidae	*Tyto novaehollandiae*	Masked Owl	V,P,3	-	2	Lives in dry eucalypt forests and woodlands from sea level to 1100 m. A forest owl, but often hunts along the edges of forests, including roadsides.	Low
Climacteridae	*Climacteris picumnus victoriae*	Brown Treecreeper (eastern subspecies)	V,P		1	The Brown Treecreeper is endemic to eastern Australia and occurs in eucalypt forests and woodlands of inland plains and slopes of the Great Dividing Range. It is less commonly found on coastal plains and ranges. The eastern subspecies lives in eastern NSW in eucalypt woodlands through central NSW and in coastal areas with drier open woodlands such as the Snowy River Valley, Cumberland Plains, Hunter Valley and parts of the Richmond and Clarence Valleys. The population density of this subspecies has been greatly reduced over much of its range, with major declines recorded in central NSW and the northern and southern tablelands. Declines have occurred in remnant vegetation fragments smaller than 300 hectares, which have been isolated or fragmented for more than 50 years.	Low
Meliphagidae	*Anthochaera phrygia*	Regent Honeyeater	E4A,P	CE	1	The species inhabits dry open forest and woodland, particularly Box-Ironbark woodland, and riparian forests of River Sheoak. Regent Honeyeaters inhabit woodlands that support a significantly high abundance and species richness of bird species. These woodlands have significantly large numbers of mature trees, high canopy cover and abundance of mistletoes. Every few years non-breeding flocks are seen foraging in flowering coastal Swamp Mahogany and Spotted Gum forests, particularly on the central coast and occasionally on the upper north coast. The Regent Honeyeater is a generalist forager, although it feeds mainly on the nectar from a relatively small number of eucalypts that produce high volumes of nectar. Key eucalypt species include Mugga Ironbark, Yellow Box, White Box and Swamp Mahogany. Other tree species may be regionally important	Low

Family	Scientific Name	Common Name	NSW status	Comm. status	Records	Comment	Likelihood of Occurrence
Neosittidae	*Daphoenositta chrysoptera*	Varied Sittella	V,P	-	1	Inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, Mallee, and Acacia woodland.	Low
Dasyuridae	*Dasyurus maculatus*	Spotted-tailed Quoll	V,P	E	2	Recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath, and inland riparian forest, from the sub-alpine zone to the coastline. Individual animals use hollow-bearing trees, fallen logs, small caves, rock outcrops and rocky-cliff faces as den sites.	Low
Dasyuridae	*Phascogale tapoatafa*	Brush-tailed Phascogale	V,P		1	The Brush-tailed Phascogale has a patchy distribution around the coast of Australia. In NSW it is mainly found east of the Great Dividing Range although there are occasional records west of the divide. They prefer dry sclerophyll open forest with sparse groundcover of herbs, grasses, shrubs or leaf litter. Also inhabit heath, swamps, rainforest and wet sclerophyll forest. Agile climber foraging preferentially in rough barked trees of 25 cm DBH or greater.	Low
Phascolarctidae	*Phascolarctos cinereus*	Koala	E1,P	E	82	In New South Wales, koala populations are found on the central and north coasts, southern highlands, southern and northern tablelands, Blue Mountains, southern coastal forests, with some smaller populations on the plains west of the Great Dividing Range. Inhabit eucalypt woodlands and forests. Feed on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but in any one area will select preferred browse species.	High
Petauridae	*Petaurus norfolcensis*	Squirrel Glider	V,P	-	1	Inhabits mature or old growth Box, Box-Ironbark woodlands and River Red Gum Forest west of the Great Dividing Range and Blackbutt-Bloodwood Forest with heath understorey in coastal areas.	High, previously recorded on the site
Pteropodidae	*Pteropus poliocephalus*	Grey-headed Flying-fox	V,P	V	31	Occur in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths, and swamps as well as urban gardens and cultivated fruit crops. Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy.	High
Emballonuridae	*Saccolaimus flaviventris*	Yellow-bellied Sheathtail-bat	V,P		2	Roosts singly or in groups of up to six, in tree hollows and buildings; in treeless areas they are known to utilise mammal burrows. When foraging for insects, flies high and fast over the forest canopy, but lower in more open country. Forages in most habitats across its very wide range, with and without trees; appears to defend an aerial territory.	Low
Molossidae	*Micronomus norfolkensis*	Eastern Coastal Free-tailed Bat	V,P	-	6	Occur in dry sclerophyll forest, woodland, swamp forests and mangrove forests east of the Great Dividing Range. Roost mainly in tree hollows but will also roost under bark or in man-made structures.	Moderate

Family	Scientific Name	Common Name	NSW status	Comm. status	Records	Comment	Likelihood of Occurrence
Vespertilionidae	*Scoteanax rueppellii*	Greater Broad-nosed Bat	V,P	-	2	Utilises a variety of habitats from woodland through to moist and dry eucalypt forest and rainforest, though it is most commonly found in tall wet forest. Although this species usually roosts in tree hollows, it has also been found in buildings. Open woodland habitat and dry open forest suits the direct flight of this species as it searches for beetles and other large, slow-flying insects; this species has been known to eat other bat species.	Low
Miniopteridae	*Miniopterus australis*	Little Bent-winged Bat	V,P	-	9	Moist eucalypt forest, rainforest, vine thicket, wet and dry sclerophyll forest, Melaleuca swamps, dense coastal forests, and banksia scrub. Generally found in well-timbered areas. Little Bentwing-bats roost in caves, tunnels, tree hollows, abandoned mines, stormwater drains, culverts, bridges and sometimes buildings during the day, and at night forage for small insects beneath the canopy of densely vegetated habitats.	Moderate
Miniopteridae	*Miniopterus orianae oceanensis*	Large Bent-winged Bat	V,P	-	1	Caves are the primary roosting habitat, but also use derelict mines, storm-water tunnels, buildings, and other man-made structures. Form discrete populations centred on a maternity cave that is used annually in spring and summer for the birth and rearing of young. Maternity caves have very specific temperature and humidity regimes. At other times of the year, populations disperse within about 300 km range of maternity caves. Cold caves are used for hibernation in southern Australia. Breeding or roosting colonies can number from 100 to 150,000 individuals. Hunt in forested areas, catching moths and other flying insects above the treetops.	Low
Myrtaceae	*Callistemon linearifolius*	Netted Bottle Brush	V,3		4	For the Sydney area, recent records are limited to the Hornsby Plateau area near the Hawkesbury River. The species was more widespread in the past, and there are currently only 5-6 populations remaining from the 22 populations historically recorded in the Sydney area. Three of the remaining populations are reserved in Ku-ring-gai Chase National Park, Lion Island Nature Reserve and Spectacle Island Nature Reserve. The species has also been recorded from Yengo National Park. Grows in dry sclerophyll forest on the coast and adjacent ranges.	Low
Myrtaceae	*Eucalyptus camfieldii*	Camfield's Stringybark	V	V	27	Restricted distribution in a narrow band with the most northerly records in the Raymond Terrace area south to Waterfall. Localised and scattered distribution includes sites at Norah Head (Tuggerah Lakes), Peats Ridge, Mt Colah, Elvina Bay Trail (West Head), Terrey Hills, Killara, North Head, Menai, Wattamolla and a few other sites in Royal National Park.	Moderate
Myrtaceae	*Eucalyptus parramattensis subsp. decadens*		V	V	189	There are two separate meta-populations of E. parramattensis subsp. decadens. The Kurri Kurri meta-population is bordered by Cessnock—Kurri Kurri in the north and Mulbring—Abedare in the south. Large aggregations of the subspecies are located in the Tomalpin area. The Tomago Sand beds meta-population is bounded by Salt Ash and Tanilba Bay in the north and Williamtown and Tomago in the south.	High

Family	Scientific Name	Common Name	NSW status	Comm. status	Records	Comment	Likelihood of Occurrence
Myrtaceae	*Syzygium paniculatum*	Magenta Lilly Pilly	E1	V	3	The Magenta Lilly Pilly is found only in NSW, in a narrow, linear coastal strip from Upper Lansdowne to Conjola State Forest. On the south coast the Magenta Lilly Pilly occurs on grey soils over sandstone, restricted mainly to remnant stands of littoral (coastal) rainforest. On the central coast Magenta Lilly Pilly occurs on gravels, sands, silts and clays in riverside gallery rainforests and remnant littoral rainforest communities.	Low
Orchidaceae	*Corybas dowlingii*	Red Helmet Orchid	E1,P,2		3	Corybas dowlingii is restricted to the central coast and Hunter regions of New South Wales where it is currently known from the Port Stephens, Bulahdelah, Lake Macquarie and Freemans Waterhole areas. It is known from the local government areas of Cessnock, Great Lakes, Lake Macquarie and Port Stephens. More recently the species has been recorded from the Wauchope and Port Macquarie areas.	Low
Orchidaceae	*Diuris arenaria*	Sand Doubletail	E1,P,2		1	Sand Doubletail is known from the Tomaree Peninsula near Newcastle. This species occurs in coastal heath and dry grassy eucalypt forest on sandy flats.	Low

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APPENDIX B
TESTS OF SIGNIFICANCE

An impact assessment including a Test of Significance (ToS) as set out in Section 7.3 of the BC Act was undertaken for threatened species and threatened ecological communities considered likely to occur within the project site, to determine if a species impact statement (SIS) is required. The species herein are listed as threatened under the *Biodiversity Conservation Act 2016* (BC Act). All species are also listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

ToS were prepared for the following species based on potential impacts:

- Koala
- Threatened microbats - Eastern Coastal Free-tailed Bat, Little Bent-winged Bat, Yellow-bellied Sheathtail-bat, Greater Broad-nosed Bat
- Squirrel Glider
- Grey-headed Flying-fox
- Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions TEC.

Koala (*Phascolarctos cinereus*), Endangered (BC Act) Endangered (EPBC Act)

Species description

In New South Wales, koala populations are found on the central and north coasts, southern highlands, southern and northern tablelands, Blue Mountains, southern coastal forests, with some smaller populations on the plains west of the Great Dividing Range. Inhabit eucalypt woodlands and forests. Feed on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but in any one area will select preferred browse species.

A CKPoM has been prepared for the population of koala in Port Stephens LGA where the site is located. Within the CKPoM, the following koala has been mapped as occurring in the site (KPoM, Water Technology 2024):

- Preferred Koala Habitat (full blue);
- Preferred Koala Habitat Buffer Over Cleared Land (blue hashed over yellow); and
- Preferred Koala Habitat Link over Cleared Land (blue stripes over yellow).

The CLPoM also lists preferred koala food trees:

- Swamp Mahogany (*Eucalyptus robusta*);
- Parramatta Red Gum (*Eucalyptus parramattensis*); and
- Forest Red Gum (*Eucalyptus tereticornis*).

Swamp Mahogany was recorded in the bushland patch in the southwest of the site. This patch will not be impacted due to the proposed activity. No other listed preferred koala food trees were detected in the site during site surveys. However, listed potentially important koala tree species including Sydney Peppermint (*Eucalyptus piperita*) and Blackbutt (*Eucalyptus pilularis*) were recorded in the site.

Threats to the koala include Loss, modification and fragmentation of habitat, vehicle strike, predation by roaming or domestic dogs, intense prescribed burns or wildfires that scorch or burn the tree canopy, koala disease, heat stress through drought and heatwaves, inadequate support for fauna rehabilitation and emergency response, small population size or geographically isolated populations, poor understanding of population distribution and trend, poor understanding of animal movements and use of habitat, poor understanding of social and economic value of koalas to community.

The following is 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.

Koala has been previously recorded in the site. The southwest bushland patch in the site has been mapped as Preferred Koala Habitat in the Port Stephens CKPoM. This patch, and the preferred koala food trees within, will not be impacted due to the proposed activity. No other areas of Preferred Koala Habitat nor Preferred Koala Food Trees will be impacted due to the proposal. Some isolated native trees are proposed for removal. However, these trees occur within mapped Buffer and Linking Habitat in the CKPoM. A KPoM has been prepared for the proposed activity on the site (Water Technology 2024). Recommendations have been made within this KPoM to mitigate any potential threats to koalas on the site, including protection of Preferred Koala Habitat and Preferred Koala Trees, and a Native Vegetation Management Plan has also been prepared (Water Technology 2024) which includes a revegetation plan to offset any lost native vegetation on the site. Furthermore, free movement of koalas through the site will be maintained through the use of koala friendly fencing.

Territorial males have larger home ranges overlapping several breeding females and sub-ordinate males on the periphery. Therefore, breeding habitat for the koala is large areas of Preferred Koala Habitat with suitable linkage in between. Movement of koalas across the site would occur mainly in the southern section of the site where adjacent patches and trees occur on neighbouring properties, which in turn connect to other habitat patches in the local area. Therefore, the proposed activity will not have 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.

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

Not applicable.

(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.

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

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

The Preferred Koala Habitat and Preferred Koala Food Trees in the site will not be impacted due to the proposal. Some potentially important isolated trees such as Blackbutt and Sydney Peppermint may be removed due to the proposal. However, these are in Buffer and Linkage Habitat only. Most of the Buffer Habitat will not be impacted due to an APZ proposed adjacent to the bushland patch and proposed infrastructure. A NVMP has been prepared which includes plans to offset losses any koala trees on the site. Therefore, impacts to koala habitat will be minimal, and in the long-term, offset.

(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, and

The proposed infrastructure due to the proposed activity may have a barrier effect on koala movement south-north through the site. However, the main movement of koalas is likely east-west through the southern section of the site where preferred koala habitat is and joins other preferred

koala habitat on neighbouring properties. Furthermore, the NVMP will include planting of koala trees along the south-north fence line of the site which will improve linkage habitat for koalas. Therefore, habitat fragmentation for koalas is likely to be minimal. Koala friendly fencing has been included as a mitigation measure for the site in the KPoM for the proposed activity.

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

The proposed activity involves the removal of some native trees (mainly isolated trees) which are within Buffer and Linkage koala habitat zones. Therefore, this habitat is considered less important than the Preferred Koala Habitat and Preferred Koala Food Trees being maintained on the site which will ensure the long-term survival of koala on the site, and within the local area.

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 areas of outstanding biodiversity value are declared for threatened species or communities within the site.

e) The proposed development or activity is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

The key threatening processes listed under schedule 4 of the BC Act that may apply to the proposed works for threatened microbats are “Removal of dead wood and dead trees”, “Loss of hollow-bearing trees” and “Clearing of native vegetation”. Also relevant to koalas is “Predation and hybridisation by feral dogs, *Canis lupus familiaris*”.

The proposed activity requires the clearing of some native vegetation and possibly dead wood and dead trees. However, the native vegetation removal will be in the form of isolated tree removal and vegetation that although may be used by koalas as linkage habitat, is not considered Preferred Koala Habitat on the site. Furthermore, native tree planting has been included in the NVMP. The proposed activity will not cause an increased risk in dog predation on koalas. Education on dog predation for neighbouring properties has been included in the KPoM for the site, as has mitigation measures for all threats to koalas that may be increased due to the proposed activity.

Conclusion

The proposal is unlikely to have a significant impact on the Koala population given that:

- The preferred habitat patch in the southwest of the site will not be impacted due to the proposed works;
- Mitigation measures for protection of fauna and habitat during the proposed works will be implemented;
- A KPoM has been prepared for the site; and
- A NVMP has been prepared for the site.

On the basis of the above considerations, it is unlikely that the proposal would result in a significant impact on the survival of the local Koala population. As such, a Species Impact Statement (SIS) is not required.

Microbats

Eastern Coastal Free-tailed Bat (*Micronomus norfolkensis*), Vulnerable (BC Act); Little Bent-winged Bat (*Miniopterus australis*), Vulnerable (BC Act); Yellow-bellied Sheathtail-bat (*Saccolaimus flaviventris*), Vulnerable (BC Act); Greater Broad-nosed Bat (*Scoteanax rueppellii*), Vulnerable (BC Act)

Species description

Eastern Coastal Free-tail Bat (ECFB)

This species occurs in dry sclerophyll forest, woodland, swamp forests and mangrove forests east of the Great Dividing Range. Roosts mainly in tree hollows but will also roost under bark or in man-made structures. Usually solitary but also recorded roosting communally, probably insectivorous.

Little Bent-winged Bat (LBB)

This species inhabits moist eucalypt forest, rainforest, vine thicket, wet and dry sclerophyll forest, Melaleuca swamps, dense coastal forests, and banksia scrub. Generally found in well-timbered areas. Little Bentwing-bats roost in caves, tunnels, tree hollows, abandoned mines, stormwater drains, culverts, bridges and sometimes buildings during the day, and at night forage for small insects beneath the canopy of densely vegetated habitats.

Yellow-bellied Sheathtail-bat (YBSB)

This species roosts singly or in groups of up to six, in tree hollows and buildings; in treeless areas they are known to utilise mammal burrows. When foraging for insects, flies high and fast over the forest canopy, but lower in more open country. Forages in most habitats across its very wide range, with and without trees; appears to defend an aerial territory.

Greater Broad-nosed Bat (GBB)

Utilises a variety of habitats from woodland through to moist and dry eucalypt forest and rainforest, though it is most commonly found in tall wet forest. Although this species usually roosts in tree hollows, it has also been found in buildings. Open woodland habitat and dry open forest suits the direct flight of this species as it searches for beetles and other large, slow-flying insects; this species has been known to eat other bat species.

Threats to threatened microbats include disturbance to roosting and summer breeding sites, foraging habitats are being cleared for residential and agricultural developments, including clearing by residents within rural subdivisions, loss of hollow-bearing trees, pesticides and herbicides may reduce the availability of insects, or result in the accumulation of toxic residues in individuals' fat stores, Artificial light sources spilling onto foraging and/or roosting habitat, and changes to water regimes are likely to impact food resources, as is the use of pesticides and herbicides near waterways.

Also, specifically for Little Bent-winged Bat, disturbance of colonies, especially in nursery or hibernating caves, may be catastrophic, extractive mining activity that destroys or disturbs caves and resident bats. Includes maternity, staging and over-wintering roosting caves, illegal extraction of guano causing disturbance to resident bats, changes to habitat, especially surrounding maternity/nursery caves and winter roosts, predation from foxes, particularly around maternity caves, winter roosts and roosts within culverts, tunnels and under bridges, predation from feral cats, particularly around maternity caves, winter roosts and roosts within culverts, tunnels and under bridges, woody weeds such as Lantana or blackberry that can overgrow cave entrances and block access or provide an entanglement risk, introduction of exotic pathogens such as the White-nosed fungus, hazard reduction and wildfire fires during the breeding season, large scale wildfire or hazard reduction can impact on foraging resources, poor knowledge of reproductive success and population dynamics.

The following is 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.

The proposed works is not expected to directly impact on any preferred habitat for threatened microbats in the site. This includes hollow-bearing trees which these microbats can use for breeding purposes. The preferred habitat for microbats in the site is the patch of woodland in the southern

section of the site which will not be impacted by the proposed activities. There will also remain a buffer for this patch in the form of an APZ. Therefore, breeding and foraging habitat will remain intact, so the local population of these species will not be placed at risk of extinction. See mitigation measures listed in Section 8 for tree and habitat protection during pre-construction, construction, and operation phases.

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

Not applicable.

(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.

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

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

The listed threatened microbats would use the woodland habitat in the southwest of the site for foraging purposes and the recorded hollows for roosting and breeding purposes. This habitat will not be impacted by the proposed activity. Threatened microbats also use open spaces for foraging, however foraging can continue during construction and operation phases as microbats forage at dusk and nocturnally and they can forage above the proposed infrastructure. Therefore, the extent to which habitat is likely to be removed or modified due to the activity is minimal.

(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, and

No habitat fragmentation will result from the proposed activity because the threatened microbats can continue to access other patches of suitable woodland habitat by moving aerially above the site.

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

No important habitat for threatened microbats will be removed, modified, fragmented or isolated, therefore the survival of threatened microbats in the local community will not be negatively impacted.

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 areas of outstanding biodiversity value are declared for threatened species or communities within the site.

e) The proposed development or activity is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

The key threatening processes listed under schedule 4 of the BC Act that may apply to the proposed works for threatened microbats are “Removal of dead wood and dead trees”, “Loss of hollow-bearing trees” and “Clearing of native vegetation”.

The proposed activity requires the clearing of some native vegetation and possibly dead wood and dead trees. However, the native vegetation removal will be in the form of isolated tree removal and vegetation that is not considered important for threatened microbats on the site.

Conclusion

The proposal is unlikely to have a significant impact on the threatened microbats given that:

- The preferred habitat patch including hollow-bearing trees in the southwest of the site will not be impacted due to the proposed works; and
- Mitigation measures for protection of fauna and habitat during the proposed works will be implemented.

On the basis of the above considerations, it is unlikely that the proposal would result in a significant impact on the survival of the threatened microbats. As such, a Species Impact Statement (SIS) is not required.

Squirrel Glider (*Petaurus norfolcensis*), Vulnerable (BC Act)

Species description

The Squirrel Glider inhabits mature or old growth Box, Box-Ironbark woodlands and River Red Gum Forest west of the Great Dividing Range and Blackbutt-Bloodwood Forest with heath understorey in coastal areas. It lives in family groups of a single adult male, one or more adult females and offspring. This species requires abundant tree hollows for refuge and nest sites. The diet of the Squirrel Glider varies seasonally and consists of Acacia gum, eucalypt sap, nectar, honeydew and manna, with invertebrates and pollen providing protein.

Threats to the Squirrel Glider include habitat loss and degradation, fragmentation of habitat, loss of hollow-bearing trees, loss of understorey food resources, inappropriate fire regimes, reduction in food resources due to drought, mortality due to entanglement on barbed wire, occupation of hollows by exotic species, mortality due to collision with vehicles, predation by exotic predators, and changes in spatial and temporal distribution of habitat due to climate change.

The following is 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.

The preferred habitat requirements for Squirrel Glider in the site include the native vegetation patch in the southwest corner and the hollow-bearing trees within this patch. This species has been previously recorded in the southwest vegetation patch.

The proposed works is not expected to directly impact on any preferred habitat for Squirrel Glider in the site. This includes hollow-bearing trees which this species uses for refuge and breeding purposes. There will also remain a buffer for this patch in the form of an APZ. Therefore, breeding and foraging habitat will remain intact, so the local population of this species will not be placed at risk of extinction. See mitigation measures listed in Section 8 for tree and habitat protection during pre-construction, construction, and operation phases.

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

Not applicable.

(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.

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

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

The Squirrel Glider would use the woodland habitat in the southwest of the site for foraging purposes and the recorded hollows for refuge and breeding purposes. This habitat will not be impacted by the proposed activity. Squirrel Gliders use isolated trees and patches of trees to move across the landscape to access other preferred habitat patches in fragmented landscapes. The proposed works will involve the removal of isolated trees on the site, however there are more suitable options for movement of Squirrel Glider across the landscape in the vegetation patches and isolated trees adjacent to the site, close to the southwest patch. Therefore, the extent to which habitat is likely to be removed or modified due to the activity is minimal.

(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, and

The suitable habitat for Squirrel Glider in the southwest patch will not be impacted, nor will adjacent connecting habitat. Therefore, the habitat for the Squirrel Glider is not likely to become fragmented or isolated due to the proposed activity.

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

No important habitat for Squirrel Glider will be removed, modified, fragmented or isolated, therefore the survival of Squirrel Glider in the local community will not be negatively impacted.

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 areas of outstanding biodiversity value are declared for threatened species or communities within the site.

e) The proposed development or activity is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

The key threatening processes listed under schedule 4 of the BC Act that may apply to the proposed works for threatened microbats are “Removal of dead wood and dead trees”, “Loss of hollow-bearing trees” and “Clearing of native vegetation”.

The proposed activity requires the clearing of some native vegetation and possibly dead wood and dead trees. However, the native vegetation removal will be in the form of isolated tree removal and vegetation that is not considered suitable for Squirrel Glider on the site.

Conclusion

The proposal is unlikely to have a significant impact on the threatened microbats given that:

- The preferred habitat patch including hollow-bearing trees in the southwest of the site will not be impacted due to the proposed works; and
- Mitigation measures for protection of fauna and habitat during the proposed works will be implemented.

On the basis of the above considerations, it is unlikely that the proposal would result in a significant impact on the survival of the Squirrel Glider. As such, a Species Impact Statement (SIS) is not required.

Grey-headed Flying-fox (*Pteropus poliocephalus*), Vulnerable (BC Act), Vulnerable (EPBC Act)

Species description

Grey-headed Flying-fox occurs in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths, and swamps as well as urban gardens and cultivated fruit crops. Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy. Individual camps may have tens of thousands of animals and are used for mating, and for giving birth and rearing young. Annual mating commences in January and conception occurs in April or May; a single young is born in October or November. Site fidelity to camps is high; some camps have been used for over a century. Can travel up to 50 km from the camp to forage; commuting distances are more often <20 km. Feed on the nectar and pollen of native trees, in particular Eucalyptus, Melaleuca and Banksia, and fruits of rainforest trees and vines. Also forage in cultivated gardens and fruit crops.

Threats to the Grey-headed Flying-fox include loss of roosting and foraging sites, electrocution on powerlines, entanglement in netting and on barbed-wire, heat stress, conflict with humans, incomplete knowledge of abundance and distribution across the species' range, and illegal shooting.

The following is 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.

The proposed works is not expected to directly impact on any preferred habitat for the Grey-headed Flying-fox (GHFF) in the site. There are no breeding roost camps on the site or nearby. The preferred habitat for GHFF in the site is the patch of woodland in the southern section of the site which the GHFF may use for foraging purposes, which will not be impacted by the proposed activities. There will also remain a buffer for this patch in the form of an APZ. There are a number of Silky Oaks that are proposed for removal that would likely provide foraging habitat for GHFF. However, this species is not local to Sydney, and there are numerous patches of native woodland and forest within the local area (including the southwest patch) that provide more suitable habitat for GHFF. Therefore, foraging habitat will remain intact, so the local population of this species will not be placed at risk of extinction. See mitigation measures listed in Section 8 for tree and habitat protection during pre-construction, construction, and operation phases.

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

Not applicable.

(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.

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

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

The GHFF would use the woodland habitat in the southwest of the site for foraging purposes. This habitat will not be impacted by the proposed activity. Therefore, the extent to which habitat is likely to be removed or modified due to the activity is minimal.

No impact on the species' habitat is expected in the long-term.

(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, and

No habitat fragmentation will result from the proposed activity because GHFF can continue to access other patches of suitable woodland habitat by moving aerially above the site.

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

No important habitat for GHFF will be removed, modified, fragmented or isolated, therefore the survival of the GHFF in the local community will not be negatively impacted.

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 areas of outstanding biodiversity value are declared for threatened species or communities within the site.

e) The proposed development or activity is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

The key threatening processes listed under schedule 4 of the BC Act that may apply to the proposed works for threatened microbats are “Removal of dead wood and dead trees”, “Loss of hollow-bearing trees” and “Clearing of native vegetation”.

The proposed activity requires the clearing of some native vegetation and possibly dead wood and dead trees. However, the native vegetation removal will be in the form of isolated tree removal and vegetation that is not considered important for GHFF on the site.

Conclusion

The proposal is unlikely to have a significant impact on the GHFF given that:

- The preferred habitat patch in the southwest of the site will not be impacted due to the proposed works; and
- Mitigation measures for protection of fauna and habitat during the proposed works will be implemented.

On the basis of the above considerations, it is unlikely that the proposal would result in a significant impact on the survival of the threatened microbats. As such, a Species Impact Statement (SIS) is not required.

Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions TEC, Endangered Ecological Community (BC Act)

Species description

This swamp community has an open to dense tree layer of eucalypts and paperbarks although some remnants now only have scattered trees as a result of partial clearing. The trees may exceed 25 m in height but can be considerably shorter in regrowth stands or under conditions of lower site quality where the tree stratum is low and dense. For example, stands dominated by *Melaleuca ericifolia* typically do not exceed 8 m in height. The community also includes some areas of fernland and tall reedland or sedgeland, where trees are very sparse or absent.

The most widespread and abundant dominant trees include *Eucalyptus robusta* (swamp mahogany), *Melaleuca quinquenervia* (paperbark) and, south from Sydney, *Eucalyptus botryoides* (bangalay) and *Eucalyptus longifolia* (Woolybutt). Other trees may be scattered throughout at low abundance or may be locally common at few sites, including *Callistemon salignus* (sweet willow bottlebrush), *Casuarina glauca* (swamp oak) and *Eucalyptus*

resinifera subsp. *hemilampra* (red mahogany), *Livistona australis* (cabbage palm) and *Lophostemon suaveolens* (swamp turpentine).

A layer of small trees may be present, including *Acacia irrorata* (green wattle), *Acmena smithii* (Lilly Pilly), *Elaeocarpus reticulatus* (blueberry ash), *Glochidion ferdinandi* (cheese tree), *Melaleuca linariifolia* and *M. styphelioides* (paperbarks).

Shrubs include *Acacia longifolia, Dodonaea triquetra, Ficus coronata, Leptospermum polygalifolium subsp. polygalifolium* and *Melaleuca* spp. Occasional vines include *Parsonsia straminea, Morinda jasminoides* and *Stephania japonica var. discolor*.

The groundcover is composed of abundant sedges, ferns, forbs, and grasses including *Gahnia clarkei, Pteridium esculentum, Hypolepis muelleri, Calochlaena dubia, Dianella caerulea, Viola hederacea, Lomandra longifolia, Entolasia marginata* and *Imperata cylindrica*.

On sites downslope of lithic substrates or with soils of clay-loam texture, species such as *Allocasuarina littoralis*, *Banksia oblongifolia*, *B. spinulosa, Ptilothrix deusta and Themeda australis*, may also be present in the understorey.

Characteristic species are listed in the final determination for this complex.

Associated with humic clay loams and sandy loams, on waterlogged or periodically inundated alluvial flats and drainage lines associated with coastal floodplains. Generally, occurs below 20 m (though sometimes up to 50 m) elevation. The composition of the community is primarily determined by the frequency and duration of waterlogging and the texture, salinity nutrient and moisture content of the soil, and latitude. The composition and structure of the understorey is influenced by grazing and fire history, changes to hydrology and soil salinity and other disturbance, and may have a substantial component of exotic grasses, vines and forbs.

This TEC was recorded as the southwest bushland patch on the site. The PCT was described as PCT 3995.

The following is 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:

Not applicable**.**

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

The proposed activity will not include the removal of any Swamp Sclerophyll Forest on Coastal Floodplains TEC (SSFCF) on the site. Further, there will be a buffer for the patch in the form of an APZ zone. Therefore, the proposed activity will not place the local occurrence of this TEC at risk of extinction.

(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,

The proposed activity will not include the removal of any Swamp Sclerophyll Forest on Coastal Floodplains TEC (SSFCF) on the site. Further, there will be a buffer for the patch in the form of an APZ zone. Therefore, the proposed activity will not modify the composition of this TEC such that the local occurrence of this TEC will not be at risk of extinction.

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

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

The proposed activity will not include the removal of any Swamp Sclerophyll Forest on Coastal Floodplains TEC (SSFCF) on the site. Further, there will be a buffer for the patch in the form of an APZ zone. Therefore, the proposed activity will not remove or modify habitat for this TEC.

No impact on the TEC habitat is expected from the proposed activity long-term.

(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, and

No habitat fragmentation will result from the proposed activity.

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

No habitat for SSFCF will be removed, modified, fragmented or isolated due to the proposed activity.

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 areas of outstanding biodiversity value are declared for threatened species or communities within the site.

e) The proposed development or activity is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

The key threatening processes listed under schedule 4 of the BC Act that may apply to the proposed works for threatened microbats are “Removal of dead wood and dead trees”, “Loss of hollow-bearing trees” and “Clearing of native vegetation”.

The proposed activity requires the clearing of some native vegetation and possibly dead wood and dead trees. However, the native vegetation removal will be in the form of isolated tree removal and vegetation that is not considered part of the southwest patch of SSFCF.

Conclusion

The proposal is unlikely to have a significant impact on the threatened microbats given that:

- The preferred habitat patch including hollow-bearing trees in the southwest of the site will not be impacted due to the proposed works; and
- Mitigation measures for protection of the patch of SSFCF during the proposed works will be implemented.

On the basis of the above considerations, it is unlikely that the proposal would result in a significant impact on the survival of SSFCF in the site, or the local area. As such, a Species Impact Statement (SIS) is not required.

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APPENDIX C
BAT SURVEY

Impact Ecology

ABN: 92895504799

BAT CALL ANALYSIS

2 November 2024

Client: WaterTech

Location: Medowie School subdivision site

Vegetation Type: PCT 3995 – Hunter Coast Paperbark-Swamp Mahogany Forest

Reporting standard

This report follows the nationally accepted standards for the interpretation and reporting of bat echolocation data (Reardon 2003). More recent versions these reporting standards are available from the Australasian Bat Society on-line at www.ausbats.org.au. Calls were analysed by Heidi Kolkert using Analook V4.2 bat call analysis software, Kaleidoscope and / or Audacity sound analysis software.

Methods for species identification

Echolocating bats produce a wide range of sounds (in the form of pulses) that can be viewed on a spectrogram. These different shaped pulses can be broken down into standard components such for comparison (Pennay et al. 2004). Some echolocating bat species have distinctive echolocation calls that are unlikely to be confused with those of other species. Other bat species overlap in both call frequency and structure making identification difficult. Poor quality calls confound the issues of identifying species with similar call frequencies. Call identification was based on existing call descriptions and keys presented in Pennay *et al*. (2004) as well as reference calls collected in New South Wales. Species' identification was further refined by considering probability of occurrence based on distributional information presented in Churchill (2008) and Van Dyck & Strahan (2008) and spatial data stored on the NSW Bionet and Atlas of Living Australia (ALA 2024) and BatMap (Australasian Bat Society 2024). Species names used in this summary follow Churchill (2008), except for Ozimops species, which follow Reardon *et al*. (2014).

Results

Five species of insectivorous bat were positively recorded during the survey period (Table 1), including: *Miniopterus Australis* (Little Bentwing Bat) and *Micronomus norfolkensis* (Eastern Freetail Bat), both listed under the *Biodiversity Conservation Act* 2016. An additional call profile was possibly identified as *Saccolaimus flaviventris* (also listed under the BC Act), however positive identification could be made due to the low quality of the call with < three pulses.

Two passes were positively identified as *Miniopterus australis* (Little Bentwing Bat). This bat usually forages for small insects beneath the canopy in densely vegetated habitats, hence the study area may provide foraging habitat. It is unlikely that the Little Bentwing Bat roosts in the study area as it typically forms large maternity colonies at this time of year in caves with other roost sites being tunnels, tree hollows, abandoned mines, stormwater drains, culverts, bridges and less-frequently buildings. The nearby Tilligerry State Conservation Area is known habitat for *Miniopterus australis*.

Table 1: Bat species recorded in the study area.

Scientific name	Common name	15/11/2024	16/11/2024	17/11/2024
Austronomus australis	White-striped Freetail-bat		x	x
Chalinolobus gouldi	Gould's Wattled Bat	x	x	x
Ozimops ridei	Ride's Free-tailed Bat	x	x	x
Micronomus norfolkensis #	Eastern Freetail Bat			1
Miniopterus australis #	Little Bentwing Bat			2
Saccolaimus flaviventris #	Yellow-bellied Sheathtail-bat		1P	

\# Species listed under the Biodiversity Conservation Act 2016
P Probable record
X Positively identified

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Reardon, T. (2003). Standards in bat detector-based surveys. Australasian Bat Society Newsletter 20, 41-43.

Reardon T. B., McKenzie N. L., Cooper S. J. B., Appleton B., Carthew S. & Adams M. (2014) A molecular and morphological investigation of species boundaries and phylogenetic relationships in Australian free-tailed bats Mormopterus (Chiroptera: Molossidae). Australian Journal of Zoology 62, 109-36.

Reinhold, L., Law, B., Ford, G. and Pennay, M. (2001). Key to the bat calls of south-east Queensland and north-east New South Wales. Department of Natural Resources and Mines, Brisbane.

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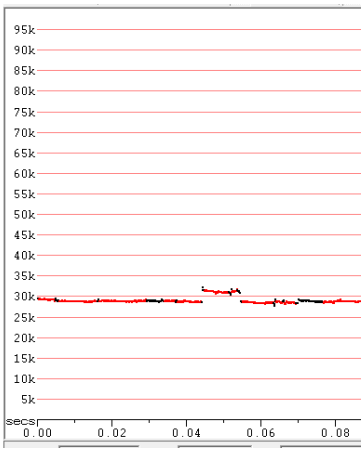
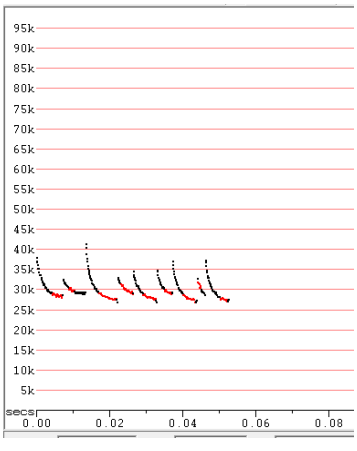
Impact Ecology

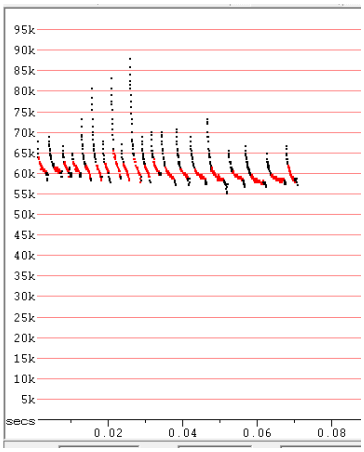
Example calls



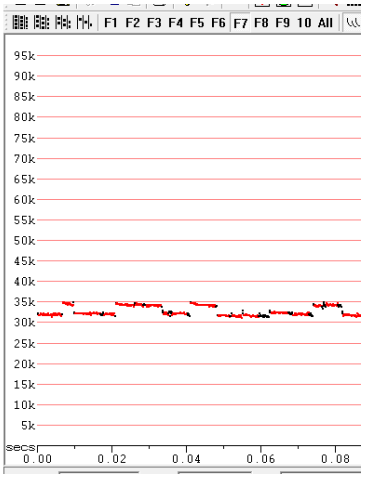
Ozimops ridei



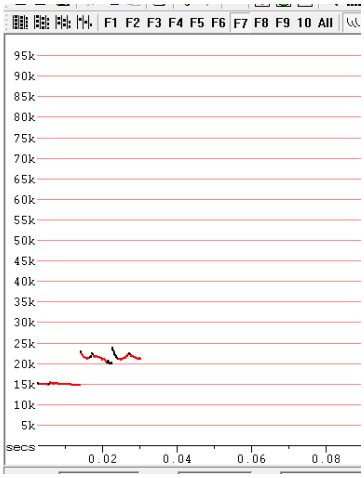
Chalinolobus gouldii



Miniopterus australis



Micronomus norfolkensis



Possible Saccolaimus flaviventris

APPENDIX D
KOALA PLAN OF MANAGEMENT

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WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

Report

Koala Plan of Management for New High School for Medowie

Department of Education (DoE)

30 January 2025

Document Status

Version	Doc type	Reviewed by	Approved by	Date issued
1.0	Draft	Dr Cameron Radford	Dr Michael Aberton	16/12/2024
2.0	Final	Dr Cameron Radford	Dr Michael Aberton	22/01/2025
3.0	Final	Dr Michael Aberton	Dr Michael Aberton	30/01/2025

Project Details

Project Name	Koala Plan of Management for New High School for Medowie
Client	Department of Education (DoE)
Client Project Manager	Tia Cutrupi
Water Technology Project Manager	Caroline Khoo
Water Technology Project Director	Dr Michael Aberton
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Document Number	23050100_R03V03_Koala Plan of Management Medowie HS

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ACKNOWLEDGEMENT OF COUNTRY

The Board and employees of Water Technology acknowledge and respect the Aboriginal and Torres Strait Islander Peoples as the Traditional Custodians of Country throughout Australia. We specifically acknowledge the Traditional Custodians of the land on which our offices reside and where we undertake our work.

We respect the knowledge, skills and lived experiences of Aboriginal and Torres Strait Islander Peoples, who we continue to learn from and collaborate with. We also extend our respect to all First Nations Peoples, their cultures and to their Elders, past and present.

Artwork by Maurice Goolagong 2023. This piece was commissioned by Water Technology and visualises the important connections we have to water, and the cultural significance of journeys taken by traditional custodians of our land to meeting places, where communities connect with each other around waterways.

The symbolism in the artwork includes:

- *Seven circles representing each of the States and Territories in Australia where we do our work*
- *Blue dots between each circle representing the waterways that connect us*
- *The animals that rely on healthy waterways for their home*
- *Black and white dots representing all the different communities that we visit in our work*
- *Hands that are for the people we help on our journey*

CONTENTS

APPENDICES

LIST OF FIGURES

LIST OF TABLES

1 INTRODUCTION

This Koala Plan of Management has been prepared to support a Review of Environmental Factors (REF) for the proposed New High School for Medowie (the activity). The purpose of the REF is to assess the potential environmental impacts of the activity prescribed by State Environmental Planning Policy (Transport and Infrastructure) 2021 (T&I SEPP) as "development permitted without consent" on land carried out by or on behalf of a public authority under Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). This document has been prepared in accordance with the Guidelines for Division 5.1 assessments under the EP&A Act.

The activity is to be undertaken pursuant to Chapter 3, Part 3.4, Section 3.37A of the T&I SEPP.

The activity will be carried out at 6 Abundance Road, Medowie (the site). The purpose of this report is to fulfill the requirements under the Port Stephens CKPoM and support the planning pathways process.

1.1 Assessment context

The NSW Department of Education (DoE) is proposing to construct a new high school at 6 Abundance Road, Medowie NSW 2318. The site is 6.51ha in area, and comprises 1 allotment, legally described as Lot 3 in DP788451 in Port Stephens Local Government Area (LGA). As such, the activity is subject to the requirements of Port Stephens Local Environment Plan 2013 (LEP) and other local legislation and policies. The lot is zoned RU2 – Rural Landscape under the Port Stephens LEP.

Port Stephens Council developed a Comprehensive Koala Plan of Management (CKPoM) in the 1990's to identify koala habitat across the LGA and identify threats to the local koala population in order to enhance the koala conservation within the LGA (Port Stephens Council, 2002). The CKPoM was endorsed in 2001 and has helped manage community development within the LGA in relation to koala conservation efforts.

The Koala Habitat Map forms part of the CKPoM and identifies areas of preferred koala habitat and buffer areas, supplementary and marginal koala habitat, and habitat linking areas. Based on the mapping of the site, different sets of requirements are placed on the development and reporting, as specified in the CKPoM. This will be covered in the following section. The proposed site has mapped Preferred Koala Habitat as well as habitat buffer areas and habitat linking areas. Therefore, further assessments are required by the CKPoM for any proposed activities on the site.

Water Technology has been requested by DoE to prepare a Koala Plan of Management (KPoM) to fulfill the requirements under the Port Stephens CKPoM and support the planning pathways process.

1.2 Site Description

A large proportion of the site is currently unused and vacant. A small shed structure and caravan are located adjacent to the northern boundary. A cluster of buildings including a single storey dwelling, an outhouse/shed structure and temporary greenhouse are located within the south eastern corner.

The site contains a largely vegetated area to the south west corner. The site is relatively flat with a gradual fall from west to east toward Abundance Road.

The site has a primary frontage to Abundance Road to the east and Ferodale Road to the north. Abundance Road and Ferodale Road are both classified Local Roads. Medowie Road, approximately 1km east of the site, is a classified Regional Road.

The area surrounding the site mostly consists of industrial, rural residential, educational, and agricultural lands. Adjacent to the north western boundary is a Shell petrol station and mechanic garage. Adjacent to the north eastern boundary is a medical health clinic. Across Abundance Road along the eastern boundary are a number

of warehouse and light industrial developments. Directly north of the site across Ferodale Road are large lots used for agricultural purposes. Medowie Public School is located on Ferodale Road, to the north west of the site, opposite the Shell petrol station.

The site in the landscape context is shown in Figure 1-1.

Figure 1-1 Project site

1.3 Project description

The proposed activity involves the construction of school facilities on the site for the purpose of the New High School for Medowie. Several sites have been assessed for their suitability and this site was the preferred location.

The site contains a densely vegetated area to the southwest corner which is identified as land with high biodiversity values corresponding to the areas of remnant native vegetation (PCT 3995 – Hunter Coast Paperbark-Swamp Mahogany Forest). The existing dwelling house and other structures on the site will be demolished as part of the works. No other works are proposed within this area. The proposed new school will accommodate 640 students in 29 permanent teaching spaces including 3 support teaching spaces across 3-storeys of buildings on the site. The proposed activity be delivered across 1 stage, and will consist of the following:

- 29 permanent teaching spaces including 3 support teaching spaces, to accommodate 640 students, and school hall to accommodate 1,000 students. Approximately 10,500 sqm of GFA is proposed.
- Main vehicular ingress and egress to Ferodale Road to the north, with a new pedestrian and vehicle crossing proposed.
- Main pedestrian access to Abundance Road.
- Kiss and ride, and bus drop and pick up areas to Abundance Road (6 x parallel spaces).
- New pedestrian wombat crossing to Abundance Road
- Approximately 55 x car parking spaces and 3 x accessible car parking spaces. • Approximately 70 x bicycle parking spaces.
- Block A (Admin) consisting of administration and learning spaces.
- Block B (Foodtech/Workshop) consisting of food technology rooms and workshops.
- Block C (Hall) consisting of school hall to accommodate 1,000 students.
- Central quad, 1 playing field, and 1 sports courtyard.

The proposed school development will include the following spaces; general learning spaces, General support learning spaces, administrative services, staff areas, gym and canteen, library areas for science, wood and metal, food and textiles, health PE, performing arts, additional learning spaces, student amenities, storage, movement (stairs and covered walkways). Refer to Figure 1-2 for plan draft.

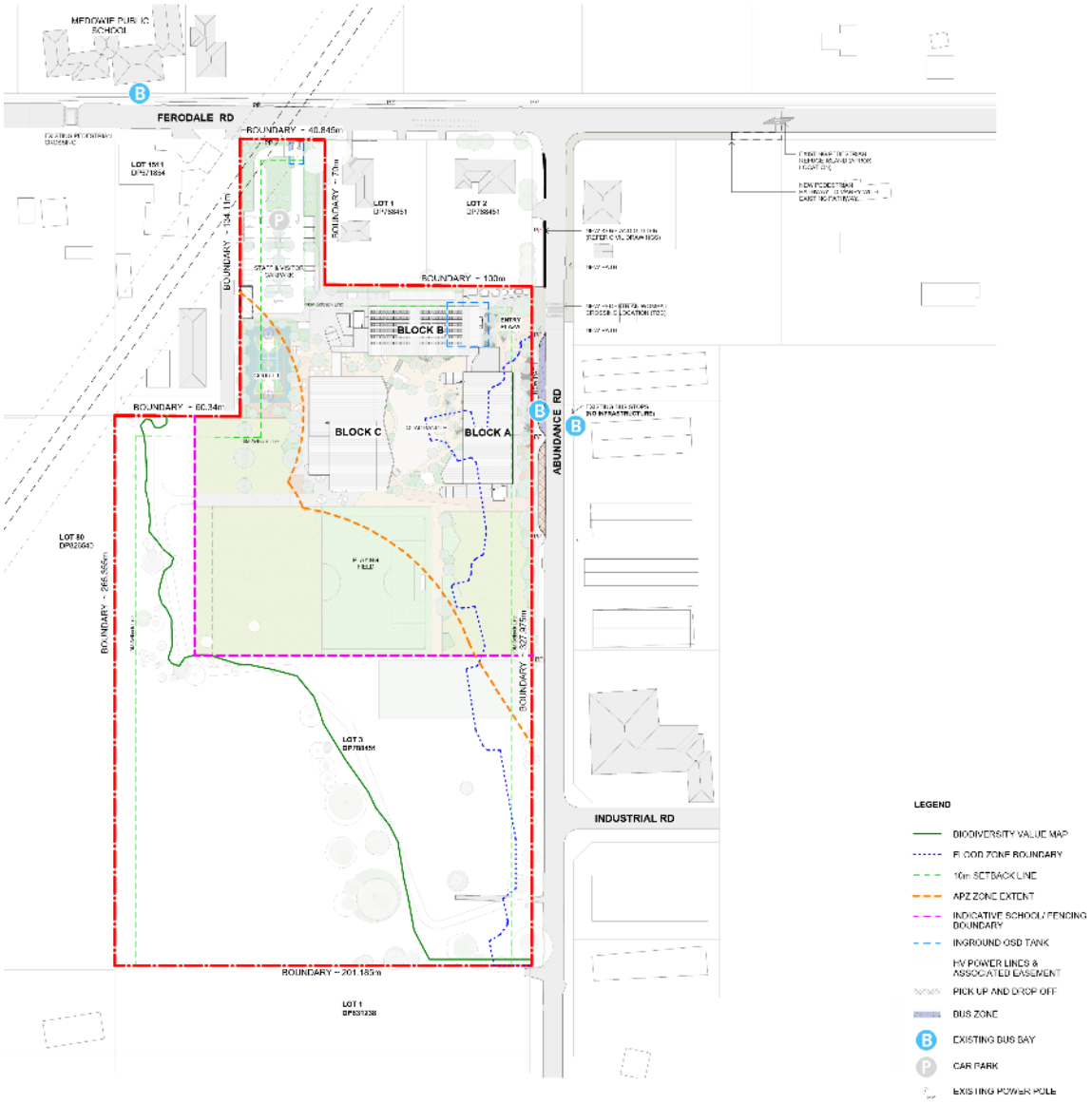

Figure 1-2 Proposed development footprint

2 BACKGROUND

2.1 Port Stephens Comprehensive Koala Plan of Management (CKPoM)

This KPoM has been prepared in line with the requirements under the Port Stephens CKPoM, which is consistent with the National Koala Strategy (ANZECC 1998). At the time of endorsement, the State Environmental Planning Policy No. 44 - Koala Habitat Protection (SEPP 44) was in effect, but has now been replaced by Chapter 3 “Koala habitat protection 2020” and Chapter 4 “Koala habitat protection 2021” under the Biodiversity and Conservation SEPP 2021.

The main objectives of the CKPoM which are most relevant to this KPoM include identifying priority conservation areas to protect significant habitat and populations, devising effective conservation strategies, restoring degraded habitat and increasing public awareness.

In relation to development proposals, the CKPoM aims to:

- Ensure that adequate detail is provided with Development Applications in order to assess, minimise and ameliorate likely impacts on koala habitat; and
- Provide guidelines and development standards to protect koalas and koala habitat.

2.2 Performance Criteria

For the abovementioned purpose, a set of performance criteria have been developed against which all relevant activities need to be assessed to fulfill the legislative requirements, both state and local. These performance criteria form an important means to regulate development so that koala habitat can be protected and effectively managed.

The general aims and objectives of these performance criteria are as follows:

a. To ensure that the koala population in the Port Stephens LGA is sustainable over the long-term.

b. To protect koala habitat areas from any development which would compromise habitat quality or integrity.

c. To ensure that any development within or adjacent to koala habitat areas occurs in an environmentally sensitive manner.

d. To ensure that acceptable levels of investigation are undertaken, considered and accepted prior to any development in or adjacent to koala habitat areas.

e. To encourage koala habitat rehabilitation and restoration.

f. Maintain interconnection between areas of Preferred and Supplementary Koala Habitat and minimise threats to safe koala movements between such areas.

g. To ensure that development does not further fragment habitat areas either through the removal of habitat or habitat links or through the imposition of significant threats to koalas.

h. To provide guidelines and standards to minimise impacts on koalas during and after development, including any monitoring requirements.

i. To provide readily understandable advice to proponents preparing development applications and for Council officers involved in the assessment of those applications.

All Development Applications in the Port Stephens LGA must demonstrate that they are consistent with the above objectives.

These performance criteria are also the most suitable for other development types such as the proposed activity assessed under this REF.

2.3 Site Context

Port Stephens has long since been an LGA where koala conservation and the importance of koala habitat preservation has been emphasised. The proposed site is located within the Port Stephens Area of Regional Koala Significance (ARKS) and is also within a Priority Population for the NSW Koala Strategy 2021-2026.

Koala sightings in the area have been recorded on Bionet since pre-1960, and a comprehensive map showing all nearby verified records is included in Appendix A. Colour coding is used to indicate the year of the sighting as per the map legend. Most of the sightings near the site are between 1975 and 1995. The records on or in very close proximity to the site are dated 1989 and 1991. There is one record from 2023 within 100m of the site.

Based on the Port Stephens CKPoM Koala Habitat Map the subject site contains three categories of koala habitat (Figure 2-1):

- Preferred Koala Habitat (full blue);
- Preferred Koala Habitat Buffer Over Cleared Land (blue hashed over yellow); and
- Preferred Koala Habitat Link over Cleared Land (blue stripes over yellow).

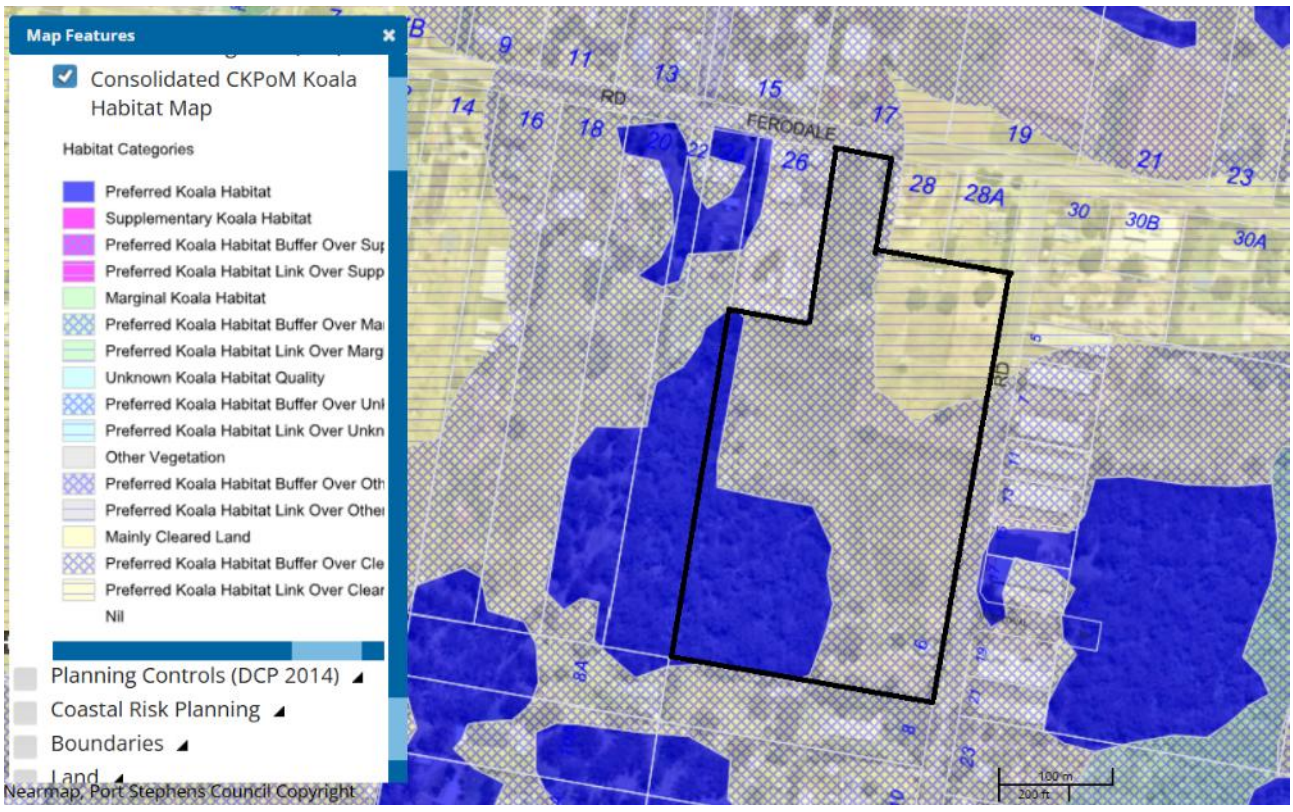

Figure 2-1 Port Stephens Koala Habitat Map

Figure 2-2 shows the proposed development in relation to the mapped koala habitat using the same symbology as above.

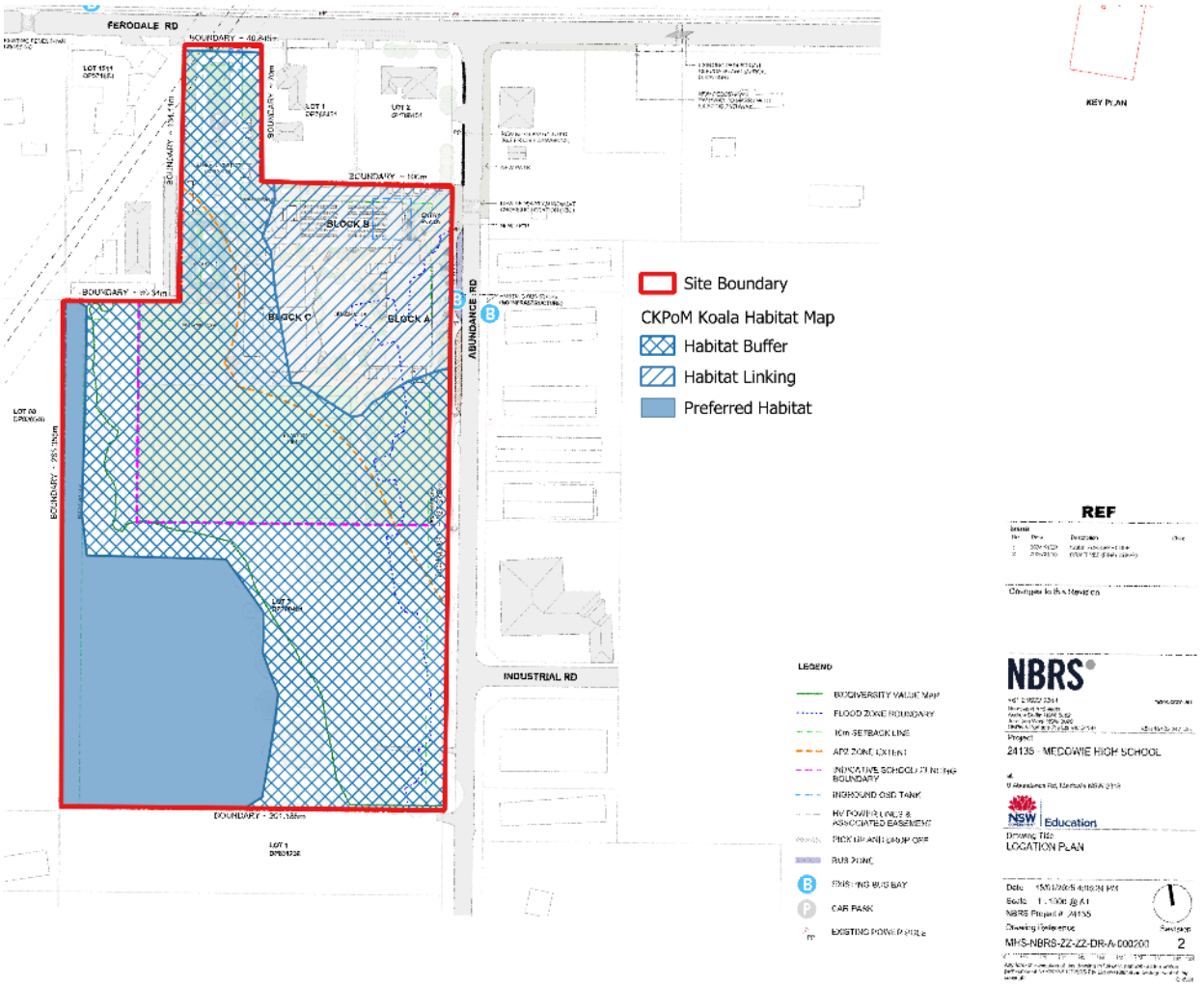

Figure 2-2 Development footprint overlaid with the Port Stephens CKPoM Koala Habitat Map

The performance criteria for development assessments apply to all habitat categories mapped on the site, with the highest level of protection afforded to preferred koala habitat and its buffer. Habitat linking areas have a lower level of restrictions than the other two koala habitat categories. Preferred koala food trees require protection wherever they occur in the Port Stephens LGA.

3 METHODOLOGY

3.1 Assessment under the CKPoM

The methodology for this KPoM follows the requirements and guidelines outlined in the Port Stephens CKPoM and its appendices.

Guidelines for Koala Habitat Assessments are included in Appendix 6 of the Port Stephens CKPoM, and a diagram outlining the process is displayed in Appendix B of this report. The steps for koala habitat assessment in order are as follows:

1. Preliminary Assessment;
2. Vegetation Mapping;
3. Koala Habitat Identification; and
4. Assessment of the proposal.

In line with the requirements of the guidelines, the assessment was carried out by two persons with qualifications and experience in tree species identification and qualifications and experience in biological science and fauna survey and management, including koala surveys. Brief CVs outlining each assessors' relevant experience is outlined in Appendix C.

Step 1, the preliminary assessment, includes a review of the Port Stephens Koala Habitat Map and a site visit to ascertain the presence or absence of preferred koala feed tree species. If the site contains any koala habitat mapping afforded the highest level of protection, or koala feed tree species, the assessment continues to step 2. Preferred koala food trees require protection wherever they occur in the Port Stephens LGA.

Step 2 of the process includes mapping of the vegetation using standardised quadrat or transect methods, and displaying the results on an A3 map. For this survey BAM plots were used as a standardised floristic survey method. The vegetation map shows the distribution of vegetation associations for the site plus a 100m area around the site. In addition to the vegetation mapping, a survey of any signs of koalas using the site as habitat was undertaken. This included a search for koala scats and scratch marks on trees within the vegetation patch and in the paddock.

In step 3, the vegetation map is then compared to the LGA-wide Vegetation Map to identify any discrepancies. Based on the outcome, either step 3a (LGA-wide Vegetation Map is not accurate) or step 3b (LGA-wide Vegetation Map is accurate) is implemented.

The final step (4) then assesses the appropriateness of the proposal based on information from the previous steps. This includes an assessment of the proposal against the performance criteria for development applications, and a map showing the proposed development in relation to the koala habitat map. If the applicant requests provisions a), b) or c) of the criteria (see Table 4-1) be waived, a koala habitat utilisation assessment needs to be undertaken. No provision waiving has been requested for this project, but a brief koala utilisation survey was undertaken using the Spot Assessment Technique (SAT), nonetheless.

The outcome of the assessment steps 1-4 is detailed in Section 4.

3.2 Information to Accompany Development Applications/REFs

As previously mentioned, the DA assessment process for koala habitat is the most appropriate method to use for the purpose of this REF approval. Table 3-1 details the adherence to the information requirements as detailed in the Port Stephens CKPoM.

Table 3-1 Information requirements

Information requirement	Inclusion in this KPoM
Sites containing Preferred or Supplementary Habitat, Habitat Buffers or Habitat Linking Areas	
1. An assessment of koala habitat, by a suitably qualified person, in accordance with the Guidelines for Koala Habitat Assessment.	See CVs attached in Appendix C.
2. Clear details concerning which vegetation is to be cleared or disturbed and that which is to be retained.	An Arboricultural Impact Assessment report including the finalised tree removal plans for the works (Assurance Trees, 2025) was reviewed as part of this assessment. See Figure 3-1 for reference to tree removal plans. For full list of tree species with figure reference see the Arboricultural Impact Assessment for the project. 40 trees and shrubs will be removed, of which 25 are weed species (predominantly African Olive *Olea europaea*). Groundcover mainly consisting of exotic paddock grasses will also be removed. Five native Silky Oaks (*Grevillea robusta*), three Sydney Peppermint (*E. piperita)*, one White Cedar (*Melia azedarach*) and some Native Daphnes (*Pittosporum undulatum*) and Cheese Trees (*Glochidion fernandii*) would also likely be removed. None of the trees proposed for removal are preferred koala feed tree species under the Port Stephens CKPoM, but that can be used as habitat or potentially secondary fee trees. The removal of these trees outside of the vegetation patch on site, and the majority of them being exotic species, is not expected to significantly impact on available koala habitat on site. However, a principle of minimal native tree removal should be adopted to benefit koalas on and near the new school site.

Information requirement	Inclusion in this KPoM
3. Details of any proposed building envelopes and fire fuel reduction zones and the means by which they are to be enforced.	Refer to Figure 2-2 for site plans. An APZ of 40-79m will be kept around the proposed development footprint and would stop at the forested zone. Therefore, no tree clearing is expected within the vegetation patch in the southwest corner of the site (preferred koala habitat). The APZ will also exclude those trees mapped as extended habitat in Appendix D discussed in Section 4.2 below. A separate bushfire assessment report has been prepared, refer to this report for further details on the APZ and bushfire protection measures. A Native Vegetation Management Plan (NVMP) has been prepared for the site (Water Technology, 2025). The NVMP contains suitable bushfire risk mitigation measures from a biodiversity preservation and enhancement perspective.
4. Proposed measures to restore or rehabilitate koala habitat, including measures which will result in the net gain of koala habitat.	A Native Vegetation Management Plan (NVMP) has been prepared for the site. The NVMP will enhance the native bush vegetation on site and thus help improve the koala habitat (including koala food trees). Further measures for koala conservation and koala habitat improvement are included in Section 5.
5. Proposed measures to allow the safe movement of koalas across the site including road designs and speed mediation measures, fence construction details where fencing is proposed, and swimming pool specifications.	As relevant, the fencing requirements for the site are detailed in Section 5.
6. Proposed measures to mitigate the impacts on koalas by dogs.	N/A. The proposal will not increase the negative impacts from dogs on koalas.
7. Details of any proposed program to monitor koalas and koala habitat, during and following development activity on a site. Monitoring programs would not be required for single lot developments. Rather, they would be expected for subdivisions.	N/A. The proposed activity is not a subdivision. The measures in Section 5 propose inclusion of koala education with potential monitoring as part of the school program.
Sites adjacent to Preferred or Supplementary Habitat, Habitat Buffers or Habitat Linking Areas	
8. Proposed measures to mitigate the impacts by dogs on koalas which occupy adjacent habitat. This must include measures (such as education of dog owners, appropriate signs, or restrictions on dog ownership) that reduce the likelihood of domestic dogs straying into koala habitat.	N/A, the school site will not have residing dogs. Mitigation measures about educating residents about threats of dogs on koalas are included in Section 5.

Information requirement	Inclusion in this KPoM
9. Proposed measures to mitigate the impact on koalas of motor vehicles travelling to the site. This must include appropriate traffic control measures on roads which run through or adjacent to nearby koala habitat and which are subject to increased traffic volumes due to the development on the site.	The development of a school on the site is expected to significantly increase the traffic on and around the site at certain times of day. Measures to mitigate impacts from increased traffic on surrounding streets are detailed in Section 5.

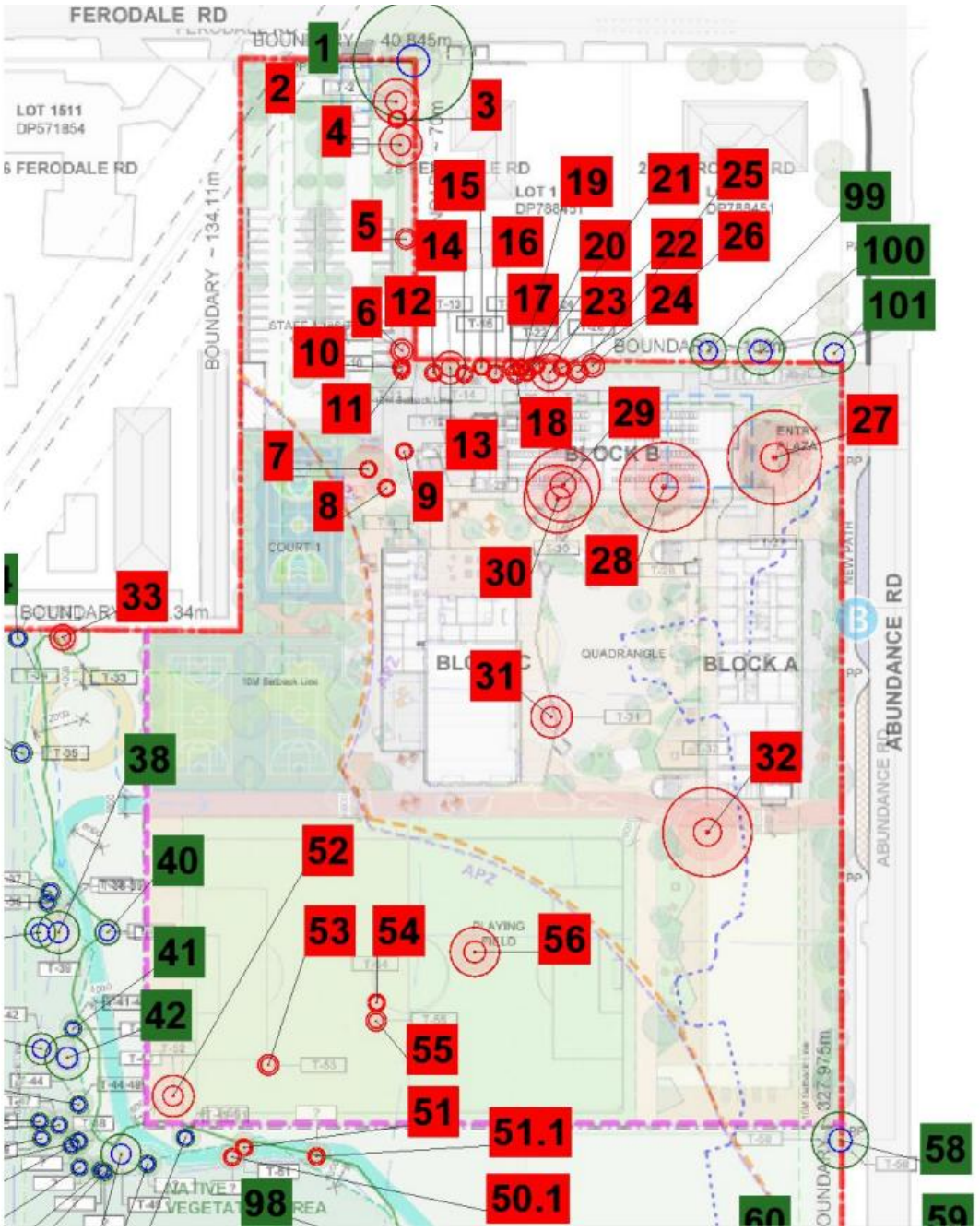

Figure 3-1 Tree removal plan. Figure courtesy Assurance Tree (2025).

4 RESULTS

4.1 Step 1: Preliminary Assessment

The koala habitat mapping of the site is shown in Figure 2-1. The site contains preferred koala habitat, as well as buffer areas and habitat linking areas. The proposed activity would be located within the buffer and linking areas, and the preferred koala habitat area would not be disturbed according to the final plans.

A site survey for this KPoM was undertaken on 15-16 October to ascertain the extent of suitable koala habitat on the site, and to identify any additional preferred koala food trees (Swamp Mahogany *Eucalyptus robusta,* Parramatta Red Gum *Eucalyptus parramattensis* and Forest Red Gum *Eucalyptus tereticornis*) and potentially important koala tree species (Port Stephens CKPoM, Appendix 8) outside the mapped extent of the preferred koala habitat. These trees require protection during the proposed activity.

The extent of the mapped preferred koala habitat was found to reflect the extent of the native vegetation patch in the southwest corner of the site accurately, with a few extensions proposed (see Section 4.2). No preferred koala food trees were identified outside the extent of the mapped koala habitat, however a number of potentially important koala tree species were identified as shown in Figure 4-1. The tree species in Figure 4-1 include Sydney Peppermint (*Eucalyptus piperita*) and Blackbutt (*Eucalyptus pilularis*).

Three Sydney Peppermints are marked for removal, all small trees below 15cm diameter at breast height. The removal of these three trees would not cause any significant impact on available koala habitat in the area. Due to their small size these trees were not mapped as potential feed trees in this assessment (Figure 4-1).

The location of the driveway on the southern section will remain in the same location as previously and will not require further removal of potential koala feed trees.

Based on the arborist report (Assurance Trees, 2025) all of the trees mapped in Figure 4-1 are marked for retention. Crosschecking with the civil plans is also required to ensure that the proposed stormwater pipes do not encroach on the TPZ of these trees.

Figure 4-1 Individual important koala trees outside Preferred Koala Habitat

4.2 Step 2: Vegetation Mapping

A vegetation map for the site is provided in Appendix D. This map shows the distribution of vegetation across the site as well a areas of existing vegetation extending outside the mapped vegetation (koala habitat extension).

The vegetation map includes the PCT mapping surrounding the site, and the extended CKPoM Koala Habitat Mapping is shown in Figure 2-1. The field survey did not include any surveys of the neighbouring sites as they were private residential properties.

To produce the map, a combination of PCT mapping, satellite imagery and ground-truthing was used. The ground-truthing included verification of vegetation boundaries as well as flora surveys across the site. The detailed flora surveys were focused on the proposed development footprint (paddock area), which does not extend into the mapped preferred koala habitat. This patch was surveyed through a random walkthrough of the area to cover as much of the site as reasonably feasible, while recording the characteristics of the patch. All individual trees within the proposed development footprint were assessed.

Full floristic surveys in the form of BAM plots were undertaken in three (3) locations across the site, and eight (8) 1x1m vegetation survey quadrats within the development footprint were surveyed in detail to assess the vegetation losses.

The search for koala scats and scratch marks on trees found no sign of koalas using the site. However, a precautionary principle should be implemented and presence or habitat usage assumed unless proven otherwise. Koalas have previously been recorded on and near the sight, and despite a large number of the records being 30 years old it shows that koalas have previously used the habitat on site.

4.3 Step 3: Koala Habitat Identification

In step 3 the Koala Habitat Map was compared to the vegetation mapping for the area. No LEP mapping or other LGA-wide vegetation mapping was found, and so the NSW state-wide PCT mapping was used alongside satellite imagery. No major discrepancies were noted and so step 3b (LGA-wide vegetation map is accurate) was implemented.

A few areas have been suggested as an expansion on the vegetation map in Appendix D.

The tree species within the area of preferred koala habitat was dominated by important koala tree species and preferred koala feed trees, with a few additional tree species characteristic of the mapped Plant Community Type. In accordance with the CKPoM, a site-specific map showing the location of individual koala trees outside the preferred koala habitat was also produced (see Figure 4-1).

4.4 Step 4: Assessment of Proposal Against Performance Criteria

In step 4 the appropriateness of the proposal was assessed. The following criteria (a-h) apply to all developments (excluding development applications proposing agricultural activities) proposed on sites that contain or are adjacent to Preferred or Supplementary Habitat, Habitat Buffers or Habitat Linking Areas.

As shown in Figure 2-2 the entire development will be outside the preferred koala habitat on site. Some sport fields and small sections of the buildings will be within koala habitat buffer area, while the main portion of the buildings will be within habitat linking area. The area of the proposed development footprint is currently predominantly cleared land with exotic dominant vegetation and is used as horse paddocks.

Table 4-1 Performance Criteria

Performance criteria	Assessment response
a. Minimise the removal or degradation of native vegetation within Preferred Koala Habitat or Habitat Buffers	None of the preferred koala habitat will be disturbed by the works, and no native vegetation removal will be undertaken within this area. The proposed building footprint has been placed in the cleared paddock area mapped as koala habitat buffer and koala habitat linking area. The vegetation in this area mainly consists of exotic paddock grasses and weeds, with a few native and exotic paddock trees. The only native trees present within the building footprint, and planned for removal, are five Silky Oaks and one White Cedar, as well as some large Native Daphne shrubs. This vegetation is not identified as koala food tree species, and the removal of these trees is not expected to have a significant impact on koala habitat availability. While paddock trees are important to allow koalas to move between habitats, the distance for koalas to cover is not significant (100-200m) and there are plenty of trees nearby such as street trees and other adjacent vegetation patches that can be used and provide better quality habitat. The placement of the building footprint, including an indicative APZ, appears to be such that the tree removal is minimised. Additionally, the APZ will serve as a construction free buffer around the vegetation patch mapped as preferred koala habitat, further increasing the vegetation protection.
b. Maximise retention and minimise degradation of native vegetation within Supplementary Koala Habitat and Habitat Linking Areas	As described above, it appears that the building footprint has been placed so that any native vegetation removal for the proposed works is minimised. The vegetation in the section mapped as koala habitat linking area was in poor condition with high grazing pressure and weed recruitment across the site. Native flora species diversity was low in this area. No preferred or important koala food tree species are proposed for removal. The site has no mapped supplementary koala habitat.

Performance criteria	Assessment response
c. Minimise the removal of any individuals of preferred koala food trees, wherever they occur on a development site. In the Port Stephens LGA these tree species are Swamp Mahogany (*Eucalyptus robusta*), Parramatta Red Gum (*Eucalyptus parramattensis*), and Forest Red Gum (*Eucalyptus tereticornis*), and hybrids of any of these species. An additional list of tree species that may be important to koalas based on anecdotal evidence is included in Appendix 8 of the CKPoM.	The proposal does not include the removal of any preferred koala food tree species. Furthermore, no trees listed in Appendix 8 (Tree species that may be important to koalas) of the Port Stephens CKPoM are expected to be impacted by the works. Some preferred feed trees occur as street trees along Abundance Road, however these have not been proposed for removal. The vast majority of preferred koala feed trees are located in the vegetation patch in the southeast corner of the lot (preferred koala habitat) and scattered along the boundary of the lot, and around the southern side of the site. Impact within these areas should be avoided as it may trigger further assessment requirements.
d. Make provision, where appropriate, for restoration or rehabilitation of areas identified as Koala Habitat including Habitat Buffers and Habitat Linking Areas over Mainly Cleared Land. In instances where Council approves the removal of koala habitat (in accordance with dot points 1-4 of the above waive clause), and where circumstances permit, this is to include measures which result in a “net gain” of koala habitat on the site and/or adjacent land	The NVMP outlines all vegetation management practices to be undertaken to restore and rehabilitate the area. See Section 5 for further details regarding the recommendations.
e. Make provision for long term management and protection of koala habitat including both existing and restored habitat	The NVMP outlines the vegetation management practices to be undertaken on the site for the long term management of native vegetation on site. See Section 5 for further details regarding the recommendations.

Performance criteria	Assessment response
f. Not compromise the potential for safe movement of koalas across the site. This should include maximising tree retention generally and minimising the likelihood that the proposal would result in the creation of barriers to koala movement, such as would be imposed by certain types of fencing. The preferred option for minimising restrictions to safe koala movement is that there be no fencing (of a sort that would preclude koalas) associated with dog free developments within or adjacent to Preferred or Supplementary Koala Habitat, Habitat Buffers or Habitat Linking Areas. Suitable fencing for such areas could include:	While no mapping of koala corridors or koala movement within the local area exists, the most likely movement corridors have been assessed by analysing the koala habitat mapping (Figure 4-2) and the vegetation (Figure 4-3) within the local area. The site is located within a semi-rural landscape with scattered vegetation patches which largely correspond to the mapped preferred koala habitat. These areas are likely the preferred corridors for movement. In general, the area within the development footprint itself is expected to have a lower frequency of koala usage, but may still be used for koalas to move between habitat patches. The proposed activity will be located within koala linking habitat and may as such obstruct koala movement across part of the site. Koala movement in the southern half of the site will not be obstructed. Tree removal outside the footprint has been minimised, but some native trees within the footprint will require removal. The removal of paddock trees is not expected to significantly impact koala movement as detailed above. The construction of buildings and fences on the site is expected to be the main hindrance to koala movement across the site. While the placement of the footprint is planned so that the impact on koala habitat is minimised, it is also important to allow movement of koalas across the site once construction is completed. Fencing that presents minimal restriction to koala movement or risk injuries or trapping of koala should be used on the site. Suitable fencing options as per the Port Stephens CKPoM include: ■ Fences where the bottom of the fence is a minimum of 200 mm above ground level that would allow koalas to move underneath; ■ Fences that facilitate easy climbing by koalas; for example, sturdy chain mesh fences, or solid style fences with timber posts on both sides at regular intervals of approximately 20m; or ■ Open post and rail or post and wire (definitely not barbed wire on the bottom strand). See Section 5 for further details regarding the recommendations. The fencing requirements are to be incorporated into the architectural and/or landscape plans.

Performance criteria	Assessment response
g. However, where the keeping of domestic dogs has been permitted within or adjacent to Preferred or Supplementary Koala Habitat, Habitat Buffers or Habitat Linking Areas, fencing of a type that would be required to contain dogs (and which may also preclude koalas) should be restricted to the designated building envelope. Fences which are intended to preclude koalas should be located away from any trees which now or in the future could allow koalas to cross the fence.	The proposal does not include the keeping of domestic dogs on the site, and as such criteria g) is not applicable to the proposal.
h. Be restricted to identified envelopes which contain all buildings and infrastructure and fire fuel reduction zone. Generally there will be no clearing on the site outside these envelopes. In the case of applications for subdivision, such envelopes should be registered as a restriction on the title, pursuant to the *Conveyancing Act 1919*.	The proposed activity has a clearly defined envelope within which the buildings and infrastructure will be located. This assessment has been carried out under the assumption that no tree removal will occur outside the defined areas, nor will there be any vegetation disturbance from site access or ancillary facilities. An APZ will be placed around the perimeter of the proposed activity, but stops at the front of the treed area. This will also act as a buffer protecting the native vegetation within the patch.
i. Include measures to effectively minimise the threat posed to koalas by dogs, motor vehicles and swimming pools by adopting the following minimum standards:	Measures to minimise threats from motor vehicles are listed below. Threats by dogs and swimming pools are not as such relevant for this activity. Education about the threat of dog attacks on koalas is recommended as part of the mitigation measures. See Section 5 for further details regarding the recommendations.
i. The development must include measures that effectively abate the threat posed to koalas by dogs through prohibitions or restrictions on dog ownership. Restrictions on title may be appropriate.	N/A

Performance criteria	Assessment response
ii. The development must include measures that effectively minimise the threat posed to koalas from traffic by restricting motor vehicle speeds, where appropriate, to 40 kph or less	The proposed activity will likely increase traffic around the new school site during drop off and pick up times. The increased traffic during these times increases the risk of vehicle strikes on koalas crossing the road, however the risk will be suitably mitigated as per below. The local speed limit will be lowered to 40 km/h as part of the standard school zone safety management practices. Pedestrian crossings around the site are raised which will add some traffic calming impacts. This along with the lowered speed limit will mitigate the risks of vehicles striking koalas. This KPoM also recommends installing koala warning signs as mitigation measures to protect koalas moving within the road reserve adjacent to the development. The details are included in Section 5 of this report. It is noted that this measure may need to be implemented by Port Stephens Council as the authority that maintains the local roads.
iii. The development must reduce the risk of koala mortality by drowning in backyard swimming pools. Appropriate measures could include: trailing a length of stout rope (minimum diameter of 50mm), which is secured to a stable poolside fixture, in the swimming pool at all times; designing the pool in such a way that koalas can readily escape; or enclosing the pool with a fence that precludes koalas. This last option should include locating the fence away from any trees which koalas could use to cross the fence	N/A

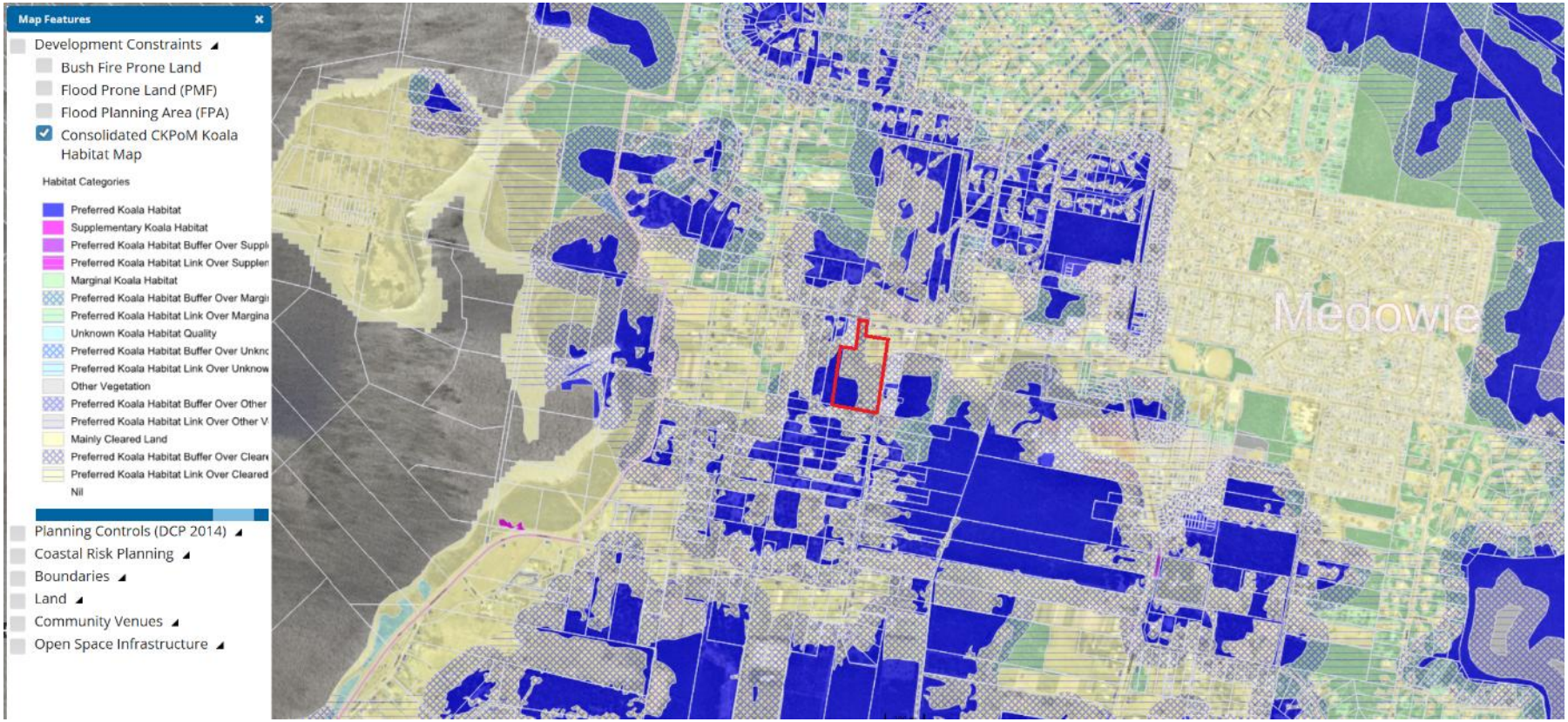

Figure 4-2 Koala Habitat Mapping in the local area

Figure 4-3 Vegetation corridors in the local area

5 RECOMMENDATIONS

The following recommendations are made to suitably mitigate the potential negative impact on the local koala population and koala habitat from the proposed activity, or where possible have a positive impact.

Mitigation measures are included for all project stages including design, pre-construction, construction and operational.

Table 5-1 Recommendations/Mitigation measures

No.	Aspect/Section	Mitigation Measure	Reason for Mitigation Measure
1.	**Vegetation Management**	It is recommended that a suitably qualified ecologist be on site during any tree removal operations to ensure koalas are not present within trees proposed for removal. No trees with koalas present should be cleared.	Koala conservation
2.		Implement the native vegetation management practices as described in the NVMP (Water Technology 2025). This will help control and manage weeds in the bushland on site and help restore koala habitat on site.	
3.		Plant gardens and revegetate using preferred koala food tree species where possible. This will enhance the habitat value of the site. Preferably the seedlings should be propagated from local seed stock. Note that all fire management strategies (fire breaks, access etc.) need to be adhered to when revegetating.	
4.	**Traffic Management**	Consult with Council regarding the need for installation of koala warning signs along the adjacent roads warning incoming traffic about koala presence in the area.	
5.		Implement speed limits and speed humps around the school (e.g. school zone speed limits) to ensure drivers approach slowly. This will be sufficiently covered by lowering speed limits to 40 km/h during drop off and pick up times when traffic loading is increased, as well as constructing a raised pedestrian crossing.	
6.		Ensure roadside vegetation is slashed to increase visibility.	
7.	**Design and construction**	Koala movement across the site should be minimally compromised by avoiding the installation of fences and other restricting structures in any of the koala habitat zones.	

No.	Aspect/Section	Mitigation Measure	Reason for Mitigation Measure
8.		Where fences are essential (such as roadside fencing), koala friendly fencing styles should be used as far as possible (Port Stephens CKPoM): a. fences where the bottom of the fence is a minimum of 200 mm above ground level allowing koalas to move underneath; b. fences that facilitate easy climbing by koalas, for example sturdy chain mesh fences or solid style fences with timber posts on both sides at regular intervals of approximately 20m; or c. open post and rail or post and wire (not barbed wire on the bottom strand). Fencing around the perimeter of and within the school fencing boundary in Figure 1-2 will need to be done to DoE standards for safety, but any fencing outside this area should follow the above recommendations.	
9.		All trees removed during the construction works stage should be checked for koala presence prior to felling.	
10.		Ensure koalas are able to migrate freely through the southern end of the lot (outside school fencing) and the preferred koala habitat, and linkage to other preferred koala habitat patches is maintained. This will be ensured in the design phase that includes no disturbance of preferred koala habitat and linkage habitat in the southern section of the site.	
11.	**Education**	Include education about koala conservation in the school program, e.g. koala habitat restoration, revegetation using preferred koala feed tree species, what to do if an injured koala is encountered, responsible dog ownership, and dangers of traffic to koalas.	
12.		Participate in Port Stephens Council's existing koala education program or koala habitat and population monitoring program (as feasible and relevant).	
13.	**Dog attack mitigation**	No dogs should be permitted on site during and after construction operations.	
14.	**Bushfire management**	The likelihood of high intensity fires (e.g. canopy fires) occurring within koala habitat should be minimised through vegetation management as covered within the NVMP (Water Technology, 2025).	
15.		High frequency of hazard reduction burns within koala habitat should be avoided	

6 SUMMARY

This Koala Plan of Management (KPoM) for the proposed construction of a school at 6 Abundance Road in Medowie has been prepared in accordance with the Port Stephens Comprehensive Koala Plan of Management (CKPoM). The KPoM covers the four steps of koala habitat assessments under the CKPoM (see 7Appendix B) and includes all the background information required as detailed in Table 3-1. The appropriateness of the development proposal has been assessed against the performance criteria for development applications, as detailed in Table 4-1.

No significant impact is expected on the local koala population or the koala habitat on site, and provided the mitigation measures and recommendations within this KPoM are adhered to, the activity is considered appropriate under the Port Stephens CKPoM.

The activity will avoid the preferred koala habitat mapped on site, as well as most of the canopy trees. Some paddock trees are likely to be removed within the development footprint, however their relevance as koala habitat is not considered high. While paddock trees can be important for koalas when moving between habitat patches, the removal of these trees is not considered likely to significantly impact koala movement across the site. Revegetation post-construction using koala food trees is also proposed to improve the koala habitat on the site.

No direct evidence of koalas using the site on an ongoing basis was found, however a precautionary approach should be adopted where koalas are assumed to use the site unless proven otherwise. A long history of koala records on and near the site, albeit most from nearly 30 years ago, shows that the site has had a historical significance as koala habitat.

7 REFERENCES

Assurance Trees (2025). *New High School for Medowie.*

NSW DCCEEW (2024). *Koala Habitat Information Base: Koala Species Sightings.*

Port Stephens Council (2002). *Port Stephens Council Comprehensive Koala Plan of Management.*

Water Technology (2025). *Medowie HS – Native Vegetation Management Plan (NVMP).*

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APPENDIX A
KOALA RECORDS IN THE LOCAL AREA OF THE STUDY SITE

Koala Species Sightings

0 350 700 m

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

THIS MAP IS NOT TO BE USED FOR NAVIGATION

Notes

All koala sightings recorded in NSW Bionet

Legend

NSW Cadastre

Cadastre

Lot

Koala Species Sightings

Koala Species Sightings

- 2024
- 2023
- 2022
- 2021
- 2020
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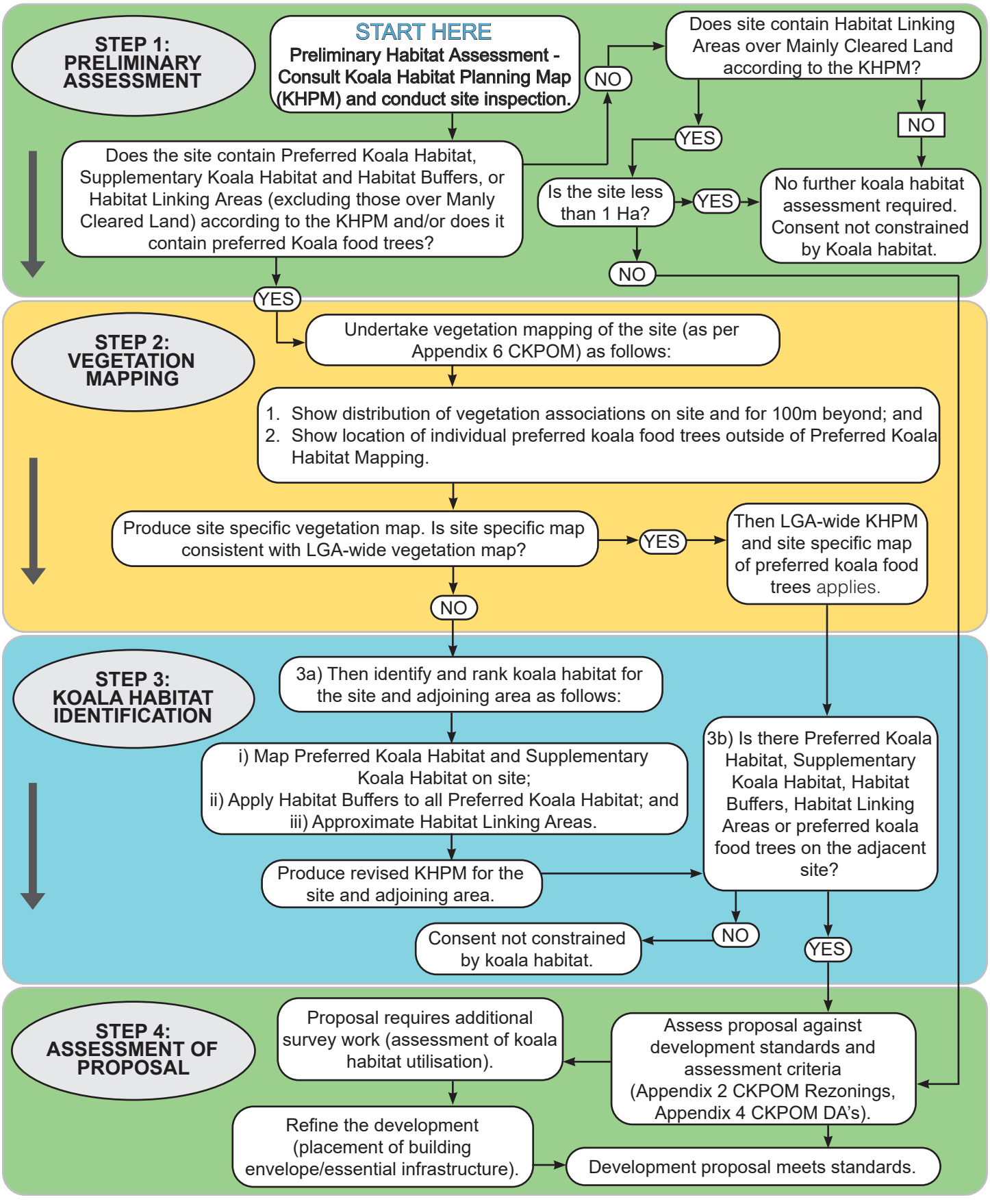
APPENDIX B
KOALA HABITAT ASSESSMENT PROCESS

PORT STEPHENS COMPREHENSIVE KOALA MANAGEMENT PLAN (CKPoM)

Koala Habitat Assessment Process



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APPENDIX C
CVS FOR KOALA HABITAT ASSESSORS

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

PETRA AROLA

petra.arola@watertech.com.au
Phone: 1300 198 413

Environmental Consultant

QUALIFICATIONS

- Master of Science Environmental and Marine Biology (2020), Åbo Akademi University, Finland
- Bachelor of Economics and Business Administration (2015), Åbo Akademi University, Finland

AFFILIATIONS

- Ecological Consultants Association of NSW

SUMMARY

Petra is a Biologist with a degree in Environmental and Marine Biology from Åbo Akademi University in Finland. While her early career focused on research in the local area of her university, since graduating and moving to Australia, Petra has worked an environmental consultant at Water Technology in Sydney, NSW. Her work includes undertaking ecological assessment, preparing biodiversity reports, planning and carrying out ecological field investigations, assisting with environmental impact assessments, conducting project research, performing stakeholder communication, and spatial analysis using GIS software.

One of the first project Petra worked on was the Koala Habitat Mapping for Mid-Western Regional Council LGA. In this project, Water Technology helped Mid-Western Regional Council fulfill their requirements under the National Recovery Plan for Koala and Koala SEPP 2021 by identifying areas of core koala habitat within the LGA boundaries. The works included extensive GIS mapping across the LGA as well as field survey efforts, resulting in a series of mapping layers for core koala habitat, potential koala habitat, connectivity areas, and lost overlapping these. The mapping will be used for conservation management planning, to guide citizen science projects, for education purposes and to find areas to implement on-ground works for the enhancement of critical habitat. The data will also be used as a basis for a future Koala Plan of Management.

More recently (ongoing), Petra has been the Project Manager and Lead for the Hawkesbury Vegetation Mapping project. The aim of this project is to update the vegetation mapping layer across the LGA, with the purpose of identifying koala habitat within the LGA. This includes both extensive spatial work undertaken by the spatial team, as well as field work undertaken by the ecology team.

Furthermore, Petra has worked on numerous ecological assessments and environmental impact assessments within areas of significant koala populations, requiring localised knowledge about the koala populations as well as background knowledge on koala conservation methods. Through the work undertaken with koalas, Petra has a thorough understanding of the background, legislation, and assessment requirements for koala population and habitat assessments, as well as skills in the field assessment techniques.

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APPENDIX D
VEGETATION MAP

Legend

Site Boundary

Koala Tree Survey Mapping

- Preferred Koala Trees (outside habitat)
- Koala Habitat Extension

Koala Habitat Map (Port Stephens CKPoM)

- Habitat Buffer Area
- Habitat Linking Area
- Preferred Koala Habitat

Plant Community Type (NSW DCCEEW)

- PCT 3436
- PCT 3995
- PCT 4006
- PCT 4020

Data sources: Metromap, NSW SEED Map, Port Stephens Online Mapping Portal

Imagery date: 2/12/2024

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Medowie High School Koala Plan of Management

Koala Vegetation Map

2024-12-03T09:22:10.621

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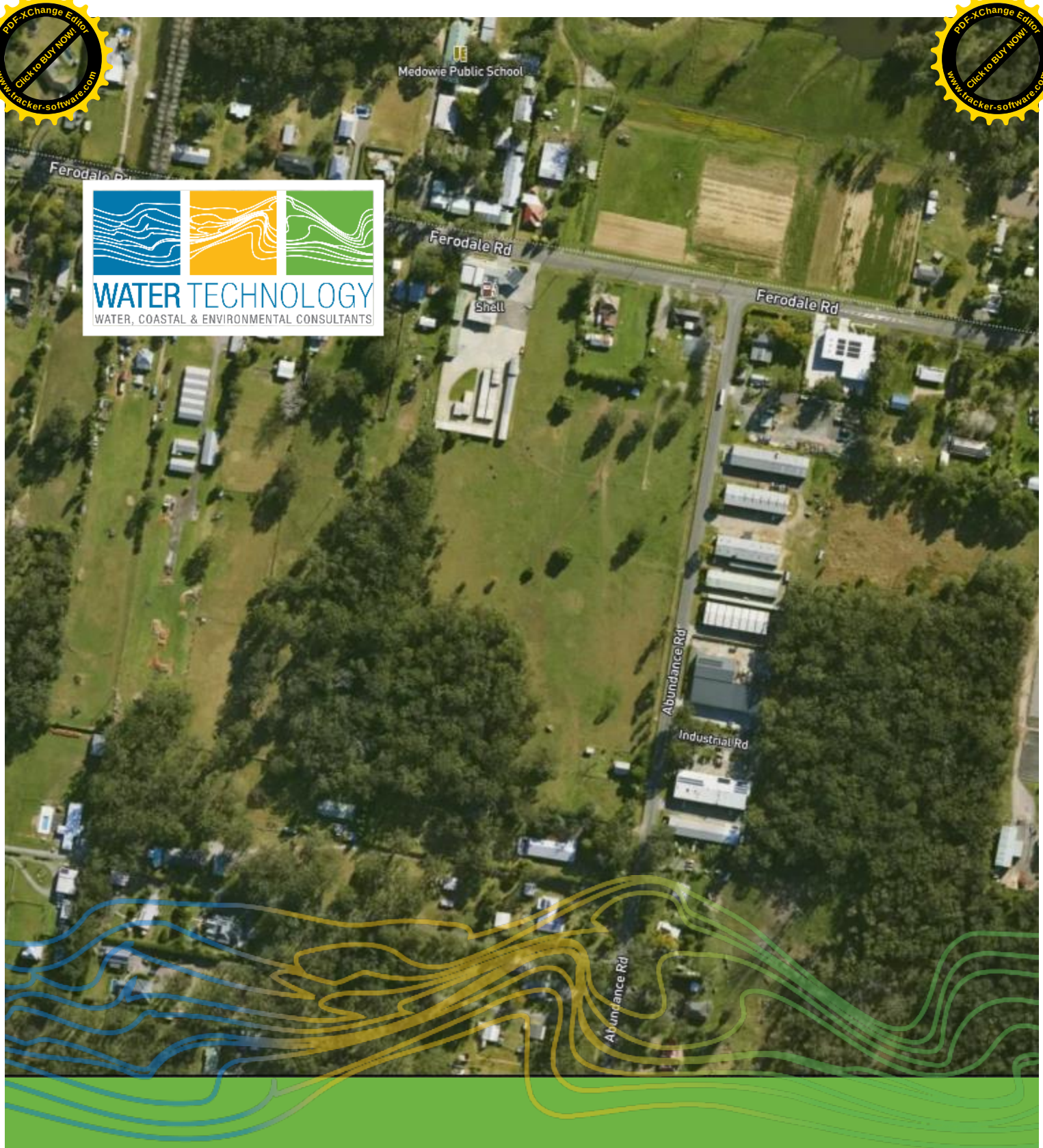
APPENDIX E
NATIVE VEGETATION MANAGEMENT PLAN



WATER TECHNOLOGY
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Native Vegetation Management Plan

New High School for Medowie

Department of Education

31 January 2025

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Document Status

Version	Doc type	Reviewed by	Approved by	Date issued
1	Draft	Dr Cameron Radford	Dr Michael Aberton	12/12/2024
2	Final	Dr Cameron Radford	Dr Michael Aberton	31/01/2025

Project Details

Project Name	Native Vegetation Management Plan - New High School for Medowie
Client	Department of Education
Client Project Manager	Emma Murray
Water Technology Project Manager	Dr Michael Aberton
Water Technology Project Director	Dr Michael Aberton
Authors	Caroline Weller
Document Number	23050100_SINSW Medowie HS_NVMP_Final

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ACKNOWLEDGEMENT OF COUNTRY

The Board and employees of Water Technology acknowledge and respect the Aboriginal and Torres Strait Islander Peoples as the Traditional Custodians of Country throughout Australia. We specifically acknowledge the Traditional Custodians of the land on which our offices reside and where we undertake our work.

We respect the knowledge, skills and lived experiences of Aboriginal and Torres Strait Islander Peoples, who we continue to learn from and collaborate with. We also extend our respect to all First Nations Peoples, their cultures and to their Elders, past and present.

Artwork by Maurice Goolagong 2023. This piece was commissioned by Water Technology and visualises the important connections we have to water, and the cultural significance of journeys taken by traditional custodians of our land to meeting places, where communities connect with each other around waterways.

The symbolism in the artwork includes:

- *Seven circles representing each of the States and Territories in Australia where we do our work.*
- *Blue dots between each circle representing the waterways that connect us.*
- *The animals that rely on healthy waterways for their home*
- *Black and white dots representing all the different communities that we visit in our work.*
- *Hands that are for the people we help on our journey.*

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New High School for Medowie

The following report is a Native Vegetation Management Plan (NVMP) undertaken for the New High School for Medowie on behalf of the Department of Education (DoE). The report documents the findings of an ecological assessment inclusive of a site visit. A plan for vegetation removal and future vegetation maintenance is provided which will be suitable for submission for the REF pathway. The NVMP takes into account the Koala Plan of Management (KPoM) that this project as a separate report.

Yours sincerely

Dr Michael Aberton
Group Lead- Waterways and Ecology
michael.aberton@watertech.com.au
WATER TECHNOLOGY PTY LTD

EXECUTIVE SUMMARY

This native vegetation management plan (NVMP) has been prepared to identify areas that will require vegetation maintenance and revegetation after the proposed construction project has been completed at 6 Abundance Road, Medowie (New High School for Medowie). The purpose of this plan is to be suitable for submission for the REF pathway to satisfy their construction conditions.

This report documents the findings of the native vegetation management plan, which identified any areas that could require weed control, ideal areas for revegetation and areas for retention/maintenance. The NVMP typically consist of managing the entire site and not just the area where works are undertaken and any disturbances incurred by the activity will be offset by the improvement of other native vegetation found on site.

The site assessment mapped the extent of the weeds on the site, identified ideal locations for photo monitoring points and identified opportunities for school pedestrian access points.

The results were then displayed in maps and recommendations for weed management and species for any revegetation were given which can be found in the mitigation section of this report. These recommendations include species associated to the PCT 3995 - Hunter Coast Paperbark-Swamp Mahogany Forest (which occurs on site), koala preferred food trees from the Port Stephens Comprehensive Koala Plan of Management, and planting of spiny shrub species to provide bird habitat and prevent entry to sensitive places.

The area mapped as PCT 3995 should be classified as a sensitive area considering it is a Threatened Ecological Community (TEC) being associated to the Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions TEC, which is listed as Endangered under the Biodiversity Conservation Act 2016.

The site assessment found sections of the vegetation present are in good condition, with few weed species present. Other sections of the subject site were large, grazed paddocks that did not possess significant ecological value. It is in these areas along the roadside that revegetation is recommended. The site assessment also discovered multiple large piles of dumped rubbish within the TEC area which will need to be removed as a recommendation.

The NVMP includes 5 years of monitoring with follow up assessments taken on a yearly basis.

CONTENTS

APPENDICES

LIST OF FIGURES

LIST OF TABLES

1 INTRODUCTION

This Native Vegetation Management Plan (NVMP) has been prepared to support the Review of Environmental Factors (REF) for the proposed New High School for Medowie (the activity). The purpose of the REF is to assess the potential environmental impacts of the activity prescribed by State Environmental Planning Policy (Transport and Infrastructure) 2021 (T&I SEPP) as "development permitted without consent" on land carried out by or on behalf of a public authority under Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

The activity is to be undertaken pursuant to Chapter 3, Part 3.4, Section 3.37A of the T&I SEPP.

The activity will be carried out at 6 Abundance Road, Medowie (the site). The purpose of this report is to provide a detailed methodology in relation to the management and regeneration of native vegetation on the site post construction works.

1.1 Project Background

The proposed New High School for Medowie is located in the Port Stephens Council Local Government Area (LGA), in the Hunter and Central Coast region of New South Wales. The site is situated at 6 Abundance Road, Medowie, NSW, 2318 (the site).

The proposed activity involves the construction of the New High School for Medowie (Figure 1-1).

The site contains a densely vegetated area to the southwest corner. Further, isolated trees are scattered throughout.

The existing dwelling and other structures on the site will be demolished as part of the works. No other works are proposed in the area.

The proposed new school will accommodate 640 students in 29 permanent teaching spaces including 3 support teaching spaces across 3-storeys of buildings on the site. Approximately 10,500 sqm of General Floor Area (GFA) is proposed. The proposed activity will be delivered across 1 stage, and will consist of the following:

- 29 permanent teaching spaces including 3 support teaching spaces, to accommodate 640 students, and school hall to accommodate 1,000 students. Approximately 10,500 sqm of GFA is proposed.
- Main vehicular ingress and egress to Ferrodale Road to the north, with a new pedestrian and vehicle crossing proposed.
- Main pedestrian access to Abundance Road.
- Kiss and ride, and bus drop and pick up areas to Abundance Road (6 x parallel spaces).
- New pedestrian wombat crossing to Abundance Road.
- Approximately 55 x car parking spaces and 3 x accessible parking spaces.
- Approximately 70 x bicycle parking spaces.
- Block A (Admin) consisting of administration and learning spaces.
- Block B (Foodtech/Workshop) consisting of food technology room and workshops.
- Block C (Hall) consisting of school hall to accommodate 1,000 students.
- Central quad, 1 playing field and 1 sports courtyard.

The proposed activity will also include the following spaces; general learning spaces, General support learning spaces, administrative services, staff areas, gym and canteen, library areas for science, wood and metal, food

and textiles, health PE, performing arts, additional learning spaces, student amenities, storage, movement (stairs and covered walkways).

1.2 Objective

Department of Education (DoE) has requested a Native Vegetation Management Plan (NVMP) at 6 Abundance Road, Medowie which will revegetate, monitor and improve the vegetation retained within the entire site after the construction period for the New High School for Medowie.

Water Technology has been engaged by DoE to prepare the NVMP to offset any vegetation impacted during the construction of the new school.

The preliminary arborist report (Assurance Trees, Jan 2025) states that out of the 95 trees assessed, 36 trees will require removal, of which 25 are listed as weeds and should be removed as part of the regional weed program. The report also states that a single threatened tree in the form of a Wallangarra White Gum (*Eucalyptus scoparia*) was sighted in the northeast corner of the site along Ferodale Road. *E. scoparia* is listed as Endangered under the NSW BC Act and Vulnerable under the federal EPBC Act. From a native vegetation management perspective, this tree should not be removed, and protection methods should be prioritised during the construction stage.

The Bushfire report (Ecological Australia - January 2025) was also assessed for this report and any vegetation within the proposed 40m - 79m Asset Protection Zone (APZ) would be assessed to minimise the native vegetation clearance within this zone.

1.3 Purpose

The purpose of this report is to provide a detailed methodology in relation to the management and regeneration of native vegetation on the site.

The aims of this NVMP are to:

- provide a sensitive area retainment zone in the southern section that has been previously assessed and found to have Preferred Koala Food Trees, hollow-bearing trees, and PCT 3995- Hunter Coast Paperbark-Swamp Mahogany Forest which is a Threatened Ecological Community (TEC);
- provide protective measures for the threatened tree Wallangarra White Gum (*Eucalyptus scoparia*) located in the northeast corner of the site along Ferodale Road during the construction stage;
- provide a weed management plan for the TEC zoned areas mapped on site; and
- improve the fauna habitat and connectivity through the site connecting Preferred Koala Habitat to that of other areas of Preferred Koala Habitat surrounding the site that is within the Port Stephens ARK (Area of Regional Koala Significance) Zone.

This can be achieved through implementing the following objectives including:

- improving the structure and diversity of the TEC by using locally sourced native species that include trees, shrubs and ground cover plants that are typical of PCT 3995- Hunter Coast Paperbark-Swamp Mahogany Forest present within the area and within the site boundary; and
- assisting in natural regeneration through weed management, monitoring and maintenance for the period of the NVMP.

1.4 Timeframe

A NVMP is generally implemented over a minimum period of three to five years, however, it can also occur in perpetuity, depending on the individual circumstances of the project.

Such circumstances include (but not limited to) the:

- impacts on native vegetation, threatened ecological communities, threatened flora and fauna, and their habitats and,
- ecosystem/native vegetation condition and management requirements (such as APZ management).

A Native Vegetation Management Plan should generally be reviewed and updated every 5 years; however, this timeframe can vary depending on factors like the local environment, land use changes, and the specific regulations in your area, so it's important to consult with relevant authorities for precise guidance. Considering there is a large patch of TEC consisting of Preferred Koala Food Trees mapped in the Port Stephens ARKS, the site should ideally be managed in perpetuity with the NVMP report being reviewed and any management requirements be addressed with necessary updates at 5 yearly intervals. This could also be used as a learning/curriculum opportunity for future students to get involved with the monitoring/maintenance projects. For the purpose of this report, the NVMP has been prepared for a five-year period.

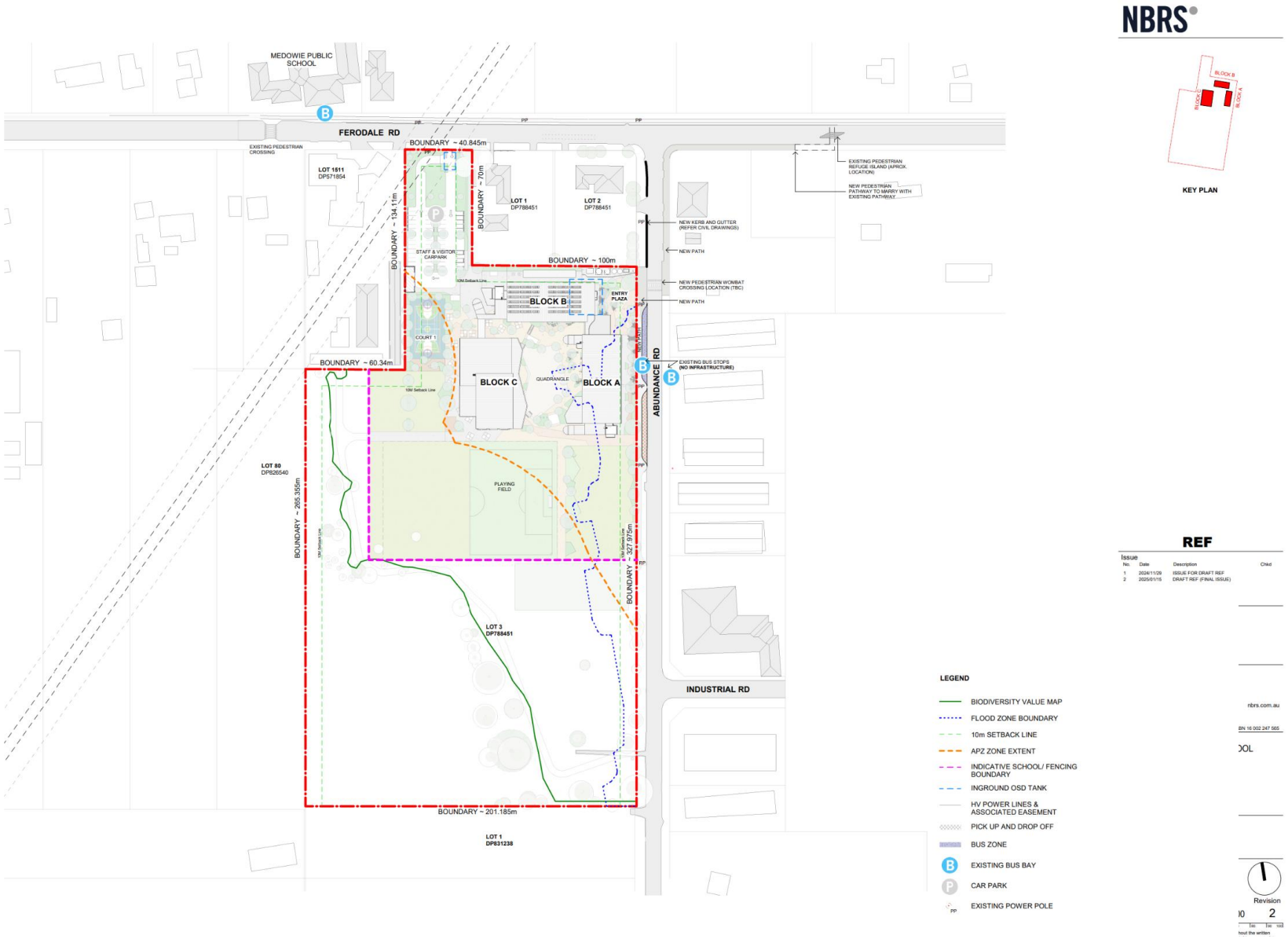

Figure 1-1 Site Plans

2 SITE BACKGROUND

2.1 Site Location and Background

The site has a street address of 6 Abundance Road, Medowie (Figure 2-1). It is 6.51 ha in area, and comprises 1 allotment, legally described as Lot 3 in DP788451 (Figure 2-2).

A large portion of the site is currently unused and vacant. A small, shed structure and caravan are located adjacent to the northern boundary. A cluster of buildings, including a single storey swelling, an outhouse/shed structure and temporary greenhouse are located within the south eastern corner.

The site contains a largely vegetated area to the south west corner. The site is relatively flat with a gradual fall from the west to east towards Abundance Road.

The site has primary frontage to Abundance Road to the east and Ferodale Road to the north. Abundance Road and Ferodale Road are both classified Local Roads. Medowie Road, approximately 1km east of the site, is classified as a Regional Road.

The area surrounding the site mostly consists of industrial, rural residential, educational, and agricultural lands. Adjacent to the north western boundary is a Shell petrol station and mechanical garage. Adjacent to the north eastern boundary is a medical health clinic. Across Abundance Road along the eastern boundary are a number of warehouses and light industrial developments. Directly north of the site across Ferrodale Road are large lots used for agricultural purposes. Medowie Public School is located on Ferodale Road, to the north west of the site, opposite the Shell petrol station.

2.2 Importance of native vegetation

Council has developed several policies for the protection of native vegetation and waterways within the Port Stephens LGA. These are enforced through provisions in the Port Stephens Development Control Plan 2014 (DCP). Permits are available to clear existing vegetation based on an assessment of the potential impact to adjoining vegetation and the resultant habitat loss to the local biodiversity. The majority of the vegetation within the subject site has been cleared of mature trees as part of the landscaping of the original residential development. A large patch of mature canopy trees remains in the southwest corner of the site.

PCT 3995 is associated with the following TEC:

- Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions (Endangered, BC Act 2016).

Desktop analysis of the site using recent high-resolution satellite imagery indicated that this PCT is likely present within the subject site (Figure 2-3). A qualified ecologist conducted an on-ground site assessment to determine the presence and condition of native vegetation on site and if it confirms to the listed associated TEC above.

There was also a threatened Wallangarra White Gum (Endangered BC Act; Vulnerable EPBC Act) near the proposed Ferodale Road entrance of which protection measures would need to be taken in this area during the design and construction phases to prevent accidental damage or destruction to the threatened species. Refer to Section 10 – Tree Protection Plan for Tree 1 of the Arboricultural Impact Assessment (Assurance Trees -January 2025).

The area is also marked as an Area of Regional Koala Significance (ARKS) and has multiple koalas recorded nearby. The vegetation on site can be used for connectivity by koalas to travel between the Medowie State Conservation area to the north and the Tilligerry State Conservation area to the south. The site assessment

confirmed small native sections within all strata levels along the Abundance Road fence line and thickening out these areas will provide a safer travel route in the open paddock areas of the site.

It will be these three areas that require a protection and rehabilitation plan which will be the focus of this NVMP.

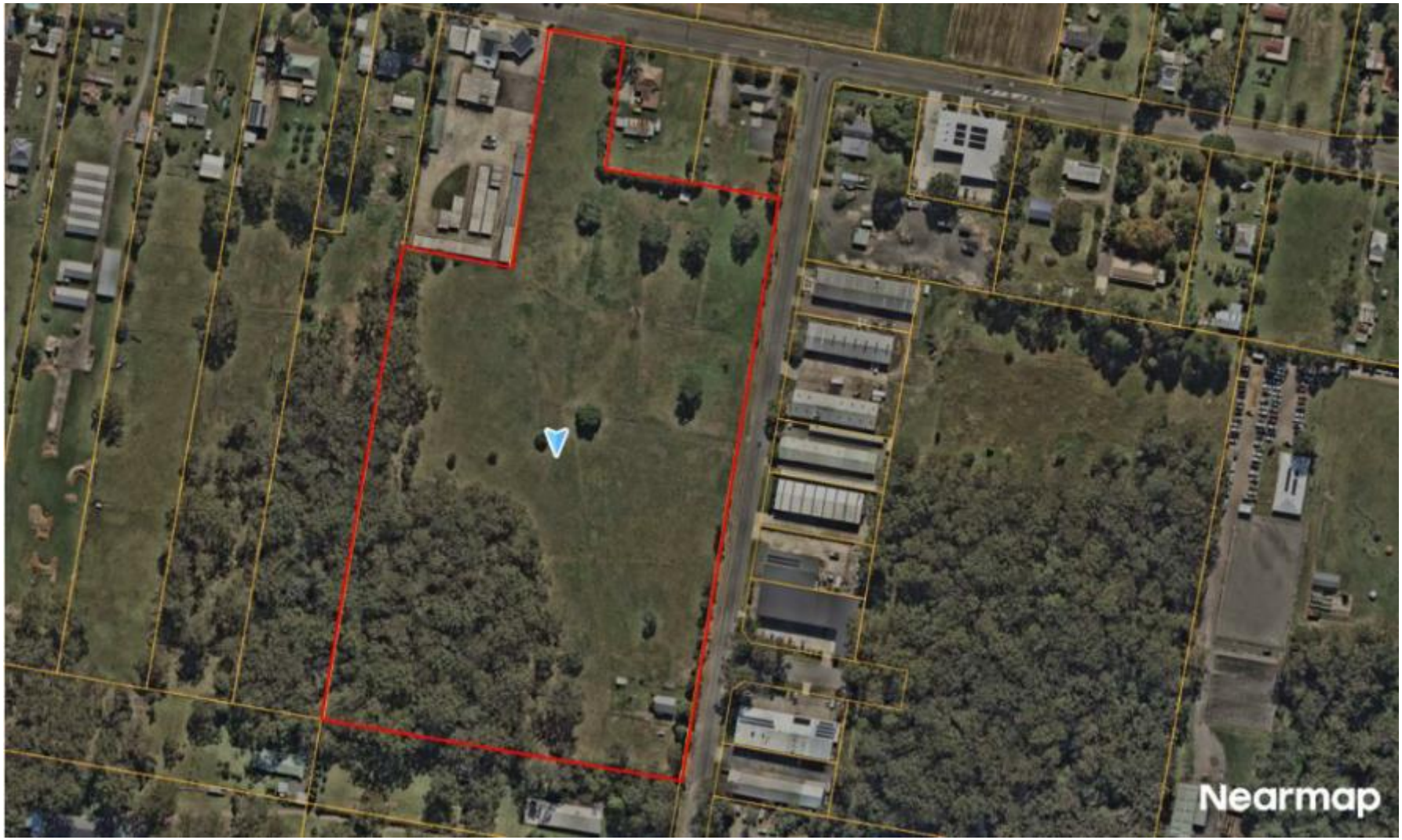

Figure 2-1 Aerial image of the site (Source: Nearmap)

Figure 2-2 Lot and DP boundary.

Figure 2-3 PCT mapping.

2.3 Biodiveristy Mapping

The Department of Climate Change, Energy, the Environment and Water under Part 7 of the BC Act prepare the Biodiversity Values Map. It identifies land with high biodiversity value that is particularly sensitive to impacts from development and clearing. The map forms part of the Biodiversity Offsets Scheme threshold, which is one of the triggers for determining whether the Biodiversity Offset Scheme applies to a clearing or development proposal.

The subject site contains areas mapped as possessing Biodiversity Values (BV) recorded as Core Habitat within an approved Comprehensive Koala Plan of Management (Koala SEPP). These coincide with the area of remnant native vegetation present in the south west corner of the site. The BV map can be seen in (Figure 2-4).

Figure 2-4 Biodiversity Values

2.4 Threatened Species Assessment

Analysis of the NSW OEH SEED mapping indicates there are several threatened species that have been previously recorded within close proximity to the site (Figure 2-5). These include:

- Koala (*Phascolarctos cinereus*) (Endangered - EPBC Act and BC Act);
- Grey-headed Flying Fox (*Pteropus poliocephalus*) (Vulnerable - EPBC Act and BC Act);
- Squirrel Glider (*Petaurus norfolcensis*) (Vulnerable – BC Act);
- Greater Broad-nosed Bat (*Scoteanax rueppellii*) (Vulnerable – BC Act); and
- Little Bent-winged Bat (*Miniopterus australis*) (Vulnerable – BC Act).

No threatened flora species have been recorded within or close to the site.

Figure 2-5 Threatened Species Map

2.5 BioNet Vegetation Classification

The NSW State Vegetation Type Map is a regional-scale map of NSW Plant Community Types. The map represents the current extent of each Plant Community Type (PCT), Vegetation Class and Vegetation Formation, across all tenures in NSW.

According to the NSW State Vegetation Type Mapping, one PCT is mapped as occurring within the subject site (Figure 2-3):

- PCT 3995 – Hunter Coast Paperbark-Swamp Mahogany Forest

Desktop analysis of the site using recent high-resolution satellite imagery indicated that this PCT is likely present within the subject site. A qualified ecologist conducted an on-ground site assessment to determine the presence and condition of native vegetation on site and if it conforms to the listed associated TECs above.

Additional PCTs occur in close proximity to, but not within the subject site. These include PCT 3436 – Hunter Coast Sandy Creekflat Low Paperbark Scrub.

PCT 3995 is associated with the following threatened Ecological Community:

- Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions which is listed as Endangered under the NSW BC Act. It is also associated with the Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland.

2.6 Soil landscape

Analysis of the NSW eSpade database indicates that the soil profile of the site is likely me-Medowie soils within the area. Soils are deep (>150 cm), well-drained red and yellow Structured Loams (Um4.13, Um6.13, Um6.12, Um6.41) on deeply weathered clay deposits and moderately deep to deep (60–>200 cm), well-drained Red Podzolic Soils (Dr2.21) and deep (200–>300 cm) Yellow Podzolic Soils (Dy3.21, Dy2.11), with some shallow well-drained Lithosols (Um1.43) on sandy/ pebbly deposits with clay lenses. This soil landscape is prone to seasonal waterlogging (localised lower slopes) and is a water erosion hazard. It has strongly acidic soils with low inherent fertility and high potential aluminium toxicity.

2.7 Waterways and Key Fish Habitat

One of the objectives of the FM Act is to conserve key fish habitats.

To achieve the objectives of the FM Act, DPI-Fisheries has identified 'Key Fish Habitats' – those aquatic habitats that are important to the sustainability of the recreational and commercial fishing industries, the maintenance of fish populations generally, and the survival and recovery of threatened aquatic species. Key Fish Habitat Mapping has been produced to provide guidance on the whereabouts of all Key Fish Habitat areas in NSW.

The subject site is not mapped as containing any Key Fish Habitat. Furthermore, the subject site is not in close proximity to any significant waterways or drainage areas or any waterfront land. The nearest waterbody is Grahamstown Lake, which is approximately 1 km west of the site (Figure 2-6). As such, there are no further provisions within the FM Act and WM Act that require consideration as part of the proposed activity.

Figure 2-6 Key Fish Habitat

3 SITE ASSESSMENT

A site inspection was conducted on 15th-17th October 2024 by Ecologist Caroline Weller who was assisted by Ecologist Petra Arola who was preparing the Koala Plan of Management (KPoM) that will be submitted as a separate report. The weather conditions were rainy to clear days with a maximum temperature of 19.1°C-22.6°C and approximately 9mm of rain during the three-day period. The site inspection consisted of a random meander but also used floristic findings from vegetation plots undertaken for the Fauna and Flora Assessment which accompanies the Review of Environmental Factors (REF) for this site. Therefore, the entire vegetation on site was ground-truthed. Further, any areas of weed infestations, sitings of Weeds of National Significance (WONS), scoping for idealistic sites for photo monitoring, and opportunistic fauna sightings or potential habitat located was also undertaken for the site. Any areas of weed infestation would then be mapped and a section on weed management would be recommended to use as a guideline for control works to occur for the next five years of management following the construction period.

3.1 Vegetation condition

The vegetation found onsite is a majority of paddock exotic grass species with a high weedy value (approximately 75% weed coverage and 25% natives). Most of the natives were found in the forest section in the southwestern corner. While most of the weeds occur in the open paddock area, there were still some woody weed species such as Lantana (*Lantana camara*), African Olive (*Olea europaea* subsp. *cuspidata*), Privet (*Lingustrum sp*) and Camphor Laurel (*Cinnamomum camphora*) within the forested section. The edge of the future APZ zone for the school buildings stops at the forested zone and therefore no native tree clearing in this section is to be expected. Sections along the Abundance Road fence boundary also had native species of all stratum levels. Therefore, if revegetation occurs it is recommended to expand this section along the road to use as a screen/ windbreak. This would also be greatly beneficial in re-establishing the koala habitat and connectivity within the Port Stephens ARKS zones. A threatened established Wallangarra White Gum (*Eucalyptus scoparia*) was found on site along Ferodale Drive in the northeast corner and will need to have protection measures in place during the construction period.

The dominant native trees found on site include Swamp Mahogany (*Eucalyptus robusta*), Smooth-barked Apple (*Angophora costata*), and Blackbutt (*E. pilularis*). The dominant shrub layer includes Sweet Pittosporum (*Pittosporum undulatum*), Sydney Wattle (*Acacia longifolia*) and Prickly Beard-heath (*Leucopogon juniperinus*). The dominant native groundcover includes Kidney Weed (*Dichondra repens*), Blady Grass (*Imperata cylindrica)* and Right-angle Grass (*Entolasia stricta*). The majority of the natives were found within the dense forested section that was confirmed to be PCT 3995 - Hunter Coast Paperbark – Swamp Mahogany Forest.

A lot of the weeds occur in the proposed activity site which is primarily paddock areas with few planted natives in the activity envelope. Other weeds occur around the house that is still being used by the caretakers of the horses onsite that are being leased on agistment. The dominant exotic canopy trees found include Camphor Laurel (*Cinnamomum camphora*) and Large-leaved Privet (*Lingustrum lucidium*). The dominant shrub layer include African Olive (*Olea europaea subsp. cuspidata*), Lantana (*Lantana camara*) and Small-leaved Privet (*Lingustrum sinense*), Swan Plant (*Gomphocarpus fruticosus*) and Evergreen Ash (*Fraxinus griffithii*). Dominant ground cover includes species such as Pattersons Curse (*Echium plantagineum*), Brome Grass (*Bromus sp*), Fireweed (*Senecio madagascariensis*), Quaking Grass (*Briza sp*) and Rye Grass (*Lolium perenne).*

A comprehensive flora list of the vegetation occurring on the property at the time of this assessment is provided in Table 3-1 and Table 3-2

Table 3-1 Comprehensive Native species list

NATIVE SPECIES	
Scientific Name	**Common Name**
Canopy Species	
Angophora costata	Sydney Red Gum, Smooth-barked Apple
Eucalyptus sp.	Stringybark
Eucalyptus globoidea	White Stringybark
Eucalyptus haemastoma	Scribbly Gum
Eucalyptus parramattensis	Parramatta Red Gum
Eucalyptus pilularis	Blackbutt
Eucalyptus robusta	Swamp Mahogany
Eucalyptus scoparia	Wallangarra White Gum
Eucalyptus tereticornis	Forest Red Gum
Glochidion ferdinandi	Cheese Tree
Grevillea robusta	Silky Oak
Melia azedarach	White Cedar
Midstorey species	
Acacia longifolia	Wattle
Breynia oblongifolia	Coffee Bush
Bursaria spinosa	Blackthorn
Exocarpos cupressiformis	Cherry Ballart, Native Cherry
Hakea salicifolia	Willow-leaved Hakea
Leucopogon juniperinus	Prickly Beard-heath
Melaleuca bracteata	‘Revolution Gold’
Persoonia linearis	Narrow-leaved Geebung
Pittosporum undulatum	Native Daphne, Sweet Pittosporum
Climbers/Scramblers	
Eustrephus latifolius	Wombat Berry
Glycine sp.	Glycine
Glycine microphylla	Small-leaf glycine
Hardenbergia violacea	Purple Coral Pea, False Sarsaparilla
Hibbertia scandens	Climbing Guinea Flower
Kennedia rubicunda	Dusky Coral Pea
Parsonsia straminea	Monkey Rope, Common Silkpod
Passiflora sp	Native Passionfruit
Rubus parvifolius	Native Raspberry
Groundcover species	
Carex sp.	Sedge
Dianella caerulea	Blue Flax-lily
Dichondra repens	Kidney Weed

NATIVE SPECIES	
Entolasia stricta	Wiry Panic, Right-angle Grass
Geranium solanderi	Native Geranium
Hydrocotyle sp.	Pennywort
Imperata cylindrica	Blady Grass
Lobelia purpurescens	Pratia
Lomandra filiformis	Wattle Mat-rush
Lomandra longifolia	Spiny-headed Mat-rush
Microlaena stipoides	Weeping Grass
Microtis unifolia	Common Onion Orchid
Oplismenus imbecillis	Creeping Beard Grass, Basket Grass
Oxalis perennans	Grassland Wood-sorrel
Poa labillardierei	Poa
Pratia purpurascens	Pratia
Pteridium esculentum	Common Bracken
Viola hederacea	Ivy-leaved Violet

Table 3-2 Comprehensive exotic species list

WEED SPECIES		
Scientific Name	**Common Name**	**WONS WEED (*)**
Canopy Species		
Cinnamomum camphora	Camphor Laurel	
Fraxinus griffithii	Evergreen Ash	
Jacaranda mimosifolia	Jacaranda	
Lingustrum lucidium	Large-leaved Privet	
Pinus radiata	Radiata Pine	
Populus sp	Poplar	
Platanus x acerifolia	London Plane, Maple-leaved Plane	
Midstorey species		
Abelia grandifola	Abelia	
Brunfelsia pauciflora	Yesterday-Today-Tomorrow	
Gomphocarpus fruticosus	Cotton Ballon Bush, Swan Plant	
Lantana camara	Lantana	*
Lingustrum sinense	Small-leaved Privet	
Nerium oleander	Oleander	
Ochna serrulata	Mickey Mouse Plant	
Olea europaea subsp. cuspidata	African Olive	
Opuntia stricta	Common Pear, Cactus	*
Photinia × fraseri	Photinia ‘Red Robin’	
Phytolacca octandra	Inkweed	

WEED SPECIES		
Pyracantha angustifolia	Orange Firethorn	
Ricinus communis	Castor Oil Plant	
Sida rhombifolia	Paddy's Lucerne	
Solanum mauritianum	Tobacco bush	
Climbers/Scramblers		
Araujia sericifera	Moth Vine	
Cardiospermum grandiflorum	Balloon Vine	
Lonicera japonica	Japanese Honeysuckle	
Groundcover species		
Agapanthus praecox. subsp.orientalis	Agapanthus, Lily of the Nile	
Anagallis arvensis	Scarlet Pimpernel, Red Chickweed	
Andropogon virginicus	Whiskey Grass	
Bidens pilosa	Cobbler's Peg, Farmer's Fiend	
Briza maxima	Quaking Grass, Giant Shivery Grass	
Briza minor	Quaking Grass, Small Shivery Grass	
Bromus sp	Brome Grass	
Cirsium vulgare	*Spear Thistle*	
Hyparrhenia hirta	Coolatai grass	
Conyza bonariensis	Fleabane	
Cordyline sp	Cordyline	
Cynodon dactylon	Couch	
Echium plantagineum	Patterson's Curse	
Ehrharta calycina	Veldt Grass	
Hypochaeris radicata	Cat's ear. Flat Weed	
Lolium perenne	Ryegrass	
Medicago murex	Medick	
Oryzopsis sp	Rice Grass	
Paspalum dilatatum	Paspalum	
Pennisetum clandestinum	Kikuyu grass	
Plantago lanceolata	Ribwort	
Poa sp	Poa	
Ranunculus sp.	Buttercup	
Rumex sp.	Dock, Sorrel	
Senecio madagascariensis	Fireweed	*
Soliva sessilis	Bindyi, Lawn Burweed	
Sonchus oleraceus	Common Sow Thistle	
Sporobolus sp.	Rats Tail Grass	
Stellaria media	Chickweed	
Taraxacum officinale	Dandelion, Pissabed	

WEED SPECIES		
Trifolium sp.	Clover	
Trifolium repens	White Clover	
Urtica urens	Small Nettle	
Verbena bonariensis	Purpletop	
Veronica filiformis	Speedwell	
Vicia sativa	Vetch	

3.2 Miscellaneous

It was noted during the site assessment that there were zones that had signs of historical rubbish dumping. This was particularly concerning with two large rubbish zones being within the threatened ecological community (TEC) area. It is recommended that these will be removed, and that caution may be needed as there were some barrels with hazardous warning signs which could lead to soil contamination and pollution and may eventuate to native vegetation degradation. The fauna and flora site (Water Technology 2025) assessment undertaken in conjunction with the NVMP site assessment also encountered bandicoots which are natural diggers and that could further spread the soil contamination or affect the native species wellbeing. It is recommended that a professional may be needed in case there is asbestos which is common amongst historical dumping grounds.

Another note of concern particularly in an area of high koala population density is some discarded barbed wire around the house. This can cause harm to any animal travelling in the area and is also recommended for removal.

4 MITIGATION MEASURES

To rehabilitate the site after the expected large-scale disturbances in building an entire new school, the following management strategies should be implemented these strategies to ensure the disturbance will be managed, so as to not cause any significant impact. The below mitigations measures and recommendations are for the entire site and any disturbances within the activity zone be offset to the management of other native vegetated areas such as the PCT 3995 - Hunter Coast Paperbark-Swamp Mahogany Forest zone in the southwest which is classified as a TEC. It is typical for a NVMP to be monitored over a 5-year period and then updated if needed which is recommended for this case since there in a TEC present on site.

4.1 Weed Management

Regular removal of non-native flora species using manual techniques should be undertaken to prevent exotic flora from establishing within the management zones. This should first be undertaken for all weeds post-construction. Following this there should be regular monitoring of the establishing vegetation through monthly inspections. Weed control requires the destruction of all parts of any plant (flowers, seeds, stems and roots) with disposal in Council's regular waste collection (organic materials). It is recommended that weed removal to be conducted by hand around the protected vegetation found on site by hand by professional bush regenerators.

Weed management is usually broken down into three categories.

4.1.1 Vines

These include weed species such as Japanese Honeysuckle (*Lonicera japonica*), Moth Vine (*Araujia sericifera*), Balloon Vine (*Cardiospermum grandiflorum*) which occur on site. They are the highest priority because once they climb up into the canopy, they can smother and kill an entire tree. Control methods include skirting the tree, which involves cutting the vines at chest height and dragging the lower section to the ground and cutting it again at 10cm above ground level. The side of the vine is then scraped, and herbicide is then carefully applied. Vines larger than the size of your thumb may require multiple scrapes on either side. Vines growing on the ground can be wound up into a ball until it reaches the base (where it is harder to pull up) and then apply the scrape and paste method. Non-chemical methods can be used by skirting the tree and then tracing the vine back to the base and digging up the roots. Either way, it is imperative that the remains are disposed of appropriately or hung off the ground to dry. If they are left on the ground, they may be able to take root again and re-establish.

4.1.2 Woody weeds

Woody weeds include Privet (*Ligustrum sp*), Lantana (*Lantana camara*), Camphor Laurel (*Cinnamomum camphora*), African Olive (*Olea europaea subsp. cuspidata)* and Evergreen Ash (*Fraxinus griffithii*) dominating the site. These should be pulled out of the ground at the early sapling stage. If plants cannot be pulled from the ground, then the chemical cut and paint method should be used. The plant is to be cut as close to the ground as possible with secateurs or loppers and then herbicide is immediately applied. If any regrowth from the trees cut down occurs, then a drill method may be needed. Multiple holes at an angle of 45-degrees are created around the circumference of the tree with herbicide applied as soon as possible. It is not recommended to hand dig out the larger saplings as this may create an erosion issue.

4.1.3 Herbaceous

These consist of your typical annual/herb weeds such as Thistles (*Cirsium sp*), Patterson's Curse (*Echium plantagineum*), Purple top (*Verbena bonariensis*) and Fireweed (*Senecio madagascariensis*). They generally have seeds that spread by the thousands in puffball-like structures during the flowering period and are generally spread by wind. These are more easily controlled in the early life stages before they flower and can

generally be mown or pulled / dug out of the ground. Smothering or mulching can also control these types of weeds as they require direct sunlight and do not survive in damp, dark environments. Other herbaceous weeds such as grasses are spread by rhizomes where they stretch out and sprout new roots into the ground. This can also be controlled by regular mowing.

4.1.4 Notes on the selective use of herbicide

Given the extensive area, it may be required to adopt broad acre herbicide application as a treatment (i.e., backpack spray). This should be undertaken during the school holidays to prevent students walking over the herbicide before it has a chance to dry. All proper Personal Protective Equipment should be worn by the qualified user and the herbicide manual recommendations for preparing the herbicide such as the correct quantities and ventilation should be followed. Selective manual chemical application may be appropriate for the vines and larger saplings where manual removal of weeds in the early stage of growth has proven to be complicated. Chemical use should be used minimally and only for selective individual plants, to avoid the chemical absorbing into the soil and down into the TEC mapped on site.

Weed management should occur every month throughout the duration of the five-year NVMP. Refer to the planning schedule in Table 6-1 for more information.

It is recommended that selective manual removal be used within the TEC area as this will decrease the chances of accidental destruction by spray drift etc of the nearby natives.

4.2 Bushfire APZ establishment

It is expected in most new developments that an Asset Protection Zone (APZ) would need to be established to prevent bushfire damage and allow the firefighters a safe access zone to contain the bushfire if the need arises. APZ establishment would include removing the shrub layer at the bases of trees, creating a canopy gap of a minimum of 2m and removing the lower branches up to 3m from the ground, while maintaining a consistent mowing regime.

The sports field and basketball courts will act as a firebreak barrier between the buildings and the bushland where the majority of vegetation will need to be cleared. This is also referred to as the Inner Protection Zone (IPZ). The Outer Protection Zone (OPZ) generally requires vegetation management such as removing shrubs growing directly underneath canopy trees and the removal of lower branches up to 3m from the ground. This will increase the gap for the fire to each into the canopy of the trees and get out of hand. There may also need to have a 2m canopy gap between the treetops and large vegetation patches such as the TEC zone (NSW Rural Fire Services -Appendix 4 *Planning for Bushfire Protection* 2019). Maintaining these gaps will also mitigate the risk of bushfire impacting the local koala population. Understorey vegetation such as grasses can be controlled through a mowing regime.

4.3 Revegetation

Revegetation generally occurs to offset disturbance made during the construction period but in this case, there is minimal natives to be removed, and any natives found within the activity space such as the Silky Oak (*Grevillea robusta*) and White Cedar (*Melia azedarach*) were likely to be planted. The removal of these trees may not be enough to trigger mitigation measures alone, but it is also expected that the activities will consist of extensive soil disturbance which will require offsetting. Revegetation species are ideally from the same PCT found on site or of local providence. Some councils also provide free tube stock handouts for certain properties that are involved in environmental initiatives such as the Land for Wildlife scheme.

It is recommended that revegetation to occur along the school fence line on Abundance Road and planted approximately 10-20m apart. There are already approximately 16 proposed trees allocated to this area in the site plans, it is recommended that a minimum of 10 of the proposed tree plantings be of koala preferred

species. Other benefits of revegetating this area would include shade and privacy for the students. The revegetation zone is out of the APZ zone and therefore will not impact the bushfire impact or APZ maintenance.

4.3.1 Source of planting stock

All plants should be sourced from local native plant nurseries. At the time of writing this report, the recommended Koala Food Tree plants of *Eucalyptus robusta* and *Eucalyptus tereticornis* were available from Newcastle Wildflower Garden Nursery in tube stock for the price of $6.95 each. However, it is recommended to ring prior to the planting day to confirm this is still correct.

Where plants are not available, seed should be collected from the local area such as the mapped PCT zone in accordance with seed collection guidelines by qualified ecologists and propagated on site before transplanting into prepared areas. Substitution with similar native species may occur where there will be a lengthy delay in obtaining those species listed above.

4.3.2 Planting methods

All plants should be either tube stock (groundcover plants) or minimum 10cm (4 inch) pot-sized for the shrubs and small trees.

The soil is expected to be highly disturbed from the installation of the new school buildings meaning that additional deep ripping may not be required.

An area surrounding the planting site should be completely removed of all exotic plants and mulched to a depth of 10cm. To prevent unnecessary plant mortality, mulch should not be placed around the stems of any plants. Jute matting can be placed over the dense paddock grasses, but any other weeds taller than 10cm may need to be removed for maximum efficiency.

All plants should be watered at the time of the planting. Follow up watering is only required if a dry period is experienced after the initial planting.

Due to the extensive presence of rabbits and kangaroos found during the site visit, installation of individual tree guards surrounding the shrubs and small trees will provide protection and improve likelihood of establishment. They should be tall enough so the kangaroos will not be able to reach over the top. Wire meshing that is bent inwardly may be suitable for this.

4.3.3 Post-planting management

Weed monitoring and removal is to be conducted monthly to ensure competition with the native plants is minimised. For the paddock grasses, a consistent mowing regime will reduce the spread of the exotic grasses and WONS such as Fireweed. If there is a high mortality within the revegetation works, follow up planting should be conducted in the second year to maintain adequate vegetation coverage of the Vegetation Regeneration Zone (VRZ). Species selection should be determined based on the success of the initial planting; as well as including those species growing successfully in the adjoining TEC zone.

4.4 Rubbish Removal

Care should be taken when removing historical waste as there me be hazardous contaminates such as asbestos and other chemicals. Care should also be used as these areas can also be opportunistically used for reptile species such as snakes. If in doubt seek a professional and always ensure the correct PPE is worn such as gloves, steel-capped boots etc. Rubbish removal should be conducted by professionals in case there may be asbestos and signs of barrels of chemicals.

4.5 4.5 Protection of threatened vegetation found on site

This will include individual species such as the Wallangarra White Gum (*Eucalyptus scoparia*) which is listed as Endangered under the NSW BC Act and Vulnerable under the federal EPBC Act and the PCT 3995 which is listed as Endangered under the Biodiversity Conservation Act 2016.

Fencing should be considered to protect the *E. scoparia* with a qualified arborist present when working around this tree and setting up the protective fencing to ensure it is undertaken correctly and making sure the root zone is also being protected.

4.6 Monitoring and reporting

It is recommended to establish photo monitoring to assess the condition of vegetation post activity works. Indications of degradation may include increased weed establishment. These photo points can also help determine if any of the revegetation works will need supplementary plantings across the five-year duration.

4.6.1 Photo points

During the site assessment, seven reference point locations within the rehabilitation site were identified as seen in **Figure 4-1**. The GPS coordinates are listed in Table 4-1. It was intentional to use easily identified landmarks such as the corner points for reference because conditions may change during the construction process.

Table 4-1 Coordinates for the photo monitoring points.

Name of photo point	Co-ordinates
Photo Point 1 - Near Petrol Station	-32.740 789, 151.854 124
Photo Point 2 – North section near *E. scoparia*	-32.739 698, 151.855 291
Photo Point 3 – North east corner on Abundance Road	-32.740 508, 151.856 195
Photo Point 4 – South east corner below house	-3a2.743 362, 151.855 629
Photo point 5 - Bottom south east PCT/APZ	-32.743 245, 151.854 824
Photo point 6 – South west corner in PCT zone	-32.743060, 151.853 623
Photo point 7 – South west section in dogleg area of PCT zone	-32.741 854, 151.853 902

Monitoring is recommended to be undertaken regularly throughout the period of operation of this NVMP to ensure that:

- Erosion and sediment controls are in place and effective until sufficient rehabilitation is achieved (i.e., 70% cover of exposed ground);

- The species density for each zone is achieved with replanting along the fence line at 20m apart (replanting may be necessary if this is not achieved); and
- Non-native species do not establish within the management zones, or within TEC zone.
- This monitoring should be conducted at a minimum every six months and precede any required weed management.

Photographs showing before and after images to illustrate the extent of the rehabilitation work should be taken after the completion of the rehabilitation works then annually to document changes in vegetation condition and structure. These can be taken at the suggested photo points with the coordinates seen in Figure 6 1. We have provided photos for the photo points suggested (Appendix B).

4.6.2 Final Report

A final report should be prepared for Department of Education at the end of the five-year period. This report should list:

- The number and species of all plants planted in the revegetation process;
- The extent of weed management required, and treatments applied;
- Photographs taken annually from the reference points to document the changes in the condition and structure of the rehabilitation works; and
- Any issues associated with the rehabilitation works that may affect the future survival of the vegetation.

Figure 4-1 Photo Monitoring Points

5 MANAGEMENT ZONES

The management zones have been outlined in the Vegetation Management Map (Figure 5-1). They mostly consist of the areas of primary focus such as around the threatened tree species found on site, the mapped TEC zone and the bushfire APZ area. Other areas that also need to be considered are areas around the old house, the open paddock areas and the landscaped areas around the proposed school buildings.

5.1 Around the Threatened Wallangarra White Gum (*Eucalyptus scoparia*)

This area is located to the north of the site located off Ferodale Road. This area can be seen as the light blue area Zone 1 in the Vegetation Management Map (Figure 5-1). The trunk was found to have scratch marks which is likely to be from a possum due to the shallow indentation marks that were close together. It is expected that this zone would have the highest chance of being impacted by being located within the activity footprint and along the road edge and main access point to the north of the site.

5.1.1 Weed management

There is a large weed infestation of Lantana and Japanese Honeysuckle (*Lonicera japonica*) underneath the Wallangarra White Gum that will be recommended to be removed by hand. Other weeds in this area include African Olive and Tobacco Bush. It should be noted that Lantana is considered a Weed of National Significance (WoNs) and should be treated as a priority. Refer to the methods outlined in Section 4.1 for the treatment methods for these weeds.

5.2 Within the TEC mapped zone

Fencing should be considered to prevent contamination during the construction period. This will prevent further rubbish and weed seed spreading into the TEC zone. However, the fencing should be koala friendly (see associated KPoM). This area is mapped as red area Zone 2 in the Vegetation Management Map (Figure 5-1).

5.2.1 Weed management

There are sporadic patches of Lantana throughout the entire zone. Considering that Lantana is a WoNS weed and that it is within a TEC then this should be treated as a high priority. Other weeds in this area include Small-leaved Privet seedlings, African Olive, Ochna, Agapanthus and a large Camphor Laurel tree. Refer to the methods outlined in Section 4.1 for the treatment methods for these weeds.

5.2.2 Rubbish removal zones

There were two large historical rubbish dump piles found in this area one of which had multiple barrels with hazardous warning signs. Therefore, it is recommended that the rubbish be removed by professionals for safety reasons. Another reason for a professional removalist is because there may be a chance of asbestos material though no obvious signs were identified during the inspection. Caution should also be made during removal as these areas are also potential habitat for reptile species such as snakes.

5.3 Within the bushfire APZ Area

This area is the 16m orange buffer zone seen in Figure 5-2 which is from the bushfire assessment report (Eco Logical Nov 2023). It is also referred to as the orange zone 3 in the Vegetation Management Map (Figure 5-1). The zone does not need much to establish as the majority is within the open paddock areas. The area also includes the existing dwelling located in the south east corner of site which is planned for demolition along with the small shed nearby. The temporary greenhouse was already removed at the time of the site inspection.

5.3.1 APZ establishment

The initial establishment will be the most labour intensive whereas the following years maintenance works will be essentially keeping down the regrowth. There is also the proposed road access for the firefighters which would also act as a vegetation break.

5.3.2 Around the house

The house is proposed for demolition, and it would likely be during this stage that the exotic weeds around the house and rubbish would also be removed. The nearby shed will also be included in removal. It will be the established driveway that would be the main access point for the firefighters.

5.3.2.1 Weed management

Weeds in this zone include Evergreen Ash which is a large hedge along Abundance Road. It is recommended that these would be removed and replaced with Preferred Koala Food Trees to enhance the connectivity for the koala movement. Other woody weeds around the house includes Cordyline (*Cordyline sp*), Abelia (*Abelia grandifola*), Yesterday Today Tomorrow (*Brunfelsia pauciflora*). Herbaceous weeds found in this area include Purpletop (*Verbena bonariensis*), Thistles (*Cirsium vulgare*), Dock (*Rumex sp*), Agapanthus (*Agapanthus praecox. subsp.orientalis*) and Buttercup (*Ranunculus sp).* Refer to the methods outlined in Section 4.1 for the treatment methods for these weeds.

5.4 Open paddock area

This area is currently holding horses on adjustment which will be removed prior to construction. This can be seen in the Zone 4 purple area seen in Figure 5-1. The internal fences and the small shed in the northern paddock will also be removed. It is this area that will be the most disturbed during the construction phase. There are a few native Silky Oak (*Grevillea robusta*) trees that have likely been planted as they are not native to the Sydney region.

5.4.1 Weed management

The weeds in this zone are primarily paddock weeds including Patterson's Curse (*Echium plantagineum*), Fireweed (*Senecio madagascariensis*), Coolatai Grass (*Hyparrhenia hirta*), Brome Grass (*Bromus sp*) and Quaking Grass (*Briza sp*). Fireweed is considered a WoNS and should be prioritised for treatment. Refer to the methods outlined in Section 4.1 for the treatment methods for these weeds.

5.4.2 Area to be revegetated

It is recommended that revegetation occurs along the Abundance Road fence line to enhance the connectivity with the area. Planted species should include Preferred Koala Food Trees and species within the PCT 3995 indicative list. These would include Eucalyptus species such as Swamp Mahogany (*Eucalyptus robusta)* and Forest Red Gum (*Eucalyptus tereticornis)*. Considering the entire site is classified as having a high bush fire rating, the plantings should not be dense and spread every 20 m. The area to be revegetated would be within the school fence line outside of the APZ zone. This can be seen as part of Zone 4 on Vegetation Management Plan (Figure 5-1)

5.4.3 Proposed Landscaping around the school buildings

Generally small areas of shrubs and groundcovers are planted around the school buildings for aesthetic values. It is recommended that this garden bed be filled with species on the PCT list attached in the Appendix. Alternatively, any natives would be suitable instead of exotics so that there is a reduced chance of weed seed being spread into the TEC found on site.

Figure 5-1 Vegetation Management Plan

Figure 5-2 Bushfire Asset Protection Zone (Source Eco Logical Nov 2023)

6 WORKS SCHEDULE

The NVMP shall operate for the duration period of five years. This period is adequate to allow time for:

- The establishment of the APZ area;
- Native regeneration to occur within the VRZ;
- Assisted replanting to be established; and
- Monitoring to be effective in preventing exotic species from encroaching upon the TEC.

The proposed works are scheduled according to the chart below (Table 6-1).

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Table 6-1 Schedule of the Native Vegetation Management Plan for the 5-year timeframe

	Year 1				Year 2				Year 3				Year 4				Year 5			
Months (abbreviated)	JFM	AMJ	JAS	OND	JFM	AMJ	JAS	OND	JFM	AMJ	JAS	OND	JFM	AMJ	JAS	OND	JFM	AMJ	JAS	OND
Install erosion/ weed suppressant controls	■																			
Revegetation works within management zones		■	■	■																
Establishment of APZ	■																			
Maintenance of APZ			■				■				■				■				■	
Weed management	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Replanting if required						■								■						
Monitoring and reporting	■		■		■		■		■		■		■		■		■		■	
Final Report																				■

JFM = January, February, March; AMJ = April, May, June; JAS = July, August, September; OND = October, November, December

6.1 Budget

An indicative budget for the proposed revegetation works can be seen in Table 6-2. Prices were based off the Newcastle Wildflower Garden Nursery stock list for the plants and Arborgreen stock list for the stakes and matting. Note prices for labour are an approximation and a quote from a qualified bush regeneration company may be needed closer to the time of works for a more accurate pricing.

Table 6-2 Indicative Budget for a 5-year NVMP.

Description	No.	Rate	Cost
Weed management			
Labour	20 days	$300/day	$6,000
APZ establishment and maintenance			
Labour	5 days	$300/day	$1,500
Zone 4			
Trees	10	$6.95	$69.50
Labour	0.5 days	$300/day	$150
Guards with stake included	30	$3	$90
Allowance for replanting (including labour)			$300
Monitoring and reporting			$24,000
Total			**$32,109.50**

7 REFERENCES

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APPENDIX A- INDICATIVE SPECIES LIST FOR PCT 3995- HUNTER COAST PAPERBARK – SWAMP MAHOGANY FOREST

PCT 3995- Hunter Coast Paperbark – Swamp Mahogany Forest TEC- YES/ NO

Indicative Species List

TREE SPECIES	FERN SPECIES	FORB SPECIES
Angophora costata	*Gleichenia dicarpa*	*Centella asiatica*
Angophora inopina	*Hypolepis muelleri*	*Centella cordifolia*
Banksia integrifolia	*Pteridium esculentum*	*Commelina cyanea*
Banksia serrata	*Telmatoblechnum indicum*	*Dianella caerulea*
Casuarina glauca	GRASS & GRASSLIKE SPECIES	*Dianella longifolia*
Corymbia maculata	*Baloskion pallens*	*Gonocarpus micranthus*
Eucalyptus robusta	*Baloskion tetraphyllum*	*Gonocarpus tetragynus*
Eucalyptus tereticornis	*Chorizandra sphaerocephala*	*Goodenia bellidifolia*
Eucalyptus x kirtoniana	*Empodisma minus*	*Goodenia heterophylla*
Glochidion ferdinandi	*Entolasia marginata*	*Goodenia paniculata*
Melaleuca quinquenervia	*Entolasia stricta*	*Liparophyllum exaltatum*
SHRUB SPECIES	*Ficinia nodosa*	*Pomax umbellata*
Acacia irrorata	*Gahnia clarkei*	*Viola hederacea*
Acacia longifolia	*Hemarthria uncinata*	OTHER SPECIES/CLIMBERS
Acacia ulicifolia	*Imperata cylindrica*	*Calochlaena dubia*
Breynia oblongifolia	*Isolepis inundata*	*Cassytha glabella*
Dodonaea triquetra	*Juncus continuus*	*Cayratia clematidea*
Leptospermum juniperinum	*Lepidosperma forsythii*	*Clematis aristata*
Leptospermum polygalifolium	*Lepidosperma longitudinale*	*Eustrephus latifolius*
Melaleuca ericifolia	*Lomandra longifolia*	*Geitonoplesium cymosum*
Melaleuca linariifolia	*Machaerina articulata*	*Glycine clandestina*
Melaleuca sieberi	*Machaerina juncea*	*Hibbertia scandens*
Monotoca elliptica	*Microlaena stipoides*	*Kennedia rubicunda*
Polyscias sambucifolia	*Oplismenus imbecillis*	*Pandorea pandorana subsp. pandorana*
Pultenaea retusa	*Paspalidium distans*	*Parsonsia straminea*
Pultenaea villosa	*Pseudoraphis paradoxa*	*Polymeria calycina*
Viminaria juncea	*Schoenus brevifolius*	*Stephania japonica var. discolor*

BOLD= Dominant species

APPENDIX B- MONITORING PHOTOS

Figure 7-1 Near Petrol Station

Figure 7-2 Top Section near E. scoparia

Figure 7-3 Top east corner on Abundance Road

Figure 7-4 South east corner below house

Figure 7-5 Bottom southeast PCT/APZ area.

Figure 7-6 South west Section in dogleg area of PCT zone.

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Varsity Lakes QLD 4227
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APPENDIX F- PRELIMINARY TREE ASSESSMENT

New High School for Medowie

ARBORICULTURAL IMPACT ASSESSMENT

Aaron Bath
ASSURANCE TREES | 80 HORNS CROSSING ROAD, VACY, NSW, 2421

22 JANUARY 2025

Contents

We acknowledge the Traditional Custodians of the land, the Worimi people. We pay our respects to their Elders past, present, and emerging, and extend that respect to all Aboriginal and Torres Strait Islander.

Table 1 - Document Control

Document Control		
Version	*Issued Date*	*Reviewed By*
DRAFT v1	9th Jan 2025	GYDE, NBRS, Colliers
DRAFT v2	19th Jan 2025	Colliers
Final v1	22nd Jan 2025	

Table 2 - REF Checklist

Requirement	Y	N	Comments
General Requirements	Y		
Does the REF include an acknowledgement of country?	Y		Just below Contents
Details of the proposed activity?	Y		Project Description
A description of the site (including address and lot/DP) and surrounding environment using text and plans/photos including details the environmental features and planning constraints?	Y		Site Description
An assessment of potential impacts of the proposal?	Y		Schedule 2 - Tree Data
A statement certifying that the contents are true, and correct?	Y		Appendix F – Limitations and Disclaimer
A statement that the proposed activity qualifies as development without consent?	Y		Project Description
A schedule of mitigation measures that are specific and deliverable?	Y		Schedule 1 – Mitigation Measures
Has an Arboricultural Impact Assessment (AIA) been prepared to support the REF which assesses existing trees within the proposed works area, including street trees, and recommends tree protection measures for trees to be retained?	Y		Whole of Document

1. Executive Summary

1.1. This document has been prepared in accordance with the Guidelines for Division 5.1 assessments by the Department of Planning, Housing and Infrastructure (formerly the Department of Planning and Environment), June 2022) and recent addendum for schools. This can be accessed here: Development without consent | Planning (nsw.gov.au).

1.2. Of the 101 trees within or near to the activity area, there are 40 trees that will require removal. Of these 40 trees, 25 are listed as weeds on the NSW Weedwise website and should be removed regardless of the activities as part of the regional weed program.

1.3. The overall impact on the environment from tree loss is as follows:

1.3.1. High Retention Value - 4

1.3.2. Moderate Retention Value - 6

1.3.3. Low Retention Value - 4

1.3.4. Very Low Retention Value – 26 (weeds as per Weed Wise NSW)

1.4. Tree 1 is listed as Endangered in NSW and Vulnerable in Australia. This tree will be subject to multiple construction activities that will need to be carefully managed to enable the successful retention of the tree.

1.5. This report details all require mitigation measures to ensure that retained trees are protected and remain viable beyond the completion of the project.

1.6. Schedule 2 - Tree Data and Schedule 3 – Maps can be found in this report and will provide location and detailed information on each tree and all mitigation measures required.

1.7. In summary the overall impact of the activities is easily managed with the mitigation measures as outlined in this report. The number of high and moderate retention value trees being removed for the development is very minimal with compared to even standard home construction on residential land in the Port Stephens area. Particularly when considering that a high number of weed species will be removed from the environment.

2. Introduction

2.1. **Consultant Details**

Company: Assurance Trees Pty Ltd

ABN: 87 158 399 350

Consulting Arborist: Aaron Bath

Mobile: (+61) 434523566

Email: aaron@assurancetrees.com.au

2.2. **Proponent**

The *Department of Education* (DoE) is the landowner, proponent and determining authority pursuant to *Section 5.1* of the *Environmental Planning and Assessment Act 1979 (the Act)*.

2.3. **Site Details**

Site Address: 6 Abundance Street, Medowie, NSW

Deposited Plan: Lot 3 in DP788451

Map of Site: *Appendix B*

2.4. **Introduction**

This *Arboricultural Impact Assessment (AIA)* has been prepared to support a Review of Environmental Factors (REF) for the proposed New High School for Medowie (the activity). The purpose of the REF is to assess the potential environmental impacts of the activity prescribed by State Environmental Planning Policy (Transport and Infrastructure) 2021 (T&I SEPP) as “development permitted without consent” on land carried out by or on behalf of a public authority under *Part 5* of the *Environmental Planning and Assessment Act 1979 (EP&A Act)*.

The activity is to be undertaken pursuant to Chapter 3, Part 3.4, Section 3.37A of the T&I SEPP.

The activity will be carried out at 6 Abundance Street, Medowie (the site). The purpose of this report is to investigate the impacts of the activity on the existing tree population within the development footprint. This involves quantifying the total loss/benefit of trees removed and establishing the overall loss of moderate and high retention value trees which contribute positively to the local environment.

The AIA also specifies any trees that can be retained and any required protection measures that will need to be utilised during the construction process. This is to ensure high quality trees are retained as assets that contribute positively to the development and the local environment upon the completion of the project.

The AIA will provide the evidence required to make a clear determination of the total effect on the environment from all clearing works.

3. Site Description

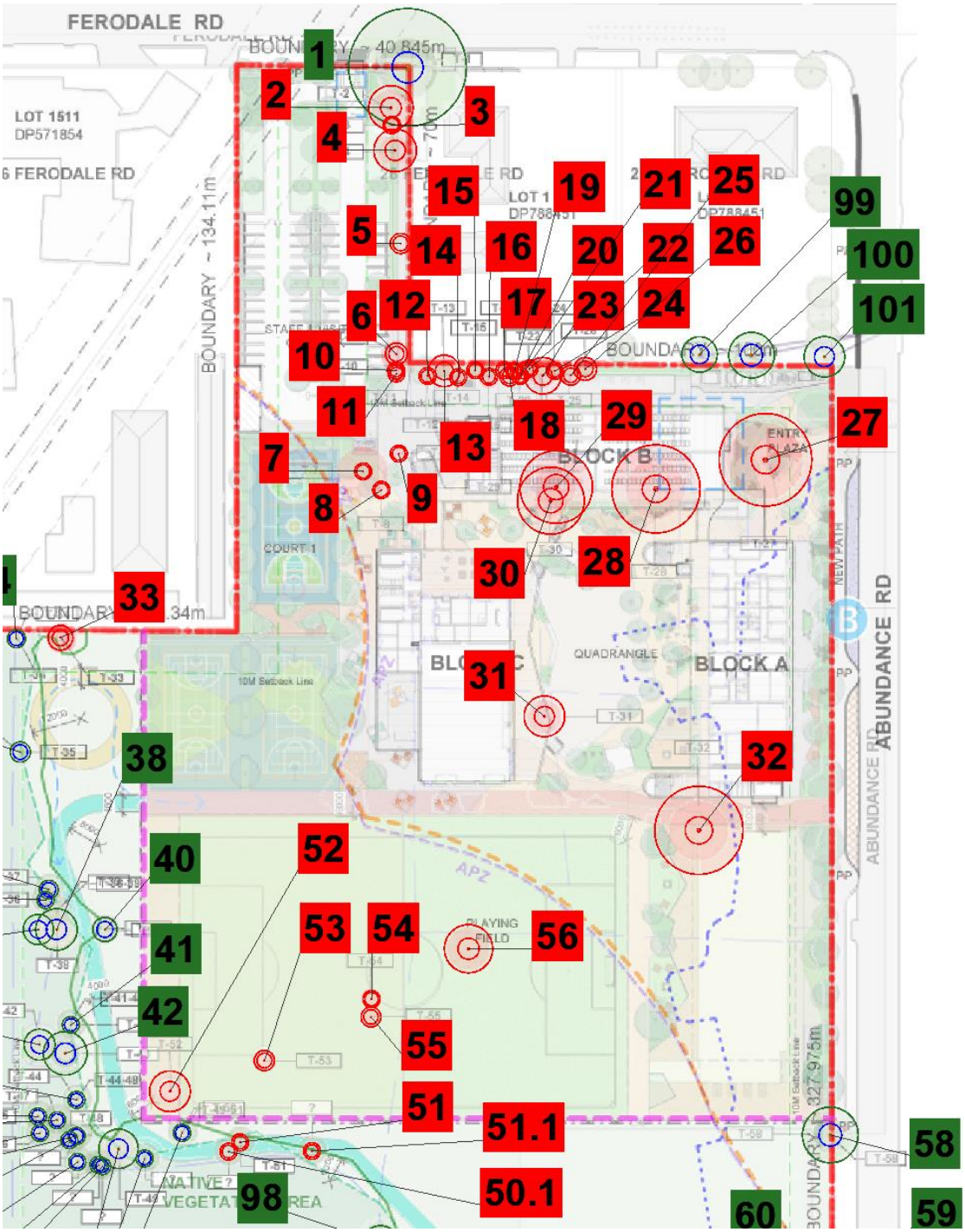

Figure 1 - Summary map of tree removals.

The site has a street address of 6 Abundance Road, Medowie. It is 6.51ha in area, and comprises 1 allotment, legally described as Lot 3 in DP788451. A large proportion of the site is currently unused and vacant. A small, shed structure and caravan are located adjacent to the northern boundary. A cluster of buildings including a single storey dwelling, an outhouse/shed structure and temporary greenhouse are located within the southeastern corner. The site contains a largely vegetated area to the southwest corner. The site is relatively flat with a gradual fall from west to east toward Abundance Road. The site has a primary frontage to Abundance Road to the east and Ferodale Road to the north. Abundance Road and Ferodale Road are both classified Local Roads. Medowie Road, approximately 1km east of the site, is a classified Regional Road. The area surrounding the site mostly consists of industrial, rural residential, educational, and agricultural lands. Adjacent to the northwestern boundary is a Shell petrol station and mechanic garage. Adjacent to the northeastern boundary is a medical health clinic. Across Abundance Road along the eastern boundary are several warehouse and light industrial developments. Directly north of the site across Ferodale Road are large lots used for agricultural purposes. Medowie Public School is located on Ferodale Road, to the northwest of the site, opposite the Shell petrol station.

4. Project Description

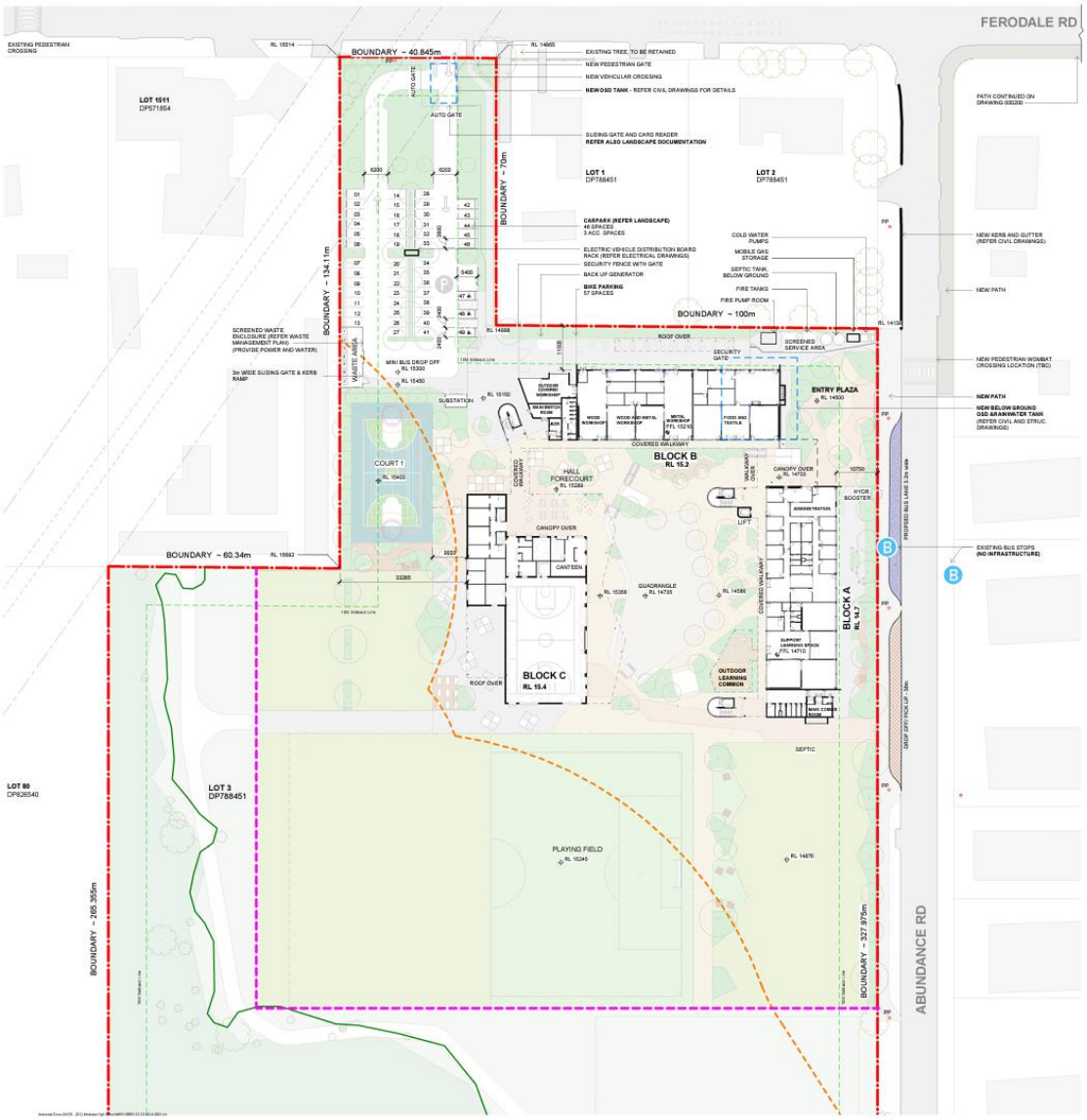

Figure 2 - Site Plan (NBRS)

The proposed activity involves the construction of school facilities on the site for the purpose of the New High School for Medowie. The site contains a densely vegetated area to the southwest corner which is identified as land with high biodiversity values corresponding to the areas of remnant native vegetation (*PCT 3995 – Hunter Coast Paperbark-Swamp Mahogany Forest*). The existing dwelling house and other structures on the site will be demolished as part of the works. No other works are proposed within this area. The proposed new school will accommodate 640 students in 29 permanent teaching spaces including 3 support teaching spaces across 3-storeys of buildings on the site. The proposed activity be delivered across 1 stage, and will consist of the following:

29 permanent teaching spaces including 3 support teaching spaces, to accommodate 640 students, and school hall to accommodate 1,000 students. Approximately 10,500 sqm of GFA is proposed.

- Main vehicular ingress and egress to Ferodale Road to the north, with a new pedestrian and vehicle crossing proposed.
- Main pedestrian access to Abundance Road.
- Kiss and ride, and bus drop and pick up areas to Abundance Road (6 x parallel spaces).
- New pedestrian wombat crossing to Abundance Road
- Approximately 55 x car parking spaces and 3 x accessible car parking spaces.
- Approximately 70 x bicycle parking spaces.
- Block A (Admin) consisting of administration and learning spaces.
- Block B (Foodtech/Workshop) consisting of food technology rooms and workshops.
- Block C (Hall) consisting of school hall to accommodate 1,000 students.
- Central quad, 1 playing field, and 1 sports courtyard.

The proposed school development will include the following spaces; general learning spaces, General support learning spaces, administrative services, staff areas, gym and canteen, library areas for science, wood and metal, food and textiles, health PE, performing arts, additional learning spaces, student amenities, storage, movement (stairs and covered walkways).

5. Report Methodology

5.1. A review of all plans was undertaken to understand the planned activities onsite prior to a site inspection.

5.2. A Preliminary Tree Assessment (PTA) was undertaken in 2023 by AQF5 consulting arborist Joseph Pidutti and a report dated 3rd November 2023 issued. The tree data from Joseph Pidutti's PTA have been used as the basis for this report.

5.3. Site inspection was completed on 12th of December 2024 by Aaron Bath. A walk around the site on foot to gain an understanding of the topography and the context of trees in the landscape.

5.4. A detailed review of all tree data was undertaken as follows:

5.4.1. Complete recalculation of Tree Retention Values for all trees.

5.4.2. Complete recalculation of all TPZ and SRZ values.

5.4.3. Checks on all tree data collected, looking for obvious errors.

5.5. Detailed review of all impacts on trees that may occur from the activity. This includes footprints of all structures, civil works, services, temporary structures and site requirements for construction activities.

5.6. Prepare a Tree Location Plan.

5.7. Prepare a Tree Protection Plan for all retained trees onsite.

5.8. Prepare a detailed Tree Protection Plan for tree 1 at entrance from Ferodale Road. Considering impacts from electrical, stormwater and civil works.

5.9. Summary of all tree removals and the overall impact to the environment.

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6. Due Diligence

6.1. Site Description

The site is a 6.51-hectare parcel of land (Lot 3 in DP788451) located with primary frontages to Abundance Road and Ferodale Road, both classified as Local Roads. It features a mix of unused vacant land, a small shed and caravan near the northern boundary, and a cluster of buildings, including a dwelling, outhouse, and greenhouse in the southeastern corner. The site slopes gradually from west to east towards Abundance Road and includes a largely vegetated area in the southwest. Surrounding land uses include industrial, rural residential, agricultural, and educational zones, with a petrol station, mechanic garage, medical clinic, and warehouses nearby, as well as large agricultural lots to the north and Medowie Public School to the northwest.

6.2. Tree Species

Tree species within the activity area are dominated by weed species including African Olive (*Olea europaea*), Privet (*Ligustrum spp.*) and Camphor Laurel (*Cinnamomum camphora*). These weed species make up most of the trees requiring removal due to the activities onsite.

Native species onsite comprise Blackbutt (*Eucalyptus pilularis*), Sydney Peppermint (*Eucalyptus piperita*), Silky Oak (*Grevillea robusta*), Native Daphne (*Pittosporum undulatum*), Smooth-barked Apple (*Angophora costata*), Cheese Tree (*Glochidion ferdinandii*), various other local *Eucalyptus* species and a small number of exotic trees common to urban areas.

6.3. Protected Species

A single occurrence of Wallangarra White Gum (*Eucalyptus scoparia*) is located at the front of the site along Ferodale Road. This tree, numbered tree 1, is listed as Vulnerable under the *Environmental Protection and Biodiversity Conservation Act 1999* and Endangered under the NSW *Biodiversity Conservation Act 2016*. Protection of this tree during construction activities is a high priority.

6.4. Ecology, Hollows and Koala

For all ecological matters refer to reports by ecologist.

6.5. Heritage Links

A search on the State Heritage Inventory shows no heritage trees on the property.

6.6. Significant Trees

No significant trees are located on the subject site, or adjoining properties.

7. Tree Removal

7.1. Of the 101 trees within or near to the activity area, there are 40 trees that will require removal. Of these 40 trees, 26 are listed as weeds on the NSW Weedwise website and should be removed as part of the regional weed program, regardless of the activities onsite.

7.2. For identification and all locations of trees to be removed see Figure 7 – Tree Location Plan and Schedule 2 - Tree Data

7.3. All reasoning/justification for tree removals is shown in Schedule 2 - Tree Data.

7.4. A breakdown of the Retention Value of trees requiring removal below:

- 4 x High Retention Value
- 6 x Moderate Retention Value
- 4 x Low Retention Value
- 26 x Very Low Retention Value

7.5. Standards for the contractor that is engaged to conduct the tree removals are listed in Appendix C – Contractor Guidelines/Standards.

7.6. There is many small shrubs and weeds in clusters that do not fit the definition of a tree that will be removed. Most of the are weed species such as Lantana, African Olive and Tobacco Bush.

7.7. The overall impact of the activities on the trees is very low with most of the vegetation removal being weed and undesirable species.

8. Mitigation Measures

All retained trees as per Table 3 - Mitigation Measures, shall be retained and protected in accordance with the instructions for each tree. Standard protection measures apply to all retained trees onsite and it is the responsibility of the Principal Contractor to ensure that all TPZ's that are close to construction activities are protected in accordance with the standard protection measures and ongoing advice from the Project Arborist (PA).

8.1. Project Arborist

As per the requirements of *AS4970-2009 Protection of Trees on Development Sites*, a suitably qualified and experienced Project Arborist (PA) must be appointed at the start of the project by the principal contractor to manage and ensure trees are managed in accordance with this plan.

The PA must be an independent consultant not associated with any tree lopping or clearing contractor. The PA must have a minimum 5 years' experience as an AQF5 Consulting Arborist and have demonstratable experience conducting root investigations.

The PA must be appointed before any practical works onsite commence including any site establishment. The PA is to conduct the inspections as per the schedule below, and provide evidence that this has been completed:

- Pre-clearing inspection to positively ID all trees listed for removal.
- Inspection of all Tree Protection as per the requirements of this report.
- Inspection of TPZ prior to removal of Tree Protection upon completion of works.
- Final report certifying that all protection measures have been completed throughout the life of the project.

The PA must approve any access and works that are to occur inside any TPZ prior to the works occurring. This is to ensure that all compounding effects over the course of the project can be properly assessed.

All works inside the TPZ of a retained tree must be supervised by the PA.

8.2. Standard Tree Protection

Below is the specification for protection measures as per *AS4970 Protection of Trees on Development Sites*.

Tree protection measures include a range of activities and structures. Structures are used to

identify and isolate the TPZ.

The TPZ is a restricted area usually delineated by protective fencing (or use of an existing structure such as an existing fence or wall). It is installed prior to site establishment and retained intact until completion of the works.

Any works inside a TPZ must be supervised by the project arborist. Any additional encroachment that becomes necessary as the site works progress must be reviewed by the project arborist and be acceptable to the determining authority before being carried out. Approved tree removal and pruning should be carried out before the installation of tree protection measures.

8.2.1. Activities Restricted Within the TPZ

Activities generally excluded from the TPZ include but are not limited to—

- machine excavation including trenching;
- excavation for silt fencing;
- cultivation;
- storage;
- preparation of chemicals, including preparation of cement products;
- parking of vehicles and plant;
- refuelling;
- dumping of waste;
- wash down and cleaning of equipment;
- placement of fill;
- lighting of fires;
- soil level changes;
- temporary or permanent installation of utilities and signs, and
- physical damage to the tree.

8.2.2. Protective Fencing

Fencing should be erected before any machinery or materials are brought onto the site and before the commencement of works including demolition. Once erected, protective fencing must not be removed or altered without approval by the project arborist. The TPZ should be secured to restrict access.

Fence posts and supports should have a diameter greater than 20 mm and be located clear of roots. Existing perimeter fencing and other structures may be suitable as part of the protective fencing.

8.2.3. Signs

Signs identifying the TPZ should be placed around the edge of the TPZ and be visible from within the development site (see image below).

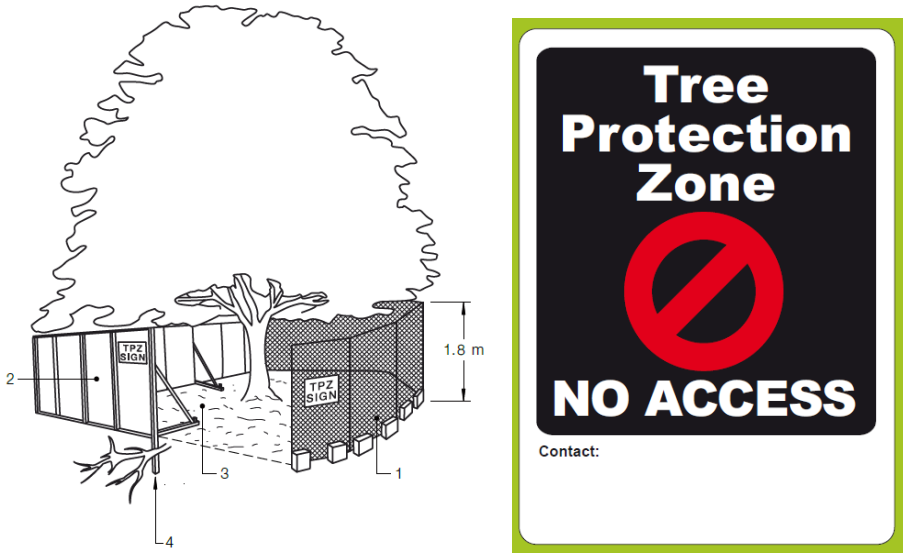

Figure 3 - Tree Protection Zone fencing example and example of a sign format

8.2.4. Other Protection Measures

When tree protection fencing cannot be installed or requires temporary removal, other tree protection measures should be used, including those set out below.

8.2.4.1. Trunk and branch protection

Where necessary, install protection to the trunk and branches of trees as shown below.
The materials and positioning of protection are to be specified by the project arborist. A minimum height of 2 m is recommended.
Do not attach temporary powerlines, stays, guys and the like to the tree. Do not drive nails into the trunks or branches.

8.2.4.2. Ground protection

If temporary access for machinery is required within the TPZ ground protection measures will be required. The purpose of ground protection is to prevent root damage and soil compaction within the TPZ. Measures may include a permeable membrane such as geotextile fabric beneath a layer of mulch or crushed rock below rumble boards as per figure below. These measures may be applied to root zones beyond the TPZ

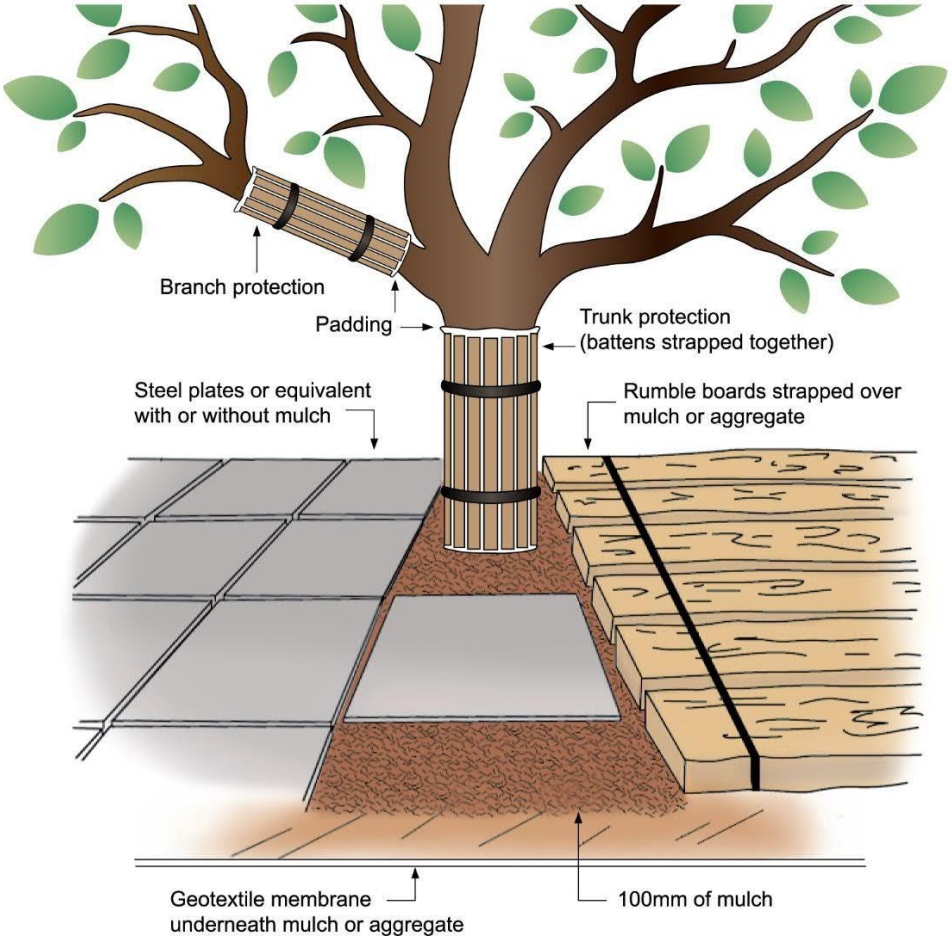

Figure 4 - Tree Protection Measures if fencing cannot be maintained or must be removed

8.2.5. Root protection during works within the TPZ

All excavation inside the TPZ should be carried out under the supervision of the project arborist to identify roots critical to tree stability. Relocation or redesign of works may be required, depending on actual location of roots.

Where the project arborist identifies roots to be pruned within or at the outer edge of the TPZ, they should be pruned with a final cut to undamaged wood. Pruning cuts should be made with sharp tools such as secateurs, pruners, handsaws or chainsaws. It is not acceptable for large roots within the TPZ to be 'pruned' with machinery such as backhoes or excavators.

Where roots within the TPZ are exposed by excavation, temporary root protection should be installed to prevent them drying out. This may include jute mesh or hessian sheeting as multiple layers over exposed roots and excavated soil profile, extending to the full depth of the root zone. Root protection sheeting should be pegged in place and kept moist during the period that the root zone is exposed.

Other excavation works in proximity to trees, including landscape works such as paving, irrigation and planting can adversely affect root systems. Seek advice from the project arborist.

8.2.6. Installing underground services within TPZ

All services should be routed outside the TPZ. If underground services must be routed within the TPZ, they should be installed by directional drilling or in manually excavated trenches. The directional drilling bore should be at least 600 mm deep. The project arborist should assess the likely impacts of boring and bore pits on retained trees. For manual excavation of trenches the project arborist should advise on roots to be retained and should monitor the works. Manual excavation may include the use of pneumatic and hydraulic tools.

8.2.7. Scaffolding

Where scaffolding is required, it should be erected outside the TPZ. Where it is essential for scaffolding to be erected within the TPZ, branch removal should be minimized. This can be achieved by designing scaffolding to avoid branches or tying back branches. Where pruning is unavoidable it must be specified by the project arborist in accordance with AS 4373. Ground below the scaffolding should be protected by boarding (e.g. scaffold board or plywood sheeting) as shown in Figure 5. Where access is required, a board walk, or other surface material should be installed to minimize soil compaction. Boarding should be placed over a layer of mulch and impervious sheeting to prevent soil contamination. The boarding should be left in place until the scaffolding is removed. Image below shows an example of appropriate scaffolding setup with a TPZ.

8.2.8. Tree 99, 100 & 101

These trees are located to the north of the Services Area. A modified Tree Protection Plan has been prepared for these trees. Figure 9 - Tree Protection Plan 2 (Tree 99, 100, 101).

8.2.9. Tree 1

Tree 1 is listed as Endangered in NSW and Vulnerable in Australia. This tree will be subject to multiple construction activities that will need to be carefully managed to enable the successful retention of the tree. A modified Tree Protection Plan has been prepared for this tree. Figure 8 - Tree Protection Plan 1 (tree 1).

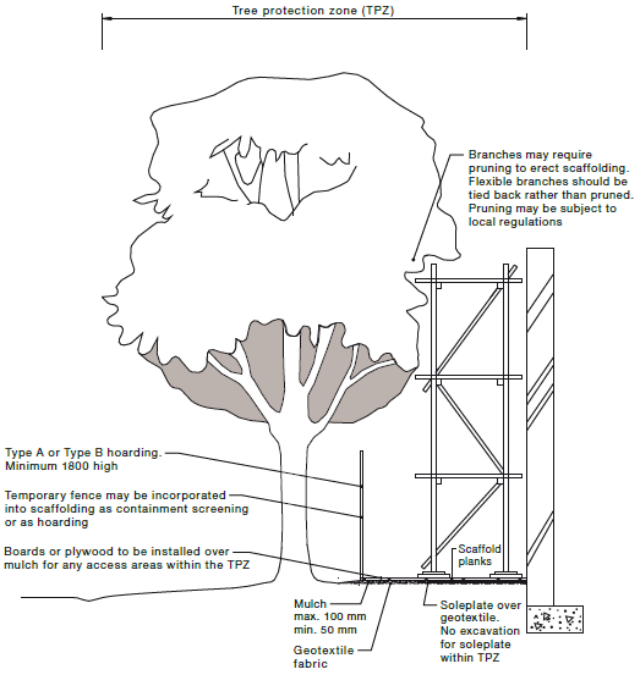

Figure 5 - Scaffolding Setup Example

8.2.10. Mulching

The area within the TPZ should be mulched. The mulch must be maintained to a depth of 50–100 mm using leaf or forest mulch. Where the existing landscape within the TPZ is to remain unaltered (e.g. garden beds or turf) mulch may not be required.

8.2.11. Watering

Soil moisture levels should be regularly monitored by the project arborist. Temporary irrigation or watering may be required within the TPZ. An above-ground irrigation system should be installed and maintained by a competent individual.

8.2.12. Weed removal

All weeds should be removed by hand without soil disturbance or should be controlled with appropriate use of herbicide.

Schedule 1 – Mitigation Measures

Tree #	Botanical Name Common Name	Retention Value	TPZ radius m	SRZ radius m	Risks	Incursion %	Risk Rating	Method	Method Risk Rating	Comments
1	*Eucalyptus scoparia* Wallangarra White Gum	High	13.92	3.52	Root impact from electrical trenching	0%	Nil	Redesign electrical trench to fall outside TPZ.	Nil	Preferred option as the electrical trenching will remove all roots on the outside of the TPZ due to depth of excavation. This is highly impacting the TPZ.
						Less 30% - Current Design	Moderate	Dig all electrical services inside the TPZ with horizontal drilling at a depth greater than 1000mm.	Low	This option would allow for a more flexible service location and is typical installation method around trees for mains power.
								PA to assess impacts of boring pits if inside the TPZ.		
								PA to monitor works and methods.		
								Ground mats to prevent compaction used for all plant and equipment inside the TPZ		
						Less 20%	Moderate	Move trenching outside SRZ and conduct non-destructive digging methods such as vac truck.	Low/Moderate	
								PA to approve final design and to monitor works.		
								Ground mats to prevent compaction used for all plant and equipment inside the TPZ		
						Less 10%	Low	Conduct trenching works with traditional excavation with hand digging and NDD if required under supervision of PA	Low	
								Ground mats to prevent compaction used for all plant and equipment inside the TPZ		
					Root impact from stormwater and OSD	0%	Nil	Redesign stormwater trench to fall outside TPZ	Nil	
						Less 10% - Current Design	Moderate	Trenching route to be pre inspected by PA using slot trenching either side of the proposed route completed with a Vac Truck under low water pressure. PA to determine root density and advise if traditional excavation can be used of NDD only to retain roots in sections of the trench while still allowing for install of pipes.	Low	
								Ground mats to prevent compaction used for all plant and equipment inside the TPZ		
						Less 5%	Low	Standard construction methods to be approved and supervised by PA.	Low	

#	Botanical Name Common Name	Retention Value	TPZ radius m	SRZ radius m	Risks	Incursion %	Risk Rating	Method	Method Risk Rating	Comments
								Ground mats to prevent compaction used for all plant and equipment inside the TPZ		
					Driveway Crossover	Less 5% - Current Design	Low	Works to be supervised by PA No machinery allowed inside TPZ area that is not part of the driveway.	Low	
								Ground mats to prevent compaction used for all plant and equipment inside the TPZ		
					Driveway	Less 5% - Current Design	Low	Standard construction methods to be approved and supervised by PA.	Low	
								Ground mats to prevent compaction used for all plant and equipment inside the TPZ		
					Pathway	Less 6% - Current Design	Moderate	Subbase excavation depth to be not more than 100mm lower than existing ground level. 20mm of sand as sublayer and 125mm concrete pathway.	Low	
								Standard construction methods to be approved and supervised by PA.		
								Ground mats to prevent compaction used for all plant and equipment inside the TPZ		
					Vegetation removal inside TPZ	Less 2%	Moderate	All removals inside the TPZ must be supervised by the PA. All works must be completed by hand and in dry conditions. Trucks and chipping machines to remain outside the TPZ and vegetation dragged out by winch or hand.	Low	
					Site and Silt Fencing	Less 2%	Moderate	Silt fencing must not be installed inside the TPZ. Silt fencing can be installed along the outer edges of the TPZ fencing.	Low	
34	*Eucalyptus pilularis* Blackbutt	Moderate	2.16	1.61	Any construction activities	Nil	Low	If construction activities risk impacting the TPZ, install standard protection fencing around the TPZ.	Low	
35	Dead tree	Very Low	2.40	1.68	Any construction activities in SRZ	Nil	Low	If construction activities risk impacting the TPZ, install standard protection fencing around the TPZ.	Low	
36	*Eucalyptus piperita* Sydney Peppermint	High	2.23	1.63	Any construction activities	Nil	Low	If construction activities risk impacting the TPZ, install standard protection fencing around the TPZ.	Low	

#	Botanical Name Common Name	Retention Value	TPZ radius m	SRZ radius m	Risks	Incursion %	Risk Rating	Method	Method Risk Rating	Comments
37	*Eucalyptus piperita* Sydney Peppermint	High	2.00	1.50	Any construction activities	Nil	Low	If construction activities risk impacting the TPZ, install standard protection fencing around the TPZ.	Low	
38	*Eucalyptus pilularis* Blackbutt	High	4.92	2.28	Fire Trail	Less 10%	Moderate	Protect tree with standard protection fencing around the TPZ area. Protective fencing can be moved to facilitate construction activities only under PA supervision. PA to supervise all works inside the TPZ.	Low	
39	*Eucalyptus piperita* Sydney Peppermint	High	3.60	2.00	Any construction activities	Nil	Low	If construction activities risk impacting the TPZ, install standard protection fencing around the TPZ.	Low	
40	*Eucalyptus piperita* Sydney Peppermint	High	2.88	1.82	Fire Trail	Less 10%	Moderate	Protect tree with standard protection fencing around the TPZ area. Protective fencing can be moved to facilitate construction activities only under PA supervision. PA to supervise all works inside the TPZ.	Low	
41	*Eucalyptus piperita* Sydney Peppermint	High	2.00	1.50	Any construction activities	Nil	Low	If construction activities risk impacting the TPZ, install standard protection fencing around the TPZ.	Low	
42	*Eucalyptus signata* Scribbly Gum	Moderate	5.16	2.32	Any construction activities	Nil	Low	If construction activities risk impacting the TPZ, install standard protection fencing around the TPZ.	Low	
43	*Eucalyptus piperita* Sydney Peppermint	High	3.67	2.01	Any construction activities	Nil	Low	If construction activities risk impacting the TPZ, install standard protection fencing around the TPZ.	Low	
44	*Eucalyptus spp.*	Moderate	2.00	1.50	Any construction activities	Nil	Low	If construction activities risk impacting the TPZ, install standard protection fencing around the TPZ.	Low	
45	*Eucalyptus spp.*	Moderate	2.00	1.50	Any construction activities	Nil	Low	If construction activities risk impacting the TPZ, install standard protection fencing around the TPZ.	Low	
46	*Eucalyptus spp.*	Moderate	2.00	1.50	Any construction activities	Nil	Low	If construction activities risk impacting the TPZ, install standard protection fencing around the TPZ.	Low	
47	*Eucalyptus spp.*	Moderate	2.00	1.50	Any construction activities	Nil	Low	If construction activities risk impacting the TPZ, install standard protection fencing around the TPZ.	Low	
48	*Eucalyptus spp.*	Moderate	2.04	1.57	Any construction activities	Nil	Low	If construction activities risk impacting the TPZ, install standard protection fencing around the TPZ.	Low	
48.1	*Eucalyptus pilularis* Blackbutt	Moderate	2.00	1.50	Any construction activities	Nil	Low	If construction activities risk impacting the TPZ, install standard protection fencing around the TPZ.	Low	

#	Botanical Name Common Name	Retention Value	TPZ radius m	SRZ radius m	Risks	Incursion %	Risk Rating	Method	Method Risk Rating	Comments
48.2	*Eucalyptus pilularis* Blackbutt	Moderate	2.00	1.50	Any construction activities	Nil	Low	If construction activities risk impacting the TPZ, install standard protection fencing around the TPZ.	Low	
48.3	*Eucalyptus pilularis* Blackbutt	Moderate	2.00	1.50	Any construction activities	Nil	Low	If construction activities risk impacting the TPZ, install standard protection fencing around the TPZ.	Low	
48.4	*Eucalyptus pilularis* Blackbutt	Moderate	2.00	1.50	Any construction activities	Nil	Low	If construction activities risk impacting the TPZ, install standard protection fencing around the TPZ.	Low	
49	*Eucalyptus piperita* Sydney Peppermint	High	4.67	2.23	Fire Trail	Less 10%	Moderate	Protect tree with standard protection fencing around the TPZ area. Protective fencing can be moved to facilitate construction activities only under PA supervision. PA to supervise all works inside the TPZ.	Low	
49.1	*Eucalyptus pilularis* Blackbutt	Moderate	2.00	1.50	Any construction activities	Nil	Low	If construction activities risk impacting the TPZ, install standard protection fencing around the TPZ.	Low	
50	*Eucalyptus pilularis* Blackbutt	Moderate	2.06	1.58	Any construction activities	Nil	Low	If construction activities risk impacting the TPZ, install standard protection fencing around the TPZ.	Low	
57	*Angophora costata* Smooth-barked Apple	Very Low	10.48	3.13	Any construction activities	Nil	Low	If construction activities risk impacting the TPZ, install standard protection fencing around the TPZ.	Low	
58	*Angophora costata* Smooth-barked Apple	Moderate	6.60	2.57	Landscaping and Hardscapes	Less 10%	Low	Protect tree with standard protection fencing around the TPZ area. Protective fencing can be moved to facilitate construction activities only under PA supervision. PA to supervise all works inside the TPZ.	Low	
59	*Angophora costata* Smooth-barked Apple	Low	2.52	1.72	Any construction activities	Nil	Low	If construction activities risk impacting the TPZ, install standard protection fencing around the TPZ.	Low	
60	*Angophora costata* Smooth-barked Apple	Moderate	2.40	1.68	Any construction activities	Nil	Low	If construction activities risk impacting the TPZ, install standard protection fencing around the TPZ.	Low	
61	*Angophora costata* Smooth-barked Apple	Moderate	5.40	2.37	Any construction activities	Nil	Low	If construction activities risk impacting the TPZ, install standard protection fencing around the TPZ.	Low	
62	*Eucalyptus spp.*	Low	3.56	1.99	Any construction activities	Nil	Low	If construction activities risk impacting the TPZ, install standard protection fencing around the TPZ.	Low	
63	*Eucalyptus pilularis* Blackbutt	Low	3.96	2.08	Any construction activities	Nil	Low	If construction activities risk impacting the TPZ, install standard protection fencing around the TPZ.	Low	

#	Botanical Name Common Name	Retention Value	TPZ radius m	SRZ radius m	Risks	Incursion %	Risk Rating	Method	Method Risk Rating	Comments
64	*Corymbia gummifera* Red Bloodwood	Very Low	3.14	1.89	Any construction activities	Nil	Low	If construction activities risk impacting the TPZ, install standard protection fencing around the TPZ.	Low	
65	*Eucalyptus pilularis* Blackbutt	Low	3.60	2.00	Any construction activities	Nil	Low	If construction activities risk impacting the TPZ, install standard protection fencing around the TPZ.	Low	
66	*Eucalyptus spp.*	Very Low	3.12	1.88	Any construction activities	Nil	Low	If construction activities risk impacting the TPZ, install standard protection fencing around the TPZ.	Low	
67	*Melia azedarach* White Cedar	Very Low	7.56	2.73	Any construction activities	Nil	Low	If construction activities risk impacting the TPZ, install standard protection fencing around the TPZ.	Low	
68	*Pinus radiata* Radiata Pine	Moderate	5.40	2.37	Any construction activities	Nil	Low	If construction activities risk impacting the TPZ, install standard protection fencing around the TPZ.	Low	
69	*Fraxinus griffithii* Evergreen Ash	Low	2.00	1.50	Any construction activities	Nil	Low	If construction activities risk impacting the TPZ, install standard protection fencing around the TPZ.	Low	
70	*Fraxinus griffithii* Evergreen Ash	Moderate	5.36	2.36	Fire Trail and Demolition of House	Less 10%	Moderate	Protect tree with standard protection fencing around the TPZ area. Protective fencing can be moved to facilitate construction activities only under PA supervision. PA to supervise all works inside the TPZ. Existing driveway to form part of fire trail so impacts will be minimal.	Low	
71	*Populus nigra 'Italica'* Lombardy Poplar	Low	7.76	2.76	Fire Trail	Less 20%	Moderate	Existing driveway so impacts will be minimal despite significant encroachment %. Protection fencing can allow access along existing driveway without supervision of PA. PA to supervise all ground disturbing works inside the TPZ.	Low	
72	*Fraxinus griffithii* Evergreen Ash x 3	Low	2.00	1.45	Fire Trail	Less 5%	Low	Existing driveway so impacts will be minimal. Protection fencing can allow access along existing driveway without supervision of PA. PA to supervise all ground disturbing works inside the TPZ.	Low	
73	*Eucalyptus piperita* Sydney Peppermint	Moderate	9.96	3.06	Any construction activities	Nil	Low	If construction activities risk impacting the TPZ, install standard protection fencing around the TPZ.	Low	
74	Dead tree	Very Low	5.44	2.37	Any construction activities	Nil	Low	If construction activities risk impacting the TPZ, install standard protection fencing around the TPZ.	Low	

#	Botanical Name Common Name	Retention Value	TPZ radius m	SRZ radius m	Risks	Incursion %	Risk Rating	Method	Method Risk Rating	Comments
75	*Eucalyptus pilularis* Blackbutt	High	5.52	2.39	Any construction activities	Nil	Low	If construction activities risk impacting the TPZ, install standard protection fencing around the TPZ.	Low	
76	*Eucalyptus pilularis* Blackbutt	High	4.92	2.28	Any construction activities	Nil	Low	If construction activities risk impacting the TPZ, install standard protection fencing around the TPZ.	Low	
77	*Eucalyptus pilularis* Blackbutt	Very Low	7.80	2.76	Any construction activities	Nil	Low	If construction activities risk impacting the TPZ, install standard protection fencing around the TPZ.	Low	
78	*Eucalyptus pilularis* Blackbutt	High	8.33	2.84	Any construction activities	Nil	Low	If construction activities risk impacting the TPZ, install standard protection fencing around the TPZ.	Low	
79	*Eucalyptus piperita* Sydney Peppermint	High	4.44	2.18	Any construction activities	Nil	Low	If construction activities risk impacting the TPZ, install standard protection fencing around the TPZ.	Low	
80	*Eucalyptus piperita* Sydney Peppermint	High	4.56	2.20	Any construction activities	Nil	Low	If construction activities risk impacting the TPZ, install standard protection fencing around the TPZ.	Low	
81	Dead tree	Very Low	3.36	1.94	Any construction activities	Nil	Low	If construction activities risk impacting the TPZ, install standard protection fencing around the TPZ.	Low	
82	*Eucalyptus piperita* Sydney Peppermint	Moderate	4.08	2.10	Any construction activities	Nil	Low	If construction activities risk impacting the TPZ, install standard protection fencing around the TPZ.	Low	
83	*Eucalyptus piperita* Sydney Peppermint	Moderate	4.32	2.15	Any construction activities	Nil	Low	If construction activities risk impacting the TPZ, install standard protection fencing around the TPZ.	Low	
84	*Eucalyptus pilularis* Blackbutt	Moderate	6.72	2.59	Any construction activities	Nil	Low	If construction activities risk impacting the TPZ, install standard protection fencing around the TPZ.	Low	
85	*Eucalyptus piperita* Sydney Peppermint	High	14.98	3.63	Any construction activities	Nil	Low	If construction activities risk impacting the TPZ, install standard protection fencing around the TPZ.	Low	
86	Dead tree	Very Low	2.52	1.72	Any construction activities	Nil	Low	If construction activities risk impacting the TPZ, install standard protection fencing around the TPZ.	Low	
87	*Eucalyptus pilularis* Blackbutt	High	5.88	2.45	Any construction activities	Nil	Low	If construction activities risk impacting the TPZ, install standard protection fencing around the TPZ.	Low	
88	*Eucalyptus piperita* Sydney Peppermint	High	5.40	2.37	Any construction activities	Nil	Low	If construction activities risk impacting the TPZ, install standard protection fencing around the TPZ.	Low	
89	*Eucalyptus pilularis* Blackbutt	Very Low	2.00	1.50	Any construction activities	Nil	Low	If construction activities risk impacting the TPZ, install standard protection fencing around the TPZ.	Low	
90	*Eucalyptus pilularis* Blackbutt	High	6.72	2.59	Any construction activities	Nil	Low	If construction activities risk impacting the TPZ, install	Low	

#	Botanical Name Common Name	Retention Value	TPZ radius m	SRZ radius m	Risks	Incursion %	Risk Rating	Method	Method Risk Rating	Comments
								standard protection fencing around the TPZ.		
91	*Eucalyptus piperita* Sydney Peppermint	Moderate	6.72	2.59	Fire Trail	Less 10%	Moderate	Protect tree with standard protection fencing around the TPZ area. Protective fencing can be moved to facilitate construction activities only under PA supervision. PA to supervise all works inside the TPZ.	Low	
92	*Eucalyptus pilularis* Blackbutt	High	9.60	3.01	Any construction activities	Nil	Low	If construction activities risk impacting the TPZ, install standard protection fencing around the TPZ.	Low	
93	*Eucalyptus pilularis* Blackbutt	High	2.40	1.68	Any construction activities	Nil	Low	If construction activities risk impacting the TPZ, install standard protection fencing around the TPZ.	Low	
94	*Eucalyptus pilularis* Blackbutt	High	2.00	1.50	Any construction activities	Nil	Low	If construction activities risk impacting the TPZ, install standard protection fencing around the TPZ.	Low	
94.1	*Eucalyptus pilularis* Blackbutt	Moderate	2.00	1.50	Any construction activities	Nil	Low	If construction activities risk impacting the TPZ, install standard protection fencing around the TPZ.	Low	
95	*Eucalyptus pilularis* Blackbutt	Moderate	2.00	1.50	Any construction activities	Nil	Low	If construction activities risk impacting the TPZ, install standard protection fencing around the TPZ.	Low	
96	*Eucalyptus pilularis* Blackbutt	Moderate	2.00	1.50	Any construction activities	Nil	Low	If construction activities risk impacting the TPZ, install standard protection fencing around the TPZ.	Low	
97	*Eucalyptus piperita* Sydney Peppermint	High	4.20	2.13	Any construction activities	Nil	Low	If construction activities risk impacting the TPZ, install standard protection fencing around the TPZ.	Low	
98	*Eucalyptus piperita* Sydney Peppermint	High	4.20	2.13	Any construction activities	Nil	Low	If construction activities risk impacting the TPZ, install standard protection fencing around the TPZ.	Low	
99	*Quercus palustris* Pin Oak	High	4.20	2.13	Root damage from trenching underground services	Less 10%	Moderate	All Underground services are to be installed outside the TPZ.	Low	
					Slabs for above ground services	Less 5%	Low	All slabs are to be engineered to favour drilled piers rather than edge beams inside the TPZ. PA to supervise all construction activities inside the TPZ.	Low	
					Landscaping along boundary	Less 5%	Low	No excavation of existing soil along boundary. PA to approve final landscaping methodology.	Low	
					Site and Silt Fencing	Less 2%	Moderate	Silt fencing must not be installed inside the TPZ. Silt fencing can be installed along	Low	

#	Botanical Name Common Name	Retention Value	TPZ radius m	SRZ radius m	Risks	Incursion %	Risk Rating	Method	Method Risk Rating	Comments
								the outer edges of the TPZ fencing.		
100	*Quercus palustris* Pin Oak	High	5.40	2.37	Root damage from trenching underground services	Less 20%	High	All Underground services are to be installed outside the TPZ.	Low	
					Slabs for above ground services	Less 10%	Moderate	All slabs are to be engineered to favour drilled piers rather than edge beams inside the TPZ. PA to supervise all construction activities inside the TPZ.	Low	
					Landscaping along boundary	Less 5%	Low	No excavation of existing soil along boundary. PA to approve final landscaping methodology.	Low	
					Site and Silt Fencing	Less 2%	Moderate	Silt fencing must not be installed inside the TPZ. Silt fencing can be installed along the outer edges of the TPZ fencing.	Low	
101	*Liquidambar styraciflua* Sweetgum	High	4.80	2.25	Root damage from trenching underground services	Less 15%	High	All Underground services are to be installed outside the TPZ.	Low	
					Slabs for above ground services	Less 10%	Moderate	All slabs are to be engineered to favour drilled piers rather than edge beams inside the TPZ. PA to supervise all construction activities inside the TPZ.	Low	
					Landscaping along boundary	Less 5%	Low	No excavation of existing soil along boundary. PA to approve final landscaping methodology.	Low	
					Site and Silt Fencing	Less 2%	Moderate	Silt fencing must not be installed inside the TPZ. Silt fencing can be installed along the outer edges of the TPZ fencing.	Low	

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Schedule 2 - Tree Data

e 4 - Tree Data

Tree #	Botanical Name Common Name	DBH mm	DRC mm	Height m	Crown Spread NSEW m	Age Class	Structure	Health	Condition	SULE	Sustainability	Landscape Significance	Retention Value	TPZ radius m	SRZ radius m	Outcome	Reason
1	*Eucalyptus scoparia* Wallangarra White Gum	1160	1276	22	8565	M	Good/Fair	Fair	4	2d	15 - 40 years	Significant	High	13.92	3.52	Retained	Endangered Tree. Protect during construction. All TPZ works supervised by PA.
2	*Cinnamomum camphora* Camphor Laurel	437	481	14	5435	M	Good	Good	5	3c	15 - 40 years	Insignificant	Very Low	N/A	N/A	Remove	Pathway and weed species
3	*Cinnamomum camphora* Camphor Laurel	170	187	10	1311	SM	Good	Good	5	3c	15 - 40 years	Insignificant	Very Low	N/A	N/A	Remove	Pathway and weed species
4	*Olea europaea* African Olive	420	462	7	2517	M	Good/Fair	Good	5	3c	5 - 15 years	Insignificant	Very Low	N/A	N/A	Remove	Regional Priority Weed Species
5	*Olea europaea* African Olive	200	220	5	3122	SM	Good	Good	5	3c	5 - 15 years	Insignificant	Very Low	N/A	N/A	Remove	Regional Priority Weed Species
6	*Olea europaea* African Olive	216	238	5	4423	SM	Good	Good	5	3c	5 - 15 years	Insignificant	Very Low	N/A	N/A	Remove	Regional Priority Weed Species
7	*Olea europaea* African Olive	160	176	10	7555	M	Good/Fair	Good	4	3c	5 - 15 years	Insignificant	Very Low	N/A	N/A	Remove	Regional Priority Weed Species
8	*Pittosporum undulatum* Native Daphne	170	187	5	1141	SM	Fair	Good	5	3c	5 - 15 years	Low	Low	N/A	N/A	Remove	Low value, remove for landscaping, hardscape encroachments
9	*Pittosporum undulatum* Native Daphne	149	164	5	1221	SM	Good/Fair	Good	5	3c	5 - 15 years	Low	Low	N/A	N/A	Remove	Low value, remove for landscaping, hardscape encroachments
10	*Olea europaea* African Olive	141	155	5	1311	SM	Good	Good	5	3c	5 - 15 years	Insignificant	Very Low	N/A	N/A	Remove	Regional Priority Weed Species
11	*Pittosporum undulatum* Native Daphne	100	110	5	1111	SM	Good	Good	5	3c	5 - 15 years	Low	Low	N/A	N/A	Remove	Low value, remove for landscaping, hardscape encroachments
12	*Olea europaea* African Olive	141	155	5	1221	SM	Good	Good	5	3c	5 - 15 years	Insignificant	Very Low	N/A	N/A	Remove	Regional Priority Weed Species
13	*Olea europaea* African Olive	311	342	7	3432	SM	Good	Good	5	3c	5 - 15 years	Insignificant	Very Low	N/A	N/A	Remove	Regional Priority Weed Species
14	*Olea europaea* African Olive	141	155	5	1211	SM	Good	Good	5	3c	5 - 15 years	Insignificant	Very Low	N/A	N/A	Remove	Regional Priority Weed Species
15	*Ligustrum sinense* Small-leaf Privet	150	165	5	2212	SM	Good/Fair	Good	5	3c	5 - 15 years	Insignificant	Very Low	N/A	N/A	Remove	Regional Priority Weed Species
16	*Olea europaea* African Olive	141	155	6	3322	SM	Good	Good	5	3c	5 - 15 years	Insignificant	Very Low	N/A	N/A	Remove	Regional Priority Weed Species
17	*Olea europaea* African Olive	110	121	5	1311	SM	Good	Good	5	3c	5 - 15 years	Insignificant	Very Low	N/A	N/A	Remove	Regional Priority Weed Species
18	*Olea europaea* African Olive	191	210	5	3312	SM	Good	Good	5	3c	5 - 15 years	Insignificant	Very Low	N/A	N/A	Remove	Regional Priority Weed Species
19	*Olea europaea* African Olive	160	176	5	2311	SM	Good	Good	5	3c	5 - 15 years	Insignificant	Very Low	N/A	N/A	Remove	Regional Priority Weed Species
20	*Olea europaea* African Olive	156	172	5	2311	SM	Good	Good	5	3c	5 - 15 years	Insignificant	Very Low	N/A	N/A	Remove	Regional Priority Weed Species
21	*Olea europaea* African Olive	156	172	5	1311	SM	Good	Good	5	3c	5 - 15 years	Insignificant	Very Low	N/A	N/A	Remove	Regional Priority Weed Species
22	*Olea europaea* African Olive	160	176	5	2311	SM	Good/Fair	Good	5	3c	5 - 15 years	Insignificant	Very Low	N/A	N/A	Remove	Regional Priority Weed Species
23	*Cinnamomum camphora* Camphor Laurel	361	397	10	3432	M	Good/Fair	Good	5	3c	15 - 40 years	Insignificant	Very Low	N/A	N/A	Remove	Hardscape area and weed species
24	*Olea europaea* African Olive	141	155	5	2211	SM	Good	Good	5	3c	5 - 15 years	Insignificant	Very Low	N/A	N/A	Remove	Regional Priority Weed Species
25	*Olea europaea* African Olive	196	216	5	1322	SM	Good/Fair	Good	5	3c	5 - 15 years	Insignificant	Very Low	N/A	N/A	Remove	Regional Priority Weed Species
26	*Ligustrum lucidum* Large-Leaf Privet	227	250	7	2323	M	Good/Fair	Good	5	3c	5 - 15 years	Insignificant	Very Low	N/A	N/A	Remove	Regional Priority Weed Species
27	*Grevillea robusta* Silky Oak	913	1004	20	9877	M	Fair	Good/Fair	4	3d	15 - 40 years	Moderate	Moderate	N/A	N/A	Remove	Fire hydrant, entry plaza hardscape, fair structure, higher ongoing risk of failure.
28	*Grevillea robusta* Silky Oak	870	957	20	8877	M	Good/Fair	Good/Fair	5	3b	Greater 40 years	High	High	N/A	N/A	Remove	Block B structure

#	Botanical Name Common Name	DBH mm	DRC mm	Height m	Crown Spread NSEW m	Age Class	Structure	Health	Condition	SULE	Sustainability	Landscape Significance	Retention Value	TPZ radius m	SRZ radius m	Outcome	Reason
29	*Grevillea robusta* Silky Oak	716	788	20	7274	M	Good	Good/Fair	5	1b	Greater 40 years	High	High	N/A	N/A	Remove	Block B structure
30	*Grevillea robusta* Silky Oak	660	726	20	1636	M	Good	Good	5	1b	Greater 40 years	High	High	N/A	N/A	Remove	Block B structure
31	*Melia azedarach* White Cedar	402	442	7	4444	SM	Good/Fair	Good	5	2b	Less 5 years	Low	Very Low	N/A	N/A	Remove	Very Low Value, Hazardous tree in school area due to toxic insects. Hardscapes and Landscaping.
32	*Grevillea robusta* Silky Oak	870	957	20	8877	M	Good/Fair	Good	5	1b	Greater 40 years	High	High	N/A	N/A	Remove	Hardscapes and Septic tank. Not viable for retention with severe TPZ encroachment.
33	*Olea europaea* African Olive	245	270	7	4343	M	Good/Fair	Good	5	3c	5 - 15 years	Insignificant	Very Low	N/A	N/A	Remove	Regional Priority Weed Species
34	*Eucalyptus pilularis* Blackbutt	180	198	10	3111	SM	Good/Fair	Good	5	2d	15 - 40 years	High	Moderate	2.16	1.61	Retained	
35	Dead tree	200	220	10	0	SM	Poor	Poor	1	4a	Dead or hazardous	Low	Very Low	2.40	1.68	Retained	
36	*Eucalyptus piperita* Sydney Peppermint	186	205	10	1111	SM	Good/Fair	Good	5	1b	Greater 40 years	High	High	2.23	1.63	Retained	
37	*Eucalyptus piperita* Sydney Peppermint	110	121	10	1111	SM	Good	Good	5	1b	Greater 40 years	High	High	2.00	1.50	Retained	
38	*Eucalyptus pilularis* Blackbutt	410	451	20	5553	M	Good	Good	5	1b	Greater 40 years	High	High	4.92	2.28	Retained	
39	*Eucalyptus piperita* Sydney Peppermint	300	330	20	3222	M	Good	Good	5	1b	Greater 40 years	High	High	3.60	2.00	Retained	
40	*Eucalyptus piperita* Sydney Peppermint	240	264	12	2121	SM	Good	Good	5	1b	Greater 40 years	High	High	2.88	1.82	Retained	
41	*Eucalyptus piperita* Sydney Peppermint	110	121	10	1111	SM	Good	Good	5	1b	Greater 40 years	High	High	2.00	1.50	Retained	
42	*Eucalyptus signata* Scribbly Gum	430	473	18	5542	M	Fair	Good	4	2d	15 - 40 years	High	Moderate	5.16	2.32	Retained	
43	*Eucalyptus piperita* Sydney Peppermint	306	337	18	3112	M	Good/Fair	Good	4	2d	Greater 40 years	High	High	3.67	2.01	Retained	
44	*Eucalyptus spp.*	110	121	7	1111	SM	Good	Good	5	1b	Greater 40 years	Moderate	Moderate	2.00	1.50	Retained	
45	*Eucalyptus spp.*	110	121	7	1111	SM	Good	Good	5	1b	Greater 40 years	Moderate	Moderate	2.00	1.50	Retained	
46	*Eucalyptus spp.*	100	110	7	1111	SM	Good	Good	5	1b	Greater 40 years	Moderate	Moderate	2.00	1.50	Retained	
47	*Eucalyptus spp.*	110	121	7	1111	SM	Good	Good	5	1b	Greater 40 years	Moderate	Moderate	2.00	1.50	Retained	
48	*Eucalyptus spp.*	170	187	10	1111	SM	Good	Good	5	1b	Greater 40 years	Moderate	Moderate	2.04	1.57	Retained	
48.1	*Eucalyptus pilularis* Blackbutt	50	55	5	1111	J	Good	Good	6	1a	Greater 40 years	Moderate	Moderate	2.00	1.50	Retained	
48.2	*Eucalyptus pilularis* Blackbutt	50	55	5	1111	J	Good	Good	6	1a	Greater 40 years	Moderate	Moderate	2.00	1.50	Retained	
48.3	*Eucalyptus pilularis* Blackbutt	50	55	5	1111	J	Good	Good	6	1a	Greater 40 years	Moderate	Moderate	2.00	1.50	Retained	
48.4	*Eucalyptus pilularis* Blackbutt	50	55	5	1111	J	Good	Good	6	1a	Greater 40 years	Moderate	Moderate	2.00	1.50	Retained	
49	*Eucalyptus piperita* Sydney Peppermint	389	428	18	7164	M	Good/Fair	Good	5	2d	Greater 40 years	High	High	4.67	2.23	Retained	
49.1	*Eucalyptus pilularis* Blackbutt	50	55	5	1111	J	Good	Good	6	1a	Greater 40 years	Moderate	Moderate	2.00	1.50	Retained	
50	*Eucalyptus piperita* Sydney Peppermint	172	189	10	1111	SM	Fair	Good	4	1b	Greater 40 years	Moderate	Moderate	2.06	1.58	Retained	
50.1	*Eucalyptus piperita* Sydney Peppermint	140	154	10	1111	SM	Good	Good	5	1b	Greater 40 years	Moderate	Moderate	2.00	1.45	Remove	Removed for fire trail. Lowest impact pathway through trees and TPZ

#	Botanical Name Common Name	DBH mm	DRC mm	Height m	Crown Spread NSEW m	Age Class	Structure	Health	Condition	SULE	Sustainability	Landscape Significance	Retention Value	TPZ radius m	SRZ radius m	Outcome	Reason
51	*Eucalyptus piperita* Sydney Peppermint	140	154	10	1111	SM	Good	Good	5	1b	Greater 40 years	Moderate	Moderate	2.00	1.45	Remove	Removed for fire trail. Lowest impact pathway through trees and TPZ
51.1	*Eucalyptus piperita* Sydney Peppermint	100	110	7	1111	J	Good	Good	6	1b	Greater 40 years	Moderate	Moderate	N/A	N/A	Remove	Removed for fire trail. Lowest impact pathway through trees and TPZ
52	*Glochidion ferdinandii* Cheese Tree	402	442	5	3222	SM	Good/Fair	Good	5	2d	15 - 40 years	Moderate	Moderate	N/A	N/A	Remove	Nuisance, low amenity value, isolated, future Soccer Oval area,
53	*Glochidion ferdinandii* Cheese Tree	200	220	5	3222	SM	Good/Fair	Good	5	2d	15 - 40 years	Moderate	Moderate	N/A	N/A	Remove	Nuisance, low amenity value, isolated, future Soccer Oval area,
54	*Olea europaea* African Olive	156	172	5	4114	SM	Good/Fair	Good	5	3c	5 - 15 years	Insignificant	Very Low	N/A	N/A	Remove	Regional Priority Weed Species
55	*Pittosporum undulatum* Native Daphne	197	217	5	1233	SM	Good/Fair	Good	5	3c	5 - 15 years	Low	Low	N/A	N/A	Remove	Low value, poor appearance, future Soccer Oval area
56	*Olea europaea* African Olive	476	524	10	5555	M	Good/Fair	Good	5	3c	5 - 15 years	Insignificant	Very Low	N/A	N/A	Remove	Regional Priority Weed Species
57	*Angophora costata* Smooth-barked Apple	873	960	10	2434	M	Poor	Poor	2	4a	Dead or hazardous	Low	Very Low	10.48	3.13	Retained	
58	*Angophora costata* Smooth-barked Apple	550	605	22	5523	M	Fair	Good	4	2b	5 - 15 years	High	Moderate	6.60	2.57	Retained	
59	*Angophora costata* Smooth-barked Apple	210	231	5	1111	SM	Poor	Poor	2	3b	Less 5 years	High	Low	2.52	1.72	Retained	
60	*Angophora costata* Smooth-barked Apple	200	220	5	3112	SM	Fair	Good	5	2d	5 - 15 years	High	Moderate	2.40	1.68	Retained	
61	*Angophora costata* Smooth-barked Apple	450	495	20	5324	M	Good/Fair	Good	5	2d	15 - 40 years	High	Moderate	5.40	2.37	Retained	
62	*Eucalyptus spp.*	297	327	7	1112	SM	Poor	Good/Fair	3	3b	Less 5 years	High	Low	3.56	1.99	Retained	
63	*Eucalyptus pilularis* Blackbutt	330	363	15	4214	M	Fair	Good	5	2d	Less 5 years	High	Low	3.96	2.08	Retained	
64	*Corymbia gummifera* Red Bloodwood	262	288	5	2211	SM	Poor	Good	5	3b	Less 5 years	Moderate	Very Low	3.14	1.89	Retained	
65	*Eucalyptus pilularis* Blackbutt	300	330	18	2111	M	Poor	Good	4	3b	Less 5 years	High	Low	3.60	2.00	Retained	
66	*Eucalyptus spp.*	260	286	10	2112	SM	Poor	Good	3	3b	Less 5 years	Moderate	Very Low	3.12	1.88	Retained	
67	*Melia azedarach* White Cedar	630	693	15	7346	M	Fair	Good	4	2b	Dead or hazardous	Moderate	Very Low	7.56	2.73	Retained	
68	*Pinus radiata* Radiata Pine	450	495	18	5414	M	Good	Good	5	2d	15 - 40 years	Moderate	Moderate	5.40	2.37	Retained	
69	*Fraxinus griffithii* Evergreen Ash x 17	80	88	Avg 5	1111	SM	Good	Good	5	3c	5 - 15 years	Low	Low	2.00	1.50	Retained	
70	*Fraxinus griffithii* Evergreen Ash	447	492	15	6252	M	Good	Good	5	2d	15 - 40 years	Moderate	Moderate	5.36	2.36	Retained	
71	*Populus nigra 'Italica'* Lombardy Poplar	647	712	23	1111	OM	Good	Good	5	3c	5 - 15 years	Low	Low	7.76	2.76	Retained	
72	*Fraxinus griffithii* Evergreen Ash x 3	140	154	Avg 5	3333	SM	Good/Fair	Good	5	3c	5 - 15 years	Low	Low	2.00	1.45	Retained	
73	*Eucalyptus piperita* Sydney Peppermint	830	913	25	6418	M	Good/Fair	Good/Fair	4	2d	15 - 40 years	High	Moderate	9.96	3.06	Retained	
74	Dead tree	453	498	20	3312	M	Poor	Poor	1	4a	Dead or hazardous	Low	Very Low	5.44	2.37	Retained	
75	*Eucalyptus pilularis* Blackbutt	460	506	25	2322	M	Good/Fair	Good	5	1b	Greater 40 years	High	High	5.52	2.39	Retained	
76	*Eucalyptus pilularis* Blackbutt	410	451	25	3343	M	Good	Good	5	1b	Greater 40 years	High	High	4.92	2.28	Retained	
77	*Eucalyptus pilularis* Blackbutt	650	715	25	4657	M	Poor	Poor	1	4a	Dead or hazardous	Low	Very Low	7.80	2.76	Retained	
78	*Eucalyptus pilularis* Blackbutt	694	763	25	3529	M	Good/Fair	Good	4	1b	Greater 40 years	High	High	8.33	2.84	Retained	

#	Botanical Name Common Name	DBH mm	DRC mm	Height m	Crown Spread NSEW m	Age Class	Structure	Health	Condition	SULE	Sustainability	Landscape Significance	Retention Value	TPZ radius m	SRZ radius m	Outcome	Reason
79	*Eucalyptus piperita* Sydney Peppermint	370	407	20	2433	M	Good	Good	5	1b	Greater 40 years	High	High	4.44	2.18	Retained	
80	*Eucalyptus piperita* Sydney Peppermint	380	418	15	7355	M	Good	Good/Fair	5	1b	Greater 40 years	High	High	4.56	2.20	Retained	
81	Dead tree	280	308	7	0	SM	Poor	Poor	1	4a	Dead or hazardous	Low	Very Low	3.36	1.94	Retained	
82	*Eucalyptus piperita* Sydney Peppermint	340	374	15	8124	M	Good/Fair	Good	5	2d	15 - 40 years	High	Moderate	4.08	2.10	Retained	
83	*Eucalyptus piperita* Sydney Peppermint	360	396	12	3221	SM	Fair	Good/Fair	5	2c	5 - 15 years	High	Moderate	4.32	2.15	Retained	
84	*Eucalyptus pilularis* Blackbutt	560	616	25	2265	M	Fair	Good	4	2d	5 - 15 years	High	Moderate	6.72	2.59	Retained	
85	*Eucalyptus piperita* Sydney Peppermint	1248	1373	25	14 14 10 14	M	Good/Fair	Good/Fair	4	1b	Greater 40 years	High	High	14.98	3.63	Retained	
86	Dead tree	210	231	10	0	SM	Poor	Poor	1	4a	Dead or hazardous	Low	Very Low	2.52	1.72	Retained	
87	*Eucalyptus pilularis* Blackbutt	490	539	25	3333	M	Good	Good	5	1b	Greater 40 years	High	High	5.88	2.45	Retained	
88	*Eucalyptus piperita* Sydney Peppermint	450	495	25	5242	M	Good	Good/Fair	5	1b	Greater 40 years	High	High	5.40	2.37	Retained	
89	*Eucalyptus pilularis* Blackbutt	550	605	25	1542	M	Poor	Poor	1	4a	Dead or hazardous	Low	Very Low	2.00	1.50	Retained	
90	*Eucalyptus pilularis* Blackbutt	560	616	25	8 2 10 5	M	Good	Good/Fair	5	1b	Greater 40 years	High	High	6.72	2.59	Retained	
91	*Eucalyptus piperita* Sydney Peppermint	560	616	15	7575	M	Good	Good/Fair	5	2d	15 - 40 years	High	Moderate	6.72	2.59	Retained	
92	*Eucalyptus pilularis* Blackbutt	800	880	30	7 9 10 7	M	Good	Good/Fair	4	1b	Greater 40 years	High	High	9.60	3.01	Retained	
93	*Eucalyptus pilularis* Blackbutt	200	220	15	1121	SM	Good	Good	5	1b	Greater 40 years	High	High	2.40	1.68	Retained	
94	*Eucalyptus pilularis* Blackbutt	290	319	18	3121	SM	Good	Good	5	1b	Greater 40 years	High	High	2.00	1.50	Retained	
94.1	*Eucalyptus pilularis* Blackbutt	80	85	5	1111	J	Good	Good	6	1a	Greater 40 years	Moderate	Moderate	2.00	1.50	Retained	
95	*Eucalyptus pilularis* Blackbutt	368	405	12	2161	SM	Fair	Good/Fair	4	2b	5 - 15 years	High	Moderate	2.00	1.50	Retained	
96	*Eucalyptus pilularis* Blackbutt	80	80	5	1111	J	Good	Good	6	1a	Greater 40 years	Moderate	Moderate	2.00	1.50	Retained	
97	*Eucalyptus piperita* Sydney Peppermint	350	380	17	5564	M	Good	Good	5	1b	Greater 40 years	High	High	4.20	2.13	Retained	
98	*Eucalyptus piperita* Sydney Peppermint	350	380	18	7687	M	Good	Good	5	1b	Greater 40 years	High	High	4.20	2.13	Retained	
99	*Quercus palustris* Pin Oak	350	380	10	3333	M	Good	Excellent	6	1a	Greater 40 years	High	High	4.20	2.13	Retained	Neighbours tree. Protect during construction
100	*Quercus palustris* Pin Oak	450	550	15	4444	M	Good	Excellent	6	1a	Greater 40 years	High	High	5.40	2.37	Retained	Neighbours tree. Protect during construction
101	*Liquidambar styraciflua* Sweetgum	400	450	14	6666	M	Fair	Good	4	1b	Greater 40 years	High	High	4.80	2.25	Retained	Neighbours tree. Protect during construction

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Schedule 3 – Maps

Figure 6 - Site Location (Six Maps, 2025)

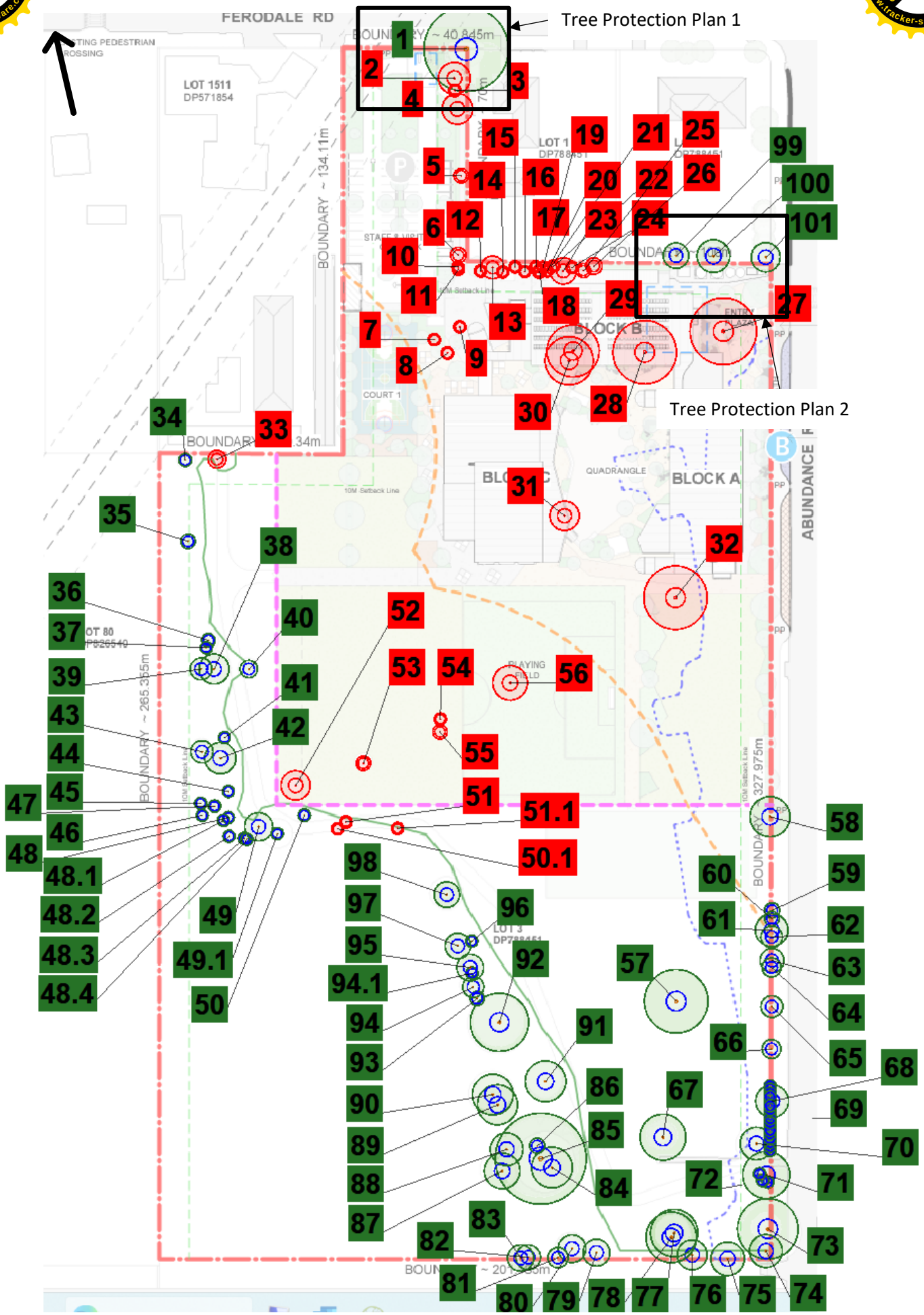

Figure 7 – Tree Location Plan

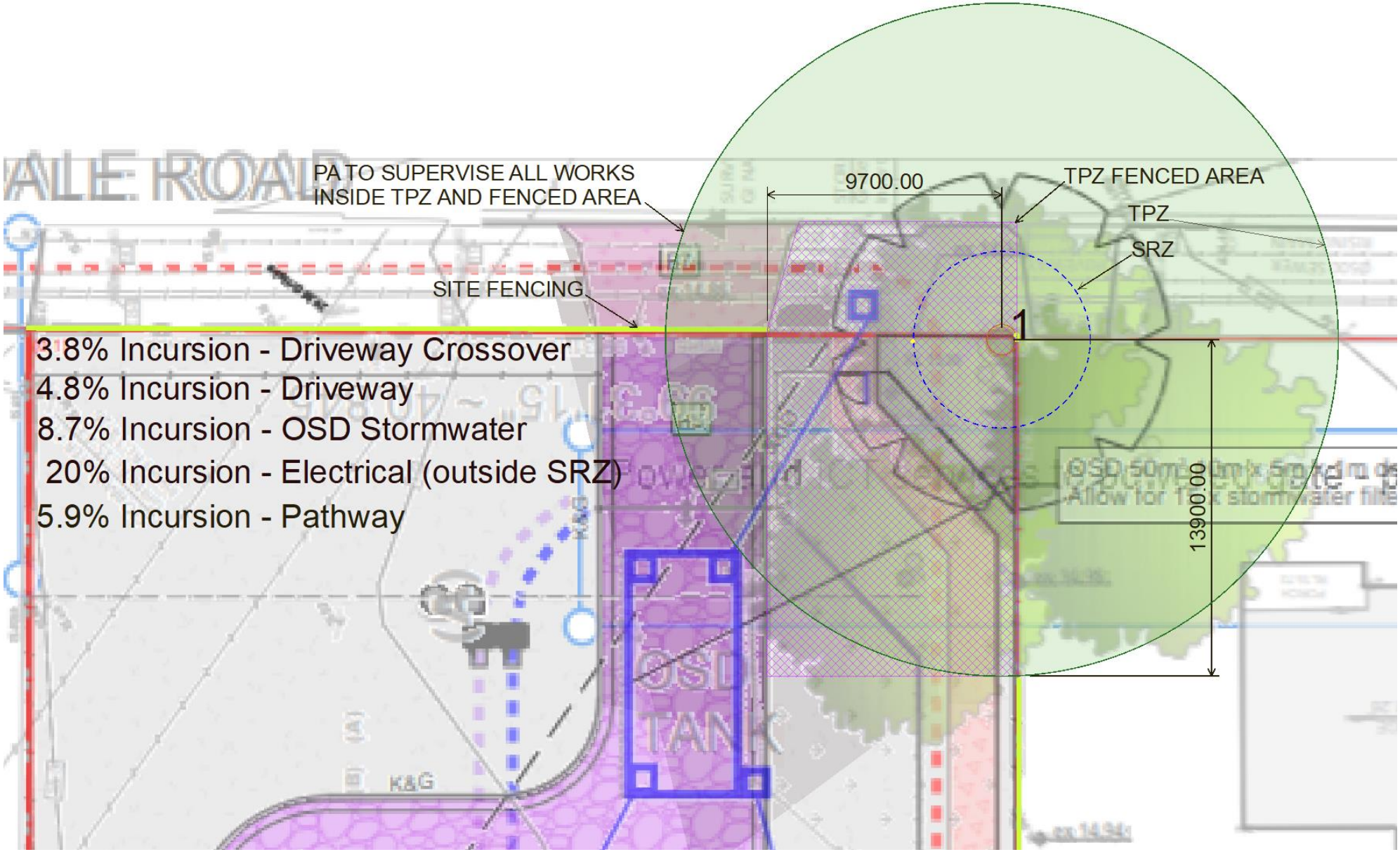

Figure 8 - Tree Protection Plan 1 (tree 1)

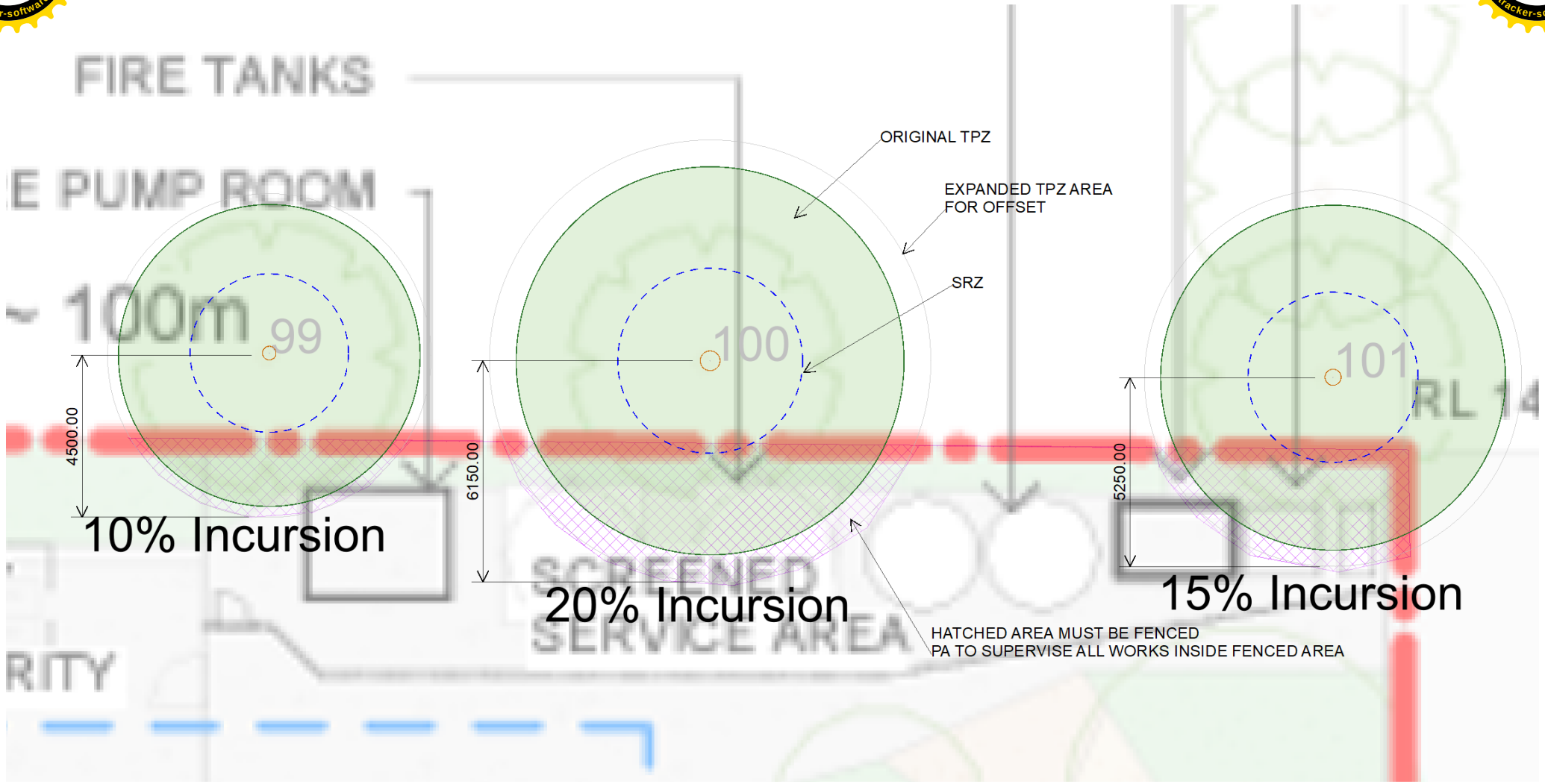

Figure 9 - Tree Protection Plan 2 (Tree 99, 100, 101)

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Schedule 4 – Site Images

Figure 10 - Tree 1 to be protected and supervised during construction.

Figure 11 - Tree 99, 100 & 101 in neighbour's yard to be protected during construction.

Figure 12 - Small shed to be demolished. Tree 67.

Figure 13 - House to be demolished.

Figure 14 - Trees on LHS of existing entrance to proposed fire trail.

Figure 15 - Hedge on RHS of existing access to proposed fire trail

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Standards Australia, 2009. *AS 4970 Protection of Trees on Development Sites,* Sydney: Standards Australia.

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Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act 1999)

Biodiversity Conservation Act 2016

Appendix A – Determining Tree Retention Values

The following steps are a standardised approach for assessing the retention values of trees. This approach is based on the *British Standard BS5837-2012: Trees in Relation to Design, Demolition and Construction*.

Step 1 – Assess tree sustainability

- Greater than 40 years
- From 15 to 40 years
- From 5 to 15 years
- Less than 5 years
- Dead or hazardous

IMPORTANT: Sustainability must only be assessed by a person with a minimum qualification of AQF 5 in Horticulture (Arboriculture).

Step 2 – Determine landscape significance rating

The level of landscape significance is determined using the following key criteria as a guide:

1. SIGNIFICANT
The tree is listed as a Heritage Item under the LEP with a local, state or national level of significance; or
The tree forms part of the curtilage of a heritage item (building /structure/artefact as defined in the LEP, and has a known or documented association with that item; or
Aboriginal cultural artefact, evidence by identifiable markings or other documentary evidence; or
The tree is a commemorative planting relating to an important historical event; or
The tree is scheduled as a Threatened Species, or is a key indicator species of an Endangered Ecological Community as defined under the *Threatened Species Conservation Act 1995 (NSW)* or the *Environmental Protection and Biodiversity Conservation Act 1999*; or
The tree is an endemic species, representative of the original vegetation of the area and is known as an important food, shelter or nesting tree for endangered or threatened fauna species; or
A remnant tree in existence prior to development of the local area; or
The tree has a very large live crown size* greater than 200m² with normal to dense foliage cover, is visually prominent in the landscape, exhibits good form and habit typical of the species and makes a significant contribution to the amenity and visual character of the area by creating a sense of place or creating a sense of identity; or
The tree is visually prominent in view from surrounding areas, being a landmark or visible from a considerable distance.
2. VERY HIGH
The tree has a strong historical association with a heritage item (building/structure/artefact/garden etc) within or adjacent the property and/or exemplifies a particular style or era of landscape design associated with the original development of the site; or

The tree is a locally-indigenous species and representative of the original vegetation of the area and the tree is located within a key wildlife corridor or has known wildlife habitat value; or is uncommon in cultivation; and Visible from surrounding properties, the street or other thoroughfares (including waterways); and The tree has a very large live crown size* exceeding 200m²; a crown density exceeding 70% Crown Cover (normal-dense), good form and branching habit, good representative of the species or is aesthetically distinctive and makes a positive contribution to the visual character and amenity of the area.
3. HIGH
The tree has a suspected historical association with a heritage item or landscape supported by anecdotal evidence or based on knowledge of similar sites, tree age, etc; or
The tree is a locally-indigenous species and representative of the original vegetation of the area; and The tree is beneficial for native wildlife; or
The tree has a large live crown size* exceeding 100m²; and The tree is a good representative of the species in terms of its form and branching habit with minor deviations from normal (e.g. crown distortion/suppression) with a crown density of at least 70% Crown Cover (normal); and The subject tree is visible from surrounding properties and makes a fair/neutral contribution to the amenity of the property/visual character of the area.
4. MODERATE
The tree has a medium live crown size* exceeding 40m²; and The tree is a fair representative of the species, exhibiting fair form and habit, moderate distortion or suppression with a crown density of more than 50% Crown Cover (thinning to normal); and The tree makes a fair contribution to the visual character and amenity of the area; and The tree is visible from surrounding properties. Not visually prominent – view may be partially obscured by other vegetation or built forms, or The tree has no known or suspected historical value or association.
5. LOW
The tree has a small live crown size* of less than 40m² and can be replaced within the short term with new tree planting; or
The tree is a poor representative of the species, poor form and habit with significant distortion or canopy suppression, with a crown density of less than 50% Crown Cover (sparse); and The tree is not visible from surrounding properties (obscured by other trees or built forms) and makes a negligible contribution to the amenity of the property/surrounding properties or detracts from the visual character of the area.
6. VERY LOW
The tree is listed as an undesirable species as listed by Council; and The tree has no heritage importance or value, no known or suspected historical association.
7. INSIGNIFICANT
The tree is a declared noxious weed under the *Noxious Weeds Act (NSW) 1993* or is an undesirable species by the local Council.

Step 3 – Weigh sustainability and landscape significance

Weigh the sustainability and landscape significance to arrive at a retention value. These two independently assessed elements have a relationship with one another. The health, condition and longevity of a tree increases or diminishes depending on its level of intactness, quality, and potential longevity.

Once there is a measure of a tree's sustainability and landscape significance, these two factors can be weighed up using the Tree Retention Value Table which categorises the tree according to its suitability or desirability for retention.

	Landscape Significance Reading						
Tree Sustainability	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Greater than 40 years	**High Retention Value**						
15 to 40 years			**Moderate**				
5 to 15 years				**Low**			
Less than 5 years					**Very Low Retention Value**		
Dead or hazardous							

Modified by A. Morton from: Couston, Mark and Howden, Melanie (2001) Tree Retention Values Table Footprint Green Pty Ltd, Sydney Australia.

Appendix B – Calculating TPZ and SRZ Values

Tree Protection Zone (TPZ)
The tree protection zone (TPZ) is the principal means of protecting trees on development sites. The TPZ is a combination of the root area and crown area requiring protection. It is an area isolated from construction disturbance, so that the tree remains viable.
The TPZ incorporates the structural root zone (SRZ).

Determining the TPZ
The radius of the TPZ is calculated for each tree by multiplying its DBH × 12.

TPZ = DBH × 12
Where DBH = trunk diameter measured at 1.4 m above ground

Radius is measured from the centre of the stem at ground level.
A TPZ should not be less than 2 m nor greater than 15 m (except where crown protection is required).
The TPZ of palms, other monocots, cycads and tree ferns should not be less than 1 m outside the crown projection.

Variations to the TPZ
It may be possible to encroach into or make variations to the standard TPZ. Encroachment includes excavation, compacted fill and machine trenching.

Minor Encroachments
If the proposed encroachment is less than 10% of the area of the TPZ and is outside the SRZ, detailed root investigations should not be required. The area lost to this encroachment should be compensated for elsewhere and contiguous with the TPZ.
Variations must be made by the project arborist considering relevant factors.

Major Encroachments
If the proposed encroachment is greater than 10% of the TPZ or inside the SRZ, the project arborist must demonstrate that the tree(s) would remain viable.
The area lost to this encroachment should be compensated for elsewhere and contiguous with the TPZ. This may require root investigation by non-destructive methods and consideration of relevant factors.

Structural Root Zone (SRZ)
The SRZ is the area required for tree stability. A larger area is required to maintain a viable tree.
The SRZ only needs to be calculated when major encroachment into a TPZ is proposed.
There are many factors that affect the size of the SRZ (e.g. tree height, crown area, soil type, soil moisture). The SRZ may also be influenced by natural or built structures, such as rocks and footings. An indicative SRZ radius can be determined from the trunk diameter measured immediately above the root buttress using the following formula. Root investigation may provide more information on the extent of these roots.

SRZ radius = (D × 50)0.42 × 0.64
Where D = trunk diameter, in m, measured above the root buttress

NOTE: The SRZ for trees with trunk diameters less than 0.15 m will be 1.5 m

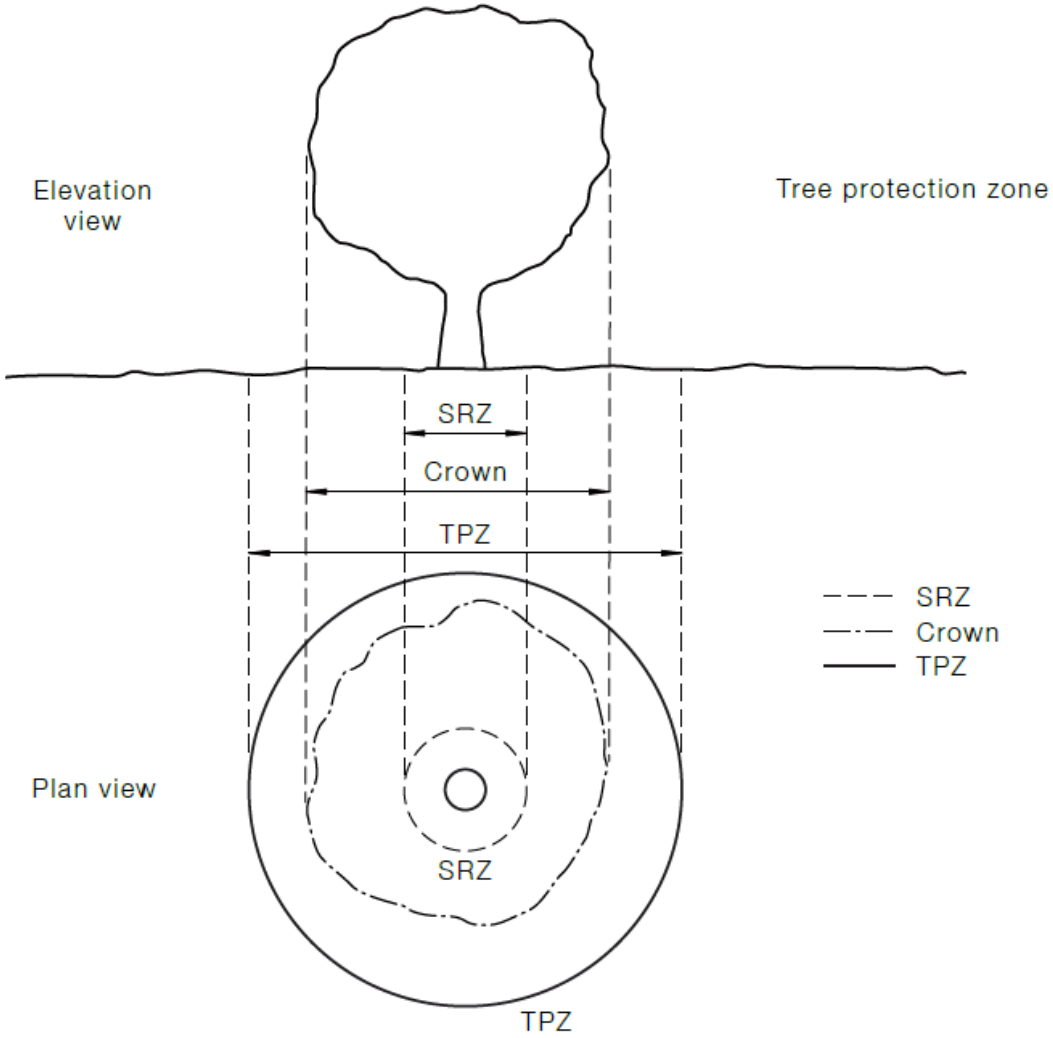

Figure 16 - TPZ and SRZ Diagram

Appendix C – Contractor Guidelines/Standards

Below is the recommended guidelines and standards for a Tree Service Provider that is engaged to conduct arboricultural works on a site, including tree removal, pruning, grinding and all other services relating to trees:

Supervisor Qualifications and Experience - All tree work must be supervised by a company/individual holding a minimum qualification level of AQF3 in Arboriculture. All work conducted on the site must be supervised by an individual holding this qualification, as a minimum, and they must remain onsite for the entire duration of the works.

Worker Qualifications – All tree pruning, and tree removal onsite must be conducted by workers holding a minimum qualification level of AQF2 in Arboriculture and supervised by the above supervisor. All workers feeding chippers, conducting stump grinding and operating machinery must be clearly competent to perform the task and supervised by the above supervisor.

SEQ Management System – The contractor must have a documented Safety Management Plan, Environmental Management Plan and it is recommended that they also have a Quality Management Plan.

Insurances – The contractor engaged should have public liability cover for a minimum value of $20 million and hold the appropriate workers compensation policy for any employees working on site, with WIC code 952520. Any company providing consulting services such as a project arborist, must have a Professional Indemnity Policy for over $2 million.

Minimum Industry Standards – The minimum Industry Standards published by Arboriculture Australia must be the minimum standards of the contractor in the way works are performed onsite and the safety procedures followed. The contractor must be able to demonstrate that they have access to these standards. These standards can be purchased at https://trees.org.au/education/minimum-industry-standards

Australian Standards – All pruning is to be in accordance with AS4373 *Pruning of Amenity Trees.*

Environmental Standards - Mulch from all native tree removal should be retained onsite for use within the school grounds if possible. If not possible, the mulch should be taken to an approved recycling facility to be solarised. This is a requirement under the *Mulch Order 2016* enforced by the EPA.

Appendix D – SULE, Condition and Age Class

SULE - Safe Useful Life Expectancy

1. Long SULE

a. Structurally sound and can accommodated future growth

b. Long term potential with minor remedial treatment

c. Trees of special significance which warrant extra care

2. Medium SULE

a. Will live between 15-40 years

b. Will live for more than 40 years but would be removed for safety or nuisance reasons

c. May live for more than 40 years but will interfere with more suitable specimens and need removal eventually

d. More suitable for retention in the medium term with some remedial care

3. Short SULE

a. Trees that may only live between 5-15 more years

b. May live for more than 15 years but would need removal for safety or other reasons

c. Will live for more than 15 years but will interfere with more suitable specimens or provide space for replacement plantings

d. Require substantial remedial care but are only suitable for short term retention

4. Removals

a. Dead, dying or seriously diseased

b. Dangerous trees through instability or loss of adjacent trees

c. Structural defects such as cavities

d. Damaged that are clearly not safe to retain

e. May or are causing damage to structures

f. That will become dangerous

5. Moved or Replaced

Trees, which can be reliably moved or replaced

a. Small trees less than 5 meters

b. Young trees between 5-15 years

c. Trees that have been regularly pruned to control growth

CONDITION RATINGS

Each tree or group of trees has been placed into categories ranging from 1 to 6, with no.1 being in the worst condition through to no.6 in a healthly condition. This is based on observations of their health and structure.

1. A dead tree.

2. A tree in severe decline. Major structural damage that cannot be repaired, dieback of trunk or scaffold branches and the majority of foliage consist of epicormic growth.

3. A tree in decline. Significant structural damage that cannot be repaired, dieback of medium to larger branches and epicormic growth.

4. A tree moderate vigor, dieback of smaller branches and twigs, thinning of crown, poor leaf colour and moderate structural defects that could be mitigated with regular care.

5. A tree in slight decline with only a small amount of twig dieback and minor structural damage that could be easily rectified.

6. A healthy vigorous tree that shows reasonably free signs of pest and diseases and good structural form

AGE CLASS

Each tree has been categorized into four maturity or age classes.

- J = Juvenile
- S/M = Semi Mature
- M = Mature
- O/M = Over Mature

Trees are categorized according to the species type, height and diameter at breast height (DBH). Recording these factors and comparing them to descriptions of the same species when fully grown can estimate maturity.

Crown radius can be taken into consideration where suppression to growth of natural habit has not been restricted.

Appendix E – Common Management Activities

Pruning – Trees require pruning for a variety of reasons:

- Pruning of the lower limbs of a tree to allow for clearance for maintenance, pedestrians, buildings, services, line of sight for traffic and appearance.
- Reduction of the height of a tree can be achieved to a certain extent through pruning. The extent to which this can be done is determined by the species, age, shape, previous pruning and appearance requirements.
- Thinning of branches to improve appearance, allow light penetration or reduce wind load
- Structural Pruning is completed when a tree is forming a defect such as a V shaped codominant branch union. Structural pruning is a critical maintenance activity for urban trees to achieve maximum safe useful life expectancy.
- Remedial Pruning is completed in response to an identified problem with the tree. This may be a pest, disease, or root disturbance from a development.
- Deadwood Removal is one of the most common pruning activities undertaken during the life of a tree. It involves the cutting out of dead branches that are likely to fall.

All tree pruning should be carried out in accordance with *AS4373 Pruning of Amenity Trees* and the superior *MIS308 Tree Pruning.*

Tree Removal – trees can be removed in four ways. The method chosen will depend on the location and condition of the tree, contractor's equipment, experience, and the client's requirements. The four methods are:

- Cutting down from the ground. Also called felling or falling the tree. The tree is then processed through a machine called a mulcher or woodchipper that reduces the wood and leaves to a product called leaf mulch. Depending on the size of the machinery used, the larger wood may be removed off site in separate trucks or cut up and fed through the machine.
- Accessing and removing the tree in pieces, this can involve rigging the pieces so to allow them to be lowered to the ground in a controlled manner. The 2 most common access methods are climbing the tree or using an EWP (cherry picker) to move around the tree to conduct the work.
- Accessing the tree and removal of pieces with a crane or helicopter. This involves lifting the pieces up and out of the area.
- Using machinery to push the tree over and process with large machinery.

Stump Grinding – this is to remove the stump from the ground entirely or to reduce the height to a certain depth below the ground to allow for the intended use of the area. This task is earthmoving by nature and thus checking for underground services should always be conducted prior to undertaking this activity.

Mulching – this is one of the most beneficial activities that can be completed for the long-term health of the tree. Spreading of a locally sourced, native leaf mulch is the most beneficial type of mulch to be used for your trees. This mulch has a mix of wood and leaf material so breaks down more rapidly, returning nutrients and organic matter into the soil that will improve the health of the tree. Mulch helps retain moisture in the soil by more than

100%. It also improves soil conditions for beneficial fungi, bacteria and worms. It regulates ground temperatures and reduces compaction of soil in trafficable areas. It helps reduce the chances of mechanical damage to the root and trunk from lawn care activities and reduces competition of grasses below the canopy. Mulch should be spread to a thickness of approximately 100mm over the area directly below the canopy. The larger the mulched area, the more beneficial.

Fertilising – this should normally be in the form of organic nutrients such as manure. Adding nutrients to soils can improve the growth rates of trees and the resistance to pests and diseases. It can also increase flowing and fruit production if required.

Supporting – this is normally only undertaken for high value trees in areas of frequent or constant use. It involves the installation of a supporting structure such as a cable or a prop to provide support for a defect of a part of the tree that has partially failed. Tree Support Systems should be installed following the requirements in *MIS310 Tree Support Systems.*

Irrigation – Provision of regular water is critical for tree health, particularly with newly planted and establishing trees.

Root Pruning – Cutting of selected roots by first removing soil then cutting the roots with a sharp blade or tool that provides a clean cut on the root end. Large structural roots should always be cut under the supervision of a AQF5 arborist as these roots may be holding the tree upright.

Stem Injection – This is the practice of injection of a chemical or liquid into the stem of the tree to treat a particular issue. This can be for treatment of sap or leaf sucking bugs, fungi or even bacteria in the soil. This is done either by a high-pressure injection or low-pressure injection tool.

Habitat Creation – This involves the deliberate creation of hollows, cracks, and splits. Installation of artificial boxes, hollow logs and similar into the canopy of suitable trees to provide habitat for a wide range of arboreal dwelling creatures. These practices should follow the guidelines established in the *MIS312 Environmental Arboriculture*.

Appendix F – Limitations and Disclaimer

1. The contents of this report are true and correct to the best of my ability and knowledge.
2. The conclusions and recommendations contained in this report, relate only to the trees that have been inspected, at the time of inspection.
3. The details of this report are specific to the site/tree(s) assessed and may not constitute general advice to be used in other applications.
4. This report and any attachments should be read in its entirety, and no individual part of the report or its attachments should be interpreted without reference to the entire report.
5. The consultant shall not be required to give testimony or attend court for matters pertaining to this report unless a separate contract is arranged to provide expert witness services or the like with a fee payable for these services.
6. Care has been taken when referencing supporting documents or the opinions of others in this report, however no responsibility can be taken for the accuracy or correctness of the information provided by others.
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8. This report and any values expressed herein represent the opinion of the consultant and the consultant's fee is not contingent upon the reporting of a specified value, a stipulated result, the occurrence of a subsequent event, nor upon any finding to be reported.
9. Following significant weather events, the condition of a tree onsite may change.
10. Maps, images, and graphics are not necessarily to scale.

Appendix G – Glossary of Terms

Abatement - Reduction in hazard, either by remedial tree works and/or removal of target(s).

Abnormal Lean - Abnormal departure of trunk from the vertical or near vertical position.

Amenity Value - The environmental and landscape benefits of a tree as opposed to its commercial value for timber. Many of these benefits are intangible or difficult to measure.

Arboriculture - The care, cultivation and management of individual trees or groups of trees in the landscape primarily for their amenity value.

Arborist - A specialist in the cultivation and care of trees and shrubs, including tree surgery, tree identification, the diagnosis, treatment, and prevention of tree diseases, and the control of pests.

Basal Flare - The rapid increase in diameter that occurs at the confluence of the trunk and roots, associated with stem and root tissue.

Bifurcation - To divide or fork into two parts, usually equal in size and occurring at a narrow angle.

Bleeding/Sap flow - The exudation of sap/resin from wounds and/or other injuries, may be accompanied by a foul odour.

Bole - The central stem of the tree. Another meaning for trunk.

Bow - The gradual curve of a branch or stem.

Bracket Fungi/Fungal Fruiting Body - Fruiting of spore producing body of wood decay fungi, forming on the external surface of the stem or trunk.

Branch Attachment - The structural linkage of branch to stem.

Branch Collar Wood - which forms around branch attachments, frequently more pronounced below the branch.

Brash Wood Type - of reaction wood which is weaker than normal due to thin cell walls and decreased fibre content; presence increases the likelihood of failure.

Burl - More correctly identified as a Lignotuber (a mass of dormant, tightly arranged buds). It is a generally circular swelling on the main stem or branch; not considered a defect.

Buttress Support - of branch, stem or root; usually associated with exaggerated growth.

Buttress Root - A large woody root located at the base of the trunk (the root crown) which is important to the overall stability of the tree due to its contributions to basal flare.

Buttress Wood - Wood under tension, in a structurally critical portion of a trunk or branch.

Callus - Can be detected within weeks after cells on the edge of a wound die and is produced by the enlargement or increased division of cells adjacent to the edge of cell dieback. Often associated with wound wood development post pruning.

Cambium - A layer of delicate meristematic cells between the inner bark or phloem and the wood or xylem, which produces new phloem on the outside and new xylem on the inside in stems, roots,etc., originating all secondary growth in plants and forming the annual rings of wood.

Canker - A localised area of dead tissue on a stem or branch, caused by fungal or bacterial organisms, characterised by wound wood development on the periphery; may be perennial or annual.

Canopy - Parts of the tree above the trunk, including leaves, and lateral and scaffold branches.

Cavity - An open wound, often characterised by the presence of decay and resulting in a hollow.

CODIT - An acronym for Compartmentalisation of Decay in Trees, this scientific theory was developed by the late Dr. Alex Shigo which now forms the basis of our knowledge of how trees respond to wounding, infection and decay.

Co-dominant Stems - Equal in size and relative importance, usually associated with either the trunks/stems or scaffold limbs/branches in the crown. Not necessarily a structural defect.

Compartmentalisation - Physiological process which creates the chemical and mechanical boundaries that act to limit the spread of disease and decay organisms within trees (see also CODIT).

Compression Wood - Type of reaction wood produced on the underside of branches and leaning trunks.

Coppice - To cut a tree to ground level to stimulate regenerative growth.

Core Drill - A technique involving creating a series of vertical cores within a tree's root zone which can be filled with a variety of materials to stimulate root initiation and growth. Often used on ageing and/or stressed trees.

Crack - Breakage in the stem, involving bark, cambium, and xylem.

Crown - Parts of the tree above the trunk, including leaves, and lateral and scaffold branches (see also Canopy).

Crown Uplift - Pruning technique where lower limbs are removed, thereby raising the overall crown above the ground.

DBH - Diameter of the trunk, measured at breast height i.e. 1.4m from ground level.

Deadwood - Branch or stem wood bearing no live tissues. (Small deadwood <2cm, medium deadwood 2-10cm, large deadwood >10cm).

Deadwooding - The act of removing deadwood from the canopy.

Decay - Process of degradation of woody tissues by fungi and bacteria through decomposition of cellulose and lignin.

Decorticate - To remove bark, rind, or husk.

Decurrent - Referring to crowns which are made up of a system of co-dominant scaffold branches, lacking a central leader.

Defect - Any structural weakness or deformity.

Dehisce - (of a pod or seed vessel, or a cut or wound) Gape or burst open.

Dieback - Death of shoots and branches, generally from tip to base.

Disease/Pathogens - A malfunction in, or destruction of tissues within a living organism, usually excluding mechanical damage; in trees, usually caused by pathogenic micro-organisms.

Dominant - In crown class, trees whose crowns extend above the general stand canopy and are not restricted by adjacent trees.

DRC (Diameter at Root Crown) - The diameter of the very lowest part of the trunk where root buttressing begins and often used to calculate a tree's structural root zone (SRZ).

End Weight - The concentration of excessive foliage toward the branch extremity.

Epicormic Growth - Shoots which result from adventitious or latent buds, generally initiated in times of distress, and are generally poorly attached.

EWP - Elevated Work Platform.

Excessive Thinning - Having relatively little extent from one side of the canopy to the opposite. In relation to pruning; excessive pruning of lateral branches at their point of origin, usually associated with removal of large amounts of live tissue.

Exclude Site Use - Implement control measures to prevent people from entering an area that has the capacity to cause harm or damage i.e. due to hazardous trees.

Fasciation - (or Cresting) Abnormal twig proliferation.

Flush Cut - Pruning technique where both branch and trunk tissue are removed behind the branch collar; considered poor practice.

Frass Bore Dust - Excrement and other debris left by wood boring insects.

Fungal Fruiting Body - (see Bracket Fungi)

Gall - In branches and stems, an abnormal, localised growth, generally seen as a large knob of undifferentiated woody tissues.

Girdling Root - A root or roots which circles and constricts the stem or roots causing death of phloem and/or cambial tissue.

Habitat Prune - (or King Prune) Reducing or removing the crown of a tree and retaining its trunk as a habitat for wildlife.

Hanger - A partially attached (but clearly broken) or unattached branch which remains lodged in the crown.

Hazard - A hazard is an action or item that has the capacity to cause harm or damage, which may be serious.

Hydrophobic - Used to describe a soil profile that is difficult to rehydrate as water either pools on it or runs off it. Generally associated with very dry, nutrient-poor soils.

Ilex - A tree or shrub of a genus that includes holly and its relatives.

Inappropriate Location - The tree's present growing environment is not suitable due to its surroundings, such as buildings, car parks etc. in relation to the inherent characteristics of the tree species.

Included Bark - Pattern of development at branch junctions where bark is turned inward rather than pushed out; contrasting with branch bark ridge. Also referred to as Embedded bark. Such a formation generally results in weakened attachment.

Infection - The establishment of parasitic micro-organism in the tissues of a tree.

Irrigation - The watering of land by artificial means to foster plant growth.

Kino - The resin which flows from Eucalypts and its relatives such as Corymbia sp. and

Angophora sp.

Leader - The primary terminal shoot or trunk of a tree.

Lean/Leaning - Departure of trunk from the vertical or near vertical position.

Lerp - A type of Psyllid that commonly predates on many species of Eucalypts and its relatives.

Loading - Refers to the mechanical stresses imposed by the weight, orientation etc. of trees and branches in relation to the site, the architecture of the tree and the weather. The amount of loading upon a tree can be directly influenced by its level of exposure to the prevailing winds.

Lopping - The removal of the crown of a tree, or a major proportion of it. Incorrect pruning method of removing branches to stubs, resulting in poor form and weak branch unions.

Mycorrhiza - A mutual association between certain fungi and the roots of vascular plants often resulting in an increased efficiency in the absorption of mineral nutrients.

Mulch - Material laid down over the rooting area to help conserve soil moisture, supress weeds and regulate soil temperature.

Nutrition - The elements and compounds required to support healthy plant growth, of which at least 17 are known.

Parasitic and semi parasitic plants - Vascular plants such as Mistletoes which infect host plants via the penetration of specialised roots called haustorium to gain access to the host's vascular system for water and mineral nutrients.

Pathogen - (See Disease/Pathogens).

Pests/Pest Insects - Pests such as Wood Borers, Termites, Leaf Beetles, Gumleaf Skeletoniser, Leafblister Sawfly, Lerps or Elm Leaf Beetle that cause tree decline. There are various methods of treatment to remove pests as well as prevent their return.

Phellinus sp. - A genus of bracket forming, wood decaying fungi which occurs in native and exotic species. Whilst the decay associated with this fungus is often localised it has a reputation for being quite destructive.

Phytotoxic - A substance which is toxic to plants.

Phloem - The part of a vascular bundle consisting of sieve tubes, companion cells, parenchyma, and fibres and forming the food-conducting tissue of a plant.

PICUS Sonic Tomograph - A specialised piece of diagnostic equipment generally used to determine the level of internal decay within a branch or trunk using sound waves.

Pollard - The removal of the tree canopy, back to the stem or primary branches. Pollarding may involve the removal of the entire canopy in one year, or may be phased over several years.

Poor Pruning - Pruning techniques (such as lopping) which are undertaken without regard for the tree's natural biology and which can cause decline, decay and potentially lead to part or whole tree failure.

Potenz Hydrogenous (pH) - The measure of soluble Hydrogen ions in a solution which is used to measure its acidity or alkalinity. Affects nutrient availability to plants.

Previous Failures - Denotes a tree has previously had a leader or branches fail. Previous failures can result in wounding if a required action is not attended to (see Wound).

Propagate/Propagation - To reproduce a plant, sexually by means of seed or asexually by cuttings, grafting or divisions, so that it is genetically identical to the parent (true to type).

Pruning - The removal or cutting back of twigs or branches.

Psyllid - A common and diverse group of sap-sucking insects related to whiteflies, aphids, and scales. They are regularly associated with native plants and most species appear to be host specific or confined to a group of closely related plants. Sustained infestations can lead to tree decline if untreated.

Reactive Growth/Reaction Wood - Production of woody tissue in response to altered mechanical loading, often in response to internal defect or decay and loss of strength.

Risk - The likelihood that a hazard will cause harm within a variable period of lime.

Root Collar/Root Crown - The transitional area between the stem/sand roots.

Saprophyte - An organism which obtains its nutrition from dead or decaying organic matter. This term is often associated with fungi and with some groups of vascular plants such as Orchids.

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Scaffold Limb - Primary structural branch of the crown.

Senescence - The stage of a tree's life cycle between maturity and death, whereby a tree will naturally decline over several years.

Softfall - An impact absorbing layer that is laid beneath a finished surface

Soil Compaction - Area of compacted soil covering the root system. Affected soil becomes less able to absorb rainfall and water, thus increasing runoff and erosion. Trees have difficulty growing in compacted soil because soil particles are pressed together leaving little space for oxygen and water, which are essential for root growth.

Soil Problems - Soil problems such as compaction, salinity,erosion can cause tree decline and potentially lead to tree failure.

Split - Breakage in stem, affecting bark, cambium and xylem.

SRZ - Structural Root Zone.

Stress - In plant physiology, a condition under which one or more physiological functions are not operating within their optimum range, e.g. A lack of soil moisture, inadequate nutrition or extremes of temperature.

Structural Defect - Internal or external points of weakness which reduce the structural integrity of branches and/or stems or roots. Defects in roots may impact upon tree stability.

Structural Roots - Contribute significantly to the structural support, anchorage and stability of a tree, often found close to the base.

Sucker - A shoot which appears from an underground root.

Suppressed - In crown class, trees which have been heavily shaded by others from above or the side and whose crown development is wholly or partially restricted.

Symbiosis - A mutual association between two organisms whereby the presence of one is beneficial to the other.

Target - Persons or property or other things of value which might be harmed by mechanical failure of the tree or by objects falling from it.

Terminally Reduce - Cutting back/reducing branches from their extremity.

Thinning/Excessive Thinning - Having relatively little extent from one side of the canopy to the other. In relation to pruning; excessive pruning of lateral branches at their point of origin, usually associated with removal of large amounts of live tissue.

TLE - Tree Life Expectancy (see Useful Life Expectancy).

Topping - Synonymous with lopping it is the indiscriminate removal of the crown of a tree, or a major proportion of it. Incorrect pruning method of removing branches to stubs, resulting in poor form and weak branch unions.

TPZ - Tree Protection Zone.

ULE - Useful Life Expectancy refers to an expected period of years that a tree can be retained before its amenity values decline to a point where it may detract from the appearance of the landscape and/or becomes potentially hazardous to people and/or property.

Understorey - Vegetation beneath the main canopy.

VTA - An acronym for Visual Tree Assessment which is the process undertaken when systematically assessing trees for attributes such as their species, health, age, defects and pest or disease infestations.

Wall 4 - A chemical and anatomical barrier formed by the cambium present at the time of wounding, which inhibits the spread of decay into xylem tissue formed after the time

of wounding.

Weak Unions - A stem or branch union which is exhibiting signs of a potential structural weakness through its growth habit and/oras a result of pest and/or disease infestation.

Weed - A plant that is not valued where it is growing and is usually of vigorous growth; especially one that tends to overgrow or suppress desirable plants.

Whorl - The arrangement of foliage or flower parts around a stem whereby they radiate from a single point.

Windthrow - The blowing over of a tree at its roots.

Wound - Any injury which induces a compartmentalisation response.

Wound Wood - Develops from callus tissue or from uninjured vascular cambium at the margins of injuries/wounds that have damaged or exposed the phloem, vascular cambium, or sapwood.

Xylem - A compound tissue in vascular plants that helps provide support and that conducts water and nutrients upward from the roots, consisting of tracheids, vessels, parenchyma cells and woody fibres.

Appendix H – Qualifications and Experience

Between 2006 and 2012 Aaron completed a Carpentry apprenticeship, Certificate 3 in Joinery, Certificate 4 in Building and Construction and obtained a builder's licence in 2010 and started working as a contractor. Working full time in the construction industry on high end residential projects as a contracting site supervisor Aaron was managing teams up to 10 people onsite daily. In 2012 Aaron began training and going to TAFE to complete a Certificate 3 in Arboriculture after being exposed to the industry through Rope Access Work and recreational rock climbing. In 2012 Aaron established Assurance Trees Pty Ltd and continued to work across the Construction Industry and Arboricultural industry simultaneously. In 2016 Aaron completed a Diploma of Arboriculture allowing him to start to complete consulting arborist services to expand his growing company. Over the next few years Aaron continued to build Assurance Trees Pty Ltd and establish himself as a respected and knowledgeable arborist both practically and academically. Aaron led Assurance Trees Pty Ltd to obtain ISO triple certification for Quality (ISO9001), Environment (ISO14001) and Safety (AS4801) in 2018 and continues to improve and generate value.

Since 2016 Aaron has developed his consulting arborist skill set to become a leading provider in the industry throughout the Hunter Region. In combination with his practical experience and understanding of the construction industry Aaron has a reputation of providing excellent solutions for design and construction projects in the field of Arboriculture.

Qualifications:

- Diploma in Arboriculture (2016)
- ISA Tree Risk Assessment Qualification (2016)
- Certificate in Arboriculture (2014)
- NSW Builders Licence (2011) (Supervisor Cert #69092S)
- Certificate 4 in Building and Construction (2010)
- Certificate 3 in Joinery and Carpentry (2009)
- Many other certificates including Cert 3 in Chemical Application, Occupational First Aid, Powerlines Training, Rescue Training, Rail Corridor certificates, EWP tickets, Truck Licences and many other courses and training events.

Experience

- Consulting arborist – Arboriculture impact assessments, risk assessments, expert witness, project arborist, pruning specifications, planting specifications, health reports and many other specialised consulting jobs.
- Trade Arborist – 1000's of tree dismantles, crane work, pruning, shaping, large scale clearing, root investigations, cabling and bracing, injections, and treatments and many other specialised tree work operations.
- Building and Construction – Site supervisor, Carpentry and many other building skills and disciplines.

End of Report

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