

Mulgoa Road upgrade, Glenmore Parkway to Jeanette Street, Blaikie Road to Jamison Road and Jamison Road to Union Road

Biodiversity Assessment Report (BAR)

Transport for NSW

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EPBC Act Assessment of Significance

Executive summary

Transport for NSW propose to upgrade about three kilometres of Mulgoa Road. The proposal involves the upgrade and widening of Mulgoa Road across three separate stages:

- Mulgoa Road upgrade between Glenmore Parkway and Jeanette Street, Glenmore Park (about 850 metres)
- Mulgoa Road upgrade between Blaikie Road and Jamison Road, Penrith (about 1.2 kilometres)
- Mulgoa Road upgrade between Jamison Road to Union Road, Penrith (about one kilometre).

Most of the study area is highly modified by roads, urban residential development, and industrial areas. Remnant vegetation has been impacted by past and continuing disturbances such as land clearing, grazing, weed spread and slashing.

Two threatened ecological communities (TECs) listed under Schedule 2 of the NSW *Biodiversity Conservation Act 2016* (BC Act) were recorded:

- Cumberland Plain Woodland in the Sydney Basin Bioregion (listed as a *critically endangered ecological community*)
- River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions (River-Flat Eucalypt Forest) (listed as *an endangered ecological community*).

Two threatened species listed under the BC Act were recorded:

- Little Lorikeet (*Glossopsitta pusilla*) (vulnerable species) (incidental sighting)
- Southern Myotis bat (*Myotis macropus*) (vulnerable species) (targeted anabat survey record).

Thirty seven (37) threatened species have a moderate or high likelihood of occurring within the study area. Eleven hollow bearing trees occur within the study area.

Within the study area the proposal would impact upon the following biodiversity values within the study area:

- 0.13 hectares of Plant Community Type (PCT) 849 – Grey Box – Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion (*Cumberland Plain Woodland*)
- 0.66 hectares of PCT 835 – Forest Red Gum – Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin (River-Flat Eucalypt Forest)
- 0.29 hectares of planted PCT 1800 - Swamp Oak open forest on riverflats of the Cumberland Plain and Hunter Valley (*Cumberland Swamp Oak Riparian Forest*)
- 1.3 hectares of planted street trees
- 2.3 hectares of exotic vegetation
- 0.1 hectare of exotic grassland
- Removal of 5 hollow bearing trees from the proposal area
- Four hectares of threatened species foraging habitat.

Assessments of significance were undertaken for two TECs and 27 threatened species that are potentially impacted by the proposal. These assessments concluded that no significant impacts would be likely to occur on State and Nationally listed TECs and threatened species as a result of the proposal.

TfNSW would offset potential impacts to the following, in accordance with the *Guideline for Biodiversity Offsets* (TfNSW (RMS) 2016):

- Clearing of two Critically Endangered Ecological Communities (CEEC)
- Removal of four hectares of species credit species habitat
- Reduction in potential Southern Myotis habitat.

Safeguards and mitigation measures have been developed to reduce the potential impacts on biodiversity values from the proposal. These include:

- Improve the condition of the riparian vegetation immediately adjacent to the School House Creek and Surveyors Creek crossing points by developing a restoration program focusing upon removal of high threat exotics and revegetation using province-sourced plants belonging to River-Flat Eucalypt Forest (PCT- 835). Revegetation of this TEC in these areas should aim to achieve all structural layers and native species composition consistent with this community.
- Minimising the removal of hollow bearing trees within the project area
- Replacement of hollows removed with nesting boxes as per Guide 8: Nest boxes of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (RTA 2011).
- Avoiding and minimising vegetation removal
- Completing pre-clearing surveys.

Glossary

Definitions	
Biodiversity Assessment Method	The Biodiversity Assessment Method (BAM) is established under section 6.7 of the Biodiversity Conservation Act (2016) (BC Act). The BAM is established for the purpose of assessing certain impacts on threatened species and threatened ecological communities (TECs), and their habitats, and the impact on biodiversity values.
Biodiversity offsets	Management actions that are undertaken to achieve a gain in biodiversity values on areas of land in order to compensate for losses to biodiversity values from the impacts of proposal (OEH 2017).
Calculator	BAM Credit Calculator. An online application of the BAM. The calculator uses the rules and calculations outlined in the BAM, and allows the user to apply the BAM at a site and observe the results of the assessment.
Construction footprint	The area to be directly impacted by the proposal during construction activities. Analogous with subject land (see definition for subject land).
Cumulative impact	The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. Refer to Clause 228(2) of the <i>Environmental Planning and Assessment Regulation 2000</i> for cumulative impact assessment requirements.
Direct impact	Direct impacts on biodiversity values include those related to clearing native vegetation and threatened species habitat, and impacts on biodiversity values prescribed by the Biodiversity Conservation Regulation 2017 (the BC Regulation)
Habitat	An area or areas occupied, or periodically or occasionally occupied, by a species, population or ecological community, including any biotic or abiotic component.
Indirect impact	Indirect impacts include but not limited to: (a) indirect impacts on adjacent vegetation and habitat during construction (b) indirect impacts on adjacent vegetation and habitat during operation (c) impacts on adjacent vegetation and habitat arising from a change in land-use patterns (OEH 2017)
Local population	The population that occurs in the study area. In cases where multiple populations occur in the study area or a population occupies part of the study area, impacts on each subpopulation must be assessed separately (OEH 2017).
MNES	A matter of national environmental significance (MNES) protected by a provision of Part 3 of the <i>Environment Protection and Biodiversity Conservation Act 1999</i> (EPBC Act)
Mitchell landscape	Landscapes with relatively homogeneous geomorphology, soils and broad vegetation types, mapped at a scale of 1:250,000 (2017).
Mitigation	Action to reduce the severity of an impact.
Mitigation measure	Any measure that facilitates the safe movement of wildlife and/or prevents wildlife mortality or injury.

Definitions

Native vegetation	<ul style="list-style-type: none">a) trees (including any sapling or shrub or any scrub),b) understorey plants,c) groundcover (being any type of herbaceous vegetation),d) plants occurring in a wetland.e) A plant is native to New South Wales if it was established in New South Wales before European settlement (BC Act).
Operational footprint	The area that will be subject to ongoing operational impacts from the proposal. This includes the road, surrounding safety verges and infrastructure, fauna connectivity structures and maintenance access tracks and compounds.
Plant Community Type (PCT)	A NSW plant community type identified using the PCT vegetation classification system (BioNet)
Population	A group of organisms, all of the same species, occupying a particular area (BAM 2017).
Proposal area/site/ footprint	The area of land that is directly impacted on by the proposal that is being assessed under the Environmental Planning and Assessment Act, including access roads, and areas used to store construction materials (OEH 2014). It includes the construction and operational areas for the proposal.
Study area	The area directly affected by the proposal and any additional areas likely to be affected by the proposal, either directly or indirectly (OEH 2017).
Target species	A species has been identified within the study area or is considered to have a moderate to high likelihood of occurrence and may be impacted by the proposal.

Abbreviations

BAM	Biodiversity Assessment Method (OEH 2017)
BC Act	Biodiversity Conservation Act 2016
BOS	Biodiversity Offset Scheme under the BC Act
CEEC	Critically Endangered Ecological Community
CEMP	Construction Environmental Management Plan
DAWE	Commonwealth Department of Agriculture, Water and the Environment
DoEE	Former Commonwealth Department of Environment and Energy
DPIE	NSW Department of Planning, Industry and Environment
DPI	NSW Department of Primary Industries
EEC	Endangered ecological community
EES	Environment Energy and Science Group, Department of Planning, Industry and Environment
EPBC Act	Environmental Protection and Biodiversity Conservation Act 1999 (Commonwealth).
FM Act	Fisheries Management Act 1994 (NSW)
GDE	Groundwater dependent ecosystems
IBRA	Interim Biogeographically Regionalisation of Australia
MNES	Matters of National Environmental Significance
NPWS	NSW National Parks and Wildlife Service
PCT	Plant Community Type
REF	Review of Environmental Factors
SEPP	State Environmental Planning Policy
TECs	Threatened Ecological Communities
TBDC	Threatened Biodiversity Data Collection
Transport	Transport for NSW
VIS	Vegetation information system

1 Introduction

1.1 Proposal background

The Mulgoa Road upgrade from 412 Mulgoa Road, Mulgoa to High Street, Penrith (the proposal) is required to manage congestion, to cater for population growth and improve travel times in the locality (Figure 1-1). Aurecon has been engaged by SMEC Holdings on behalf of Transport NSW (TfNSW) to prepare a Biodiversity Assessment Report (BAR).

1.2 The proposal

TfNSW propose to upgrade approximately three kilometres of Mulgoa Road across three sections to a six-lane road divided by a median. The proposal is part of a larger upgrade of Mulgoa Road over approximately 6.2 kilometres that extends through the suburbs of Penrith, Jamisontown, Regentville and Glenmore Park. Mulgoa Road forms the main access route between Penrith and the M4 Motorway, connecting the Penrith community with Greater Sydney. This road upgrade aims to improve the accessibility of the region by reducing congestion and improving travel times, as well as overall improving road safety. In the future this upgrade may be integrated with other road networks and transport infrastructure upgrades committed for the area.

The upgrade would be conducted across three stages:

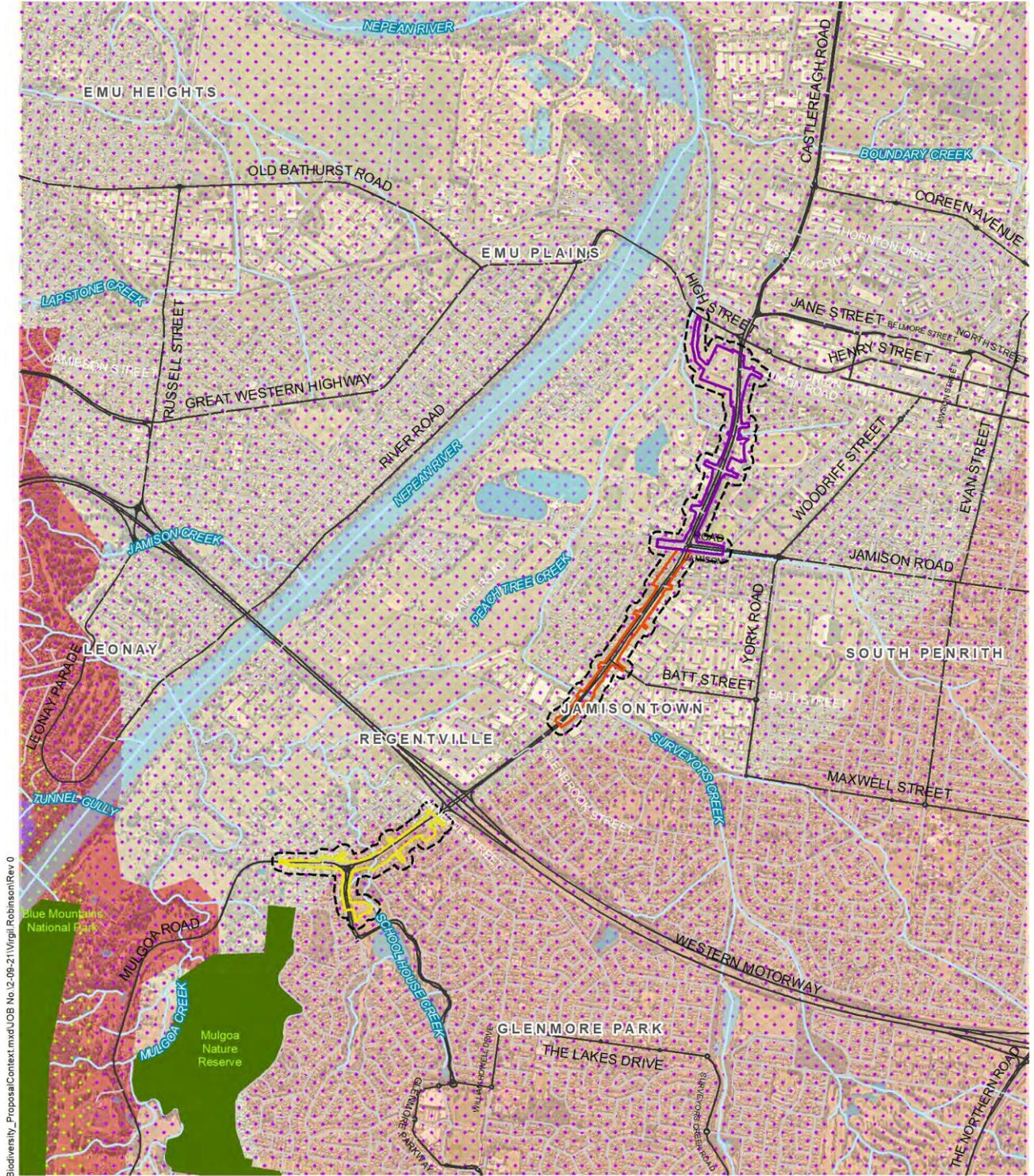
- Mulgoa Road Stage 2 – Glenmore Parkway to Jeanette Street (530 m)
- Mulgoa Road Stage 5A – Blaikie Road to Jamison Road (1,170 m)
- Mulgoa Road Stage 5B – Jamison Road to Union Road (1,000 m)

Key features of the proposal include:

- Upgrading Mulgoa Road to a six-lane divided road (three lanes in each direction) with a wide central median
- Upgrading of intersections at the roundabout at Glenmore Parkway, Spencer Street, Batt Street, Freedom Furniture site, Jamison Road, Panther Place, Retreat Drive/Ransley Street and Union Road
- Upgrading of local road accesses at Gibbs Street (including the removal of Gibbs Street Service Road), Willoring Crescent, Stuart Street, Preston Street, McNaughton Street and Rodley Avenue
- Installation of a new bridge structure over Surveyors Creek
- Reinstatement of bus stops along Mulgoa Road with provision for bus priority at key intersections
- Provision of a shared user path on the eastern side and pedestrian path on the western side of Mulgoa Road for the length of the proposal
- Drainage and flooding infrastructure upgrades
- Roadside furniture and street lighting
- Noise barriers
- Utility relocations
- Tree planting and landscaping
- Temporary establishment of up to four construction compound sites.

The expansion of Mulgoa Road to a six-lane road is expected to impact 0.79 hectares of native vegetation and 8.57 hectares of planted and exotic vegetation. Construction of the proposal is expected to commence in late 2022 and be about 18 months in duration, subject to approval, funding, weather, access considerations and issuance of construction contracts.

The study area (Figure 1-2) for this BAR encompasses a 50-metre buffer surrounding the construction footprint of the proposal. Flora and fauna surveys to assess the potential direct and indirect impacts associated with the proposal were conducted within this buffer and covered approximately 49 hectares.

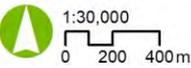


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- Study area
- NPWS Estate
- Water bodies
- Watercourse
- Major road
- Local road
- Stage 2
- Stage 5A
- Stage 5B
- Cumberland Plain
- Hawkesbury - Nepean Channels and Floodplains
- Hawkesbury - Nepean Terrace Gravels
- Kurrajong Fault Scarp
- IBRA Subregions - Cumberland
- IBRA Subregions - Wollemi



Source: Aurecon, TfNSW, Spatial Services, Nearmap, Esri



Projection: GDA 1994 MGA Zone 56

Mulgoa Road Biodiversity Assessment Report

Proposal context

Figure 1-1: Proposal context

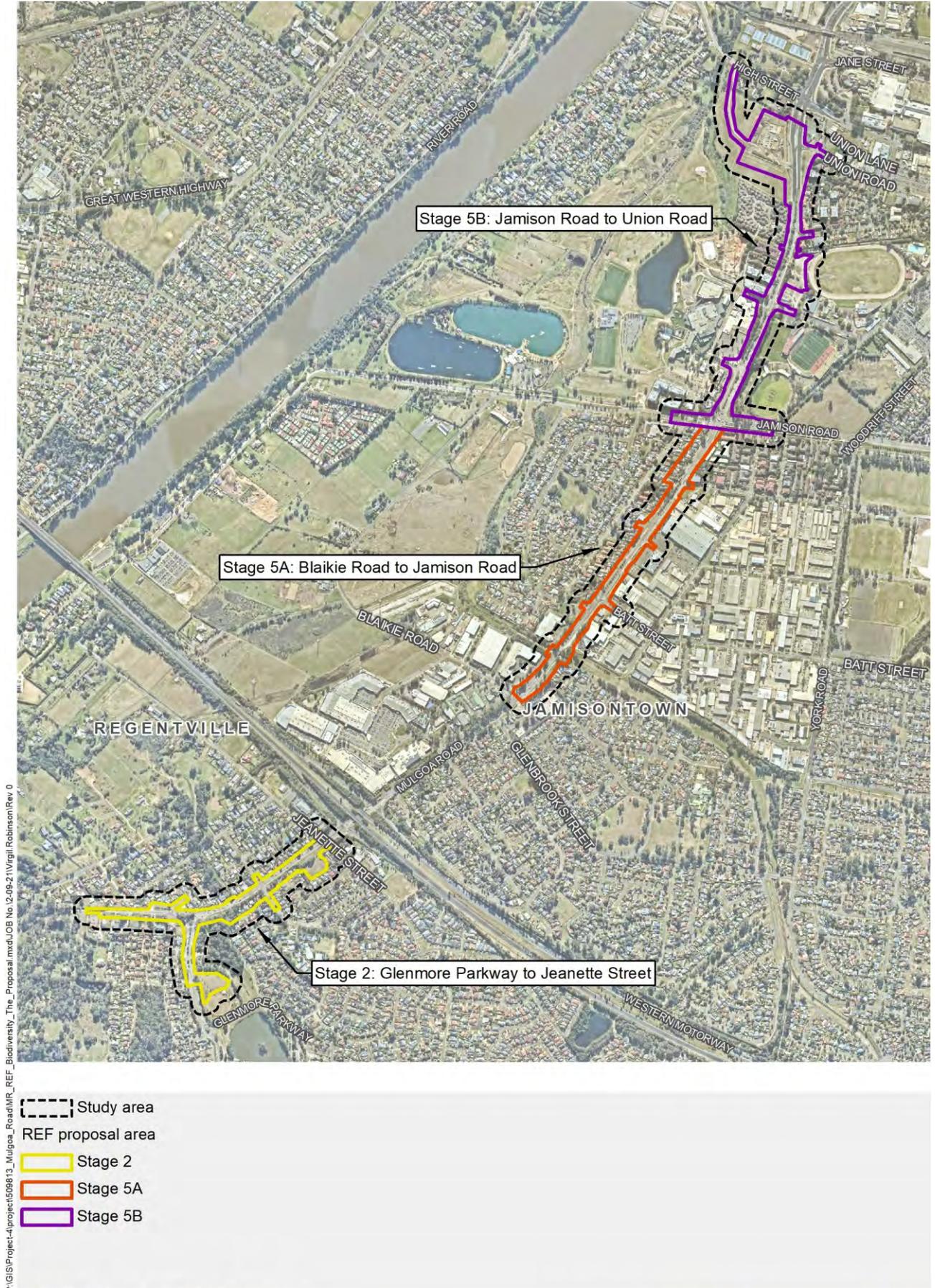


Figure 1-2: The proposal

2 Legislative context

2.1 Legislative context

A Review of Environmental Factors (REF) is prepared to satisfy TfNSW duties under s.5.5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) to “examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of that activity” and s.5.5 in making decisions on the likely significance of any environmental impacts. This biodiversity impact assessment forms part of the REF being prepared for the Mulgoa Road, Jamisontown upgrade, and assesses the biodiversity impacts of the proposal to meet the requirements of the EP&A Act.

Sections 7.2 A of the BC Act and Part 7A of the FM Act require that the significance of the impact on threatened species, and endangered ecological communities is assessed using a five-part test. Where a significant impact is likely to occur, a species impact statement (SIS) must be prepared in accordance with the Environment Agency Head’s requirements or a Biodiversity Development Assessment Report (BDAR) must be prepared by an accredited assessor in accordance with the Biodiversity Assessment Method (BAM).

In September 2015, a “strategic assessment” approval was granted by the Federal Minister in accordance with the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The approval applies to Transport road activities being assessed under Division 5.1 (formerly Part 5) of the EP&A Act with respect to potential impacts on nationally listed threatened species, ecological communities and migratory species.

As a result, TfNSW road proposals assessed via an REF:

- must address and consider potential impacts on nationally listed threatened species, populations, ecological communities and migratory species, including application of the “avoid, minimise, mitigate and offset” hierarchy
- do not require referral to the Department of Agriculture, Water and the Environment (DAWE) for these matters, even if the activity is likely to have a significant impact.
- must use the Biodiversity Offset Scheme (BOS) to offset project impacts

To assist with this, assessments are required in accordance with the Matters of National Environmental Significance: Significant impact guidelines 1.1. *Environment Protection and Biodiversity Conservation Act 1999* (DoE 2013).

2.2 Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities, heritage places and water resources which are defined as Matters of National Environmental Significance (MNES).

Under the EPBC Act, an action includes a proposal, undertaking, development or activity that may impact MNES. An action that ‘has, will have or is likely to have a significant impact on a MNES’ is deemed to be a ‘controlled action’ and may not be undertaken without prior approval from the Commonwealth Minister for the Department of Agriculture, Water and the Environment (DoAWE). An action that may potentially have a significant impact on a MNES is to be referred to DoAWE for determination as to whether or not it is a controlled action.

MNES categories listed under the EPBC Act are:

- World heritage
- National heritage
- Ramsar wetlands
- Threatened species and communities
- Migratory species
- Protection from nuclear actions
- Commonwealth marine areas
- The Great Barrier Reef Marine Park
- Water resources impacted by coal seam gas or other large coal mining development

2.2.1 Environmental Planning and Assessment Act 1979

The EP&A Act provides a framework for environmental planning and development approvals and includes provisions to ensure that the potential environmental impacts of a development are assessed and considered in the project approval process. The proposal is subject to assessment under Division 5.1 of the EP&A Act.

TfNSW is both the proponent and determining authority under Division 5.1 of the EP&A Act. Under 5.5 (1) of the EP&A Act, TfNSW must 'examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of that activity'. This BAR forms part of the REF being prepared for the Mulgoa Road, Jamisontown widening and assesses the biodiversity impacts of the proposal to meet the requirements of the EP&A Act.

2.2.2 Biodiversity Conservation Act 2016

The *Biodiversity Conservation Act 2016* (BC Act) became operational in August 2017 to replace the Threatened Species Conservation Act 1995. The BC Act promotes the maintenance of a healthy, productive and resilient environment. The BC Act focuses on biodiversity conservation through ecologically sustainable development.

The BC Act applies to the proposal through the requirement to avoid, minimise and offset the impacts of proposed development and land use changes on biodiversity. The proposal would consider potential impacts to biodiversity values and biodiversity and the need for any biodiversity offsets.

Section 7.3 of the BC Act contains a five-part test of significance for determining whether a proposed development or activity is likely to significantly affect threatened species or ecological communities, or their habitats. Where a significant impact is likely to occur, a SIS must be prepared in accordance with the Director-General's requirements or a BDAR must be prepared by an accredited assessor in accordance with the BAM.

2.2.3 Fisheries Management Act 1994

The *Fisheries Management Act 1994* (FM Act) aims to conserve, develop and share the fishery resources of the State for the benefit of present and future generations. Part 7A Division 4 of the FM Act prohibits, without a licence or permit, activities that damage habitats or harm threatened species, populations or ecological communities.

2.2.4 Biosecurity Act 2015

The *Biosecurity Act 2015* (Biosecurity Act) covers all biosecurity risks, including pest animals, plant diseases and weeds and introduces the legally enforceable concept of a general biosecurity duty. The Biosecurity Act divides NSW into regions based on combined LGAs and priority weeds for a region. Some weeds are managed at a State level as they form part of a broader containment strategy. The legislation also complements listed as Weeds of National Significance (WoNS).

3 Methodology

Names of vegetation communities used in this report are based on the PCTs used in the BioNet Vegetation Classification (November 2020).

These names are cross-referenced with those used for threatened ecological communities listed under the BC Act and/or the EPBC Act. They are also cross-referenced with existing vegetation mapping using dominant species and structure of the communities in *Native vegetation of southeast NSW: A revised classification and map for the coast and eastern tablelands* (Tozer *et al.* 2010).

Names of plants used in this document follow PlantNet Royal Botanic Gardens (Royal Botanic Gardens 2020) for recent taxonomic changes. Scientific names are used in this report for species of plant. Scientific and common names (where available) are provided in plant lists in Annexure A. The names of introduced species are denoted with an asterisk (*).

For threatened species of plants, the names used in the EES Threatened Species Website (Office of Environment, Energy & Science 2020) are also provided in the tabulated data in appendices where these differ from the names used by PlantNet database.

Names of vertebrate fauna follow the Australian Faunal Directory maintained by the Department of the Environment (DOEE 2020). Common names are used in the report for species of animal. Scientific names are included in species lists found in Annexure A.

3.1 Personnel

This assessment has been conducted by the suitably qualified and experienced ecologists. Table 3-1 details of their roles and qualifications.

Table 3-1: Proposal personnel

Name	Qualification/s	Years of experience	Role
Paul Gadsby	Masters of Conservation Biology Bachelor of Science (Ecology and Environmental Science) BAM accredited assessor # BAAS20010	13	Field surveys and biodiversity assessment content
Janelle So	Bachelor of Advanced Science (Honours) (Biology and Ecology)	1	Field surveys and biodiversity assessment content
Dominic Adshead	Bachelor of Science (Forestry)	25	Quality assurance review

3.2 Background research

Background research was undertaken to collect and review information relevant to the presence and likelihood of occurrence of threatened ecological communities, terrestrial and aquatic threatened species and their habitat, important habitat for migratory species and areas of outstanding biodiversity value. Searches were undertaken on 16 November 2020 using NSW and Federal databases and are detailed in Table 3-2.

Table 3-2: Background database searches

Source	Database name	Accessed	Search area	Date conducted
OEH	BioNet Atlas of NSW Wildlife	http://www.bionet.nsw.gov.au/38T	10km x 10km grid centred on the proposal	16 November 2020
	BioNet Vegetation Classification	https://www.environment.nsw.gov.au/NSWVCA20PRapp/search/pctsearch.aspx	PCTs mapped within 10km of the proposal	16 November 2020
	Sharing and Enabling Environmental Data (SEED) in NSW datasets	https://geo.seed.nsw.gov.au/Public_View/index.html?viewer=Public_Viewer&locale=en-AU38T	10km surrounding the proposal	16 November 2020
	Biodiversity Values Map	https://www.lmbc.nsw.gov.au/Maps/index.html?viewer=BOSE_TMap	10km surrounding the proposal	16 November 2020
NSW Department of Primary Industries (DPI) Fisheries	NSW DPI Fisheries Fish Records Viewer	https://www.dpi.nsw.gov.au/about-us/research-development/spatial-data-portal38T		16 November 2020
	NSW WeedWise	https://weeds.dpi.nsw.gov.au/38T	Greater Sydney	16 November 2020
	NSW DPI Key Fish Habitat maps	https://www.dpi.nsw.gov.au/fishing/habitat/publications/pubs/key-fish-habitat-maps38T	Sydney Map	16 November 2020
Australian Government Department of Environment	EPBC Protection Matters Search Tool (PMST) for Matters of National Environmental Significance (MNES)	http://environment.gov.au/erin/ert/epbc/index.html38T	10km radius of the proposal	16 November 2020
	Atlas of Groundwater Dependent Ecosystems (GDE)	http://www.bom.gov.au/water/groundwater/gde/38T		16 November 2020

3.3 Habitat assessment

Habitat assessment was undertaken for TECs, populations and threatened species to determine the likelihood of occurrence or the occurrence of habitat within the study area. The probability of TECs and threatened species occurrence was evaluated using information relating to each species' habitat, range and lifecycle requirements and assessed against biotic and abiotic habitat features present within the study area. A likelihood of occurrence rating was given to each TEC and threatened species and ranged from low to recorded (refer to Table 3-3). The results from the habitat assessment are presented in Annexure B.

Table 3-3: Likelihood of occurrence

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 proposal 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 proposal area. Also includes species known or likely to visit the proposal area during regular seasonal movements or migration.
Moderate	Potential habitat is present in the proposal area. Species unlikely to maintain sedentary populations, however may seasonally use resources within the proposal 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 proposal 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 proposal area and has not been recorded recently in the locality (10 km). It may be an occasional visitor, but habitat similar to the proposal 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 proposal 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 proposal area. Based on a field assessment of the habitat constraints or microhabitats on the proposal area, the habitat is identified as being substantially degraded such that the species is unlikely to utilise the proposal area (or specific vegetation zones), or an expert report that is prepared that states the species is unlikely to be present on the proposal area or specific vegetation zones.

3.3.1 Biodiversity Assessment Method

The Biodiversity Assessment Method is used to determine the ecosystem and species credit requirements of the Proposal, where it exceeds the thresholds identified in the *Biodiversity Offset Guidelines* (RMS, 2016). Given that the Proposal is unlikely to have a significant impact on any threatened species, populations or communities, a BDAR is not required for this Proposal. Full credit calculations have not been completed for this project as it is being assessed under Part 5 of the EP&A Act, with Transport for NSW as the determining authority.

3.4 Field survey

Field surveys were conducted to ground-truth results from habitat assessments and background research (database searches). All accessible vegetation (exotic and native) was checked with potential threatened ecological communities and species with a moderate or higher likelihood of occurrence targeted. Surveys were conducted by Aurecon ecologists on 23 and 24 November 2020 and included the 50-metre study area buffer, except where the study area included private property. In these instances, an 'over the fence' inspection was used. Habitat within private property primarily consisted of lawn and maintained flower gardens.

An anabat to detect microbats was placed on School House Creek on 28 March to 2 April 2021.

A targeted survey for Sydney Plains Greenhood (*Pterostylis saxicola*) was completed on 27 October 2021, within the recommended survey interval for this orchid, and after confirmation that reference sites outside the project area were in flower.

Surveys were undertaken in accordance with the following guidelines:

- Biodiversity Assessment Methodology (DPIE, 2020a)
- Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (RTA, 2011)
- Surveying threatened plants and their habitats: *NSW survey guide for the Biodiversity Assessment Method* (DPIE, 2020b)
- Methodology detailed in the NSW Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities (Working Draft) (DEC, 2004)

These surveys involved:

- Random meander for a general flora inventory
- Comprehensive searches of suitable habitat (survey effort exceeded the requirements of the parallel field traverse technique)
- Inspection of PCTs to make any necessary updates to the existing PCT mapping
- Opportunistic survey of all fauna based on visual, aural or habitat inspections
- Recording the occurrence and extent of weed species
- Targeted survey for Cumberland Plain Land Snail (*Meridolum corneovirens*)
- Targeted anabat survey for Southern Myotis bat (*Myotis macropus*)
- Targeted survey for Sydney Plains Greenhood (*Pterostylis saxicola*)

3.4.1 Timing and weather

Weather conditions were recorded from Penrith weather station, around three kilometres from the proposal. Onsite conditions were generally warm and sunny. Table 3-4 details weather conditions from the 18 to 24 November 2020, 28 March to 2 April 2021 (microbat survey) and 27 October 2021 (Sydney Plains Greenhood survey).

Table 3-4: Summary of weather conditions during field surveys

Date	Temperature (min)	Temperature (max)	Rain	Wind speed maximum km/h
18 November 2020	15	26.5	9.4	35
19 November 2020	14.4	30.7	0.2	26
20 November 2020	16.7	39.9	0	61
21 November 2020	15.5	29	6.6	33
22 November 2020	15.8	28.5	1.6	19

Date	Temperature (min)	Temperature (max)	Rain	Wind speed maximum km/h
23 November 2020	19.2	28.2	0.2	57
24 November 2020	14.9	26.8	0.2	22
28 March 2021	13.4	27.4	0	24
29 March 2021	13.7	27.1	0	24
30 March 2021	16.4	24.0	0	24
31 March 2021	11.3	25.9	0	24
1 April 2021	12.0	27.0	0	20
2 April 2021	14.1	27.6	0	15
27 October 2021	13.9	30.3	0	26

3.4.2 Vegetation surveys

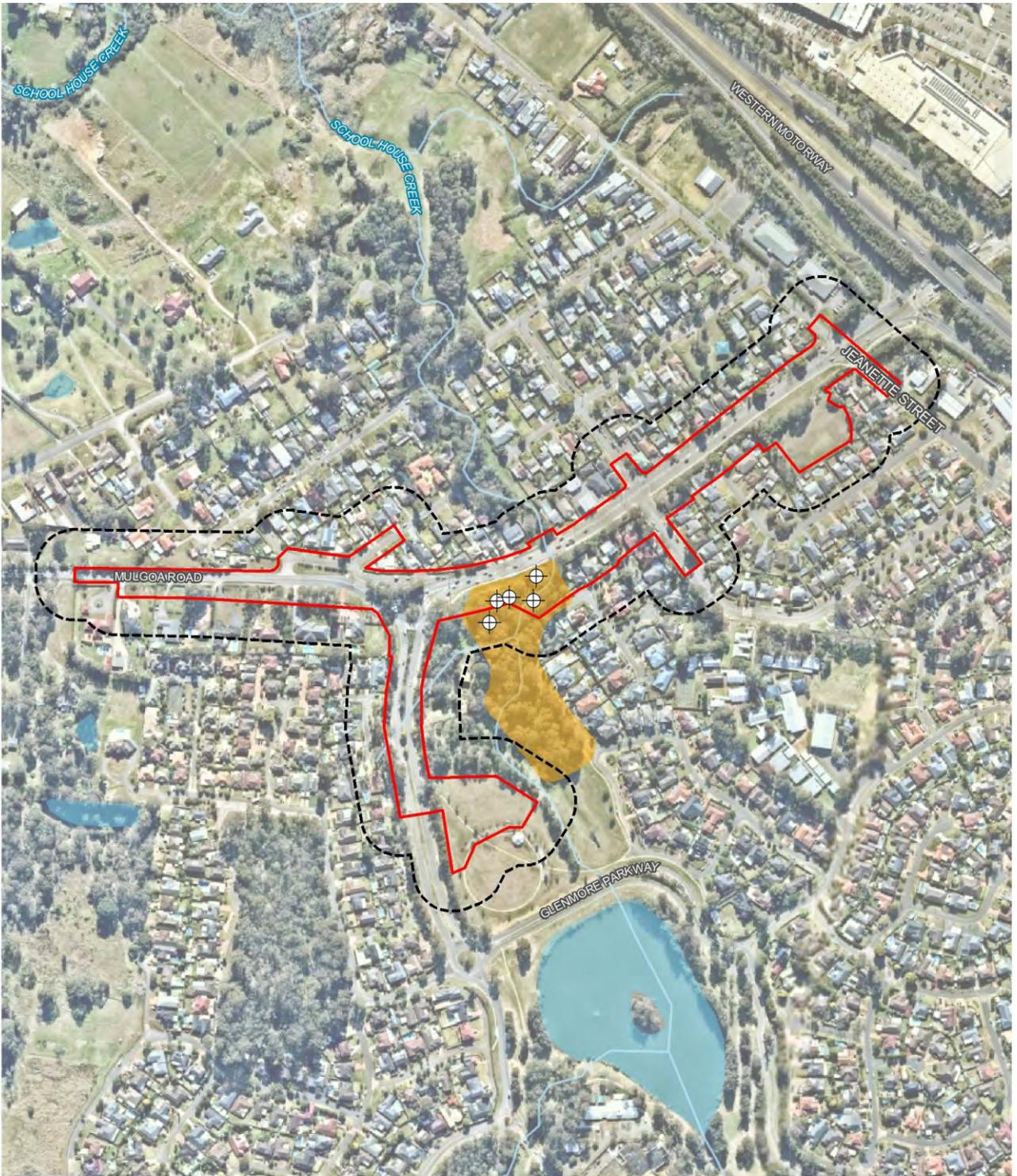
Vegetation surveys were conducted within the study area on the 23 and 24 of November 2020. Flora species lists were compiled for all native and where possible exotic flora. Native vegetation community boundaries and exotic assemblages were confirmed and delineated during field surveys using aerial imagery.

Remnant and planted native vegetation were identified, classified accordingly to the NSW PCTs (Figure 3-1 to Figure 3-3). Each PCT was assigned the corresponding formation, class and TEC (if applicable). Two plot-base floristic surveys were undertaken and consisted of a nested 20 x 50 metre quadrat in accordance with Section 5 of Biodiversity Assessment Method 2020. The number of plots was determined in accordance with minimum plots required per vegetation zone under the BAM (refer Table 3-5) with their location shown in Figure 3-1 and Figure 3-3.

Non-local native and exotic were also identified and mapped to assist with assessing threatened species habitat.

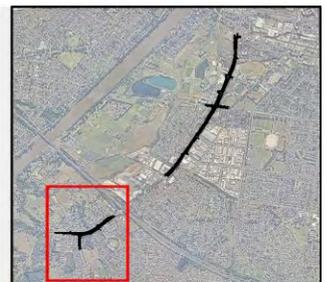
Table 3-5: Plots completed per vegetation zone area

Vegetation zone	Area (ha)	Minimum number of plots/mid-lines	No. plots completed within the study area
PCT 835_moderate	1.75	1 plot/mid-lines	1 plot/mid-lines
PCT 849_moderate	0.5	1 plot/mid-lines	1 plot/mid-lines

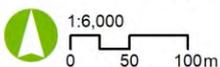


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- Study area
- REF proposal area
- Water body
- Watercourse
- PCT 835 - Cumberland River-Flat Forest
- Survey locations



Source: Aurecon, TfNSW, Spatial Services, Nearmap, Esri

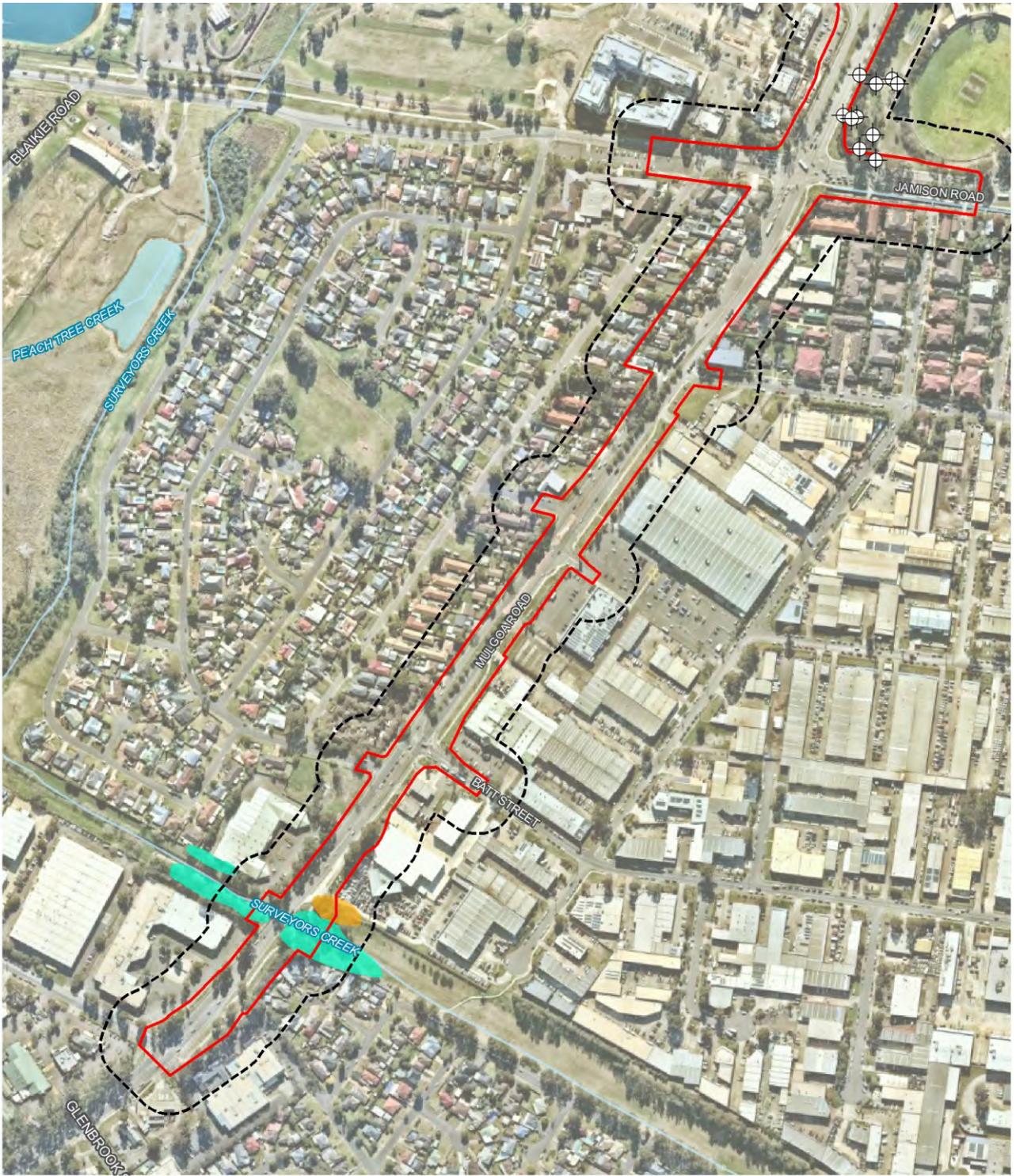


Projection: GDA 1994 MGA Zone 56

Mulgoa Road **Biodiversity Assessment Report**

Vegetation survey locations Stage 2

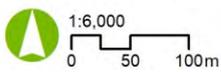
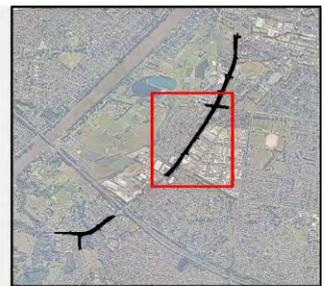
Figure 3-1: Vegetation survey locations – Stage 2



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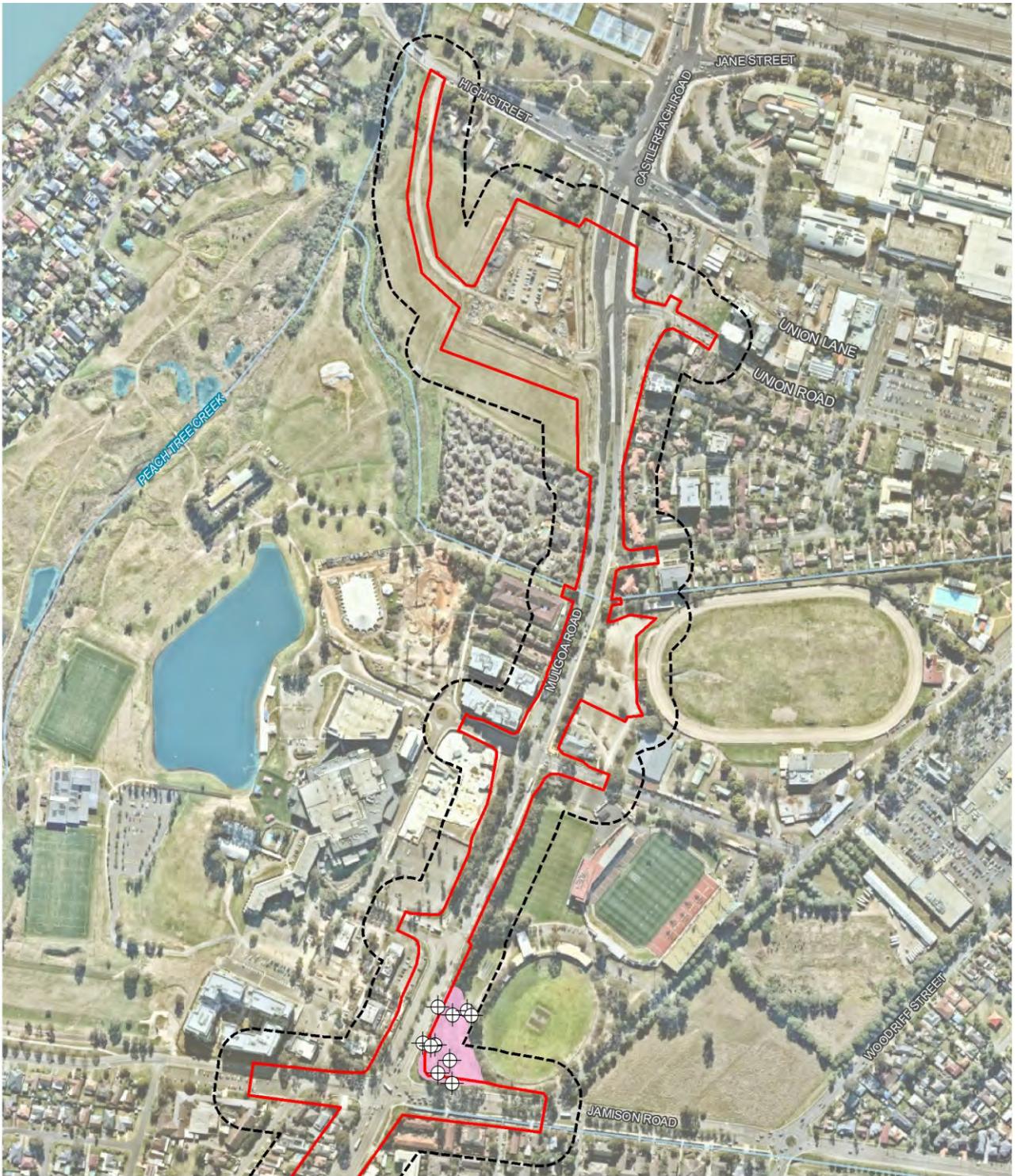
-  Study area
-  REF proposal area
-  Water body
-  Watercourse
-  PCT 835 - Cumberland River-Flat Forest
-  Planted PCT 1800 - Cumberland Swamp Oak Riparian Forest
-  Survey locations

Source: Aurecon, TfNSW, Spatial Services, Nearmap, Esri



Projection: GDA 1994 MGA Zone 56

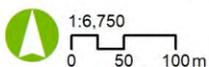
Figure 3-2: Vegetation survey locations – Stage 5A



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- Study area
- REF proposal area
- Water body
- Watercourse
- PCT 849 - Cumberland Shale Plains Woodland Stage 5B
- Survey locations

Source: Aurecon, TfNSW, Spatial Services, Nearmap, Esri



Projection: GDA 1994 MGA Zone 56



Mulgoa Road **Biodiversity Assessment Report**

Vegetation survey locations Stage 5B

Figure 3-3: Vegetation survey locations – Stage 5B

3.4.3 Targeted flora surveys

Flora surveys were conducted on 23 and 24 November 2020, and 27 October 2021 in accordance with *Surveying threatened plants and their habitats* (DPIE, 2020b). Targeted surveys were undertaken for threatened species that were considered to have a moderate or higher likelihood of occurring with the study area.

Targeted surveys searched areas of suitable habitat within the study area for the candidate threatened flora (as shown in Table 3-6). Suitable habitat for these species was found to occur within remnant vegetation across the study area. Due to the small size and shape of the remnants and the density of *Lantana* in some patches, parallel field transverse was not deemed the most effective survey method. To increase the likelihood of detection targeted surveys involved methodical habitat searches (at a closer than recommended distance of the parallel field traverse).

Survey timing was outside of the recommended timing for three of the fifteen threatened species. As two of the species *Dillwynia tenuifolia* and *Persicaria elatior* are non-cryptic and given the area of suitable habitat for each species was small; increased survey effort was undertaken to search all areas of suitable habitat for above ground vegetative features. Targeted survey for *Pterostylis saxicola* was completed in all areas of suitable habitat, and after confirmation that reference sites outside the project area were in flower, but did not find the species.

Table 3-6: Targeted flora species survey details

Species	Minimum survey requirements ¹	Survey completed
<i>Acacia bynoeana</i>	Survey all year round	Methodical suitable habitat searches
<i>Acacia pubescens</i>	Survey all year round	Methodical suitable habitat searches
<i>Dillwynia tenuifolia</i>	August, September, October	Methodical suitable habitat searches
<i>Eucalyptus benthamii</i>	Survey all year round	Methodical suitable habitat searches
<i>Grevillea juniperina</i> subsp. <i>juniperina</i>	Survey all year round	Methodical suitable habitat searches
<i>Marsdenia viridiflora</i> subsp. <i>viridiflora</i>	Survey all year round	Methodical suitable habitat searches
<i>Micromyrtus minutiflora</i>	Survey all year round	Methodical suitable habitat searches
<i>Persicaria elatior</i>	January, February, March, April, May, December	Methodical suitable habitat searches
<i>Persoonia nutans</i>	Survey all year round	Methodical suitable habitat searches
<i>Pimelea curviflora</i> var. <i>curviflora</i>	Survey all year round	Methodical suitable habitat searches
<i>Pimelea spicata</i>	Survey all year round	Methodical suitable habitat searches
<i>Pterostylis saxicola</i>	October, November, December	Targeted surveys completed in October 2021
<i>Pultenaea parviflora</i>	Survey all year round	Methodical suitable habitat searches
<i>Pultenaea pedunculata</i>	Survey all year round	Methodical suitable habitat searches

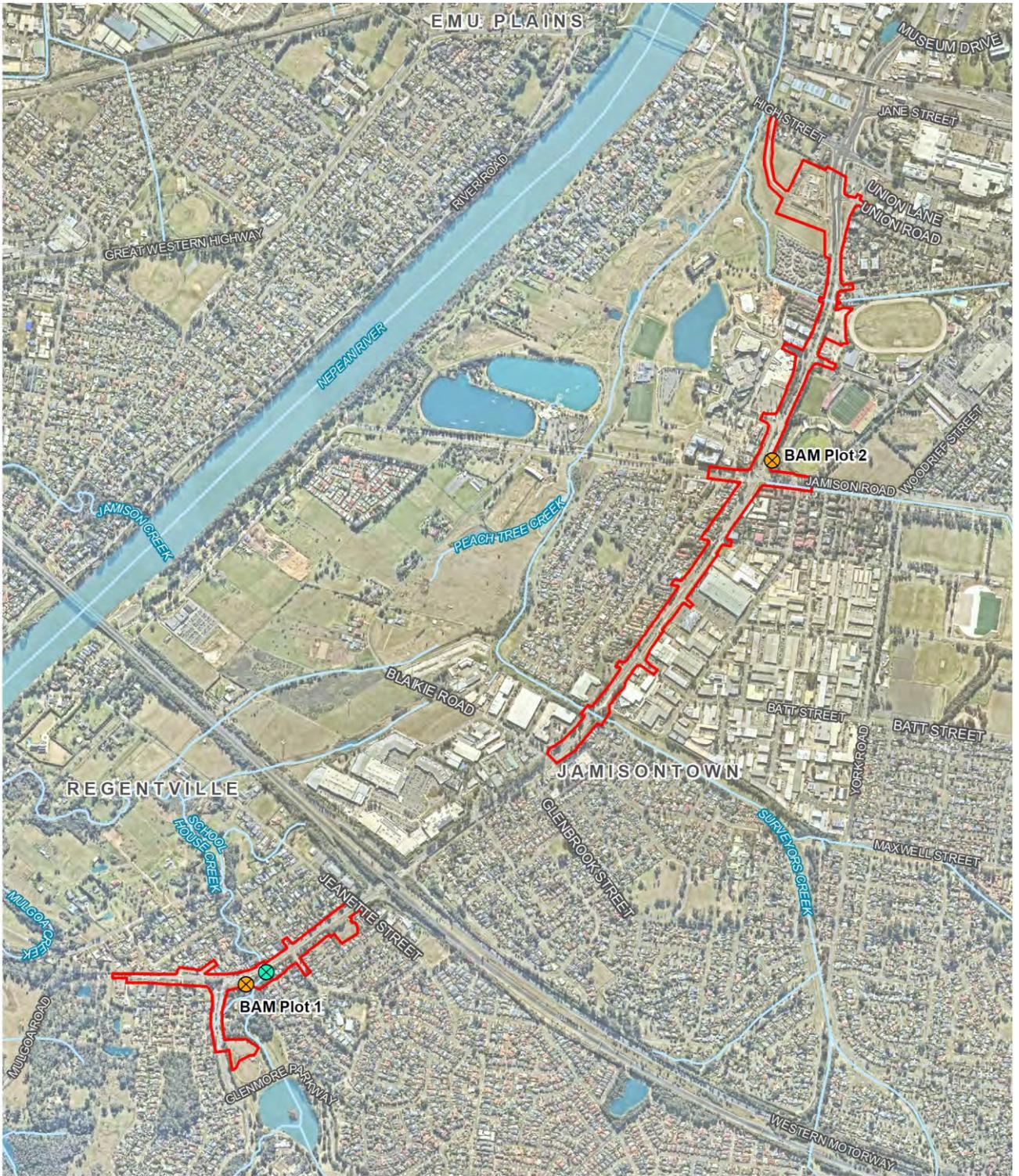
Species	Minimum survey requirements ¹	Survey completed
<i>Wahlenbergia multicaulis</i>	Survey all year round	Methodical suitable habitat searches

3.4.4 Targeted fauna surveys

Initial fauna surveys consisted of habitat assessments and visual inspections of habitat features within the study area for signs of use, tracks, scats and other traces. Opportunistic fauna observations were recorded during surveys of the study area over two days (23 and 24 November 2020). During these surveys all fauna were recorded along with habitat features that are important for the species life cycle.

Targeted surveys were carried out for the Cumberland Plain Land Snail on the 24 November 2020. Surveys involved searching suitable within the remnant vegetation surrounding School House Creek, where accumulated bark at the base of mature trees, fallen logs and other debris was searched. Preferred habitat was absent from other areas of remnant vegetation due to slashing, mowing and removal of shrub layer vegetation. The location of searches is shown in Figure 3-4.

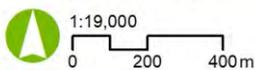
Eight species of microbat have a moderate or higher likelihood of occurring within the study area. Hollow bearing trees, culverts and bridges which may represent potential roosting habitat is present. Of these bat species based on the requirements of the BAM, targeted anabat surveys were required for the threatened Southern Myotis bat (*Myotis macropus*), with School House Creek the only suitable area for survey. Significant rainfall (415mm for Penrith Bureau of Meteorology weather station in March) resulted in major flooding in western Sydney in mid-March, delaying commencement of survey. Suitable survey conditions allowed the anabat placed at School House Creek between Monday 28 March to Friday 2 April. Four species of bat (including the Southern Myotis, *Mormopterus* spp., *Vespadelus* spp., and *Chalinolobus gouldii*) were recorded, indicating the favourable conditions for microbat activity and survey.



- REF proposal area
- Water body
- Watercourse
- ✕ Anabat location
- ✕ BAM Plot location

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Source: Aurecon, TfNSW, Spatial Services, Nearmap, Esri



Projection: GDA 1994 MGA Zone 56

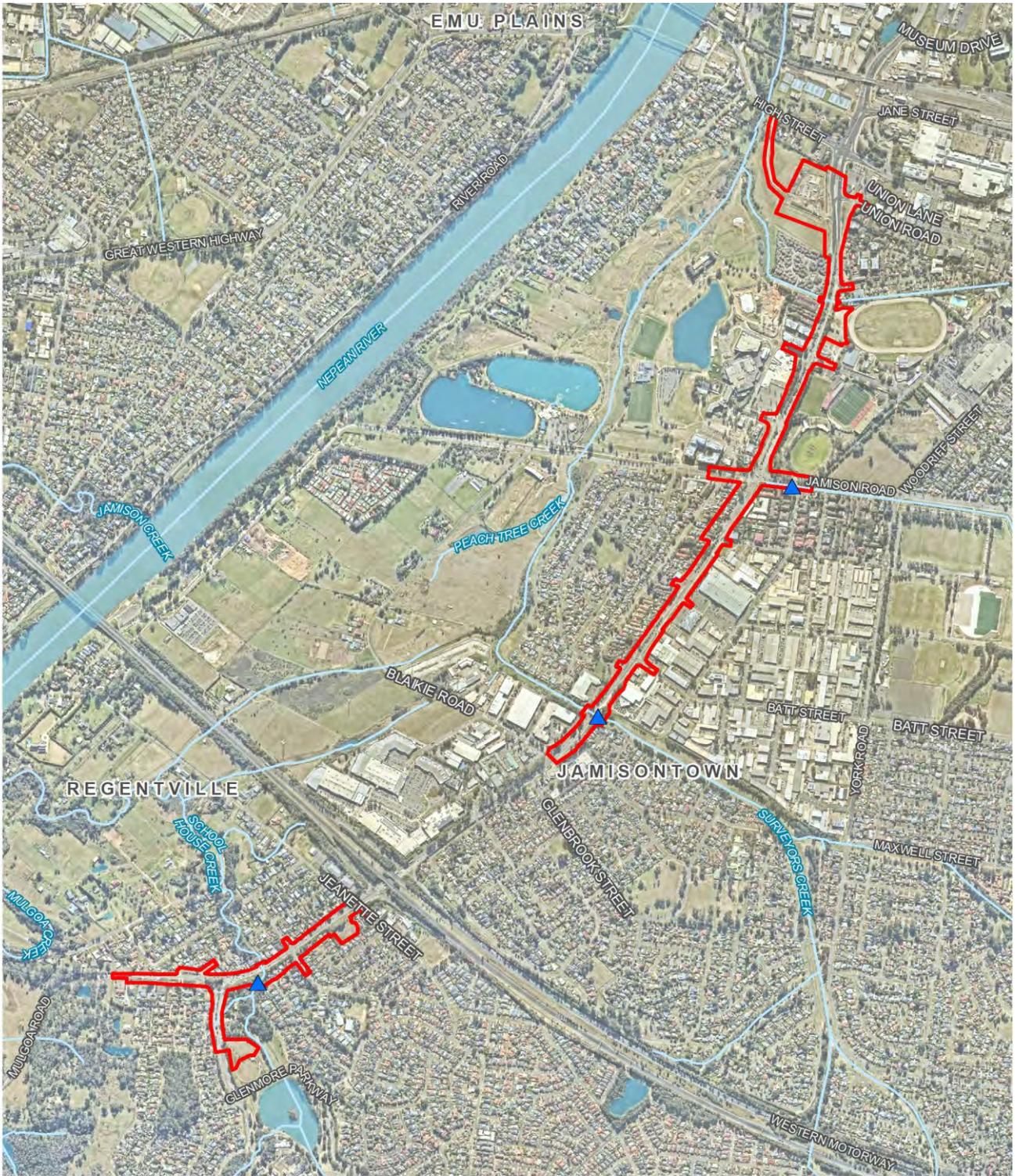
Figure 3-4: Threatened species survey locations

3.4.5 Aquatic surveys

Three creeks occur within the study area and each was assessed for habitat features in accordance with the NSW DPI (Fisheries) document *Policy and Guidelines for fish habitat conservation and management* (2013 update).

Waterway habitat assessment was undertaken on the 23 and 24 November 2020 within the locations shown in Figure 3-5 and included confirmation of:

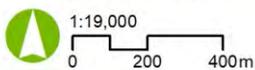
- The ecosystem type (e.g. wetlands, floodplains, streams, estuaries, lakes).
- Dimensions of waterway and depth of water.
- Flow characteristics and hydrological features of aquatic habitat, including changes to drainage and filtration and flow regime.
- Bed substrate (e.g. rocks, coral, gravel, sand, mud).
- Habitat features (e.g. pools, riffles, billabongs, reefs).
- Existing infrastructure and barriers to fish movement (natural or artificial).
- Width and species composition of riparian vegetation including the type of vegetation present (e.g. macrophytes, snags, seaweeds, seagrasses, mangroves, saltmarsh) and condition.
- Water quality (i.e. a snapshot using basic water quality indicators at the time of sampling including dissolved oxygen, pH, turbidity, temperature, nutrients and salinity).



- REF proposal area
- Water body
- Watercourse
- ▲ Aquatic survey location

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Source: Aurecon, TfNSW, Spatial Services, Nearmap, Esri



Projection: GDA 1994 MGA Zone 56

Figure 3-5: Aquatic survey locations

4 Existing environment

The proposal is located within the Cumberland sub-region of the Sydney Basin Bioregion. The geology beneath the study area is a mosaic of Triassic sedimentary deposits from the Wianamatta Group and multiple alluvial deposits. The topography consists of low rolling hills, with slopes of 0 to 10%, local relief is between 25 to 40 metres. Three drainage lines intersect the proposal, all flowing to the Nepean river. Native and exotic vegetation within the corridors of School House Creek, Surveyors Creek and an unnamed creek link the vegetation of the proposal to the Nepean River and Blue Mountains National Park. The condition and connectivity of this vegetation is variable between and along the extent these drainage features.

Two Mitchell Landscapes occur within the proposal (Figure 1-1) with the following characteristics (DECC, 2002):

- Cumberland Plain: low rolling hills, small number of volcanic vents, partly covered by Tertiary river gravels and sands, general elevation 30 to 120 metres. Red and brown texture-contrast soils on crests grading to yellow harsh texture-contrast soils in valleys.
- Hawkesbury – Nepean Channels and Floodplains: Meandering channel and moderately wide floodplain of the Hawkesbury and Nepean Rivers. Quaternary sand and gravel, general elevation 0 to 20 metres, local relief less than 10 metres. Undifferentiated alluvial sand to poorly structured gradation profiles of sandy loam or clay loam.

The Cumberland Plain has an extensive history of disturbance to the natural environment that includes vegetation clearing and urban development. As such residential dwellings and infrastructure comprise much of the proposal area. Remnant native vegetation is confined to riparian corridors, private land and public parks.

Native vegetation consists primarily of a canopy of Forest Red Gum (*Eucalyptus tereticornis*), Cabbage Gum (*E. amplifolia*), Grey Box (*E. moluccana*), Broad-leaved Apple (*A. subvelutina*) and Swamp Oak (*Casuarina glauca*). Blackthorn (*Bursaria spinosa*), Parramatta Wattle (*Acacia parramattensis*) and Sweet Pittosporum (*Pittosporum undulatum*) are common species within the shrub layer. Commonly encountered ground layer species are Weeping grass (*Microlaena stipoides*), Basket grass (*Oplismenus aemulus*), Blue trumpet (*Brunoniella australis*) and Berry Saltbush (*Einadia hastata*). Exotic species include African Love grass (*Eragrostis curvula*), Lantana (*Lantana camara*), Large-leaved Privet (*Ligustrum lucidum*), Small-leaved Privet (*Ligustrum sinense*), African Olive (*Olea europaea* subsp. *cuspidata*) and Moth vine (*Araujia sericifera*). A full species list for all surveyed plots is found in Annexure A.

4.1 Plant community types

The Cumberland Plain West vegetation mapping (DPIE, 2014) identifies five vegetation communities within the 1500 metre assessment area buffer:

- PCT 835 Cumberland River-Flat Forest
- PCT 849 Cumberland Shale Plains Woodland
- PCT 850 Cumberland Shale Hills Woodland
- PCT 1181 Forest Smooth-barked Apple - Red Bloodwood - Sydney Peppermint heathy open forest on slopes of dry sandstone gullies of western and southern Sydney, Sydney Basin Bioregion
- PCT 1395 Cumberland Shale - Sandstone Ironbark Forest

On ground surveys and BAM plots confirmed the presence of two plant communities:

- PCT 835 Cumberland River-Flat Forest (Figure 4-3 and Figure 4-4)
- PCT 849 Cumberland Shale Plains Woodland (Figure 4-5)



Figure 4-1 Site photo of PCT 835 present within the proposal area

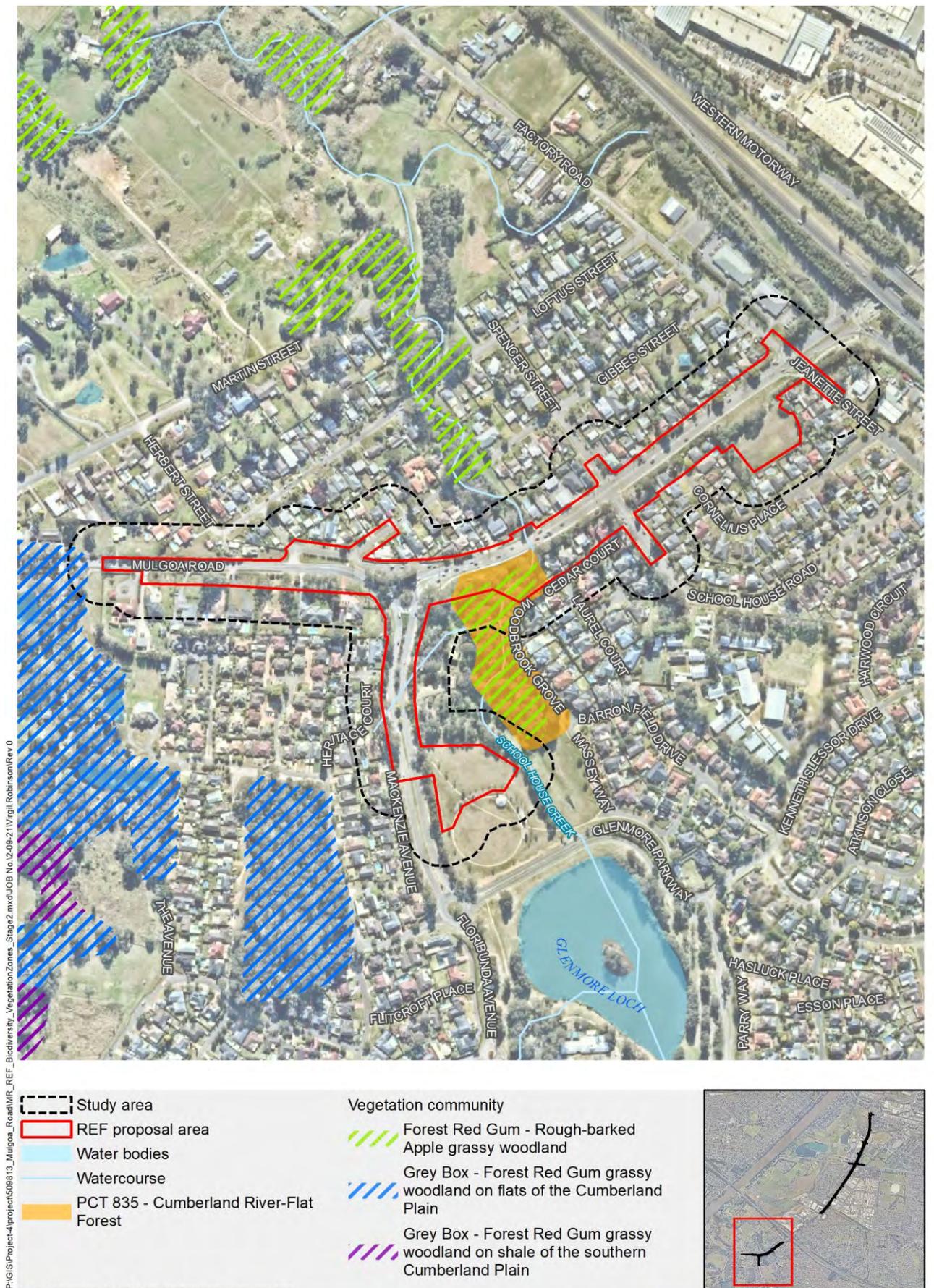


Figure 4-2 Site photo of PCT 849 present within the proposal area

In addition, three exotic, planted and non-local native vegetation communities were identified onsite:

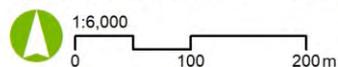
- Planted PCT 1800 Cumberland Swamp Oak Riparian Forest (not EEC)
- Non-local native vegetation
- Exotic vegetation (including plantings)

Vegetation within the study and proposal area is shown in Figure 4-3 to Figure 4-5 and summarised in Table 4-1. Two native plant communities identified onsite meet the description of TECs under the BC Act and the EPBC Act, although they are of varying quality. A description of each is provided in the following sections.



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Source: Aurecon, TfNSW, Spatial Services, Nearmap, Esri

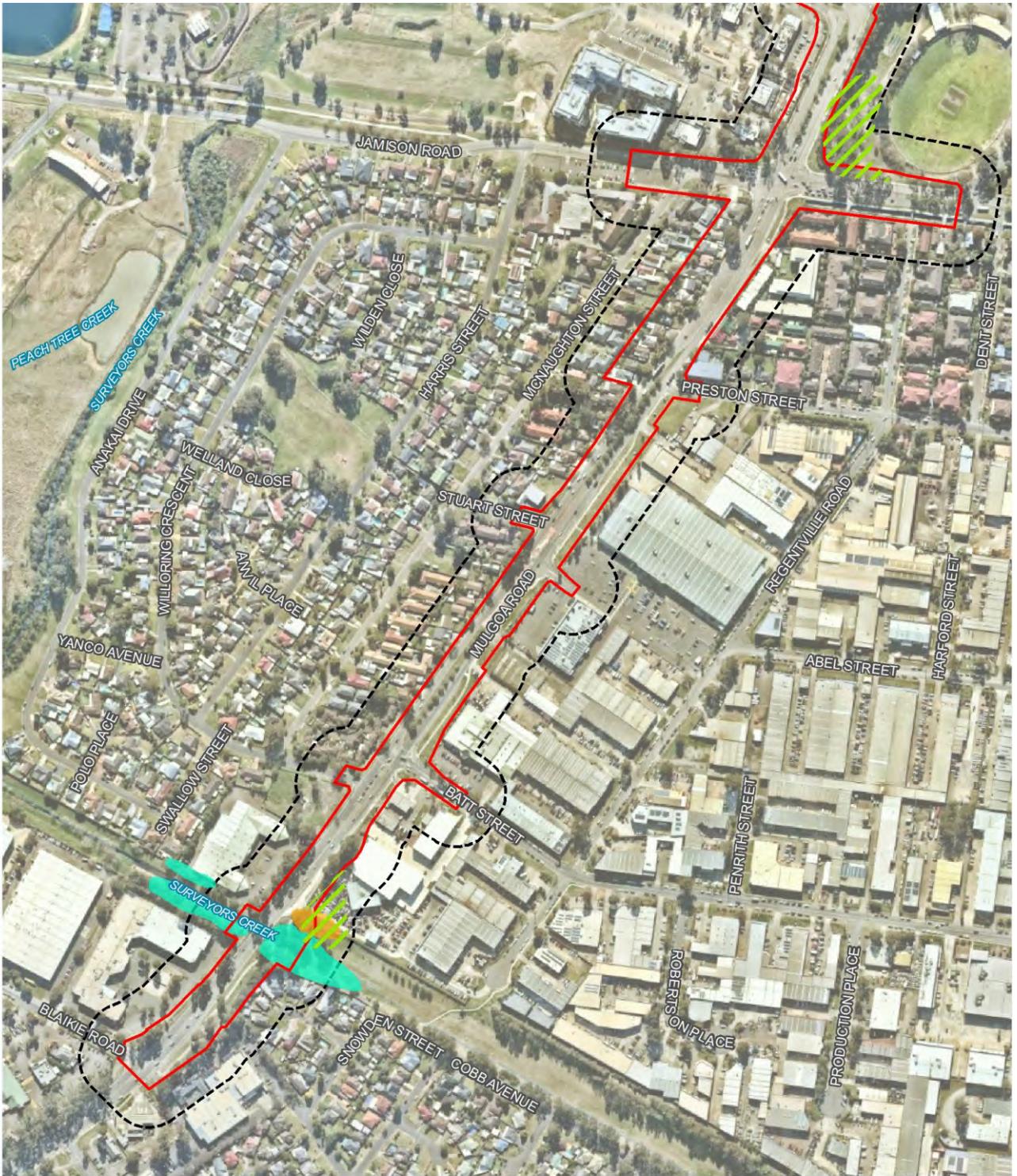


Projection: GDA 1994 MGA Zone 56

Mulgoa Road Biodiversity Assessment Report

Vegetation Zones Stage 2

Figure 4-3: Vegetation zones stage 2



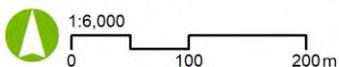
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- Study area
- REF proposal area
- Water bodies
- Watercourse
- Planted PCT 1800 - Cumberland Swamp Oak Riparian Forest
- PCT 835 - Cumberland River-Flat Forest

- Vegetation community**
- Forest Red Gum - Rough-barked
- Apple grassy woodland



Source: Aurecon, TfNSW, Spatial Services, Nearmap, Esri

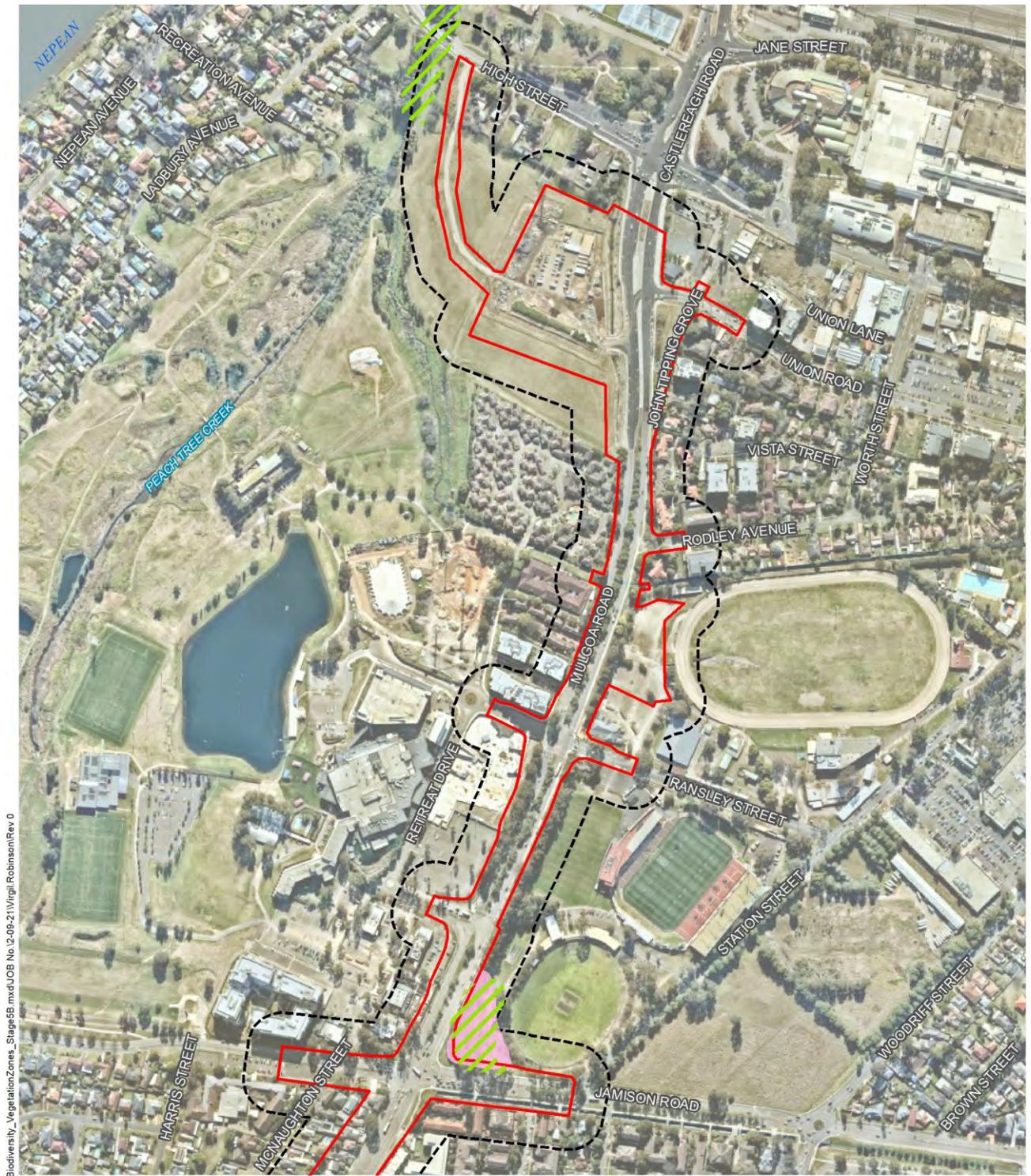


Projection: GDA 1994 MGA Zone 56

Mulgoa Road **Biodiversity Assessment Report**

Vegetation Zones Stage 5A

Figure 4-4: Vegetation zones stage 5A

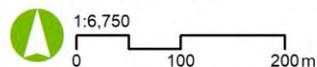


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- | | | | |
|--|--|--|-------------------------------|
| | Study area | | Forest Red Gum - Rough-barked |
| | REF proposal area | | Apple grassy woodland |
| | Water bodies | | |
| | Watercourse | | |
| | PCT 849 - Cumberland Shale P Woodland Stage 5B | | |



Source: Aurecon, TfNSW, Spatial Services, Nearmap, Esri



Projection: GDA 1994 MGA Zone 56

Mulgoa Road **Biodiversity Assessment Report**

Vegetation Zones Stage 5B

Figure 4-5: Vegetation zones stage 5B

Table 4-1: Plant community types

Plant community type (PCT)	Vegetation zone	Vegetation integrity score	Patch size in study area (ha)	Threatened ecological community? BC Act EPBC Act
PCT 849 Cumberland Shale Plains Woodland	Grey Box – Forest Red Gum grassy woodland moderate	36	0.58	Yes Yes
PCT 835 Cumberland River-Flat Forest	Forest Red Gum – Rough-barked Apple grassy woodland moderate	48.9	0.93	Yes Yes
Planted PCT 1800 Cumberland Swamp Oak Riparian Forest	Swamp Oak open forest <i>revegetation</i>	10.7	0.29	No No
Street trees and plantings		n/a	n/a	No
Exotic vegetation and grassland		n/a	n/a	No

PCT: 849 Cumberland Shale Plains Woodland

Vegetation formation: Grassy Woodlands

Vegetation class: Coastal Valley Grassy Woodlands

PCT: 849

Conservation status: CEEC under the EPBC Act and BC Act

Estimate of percent cleared: 93%

Condition: Low to Moderate

Extent in the study area: 0.58 hectares

Proposal area: 0.13 hectares

Plots completed: 1

Composition condition score	Structure condition score	Function condition score	Vegetation integrity score
32.5	18.3	78.8	36
Growth form	Typical species		
Trees	<i>Grey Box (E. moluccana), Forest Red Gum (E. tereticornis), Broad-Leaved Ironbark (E. fibrosa)</i>		
Shrubs	N/A		
Grass and grass like	<i>Windmill grass (Chloris truncata)</i>		

Composition condition score	Structure condition score	Function condition score	Vegetation integrity score
Forb	<i>Kidney weed (Dichondra repens)</i> , <i>Blue Trumpet (Brunoniella australis)</i> , <i>Sprawling Bluebell (Wahlenbergia gracilis)</i>		
Fern	N/A		
Other	N/A		

The BioNet Vegetation Database records this community as Cumberland Shale Plains Woodland. It is an open grassy woodland dominated by Grey Box (*Eucalyptus moluccana*), Forest Red Gum (*E. tereticornis*) and Ironbark (*E. crebra* or *E. fibrosa*). The understorey typically is a sparse to moderate cover of shrubs plus high cover of grasses and forbs.

This patch of remnant Cumberland Plain Woodland is located on the corner of Jamison and Mulgoa Road, adjoining Howell Oval. It is dominated by Forest Red Gum, Grey Box and Broad-leaved Ironbark. Spotted Gum (*Corymbia maculata*) and Grey Ironbark (*E. siderophloia*) occur as plantings varying in age mostly from 20 to 60 years old. The shrub layer is devoid of native species due to vegetation thinning and continued slashing. The ground layer is comprised by a mixture of native and exotics species. Native species included Fishweed (*Einadia trigonos*), Lesser Joyweed (*Alternanthera denticulate*), Kidney Weed (*Dichondra repens*) and Windmill grass (*Chloris truncata*). Exotic species such as Plantago (*Plantago lanceolata*), Fleabane (*Conyza* spp.), and Kikuyu (*Cenchrus clandestinus*) are common. Due to continued suppression by slashing and the exclusion of fire, a greater floristic diversity is likely to be contained within the seedbank than encountered during survey.

This community is described to occur at varying elevations within the Cumberland Plain, from below 150 metres to some records at higher elevations with slight inclinations and on hills. The elevation of the proposal along Mulgoa Road ranges from approximately 25 to 40 metres above sea level. These geographical traits of the proposal meet the general description of this vegetation community.

PCT: 835 Cumberland River-Flat Forest

Vegetation formation: Forested Wetlands

Vegetation class: Coastal Floodplain Wetlands

PCT: 835

Conservation status: EEC under the BC Act, CEEC under the EPBC Act

Estimate of percent cleared: 93%

Condition: Low to Medium

Extent in the study area: 0.93 hectares

Proposal area: 0.66 hectares

Plots completed: 1

Composition condition score	Structure condition score	Function condition score	Vegetation integrity score
63	21.8	85	48.9
Growth form		Typical species	
Trees	<i>Cabbage Gum</i> (<i>Eucalyptus amplifolia</i>), <i>Broad-leaved Apple</i> (<i>Angophora subvelutina</i>), <i>Thin-Leaved Stringy-bark</i> (<i>E. eugenoides</i>) and <i>Grey Box</i> (<i>E. moluccana</i>).		
Shrubs	<i>Blackthorn</i> (<i>Bursaria spinosa</i>), <i>Sweet Pittosporum</i> (<i>Pittosporum undulatum</i>) and <i>Parramatta Wattle</i> (<i>Acacia parramattensis</i>)		
Grass and grass like	<i>Weeping grass</i> (<i>Microlaena stipoides</i>), <i>Basket grass</i> (<i>Oplismenus aemulus</i>)		
Forb	<i>Kidney weed</i> (<i>Dichondra repens</i>), <i>Blue Trumpet</i> (<i>Brunoniella australis</i>), <i>Sprawling Bluebell</i> (<i>Wahlenbergia gracilis</i>), <i>Slender Stackhousia</i> (<i>Stackhousia viminea</i>)		
Fern	<i>Mulga fern</i> (<i>Cheilanthes sieberi subsp. sieberi</i>)		
Other	N/A		

The BioNet Vegetation Classification describes the Cumberland Riverflat Forest as an open Eucalypt forest located on the alluvial flats along the Hawkesbury and Nepean River systems, including smaller areas alongside the smaller water bodies that drain the Cumberland Plain.

Two patches of remnant native vegetation within the proposal were confirmed to be PCT 835 - Cumberland River Flat Forest. The largest patch flanks School House Creek and occurs between Mulgoa Road and Glenmore Parkway, with a smaller patch occurring on Surveyors Creek on the eastern side of Mulgoa Road, Jamisontown (Figure 4-4). The canopy within the two patches consists of Cabbage Gum (*E. amplifolia*), Broad-leaved Apple (*A. subvelutina*) and Thin-leaved stringy bark (*E. eugenoides*). Due to disturbances associated with channel construction the shrub and ground layer has been lost from the patch adjacent to Surveyors Creek. Native species within School House Creek remnant contains Blackthorn (*Bursaria spinosa*), Sweet Pittosporum (*Pittosporum undulatum*) and Parramatta Wattle (*Acacia parramattensis*) in the shrub layer. The ground layer was comprised of Weeping grass (*Microlaena stipoides*), Basket grass (*Oplismenus aemulus*), Slender stackhousia (*Stackhousia viminea*), Blue trumpet (*Brunoniella australis*) and Berry Saltbush (*Einadia hastata*). Exotic species are common within the patch and are adversely impacting native vegetation and threaten the long-term health of the ecosystem. Commonly occurring exotics include Large-leaved Privet (*Ligustrum lucidum*), Small-leaved Privet (*Ligustrum sinense*), Lantana (*Lantana camara*), African Olive (*Olea europaea subsp. cuspidata*) and African Love grass (*Eragrostis curvula*). The dominance and abundance of aggressive High Threat Exotics are due to past disturbances such as tree removal, grazing and exclusion of fire. As a result, native shrub and ground covers are relatively sparse within the patch.

It is important to note that this assessment captures a snapshot of above ground floristics and does not assess the seedbank or dormant vegetation, of which it is likely that significant seedbank reserves may exist in the soil.

The low elevation and mean rainfall between 750-1000 millimetres described for this vegetation community was reflected by the geographical attributes of the proposal.

4.2 Threatened ecological communities

Two PCTs recorded within the proposal area (Figure 4-6) (PCT 849 and PCT 835) are analogous with TECs under the BC Act, while the planted Swamp oak open forest (PCT 1800) is not considered to meet the definition of a TEC. An assessment of each plant community onsite against the NSW Scientific Committee determinations is provided in the following section.

4.2.1 Cumberland Shale Plains Woodland

PCT 849 Cumberland Shale Plains Woodland is listed as a Critically Endangered Ecological Community under Part 1 of Schedule 2 of the BC Act.

The study area occurs in the Sydney Basin Bioregion, which is associated with clay soils derived from Wianamatta Group on flat to undulating to steep terrain, which is typical of the listed community. The study area is also within the Penrith LGA, which is noted as one of the areas within the Sydney Basin Bioregion where Cumberland Plain Woodland occurs.

The final determination states that the vegetation composition of this woodland typically consists of an open tree canopy dominated by various Eucalyptus species, and an open or scattered layer of shrubs beneath depending on the level of disturbances. The groundcover consists of a diverse assemblage of grasses, which would be continuous even with historical clearing of the upper storey, as well as variety of forb species.

Significant disturbances have occurred at each of the patches, but despite this, the vegetation of PCT 849 Cumberland Shale Plains Woodland recorded in the proposal contains the primary canopy species listed within the determination and occupies the known landscape position and geology. As such, the areas of Cumberland Shale Plains Woodland (PCT 849) identified within the proposal comprises the TEC Cumberland Plain Woodland in the Sydney Basin Bioregion.

4.2.2 Cumberland River-Flat Forest

PCT 835 Cumberland River-Flat Forest identified within the proposal is associated with TEC River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions, and is listed in Schedule 2, Part 2 of the BC Act as an Endangered Ecological Community.

Located on Coastal Floodplains of the Sydney Basin, this community sits on silts, clay-loams and sandy loams within periodically inundated alluvial flats, drainage lines or around rivers. This TEC generally occurs on lower elevations but may also be seen up to 250 metres above sea level in the Sydney Basin. The vegetation species present is highly influenced by the water in the environment, namely the frequency and duration of recent rainfall, waterlogging and drought. A history of clearing, fire and low site quality has impacts on the growth and structure of all layers but does not negate the presence of this community. As a result, the vegetation may vary from tall open forests or woodlands to one with a more reduced, scattered tree canopy. The groundcover is abundant with native grasses, forbs and scramblers, but due to historical disturbances and changes in hydrology and soil salinity, exotic species may also be present in high numbers.

The recorded areas of PCT 835 Cumberland River-Flat Forest within the proposal align with this description of the TEC and its associated vegetation species, predominantly around creek lines as is common for coastal floodplains.

4.2.3 Cumberland Swamp Oak Riparian Forest

Cumberland Swamp Oak Riparian Forest is listed under Schedule 2, Part 2 of the BC Act as an Endangered Ecological Community.

This TEC is associated with grey-black clay-loams and sandy loams, saline groundwater, and found on waterlogged or periodically inundated flats, drainage lines and edges of other water bodies as is common for coastal floodplains. The community structure varies depending on waterlogging duration and frequency, groundwater salinity, and latitude. Cumberland Swamp Oak Riparian Forest is present on the riparian corridor flanking Surveyors Creek. The former vegetation underwent physical disturbance due to channel construction and presently consists of a canopy of revegetated Swamp oak (*Casuarina glauca*), a diagnostic species of this TEC. The understory contains an assemblage of exotic ground covers and vines such as Kikuyu (*Cenchrus clandestinus*) and Moth vine (*Araujia sericifera*).

While the community onsite meets the definition of this TEC, the area has been extensively disturbed previously as part of the channel works associated with Surveyors Creek. Surveyors Creek is completely channelised and now exists as a concrete channel. As such, extensive earthworks and other disturbances occurred in the area that may have previously naturally contained this community. It is considered that the Swamp Oaks that now occur in this location have been planted as part of the channelization work and it is therefore not a naturally occurring community. For the purposes of this assessment, it is not considered to meet the definition of Swamp Oak Flood Plain Forest TEC.

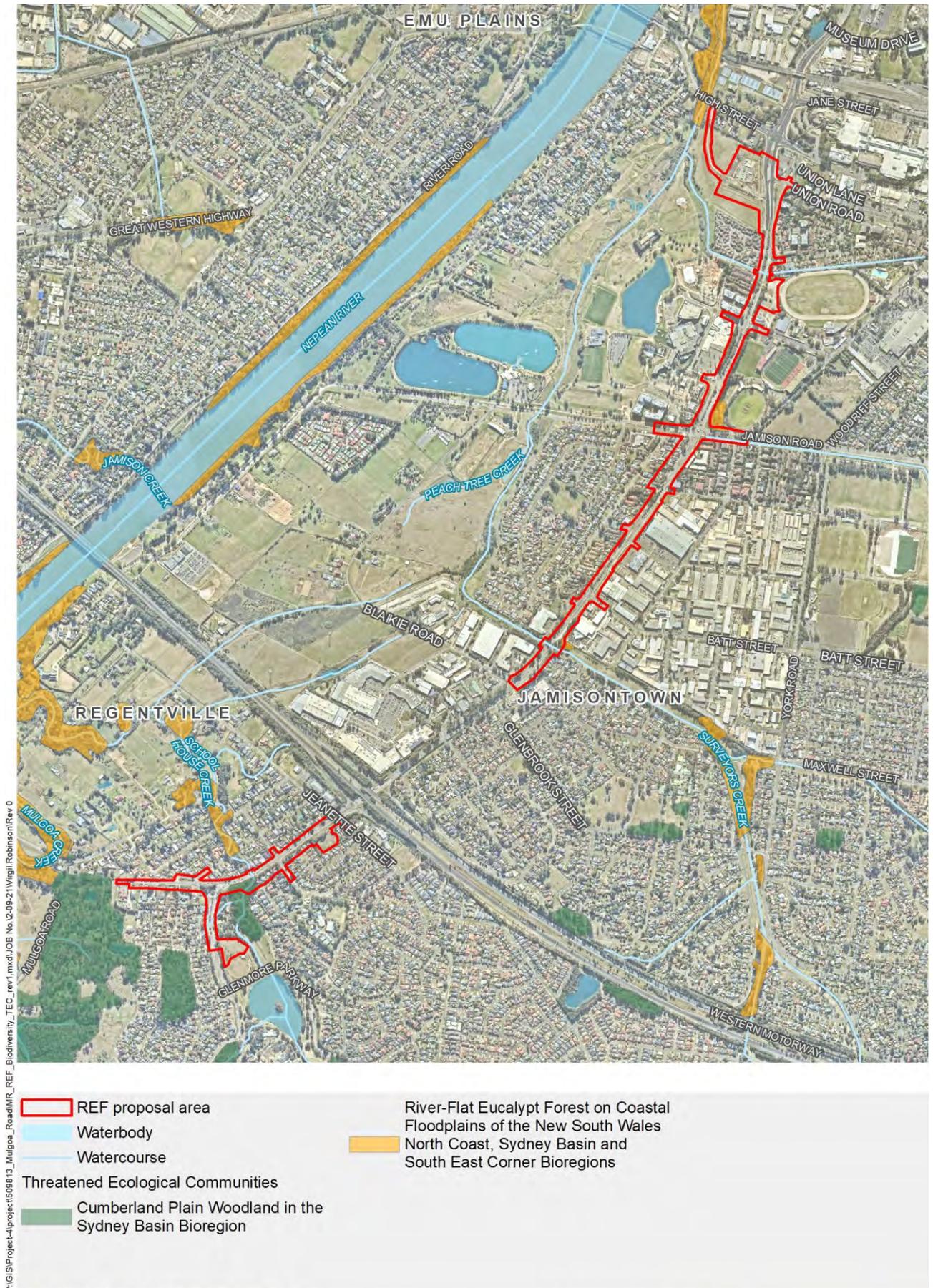


Figure 4-6: Threatened ecological communities

4.3 High threat exotic and priority weeds

The following priority weeds declared for the Penrith LGA and High Threat Exotic (HTE) weeds were recorded within the proposal and are listed with their associated duties under the Biosecurity Act 2015 in Table 4-2.

Table 4-2: High Threat Exotic Weeds found within the proposal

Scientific name	Common name	HTE	WoNS	Duty
<i>Anredera cordifolia</i>	Madeira vine	Yes	Yes	Must not be imported into the State or sold
<i>Amaranthus spp.</i>	Amaranthus			General Biosecurity Duty
<i>Araujia sericifera</i>	Moth vine	Yes		General Biosecurity Duty
<i>Asparagus aethiopicus</i>	Ground asparagus	Yes	Yes	Must not be imported into NSW or sold.
<i>Asparagus plumosus</i>	Climbing asparagus	Yes	Yes	Must not be imported into the State or sold.
<i>Bidens pilosa</i>	Cobbler's Pegs	Yes		General Biosecurity Duty
<i>Cenchrus clandestinus</i>	Kikuyu Grass	Yes		General Biosecurity Duty
<i>Cestrum parqui</i>	Green cestrum	Yes		Land managers should mitigate spread from their land. Plant should not be bought, sold, grown, carried or released into the environment.
<i>Chenopodium album</i>	Fat Hen			General Biosecurity Duty
<i>Chloris gayana</i>	Rhodes grass	Yes		General Biosecurity Duty
<i>Conyza spp.</i>				General Biosecurity Duty
<i>Ehrharta erecta</i>	Panic Veldtgrass	Yes		General Biosecurity Duty
<i>Eleusine indica</i>	Crowsfoot Grass			General Biosecurity Duty
<i>Eragrostis curvula</i>	African Lovegrass	Yes		Must not be traded, carried, grown or released into the environment.
<i>Hypochaeris radicata</i>	Catsear			General Biosecurity Duty
<i>Lantana camara</i>	Lantana	Yes	Yes	Must not be imported into the State or sold
<i>Ligustrum lucidum</i>	Large leaf privet	Yes		General Biosecurity Duty

Scientific name	Common name	HTE	WoNS	Duty
<i>Ligustrum sinense</i>	Small leaf privet	Yes		General Biosecurity Duty
<i>Lepidium spp.</i>				General Biosecurity Duty
<i>Modiola caroliniana</i>	Red-flowered mallow			General Biosecurity Duty
<i>Ochna serrulata</i>	Mickey Mouse Plant	Yes		General Biosecurity Duty
<i>Olea europaea subsp. cuspidata</i>	African Olive	Yes		The plant or parts of the plant are not traded, carried, grown or released into the environment.
<i>Paspalum dilatatum</i>	Dallis grass	Yes		General Biosecurity Duty
<i>Plantago lanceolata</i>	Plantain			General Biosecurity Duty
<i>Poa annua</i>	Annual blue grass			General Biosecurity Duty
<i>Richardia stellaris</i>				General Biosecurity Duty
<i>Sida rhombifolia</i>	Paddy's Lucerne			General Biosecurity Duty
<i>Solanum nigrum</i>	Black-berry Nightshade			General Biosecurity Duty
<i>Solanum seaforthianum</i>	Brazilian Nightshade			General Biosecurity Duty
<i>Sonchus oleraceus</i>	Common Sowthistle			General Biosecurity Duty
<i>Soliva sessilis</i>	Bindi			General Biosecurity Duty
<i>Taraxacum officinale</i>	Dandelion			General Biosecurity Duty
<i>Verbena rigida var. rigida</i>	Veined Verbena			General Biosecurity Duty

4.4 Groundwater dependent ecosystems

The groundwater dependent ecosystems atlas shows a number of terrestrial GDE's within the study area. These are associated with the areas of remnant native vegetation, which are represented by the areas of Cumberland River-Flat Forest and Cumberland Shale Plains Woodland (Figure 4-7).

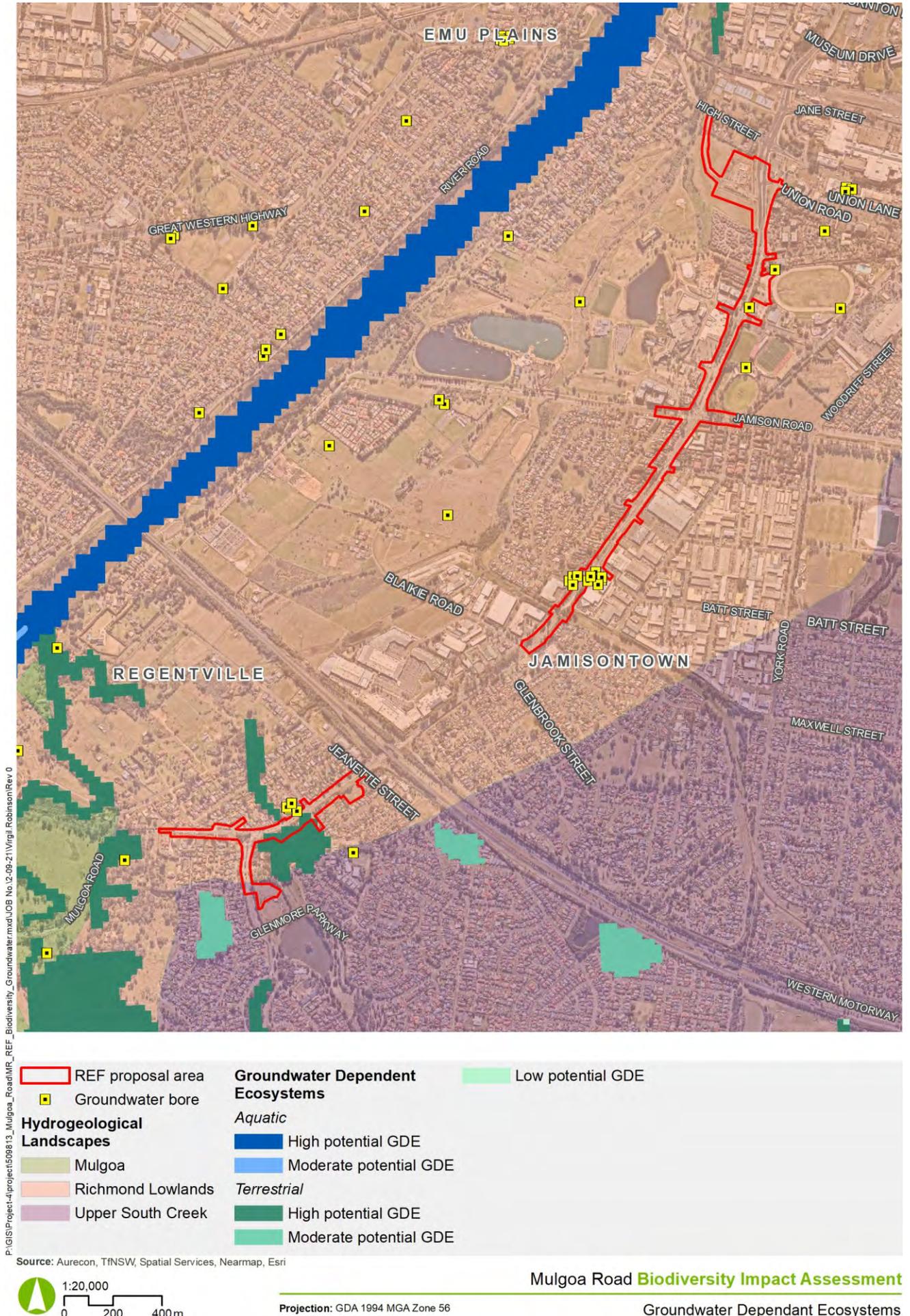


Figure 4-7: Groundwater dependent ecosystems

4.5 Threatened species

4.5.1 Threatened flora

There is potential for up to 40 threatened species to occur (Annexure B), however no threatened flora species were recorded during surveys.

4.5.2 Threatened fauna

The highly urbanised environment surrounding Mulgoa Road contains a mosaic of planted street trees, garden beds and habitat plantings. As over 90% of the proposal area has undergone historical vegetation clearing, the remaining vegetation becomes increasingly important for foraging, roosting and breeding habitat for native fauna. The remnant, planted and exotic vegetation within the proposal provides potential foraging and nesting resources for highly mobile species such as birds and bats, both flying-foxes (flowering eucalypts) and microbats (insects and riparian flyways).

Fifty eight (58) threatened fauna species are recorded in the locality (within 10 kilometres of the proposal). Two species are recorded within the proposal (Figure 4-8) and 37 species have a moderate or higher likelihood of occurring within the proposal (Table 4-3 and Annexure B). This includes eight species of microchiropteran bats and 26 species of birds.

Table 4-3: Fauna habitat assessment and surveys results

Scientific name	Common Name	BC Act status	Potential occurrence (Moderate, High, Recorded)
<i>Anthochaera phrygia</i>	Regent Honeyeater	CE	Moderate
<i>Artamus cyanopterus cyanopterus</i>	Dusky Woodswallow	V	Moderate
<i>Botaurus poiciloptilus</i>	Australasian Bittern	E	Moderate
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	V	Moderate
<i>Chthonicola sagittata</i>	Speckled Warbler	V	Moderate
<i>Circus assimilis</i>	Spotted Harrier	V	Moderate
<i>Climacteris picumnus victoriae</i>	Brown Treecreeper (eastern subspecies)	V	Moderate
<i>Daphoenositta chrysoptera</i>	Varied Sittella	V	Moderate
<i>Falsistrellus tasmaniensis</i>	Eastern False Pipistrelle	V	Moderate
<i>Glossopsitta pusilla</i>	Little Lorikeet	V	Recorded
<i>Grantiella picta</i>	Painted Honeyeater	V	Moderate
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	V	Moderate
<i>Hieraaetus morphnoides</i>	Little Eagle	V	Moderate
<i>Hirundapus caudacutus</i>	White-throated Needletail	n/a	Moderate

Scientific name	Common Name	BC Act status	Potential occurrence (Moderate, High, Recorded)
<i>Ixobrychus flavicollis</i>	Black Bittern	V	Moderate
<i>Lathamus discolor</i>	Swift Parrot	CE	Moderate
<i>Lophoictinia isura</i>	Square-tailed Kite	V	Moderate
<i>Melanodryas cucullata cucullata</i>	Hooded Robin (south-eastern form)	V	Moderate
<i>Melithreptus gularis gularis</i>	Black-chinned Honeyeater (eastern subspecies)	V	Moderate
<i>Meridolum corneovirens</i>	Cumberland Plain Land Snail	E	Moderate
<i>Micronomus norfolkensis</i>	Eastern Coastal Free-tailed Bat	V	Moderate
<i>Miniopterus australis</i>	Little Bent-winged Bat	V	Moderate
<i>Miniopterus orianae oceanensis</i>	Large Bent-winged Bat	V	Moderate
<i>Myotis macropus</i>	Southern Myotis	V	Recorded
<i>Neophema pulchella</i>	Turquoise Parrot	V	Moderate
<i>Ninox connivens</i>	Barking Owl	V	Moderate
<i>Ninox strenua</i>	Powerful Owl	V	Moderate
<i>Pandion cristatus</i>	Eastern Osprey	V	Moderate
<i>Petroica boodang</i>	Scarlet Robin	V	Moderate
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	V	Moderate
<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheath-tail-bat	V	Moderate
<i>Scoteanax rueppellii</i>	Greater Broad-nosed Bat	V	Moderate
<i>Stagonopleura guttata</i>	Diamond Firetail	V	Moderate
<i>Tyto novaehollandiae</i>	Masked Owl	V	Moderate
<i>Tyto tenebricosa</i>	Sooty Owl	V	Moderate

Threatened microchiropteran bats

Eight species of microchiropteran bats were assessed as having a moderate or higher likelihood of occurrence within the study area. The study area contains culverts, bridges and eleven hollow bearing trees that may provide roosting sites for these species. Of these eight species, targeted surveys were completed for and recorded the Southern Myotis (Figure 4-8, Table 4-3, Annexure B).

Grey-headed Flying-Fox habitat

Three recent records for the Grey-headed Flying-Fox occur within the proposal area. The National Flying-fox monitoring programme (DAWE, 2021) has mapped ten camps within 25 kilometres (2012-present), with the closest camp at Emu Plains, approximately 1 kilometre from the study area. The Flying-Fox viewer indicates that the camp has not been used since February 2019. While no camps are located within the study area, individuals can travel up to 50 kilometres from the camp per night for food resources. The study area contains a variety of vegetation that constitutes suitable foraging habitat for the Grey-Headed Flying-Fox.

Koala habitat

The study area contained two primary and one supplementary species of feed tree for the Koala, however as the vegetation within the study area is fragmented or highly isolated it is unlikely that Koalas are utilising the habitat.

Threatened birds

One incidental sighting of a Little Lorikeet (*Glossopsitta pusilla*) was observed near the PCT 849 remnant on the corner of Mulgoa and Jamison Road, Penrith. The species was observed flying over and was potentially feeding from the numerous flowering Grey Ironbark (*Eucalyptus siderophloia*). The Little Lorikeet utilises small hollow openings (three centimetres in diameter), with potential breeding sites present within study area. Given the highly urbanised environment of Mulgoa Road, it is unlikely that the species is breeding in the proposal area.

The study area contains foraging habitat and hollow bearing trees that could potentially support 26 species of threatened birds listed in Table 4-3.

Threatened amphibians

No threatened amphibians were assessed as having a moderate or higher likelihood of occurring within the study area.

Threatened reptiles

No threatened reptiles were assessed as having a moderate or higher likelihood of occurring within the study area.

Threatened Invertebrates

Remnant Cumberland River-Flat Forest on the southern side of Mulgoa Road, adjacent School House Creek was surveyed for the Cumberland Plain Land Snail (*Meridolum corneovirens*) as it contained suitable habitat (such as mature Eucalypts, dense leaf litter and woody debris). No individuals, living or shells were recorded. Vegetation outside of this area has a modified ground layer and does not contain sufficient habitat features to support the species.

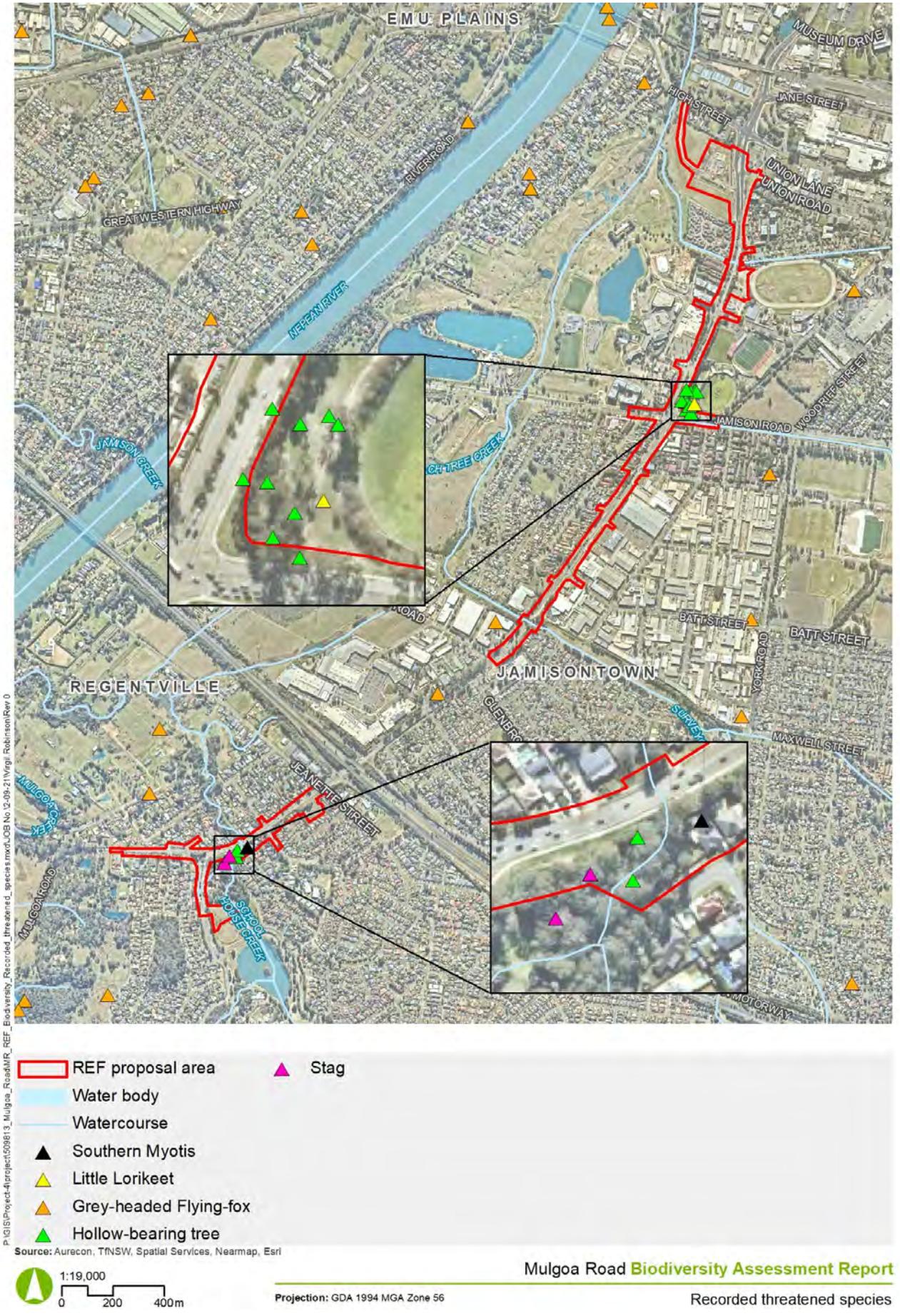


Figure 4-8: Recorded threatened species

4.6 Aquatic results

The proposal is located within the Nepean catchment and contains three creeks, they are School House Creek, Surveyors Creek and an unnamed creek. All are intersected by Mulgoa Road. The creeks and associated vegetation have undergone significant disturbances and as the result of vegetation clearing, grazing, pollution, eutrophication and channel works. No aquatic fauna was observed within the three creeklines.

School House Creek is classified as a 2nd order stream, Surveyors Creek a 4th order stream and the unnamed creek a 1st order stream based on the Strahler method of stream ordering (DI, 2018). None of the creeks within the study area meet the thresholds for Key Fish Habitat under the *Policy and guidelines for fish habitat conservation and management* (DPI, 2013) as the unnamed creek and School House Creek are first and second order creeks; and Surveyors Creek is a concrete-lined channel.

School House Creek measures 5 metres across, with a bank height of 2 metres and contains an abundance of aquatic and terrestrial vegetation. Water was flowing within the creek at the time of surveys (50 centimetres deep). The creek bed substrate consisted of gravel and sand. Common in creek vegetation included Broadleaf Cumbungi (*Typha orientalis*) and Knotweed (*Persicaria* sp.), with Cabbage Gum and Spiny Mat-Rush frequently inhabiting the creekbanks. The drainage line flows through culverts beneath Mulgoa Road. Platypus DNA and burrows have been identified in School House Creek. Platypus are believed to stay within a few hundred metres of the mouth of the creeks (UWS, 2021).

Surveyors Creek and the unnamed creek are highly degraded and channelised. Surveyors Creek measures 10 metres wide and three metres high. The unnamed creek is three metres wide and two metres high. Both were flowing at the time of survey (water depth two centimetres) and contain a mixture of remnant and planted native canopy such as Cabbage Gum and Swamp Oak. The ground layer adjacent the channel was invaded by exotic grasses such as Kikuyu.

No threatened species are considered to have a moderate or higher likelihood of occurring within the creeklines of the study area.

4.7 Areas of outstanding biodiversity value (where applicable)

No areas of outstanding biodiversity value occur within the study area.

4.8 Wildlife connectivity corridors

School House and Surveyors Creeks are important corridors for wildlife as these creeks contain the majority of native (as well as exotic) vegetation within study area. The vegetation adjacent School House Creek is mapped within the BAM important areas mapping as potential habitat for the Swift Parrot, as important over-wintering habitat for this migratory species. Within the BAM calculator important habitat maps are available for select species and identify areas considered important to support critical life stages of a species.

Habitat within these corridors includes two hollow-bearing trees, dense understorey and leaf litter, woody debris and flowing water within the channel. However, it has been severely degraded by human encroachment and run-off which has led to weed infestations and habitat degradation. In its current state, the two creek corridors are only likely to provide habitat for common fauna species such as birds, microbats and some mammals such as Ringtail Possums (*Pseudocheirus peregrinus*). Four species of bat, including the threatened Southern Myotis, were recorded within the School House Creek drainage line during the anabat survey.

The existing Mulgoa Road footprint in this location has created a barrier to fauna movement for many years. As such, it is likely that these corridors are only being used currently by highly mobile fauna species.

Habitat and fauna within the corridors are connected to the Nepean River and Blue Mountains National Park as the three creeklines within the proposal extend (with fragmented vegetation) through to the Nepean River system. As such these riparian corridors are important features within the locality for maintaining resident and migratory fauna populations.

4.9 Matters of National Environmental Significance

The Protected Matters Search Tool identified the following Matters of National Environmental Significance as outlined in Table 4-4:

Table 4-4: Matters of National Environmental Significance

Matter	Number present
World Heritage Properties	1
National Heritage Places	1
Wetlands of International Importance	None
Great Barrier Reef Marine Park	None
Commonwealth Marine Area	None
Listed Threatened Ecological Communities	11
Listed Threatened Species	49
Listed Migratory Species	16

Of the above listed Matters of National Environmental Significance, the proposal may impact upon, or has a moderate or higher likelihood of impacting upon the following:

- Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest, listed as critically endangered under the EPBC Act.
- Coastal floodplain eucalypt forest of eastern Australia, listed as critically endangered under the EPBC Act.
- Grey-headed Flying-fox (*Pteropus poliocephalus*) listed as vulnerable under the EPBC Act.
- Regent Honeyeater (*Anthochaera phrygia*) listed as critically endangered under the EPBC Act.
- Swift Parrot (*Lathamus discolor*) listed as critically endangered under the EPBC Act.
- Large-eared Pied Bat (*Chalinolobus dwyeri*) listed as vulnerable under the EPBC Act.
- Australasian Bittern (*Botaurus poiciloptilus*) listed as endangered under the EPBC Act.
- White-throated Needletail (*Hirundapus caudacutus*) listed as vulnerable under the EPBC Act.
- Painted Honeyeater (*Grantiella picta*) listed as vulnerable under the EPBC Act.
- Black-faced Monarch (*Monarcha melanopsis*) listed as a migratory species under the EPBC Act.

4.9.1 Threatened ecological communities

Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest and Coastal floodplain eucalypt forest of eastern Australia were assessed against the condition thresholds and key diagnostic features for TECs under each of the respective conservation advice guidelines (

Table 4-5 and Figure 4-9). Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest (patch 1) and Coastal floodplain eucalypt forest of eastern Australia (patch 3) were found to conform to the condition thresholds.

Remnant patches of Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest contained key diagnostic features that included: a canopy dominated by species Grey Box, grassy understory, located on the Cumberland Plain and with an annual rainfall between 700-900 millimetres.

Patches of remnant Coastal floodplain eucalypt forest of eastern Australia contained key diagnostic features that included: a canopy dominated by Cabbage gum and Broad-leaved Apple, positioned on an alluvial floodplain and within the Cumberland Plain.

Table 4-5: EPBC Act assessment of condition thresholds for Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest

Patch	Are native tree species present with a minimum projected foliage cover of 10%?	Is the patch of the ecological community 0.5 ha or greater in size?	Of the perennial understorey vegetative cover present, is 50% made up of native species?	Is the patch 5 ha or greater in size?	Is the patch contiguous with a native vegetation patch 5 ha or greater in size?	Of the perennial understorey vegetative cover present, is 30% made up of native species?	Does the patch contain at least one tree per ha that is large (> 80cm dbh6) or has a hollow?	EPBC Listed community
1	Yes	Yes*	Yes	N/A	N/A	N/A	N/A	Present
2	Yes	Yes	No	N/A	N/A	N/A	N/A	Absent

Includes area that have been subjected to revegetation.

Figure 4-9: EPBC Act assessment of condition thresholds for Coastal floodplain eucalypt forest of eastern Australia

Patch size thresholds → Biotic thresholds ↓	Large patch Patch size ≥ 2 ha	Small contiguous ⁷ patch Patch size ≥ 0.5 ha within a larger area of native vegetation ≥ 5 ha	Small patch Patch size ≥ 0.5 ha
High condition ≥ 80% of its total perennial understorey vegetation cover ¹ is comprised of native species AND Ground cover richness ² ≥ 10 native species per sample plot AND ≥ 20 large trees ³ per ha	CLASS A1 Large or contiguous patch in high condition		CLASS B1 Small patch in high condition
Good condition with arboreal mammals ≥ 50% of its total perennial understorey vegetation cover ¹ is comprised of native species AND Ground cover richness ² ≥ 6 native species per sample plot AND At least 10 large trees ³ per ha AND Evidence of 4 or more species of arboreal mammals ⁴ detected ⁵ in the patch	CLASS A2 Large or contiguous patch in good condition with arboreal mammals		CLASS B2 Small patch in good condition with arboreal mammals
Good condition ≥ 50% of its total perennial understorey vegetation cover ¹ is comprised of native species AND Ground cover richness ² ≥ 6 native species per sample plot AND At least 10 large trees ³ per ha	CLASS B3 Large or contiguous patch in good condition		CLASS C1 Small patch in good condition
Moderate condition ≥ 30% of its total perennial understorey vegetation cover ¹ is comprised of native species AND Ground cover richness ≥ 4 native species per sample plot ²	CLASS C2 Large or contiguous patch in moderate condition		

5 Avoidance and minimisation

Unmitigated impacts from the construction and operation of roads has the potential to exacerbate the decline of biodiversity, threatening the long-term survival of ecosystems and the species they house. These impacts should be avoided as far as practicable in the planning stages of the proposal through detailed design. TfNSW *Biodiversity Guidelines* (2011) state when managing biodiversity proposals should aim to:

- Avoid and minimise impacts first.
- Mitigate impacts where avoidance is not possible.
- Offset where residual impacts cannot be avoided.

Impacts on TECs has been minimised by a range of complimentary measures including:

- Detailed design to reduce impacts on TEC, particularly around School House Creek, to minimise the footprint.
- Establish formal exclusion zones around individual trees (including tree guards and root protection areas) and native vegetation to be retained including individual street trees
- Minimise the clearing to 0.13 ha of Cumberland Plain Woodland and 0.66 ha of Cumberland River-Flat Forest through careful design.
- Any tree pruning must be in accordance with AS4373.
- Revegetation of temporary laydown areas and access tracks with species mix and structural attributes of the adjoining PCT. Follow up weed control should be completed for twelve months after establishment of new areas.
- Weed and biosecurity controls implement during and following construction within and in areas immediately adjoining the proposal area.
- Installation of erosion and sediment control measures to reduce the potential for topsoil loss, dispersal of sediment and weed seeds and damage to retained vegetation in accordance with *Managing Urban Stormwater* guidelines (NSW Government 2004).

In additional to the above measures to avoid and minimise general biodiversity impacts associated with proposal, consistent with TfNSW guidelines (RTA 2011), are:

- Fauna friendly culvert design should allow for terrestrial fauna movement underneath structures.
- Pre-clearance surveys, including the preparation of a wildlife management plan, by accredited biodiversity specialists.
- A biodiversity specialist is present during vegetation clearing works.
- Avoid clearing hollow bearing trees where possible as it takes over 100 years for these structures to form. In addition, the importance of retaining naturally formed hollows is significant as hollow dependent fauna prefer these structures to artificial nest boxes. Artificial nest boxes of a range of sizes should be provided to offset any hollows removed (on a 1:1 (hollow to nest box) basis).
- Reuse woody debris where possible to enhance habitat.
- Maintain habitats within aquatic environment during and following construction to enable the movement of aquatic species within any waterways in accordance with fish passage guidelines (Fairfull and Witheridge 2003).
- Utilise existing disturbed areas for laydown and works areas.

These mitigation measures are further detailed in Section 7.

6 Impact assessment

6.1 Construction impacts

The proposal has the potential to directly diminish biodiversity values within the footprint, with indirect impacts extending to the broader landscape. The following sections detail the impacts from the proposal and include the clearing of TECs and threatened species habitat.

6.1.1 Removal of native vegetation

Clearing of native vegetation is a Key Threatening Process under the BC and EPBC Acts. The proposal would impact upon a total of 0.79 hectares of native vegetation comprising 0.66 hectares of PCT 835 Cumberland River-Flat Forest, 0.13 hectares of PCT 849 Cumberland Shale Plains Woodland (see Table 6-1). In addition, 0.29 hectares of the planted vegetation which conforms to PCT 1800 would be removed and a total of 8.57 hectares of street trees, plantings and exotics would be removed.

All patches of native vegetation (Cumberland River-Flat Forest and Cumberland Shale Plains Woodland) meet the definition of TECs under the BC Act, with two patches meeting the condition thresholds for TECs under the EPBC Act. PCT 1800 Cumberland Swamp Oak Riparian Forest adjacent to Surveyors Creek is planted and is not considered to meet the BC and EPBC Acts community listing.

Table 6-1: Impacts on vegetation

Plant community type (PCT)	Status		Proposal area ¹ (ha/m ²)
	BC Act	EPBC Act	
PCT 849 Cumberland Shale Plains Woodland	CEEC	CEEC	0.13ha
PCT 835 Cumberland River-Flat Forest	EEC	CEEC	0.66ha
PCT 1800 Cumberland Swamp Oak Riparian Forest	N/A	N/A	0.29ha
Street trees, revegetation areas and exotics	N/A	N/A	8.57ha
Hollow bearing trees			5 hollow bearing trees

Note: 1- Area to be cleared based on ground-truthed vegetation mapping within the proposal.

6.1.2 Removal of threatened fauna species habitat and habitat features

Over 95% of native vegetation has been previously removed within the study area. Important habitat features are present within several patches of remnant, planted native vegetation and some street trees. They include eleven hollow bearing trees, dense leaf litter, fallen woody debris, dense shrub layer, perching and aquatic habitat within the study area. Vegetation clearing associated with the proposal will remove an additional 8.57 hectares of potential threatened species habitat in the form of exotic plantings, gardens and revegetation areas, and includes five hollow bearing trees.

Thirty seven (37) threatened species have a moderate or higher likelihood of occurrence within the proposal. One incidental sighting of a Little Lorikeet (*Glossopsitta pusilla*) was observed adjacent to the PCT 849 remnant on the corner of Mulgoa and Jamison Road, Penrith. The Grey-headed Flying Fox (*Pteropus poliocephalus*) is previously recorded from within the proposal area and may forage in the area. Targeted surveys were conducted for Cumberland Plain Land Snail in areas that contained suitable habitat, however no individuals were recorded. Targeted surveys recorded one threatened Microchiropterian bat (Southern Myotis bat (*Myotis macropus*)).

Outside of native vegetation remnants, fauna habitat is largely suited to mobile species utilising the area for foraging and roosting.

The proposal also includes the removal of non-local native and non-native vegetation. In the urban landscape, planted vegetation, in particular non-local native species such as Spotted Gum and Bottlebrush (*Callistemon viminalis*) offer important foraging and roosting habitat for fauna including the Little Lorikeet and Grey-Headed Flying-Fox. No planted eucalypts within the proposal area contained hollows.

Table 6-2: Impacts on threatened fauna and fauna habitat

Species	Potential occurrence	Impacted by proposal?	Impact (ha/ individuals)
Regent Honeyeater	Moderate	Yes	0.79ha of foraging habitat
Regent Honeyeater	Moderate	Yes	0.79ha of foraging habitat
Dusky Woodswallow	Moderate	Yes	0.79ha of foraging habitat
Australasian Bittern	Moderate	Yes	0.66ha of foraging habitat
Large-eared Pied Bat	Moderate	Yes	0.79ha of foraging habitat
Speckled Warbler	Moderate	Yes	0.79ha of foraging habitat
Spotted Harrier	Moderate	Yes	0.79ha of foraging habitat
Brown Treecreeper (eastern subspecies)	Moderate	Yes	0.79ha of foraging habitat
Varied Sittella	Moderate	Yes	0.79ha of foraging habitat
Eastern False Pipistrelle	Moderate	Yes	0.79ha of foraging habitat
Little Lorikeet	Moderate	Yes	0.79ha of foraging habitat
Painted Honeyeater	Moderate	Yes	0.79ha of foraging habitat
White-bellied Sea-Eagle	Moderate	Yes	0.79ha of foraging habitat
Little Eagle	Moderate	Yes	0.79ha of foraging habitat
White-throated Needletail	Moderate	Yes	0.79ha of roosting habitat
Black Bittern	Moderate	Yes	0.66ha of foraging habitat
Swift Parrot	Moderate	Yes	0.79ha of foraging habitat
Square-tailed Kite	Moderate	Yes	0.79ha of foraging habitat

Species	Potential occurrence	Impacted by proposal?	Impact (ha/ individuals)
Hooded Robin (south-eastern form)	Moderate	Yes	0.79ha of foraging habitat
Black-chinned Honeyeater (eastern subspecies)	Moderate	Yes	0.79ha of foraging habitat
Eastern Coastal Free-tailed Bat	Moderate	Yes	0.79ha of foraging habitat
Little Bent-winged Bat	Moderate	Yes	0.79ha of foraging habitat
Large Bent-winged Bat	Moderate	Yes	0.79ha of foraging habitat
Southern Myotis	Moderate	Yes	0.79ha of foraging habitat
Turquoise Parrot	Moderate	Yes	0.79ha of foraging habitat
Barking Owl	Moderate	Yes	0.79ha of foraging habitat
Powerful Owl	Moderate	Yes	0.79ha of foraging habitat
Eastern Osprey	Moderate	Yes	0.79ha of foraging habitat
Scarlet Robin	Moderate	Yes	0.79ha of foraging habitat
Grey-headed Flying-fox	Moderate	Yes	0.79ha of foraging habitat
Yellow-bellied Sheath-tail-bat	Moderate	Yes	0.79ha of foraging habitat
Greater Broad-nosed Bat	Moderate	Yes	0.79ha of foraging habitat
Diamond Firetail	Moderate	Yes	0.79ha of foraging habitat
Masked Owl	Moderate	Yes	0.79ha of foraging habitat
Sooty Owl	Moderate	Yes	0.79ha of foraging habitat

6.1.3 Removal of threatened plants

No threatened flora species were located within the proposal during field surveys.

6.1.4 Key Threatening Processes

Six Key Threatening Processes (KTP) are considered to have a moderate to very high likelihood of impacting native flora, fauna and vegetation communities in the short to medium term. The likely KTPs and the associated risks of these as a result of the proposal are listed in Table 6-3. Mitigations to Key Threatening Processes are discussed in Chapter 7.

Table 6-3: Key threatening processes

Key threatening process	Impact on biodiversity	Risk
Clearing of native vegetation	The proposal would clear 0.79ha of native vegetation in separate areas over the length of the linear proposal area	Very high
Invasion and establishment of exotic vines and scramblers	The disturbance associated with the clearing of native vegetation will promote the further establishment of aggressive vines, such as Balloon vine (<i>Cardiospermum grandiflorum</i>) and Madeira vine (<i>Anredera cordifolia</i>) within the riparian corridor of School House Creek and Surveyors Creek	High
Invasion of native plant communities by exotic perennial grasses	The disturbance associated with earthworks and clearing of native vegetation will promote the further establishment of aggressive perennial grasses from internal and external sources.	Very high
Invasion of native plant communities by African Olive (<i>Olea europaea</i> subsp. <i>cuspidata</i>)	African Olive, an invasive perennial woody weed is highly likely to increase its dominance on native vegetation following disturbance events such as vegetation clearing.	Moderate
Invasion, establishment and spread of Lantana (<i>Lantana camara</i>)	Lantana, an invasive perennial woody weed is highly likely to increase its dominance on native vegetation following disturbance events such as vegetation clearing.	High
Loss of Hollow-bearing Trees	There is a very high likelihood of further decline in hollow bearing trees within the proposal area due to road widening.	Very High
Clearing of native vegetation	The proposal would clear 0.79ha of native vegetation in separate areas over the length of the linear proposal area	Very high
Invasion and establishment of exotic vines and scramblers	The disturbance associated with the clearing of native vegetation will promote the further establishment of aggressive vines, such as Balloon vine (<i>Cardiospermum grandiflorum</i>) and Madeira vine (<i>Anredera cordifolia</i>) within the riparian corridor of School House Creek and Surveyors Creek	High
Invasion of native plant communities by exotic perennial grasses	The disturbance associated with earthworks and clearing of native vegetation will promote the further establishment of aggressive perennial grasses from internal and external sources.	Very high
Invasion of native plant communities by African Olive (<i>Olea europaea</i> subsp. <i>cuspidata</i>)	African Olive, an invasive perennial woody weed is highly likely to increase its dominance on native vegetation following disturbance events such as vegetation clearing.	Moderate
Invasion, establishment and spread of Lantana (<i>Lantana camara</i>)	Lantana, an invasive perennial woody weed is highly likely to increase its dominance on native vegetation following disturbance events such as vegetation clearing.	High
Loss of Hollow-bearing Trees	There is a very high likelihood of further decline in hollow bearing trees within the proposal area due to road widening.	Very High

6.1.4 Aquatic impacts

To widen culverts, some parts of School House Creek and Surveyors Creek will be directly impacted by the proposal. A total of up to 0.95 hectares of riparian areas will be impacted by the proposal.

The creeks within the study area only provide limited potential habitat for common riparian species including macroinvertebrates and highly mobile water birds. The existing riparian creeks have been disturbed by channelization, installation of culverts and other disturbances to hydrological flows and the potential for fish passage. The proposal will create additional disturbances, but these will be minor as these are already disturbed systems with minimal habitat.

6.1.5 Injury and mortality

The proposal area is highly modified, containing patches of disturbed and fragmented vegetation. As such, disturbance sensitive species are likely to be absent, seasonal or present in low numbers. New developments and upgrades within the broader landscape are highly likely to reduce remaining fauna populations overtime through direct and indirect impacts such as vegetation clearing, fragmentation and edge effects. Mitigation measures to reduce these effects are outlined in Chapter 7. Provided these measures are followed the impacts to fauna should be negligible in the short term. The highest risk to fauna occurs during the vegetation clearing stage as the removal of trees and shrubs is proposed. Machinery and plant are a potential source of fauna injury and mortality during construction, with daily operational traffic likely to adversely impact native fauna individuals and populations in the long-term.

6.2 Indirect/operational impacts

6.2.1 Wildlife connectivity and habitat fragmentation

Wildlife connectivity within the proposal is largely restricted to the riparian corridors of School House Creek and Surveyors Creek. These corridors are extensive and link, though discontinuous in sections, the vegetation and aquatic habitats to the Nepean River and Blue Mountains National Park. The largely urbanised environment contains a range of highly mobile fauna groups such as avifauna and bats, and less mobile species such as water dragons and possums. Mobile species are unlikely to face significant impacts from the widening of Mulgoa Road, however the risk posed to fauna if crossing the road by foot will likely increase.

The proposed works will not create new fragments within the locality, however the distance between fragments will increase by the width of the road widening and the associated removal of native vegetation. Impacts such as edge effects, increased vehicle noise, streetlights and canopy gaps are likely to occur. Consequently, fauna movements and migrations may be reduced in the study area where the quality of the habitat is impacted.

The culverts are likely to already provide some favourable habitat connectivity for ground-dwelling and highly mobile species. Where possible, culverts should be installed to maximise the height and light availability to encourage fauna movement. Design of culvert structures to enable fauna passage at key locations such as School House Creek would reduce potential roadkill of mammals.

6.2.2 Edge effects on adjacent native vegetation and habitat

The removal of native vegetation will increase the edge to core ratio within the native bushland remnants of the proposal. The decline in core vegetation impacts both flora and fauna habitat by allowing for the invasion of aggressive weeds and by decreasing foraging habitat. In addition, the narrowing of the riparian corridor and increases in traffic noise may impact upon sensitive fauna species, such as the Satin Bower bird (recorded incidentally during survey), causing the species to vacate the remnant. The narrowing of native vegetation threatens the long-term viability of the remnants within the proposal. Mitigation measures are outlined in Chapter 7.

6.2.3 Invasion and spread of weeds

Vegetation clearing and all forms of soil disturbances, including machine work, may result in an increase in the invasion and further spread of exotic flora throughout the native vegetation patches. Section 4.3 details the presence of 33 High Threat Exotics, WoNS and other exotic vegetation recorded within the proposal area. Mitigation and weed control measures, during and following construction, would reduce this potential.

6.2.4 Invasion and spread of pests

Given the highly modified urban environment the works associated with proposal are unlikely to result in additional pests in the proposal area.

6.2.5 Invasion and spread of pathogens and disease

The highest risk of invasion and spread of pathogens such as *Phytophthora spp.* is via the importation of soils either on machinery or as fill. As a standard mitigation measure all vehicles must arrive to the proposal area clean of dirt and seed and all imported fill must be certified as clean.

6.2.6 Noise, light and vibration

The study area is highly urbanised, with habitat subject to noise, vibration and artificial light from traffic and streetlights along Mulgoa Road. Adjacent habitat within close proximity to Mulgoa Road is considered sub optimal, particularly for sensitive species.

During the construction phase, there would be a temporary larger increase in the levels of noise, vibration and light. While these impacts are only temporary in nature, they are likely to result in the relocation of sensitive species such as small birds and fauna. The increase of light during night works may increase the number of insects present and thus temporarily increase the microbat activity within the area. This in turn may increase the competition for any hollows present within the study area.

Upon completion, noise, light and vibration levels are likely to be slightly higher than pre-works. The impacts associated with road widening are likely to be negligible, as annual increases in traffic volume is to be expected as population growth continues.

6.2.7 Groundwater dependent ecosystems

PCT 849 is identified in the GDE Atlas as a terrestrial GDE. The proposal will directly impact on these areas by removing vegetation and may indirectly impact some other areas identified as GDEs through road widening. Given that the road already bisects the areas of GDEs mapped, it is likely that this has already altered the hydrology of these terrestrial GDEs. It is unlikely that the proposal will result in substantial changes to the hydrology of this GDE as it involves stormwater management and mitigation measures to minimise any changes.

6.3 Cumulative impacts

There are multiple projects within the Cumberland Plain that impact upon threatened species, ecological communities, habitats and key threatening processes.

Table 6-4 details the impacts of the proposal to the cumulative impacts to biodiversity values in the regional context.

Table 6-4: Present and future projects

Project	Biodiversity value impacted	Construction impacts	Operational impacts
Mamre Road widening works	Clearing significant areas of native vegetation: PCT 835, 849, 1800	Clearing of remnant native vegetation Removal of threatened species and habitat Changes to natural drainage Increase in heavy vehicle movements	Increased traffic movements. Impacts to wildlife Increased lighting and noise
Western Sydney Airport (underway)	Clearing 360 ha of native vegetation including: PCT 849 and 1800	Clearing of remnant native vegetation Removal of threatened species and habitat Increase in heavy vehicle movements Changes to natural drainage	Increase in air and road traffic
The Northern Road upgrade, Glenmore Parkway to Jamison Road	Clearing of 59 ha of significant native vegetation	Clearing of native vegetation Increase in heavy vehicle movements	Increased traffic movements. Impacts to wildlife Increased lighting and noise
Sydney Metro Railway (Western Sydney Airport to Western Line)	Clearing of significant native vegetation: PCT 835, 849, 1800	Clearing of remnant native vegetation Removal of threatened species and habitat Increase in heavy vehicle movements Changes to natural drainage	Impacts to wildlife Increased lighting and noise

The native vegetation and associated habitat features within the Cumberland Plain have undergone irreversible clearing, grazing and modification in the past, with many of these threats presently continuing or proposed to occur in the near future. Preserving ecosystems and avoiding impacts to the remaining habitat within the region is of highest importance if endangered and critically endangered ecological communities are to retain their integrity and function in the short term.

A total of 0.79 hectares of native vegetation is to be removed as a result of the proposal proposed works. This proposal, as with most projects in the area, may impact threatened native vegetation, flora, fauna and their habitat. Mitigation measures such as those outlined in Chapter 7 typically reduce the impact of a proposal, however most projects still result in a net loss of biodiversity over time. To reduce these impacts, Tf NSW offsets impacts for highly threatened communities and species where thresholds within the *Guideline for Biodiversity Offsets* (RMS, 2016) are exceeded. Chapter 8 discusses the applicability of offsets for this proposal.

6.4 Assessments of significance

Assessments of significance have been undertaken for TECs and for threatened species with a moderate or above likelihood of occurrence. A total of 33 assessments were conducted for entities listed under Schedule 1 and 2 of the BC Act and nine under the EPBC Act. Copies of these are located within Annexure C – BC Act Assessment of Significance and EPBC Significant Impact Assessments. Table 6-5 and Table 6-6 outline the findings in relation to the BC and the EPBC Acts.

Table 6-5: BC Act Assessment of significance summary table

Threatened species, or communities	Significance assessment question ¹					Likely significant impact?
	a	b	c	d	e	
River Flat Eucalypt Forest	X	N	N	N	Y	N
Cumberland Plain Woodland	X	N	N	N	Y	N
Little Lorikeet	N	X	N	N	N	N
Regent Honeyeater	N	X	N	N	N	N
Varied Sittella	N	X	N	N	N	N
Australasian Bittern	N	X	N	N	N	N
Speckled Warbler	N	X	N	N	N	N
Spotted Harrier	N	X	N	N	N	N
Brown Treecreeper (eastern subspecies)	N	X	N	N	N	N
Painted Honeyeater	N	X	N	N	N	N
White-bellied Sea-Eagle	N	X	N	N	N	N
Little Eagle	N	X	N	N	N	N
Black Bittern	N	X	N	N	N	N
Swift Parrot	N	X	N	N	N	N
Square-tailed Kite	N	X	N	N	N	N
Hooded Robin (south-eastern form)	N	X	N	N	N	N

Threatened species, or communities	Significance assessment question ¹					Likely significant impact?
	a	b	c	d	e	
Black-chinned Honeyeater (eastern subspecies)	N	X	N	N	N	N
Turquoise Parrot	N	X	N	N	N	N
Barking Owl	N	X	N	N	N	N
Powerful Owl	N	X	N	N	N	N
Eastern Osprey	N	X	N	N	N	N
Scarlet Robin	N	X	N	N	N	N
Grey-headed Flying-fox	N	X	N	N	N	N
Diamond Firetail	N	X	N	N	N	N
Masked Owl	N	X	N	N	N	N
Sooty Owl	N	X	N	N	N	N
Grey-headed Flying-fox	N	X	N	N	N	N
Eastern False Pipistrelle	N	X	N	N	N	N
Eastern Coastal Free-tailed Bat	N	X	N	N	N	N
Little Bent-winged Bat	N	X	N	N	N	N
Large Bent-winged Bat	N	X	N	N	N	N
Southern Myotis	N	X	N	N	N	N
Yellow-bellied Sheath-tail-bat	N	X	N	N	N	N
Greater Broad-nosed Bat	N	X	N	N	N	N

Notes: Y= Yes (negative impact), N= No (no or positive impact), X= not applicable, ?= unknown impact.

1. Under Section 7.2 of the BC Act, a proposed proposal or activity is likely to significantly affect threatened species or ecological communities, or their habitats if:

- a. in the case of a threatened species, whether the proposed proposal 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,
- b. in the case of an endangered ecological community or critically endangered ecological community, whether the proposed proposal or activity:
 - i. is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or
 - ii. is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

- c. *in relation to the habitat of a threatened species or ecological community:*
 - i. *the extent to which habitat is likely to be removed or modified as a result of the proposed proposal or activity, and*
 - ii. *whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed proposal or activity, and*
 - iii. *the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality,*
- d. *whether the proposed proposal or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),*
- e. *whether the proposed proposal or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.*

Two TECs will be directly impacted by the proposed works. Eight EPBC listed species have a moderate likelihood of occurring within the proposal. While the proposal is likely to impact upon these species, the removal of approximately nine hectares of potential habitat (including native vegetation (0.79) and planted, revegetation, street trees and exotic vegetation) is not likely to significantly impact the long-term survival of the populations within the study area. Annexure C contains the EPBC Act Assessment of Significance for the two vegetation communities and the eight threatened species and three migratory species.

Table 6-6: EPBC Act significance assessments summary table.

Threatened species, or communities	Important population ²	Likely significant impact?
River-Flat Eucalypt Forest	No	No
Cumberland Plain Shale Woodlands	No	No
Regent Honeyeater	No	No
White-throated Needletail	No	No
Australasian Bittern	No	No
Grey-headed Flying-fox	No	No
Swift Parrot	No	No
Large-eared Pied Bat	No	No
Painted Honeyeater	No	No
Black-faced Monarch	No	No

A 'population of a species' as determined by the EPBC Act is an occurrence of the species in a particular area. In relation to critically endangered, endangered or vulnerable threatened species, occurrences include but are not limited to:

- a) *a geographically distinct regional population, or collection of local populations, or*
- b) *a population, or collection of local populations, that occurs within a particular bioregion.*

Important Population as determined by the EPBC Act is one that for a vulnerable species:

- a) *is likely to be key source populations either for breeding or dispersal*
- b) *is likely to be necessary for maintaining genetic diversity*
- c) *is at or near the limit of the species range.*

7 Mitigation

Mitigation measures to avoid and minimise impacts that may result from the proposal are detailed below in Table 7-1. These measures are designed to cover impacts from pre-works design, pre-works construction, construction and the maintenance.

Table 7-1: Mitigation measures

Impacts	Mitigation measures	Timing and duration	Likely efficacy of mitigation	Residual impacts anticipated
Removal of native vegetation	Native vegetation removal will be minimised through detailed design.	Detailed design	Effective	Removal of 0.79 ha of native vegetation.
	Pre-clearing surveys will be undertaken for all species, including aquatic, in accordance with <i>Guide 1: Pre-clearing process of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects</i> (RTA 2011). Preclearing surveys should include specific emphasis on confirming the presence of <i>Myotis macropus</i> in potential roost sites well in advance of clearing works to allow mitigation strategies to be confirmed and implemented.	Prior to construction	Effective	None
	Vegetation removal will be undertaken in accordance with <i>Guide 4: Clearing of vegetation and removal of bushrock of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects</i> (RTA 2011).	During construction	Effective	Removal of 0.79 ha of native vegetation
	Native vegetation will be re-established in accordance with <i>Guide 3: Re-establishment of native vegetation of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects</i> (RTA 2011). Revegetate disturbance areas to former TEC using all structural layers and species native to the community Accredited bush regenerators to implement native revegetation in accordance with PCT mapping within this report.	Post construction	Effective	Positive
	The unexpected species find procedure is to be followed under <i>Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects</i> (RTA 2011) if threatened ecological communities, not assessed in the biodiversity assessment, are identified in the proposal site.	During construction	Proven	Temporary

Impacts	Mitigation measures	Timing and duration	Likely efficacy of mitigation	Residual impacts anticipated
	To mitigate clearing and fragmentation, improve the condition of the riparian vegetation along School House and Surveyors Creek within and adjacent to the project area the by developing a restoration plan focusing upon removal of high threat exotics and revegetation using province-sourced plants belonging to PCT 835 Cumberland River-Flat Forest.	Post construction	Effective	Positive
	Installation of clearing limits and exclusion zones within TECs prior to work commencing.	Preconstruction	Effective	Temporary
Removal of threatened species habitat and habitat features	Habitat removal will be minimised through detailed design. Exclusion zones surrounding hollow bearing trees (identified for retention). Installation of nesting boxes for hollows removed in accordance with TfNSW guidelines (RTA 2011).	Detailed design	Effective	Removal of 5 hollow bearing trees
	Habitat removal will be undertaken in accordance with <i>Guide 4: Clearing of vegetation and removal of bushrock</i> of the <i>Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects</i> (RTA 2011).	During construction	Effective	Removal of 5 hollow bearing trees and 0.79 ha of native vegetation.
	Habitat will be replaced or re-instated in accordance with <i>Guide 5: Re-use of woody debris and bushrock</i> and <i>Guide 8: Nest boxes</i> of the <i>Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects</i> (RTA 2011). Install microbat habitat in culverts and bridges to enhance fauna habitat (such as cylindrical pipe recesses (65mm x 150mm approx.), roughed areas under decks and/or bat boxes) where appropriate.	During construction	Proven	Positive
	The unexpected species find procedure is to be followed under <i>Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects</i> (RTA 2011) if threatened fauna, not assessed in the biodiversity assessment, are identified in the proposal site.	During construction	Proven	Positive

Impacts	Mitigation measures	Timing and duration	Likely efficacy of mitigation	Residual impacts anticipated
Removal of threatened plants	Pre-clearing surveys will be undertaken in accordance with <i>Guide 1: Pre-clearing process of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects</i> (RTA 2011).	During construction	Proven	None
	The unexpected species find procedure is to be followed under <i>Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects</i> (RTA 2011) if threatened flora species, not assessed in the biodiversity assessment, are identified in the proposal site.	During construction	Proven	Temporary
Aquatic impacts	Aquatic habitat will be protected in accordance with <i>Guide 10: Aquatic habitats and riparian zones of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects</i> (RTA 2011) and Section 3.3.2 <i>Standard precautions and mitigation measures of the Policy and guidelines for fish habitat conservation and management Update 2013</i> (DPI (Fisheries NSW) 2013).	During construction	Effective	Removal of 0.66 ha of vegetation adjoining potential aquatic habitat at School House Creek.
	Structures within and around the waterways including drainage outlets, bridge works and culverts, should be designed to consider biodiversity principles and minimise erosion and sedimentation issues and prevent substantial changes in flow rates that may impact both the immediate area and downstream features. See <i>Why do fish need to cross the road?</i> (Fairfull and Witheridge, 2003) for potential design considerations.	Detailed design	Effective	None
Groundwater dependent ecosystems	Interruptions to water flows associated with groundwater dependent ecosystems will be minimised through detailed design.	Detailed design	Effective	None
Changes to hydrology	Changes to existing surface water flows will be minimised through detailed design.	Detailed design	Effective	None
Fragmentation of identified habitat corridors	Connectivity measures will be implemented in accordance with the <i>Wildlife Connectivity Guidelines for Road Projects</i> (RTA 2011).	Detailed design, during construction and post construction	Effective	Negligible

Impacts	Mitigation measures	Timing and duration	Likely efficacy of mitigation	Residual impacts anticipated
	Any connectivity measures implemented will be installed under the supervision of an experienced ecologist.	During construction	Effective	Positive
Edge effects on adjacent native vegetation and habitat	Exclusion zones will be set up at the limit of clearing in accordance with <i>Guide 2: Exclusion zones of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects</i> (RTA 2011).	During construction	Effective	Yes, there will be increased edge effects on native vegetation and habitat.
Injury and mortality of fauna	Fauna will be managed in accordance with <i>Guide 9: Fauna handling of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects</i> (RTA 2011).	Post construction	Effective	Yes, potential impacts during clearing and increased risk to fauna in the operational phase of the proposal.
Invasion and spread of weeds	Weed species will be managed in accordance with <i>Guide 6: Weed management of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects</i> (RTA 2011). To prevent the spread and establishment of exotic species and their propagules, AABR accredited Bush regenerators are to undertake weed control prior to and post construction.	Post construction	Effective	Positive
Invasion and spread of pests	Pest species will be managed within the proposal site.	During construction	Effective	Positive
Invasion and spread of pathogens and disease	Pathogens will be managed in accordance with <i>Guide 2: Exclusion zones of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects</i> (RTA 2011).	During construction	Effective	Temporary, during construction only

Impacts	Mitigation measures	Timing and duration	Likely efficacy of mitigation	Residual impacts anticipated
Noise, light and vibration	Shading and artificial light impacts will be minimised through detailed design.	Detailed design	Effective	Yes, increased (temporary) impacts in the construction phase and slightly increased impacts during the operational phase.

8 Offset strategy

8.1 Quantification of offset or revegetation requirements

In accordance with the Transport for NSW *Biodiversity Offset Guidelines* (RMS, 2016), offsets are required for the following impacts from the proposal:

- Clearing 0.66 hectares of Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest (national or NSW listed critically endangered ecological community in moderate to good condition) and 0.13 ha of Coastal floodplain eucalypt forest of eastern Australia
- Works involving clearing of more than one hectare of NSW listed threatened species habitat where the species is a species credit species as defined in the OEH Threatened Species Profile Database (TSPD)
- Offsetting potential impacts on Southern Myotis habitat.

The BAM-C was used to calculate offset requirements for these impacts. A total of 19 ecosystem credits and 18 species credits are required to offset the biodiversity impacts of the proposal.

Table 8-1: Credit offset requirements

Credit class/entity		Number of credits
Ecosystem		
PCT 835		16
PCT 849		3
Species Credits		
Common name	Scientific name	
Southern Myotis	<i>Myotis macropus</i>	18

9 Conclusion

The proposal area consists of 0.79 hectares of native vegetation across the linear extent of the proposal area, comprising the following vegetation communities.

- PCT 835 Cumberland River-Flat Forest
- PCT 849 Cumberland Shale Plains Woodland
- PCT 1800 Cumberland Swamp Oak Riparian Forest (planted)

Cumberland River-Flat Forest and Cumberland Shale Plains Woodland conform to TECs under the BC and EPBC Acts, while the Cumberland Swamp Oak Riparian Forest is planted in a modified environment and does not conform to a TEC.

The proposed works will clear 0.79 hectares of native vegetation across the linear extent of the proposal, resulting in the loss of 0.66 hectares from Cumberland River-Flat Forest, 0.13 hectares from Cumberland Shale Plains Woodland and 0.07 hectares from Cumberland Swamp Oak Riparian Forest. Clearing of native vegetation may contribute to existing impacts of fragmentation and lack of connectivity of native vegetation which occurs in sections of the study area. Eleven hollow bearing trees occur within the study area, of which 5 are identified for removal within the project area.

Desktop research and habitat characteristics of the study area indicate that 99 threatened species potentially occur within the proposal area. Of these 99, a total of 37 are considered to have a moderate or higher likelihood of occurrence within the proposal. Within those 37, Southern Myotis bat has the potential to be impacted by the proposed works and surveys for this species were conducted and confirmed its presence.

Targeted searches were undertaken across the proposal area for threatened flora and populations; however, no instances were recorded. One Little Lorikeet was observed during surveys, it is likely to be utilising the flowering Grey Ironbark within the proposal area. Marginal and suitable habitat was surveyed for the Cumberland Plain Land Snail (*Meridolum corneovirens*), however no instances were recorded. Targeted anabat survey identified the threatened Southern Myotis bat at School House Creek.

Further to this an assessment using the BAM-C and based on a conservative approach given the lack of targeted surveys conducted to date indicates that a total of 19 ecosystem credits and 18 species credits are required to fulfil the projects offset obligations.

Based on the assessment above it is highly recommended that as a minimum:

- Avoidance of hollow bearing trees, re-instatement and replacement to mitigate losses
- Restoration including weed control and revegetation is undertaken

Assessments of significance were conducted for all TEC and threatened species likely to be impacted by the proposal (Section 6.4, Annexure C). These assessments of significance concluded that the proposal is unlikely to have any significant impact upon any threatened species or ecological community.

Key mitigation actions and safeguards for the proposal are summarised below:

- Through detailed design, avoid, where possible clearing of TECs
- Installation of exclusion zones and tree protection zones for hollow bearing trees identified for retention
- Pre-clearance checks for threatened microchiropteran bats that may have moved into the culverts
- Installation of bat, mammal and bird nest boxes adjacent to and within culverts of School House Creek and the bridge at Surveyors Creek.

10 References

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Annexure A

Species recorded

Recorded flora

Family	Scientific Name	Common name	Status		Cover in each plot*		
			BC Act	EPBC Act	Plot 1	Plot 2	Incidental observation
Fabaceae	<i>Acacia parramattensis</i>	Parramatta Wattle	N/A	N/A	1		Y
Asteraceae	<i>Ageratina Adenophora</i>	Crofton weed	N/A	N/A			Y
Amaranthaceae	<i>Alternanthera dentata</i>	Lesser Joyweed	N/A	N/A		0.1	
Amaranthaceae	<i>Amaranthus spp.</i>	Amaranthus	N/A	N/A		0.1	
Basellaceae	<i>Anredera cordifolia</i>	Madeira vine	N/A	N/A			Y
Asparagaceae	<i>Arthropodium milleflorum</i>	Vanilla lily	N/A	N/A	0.1		
Myrtaceae	<i>Angophora subvelutina</i>	Broad-leaved apple	N/A	N/A			Y
Apocynaceae	<i>Araujia sericifera</i>	Moth vine	N/A	N/A	0.1		
Asparagaceae	<i>Asparagus aethiopicus</i>	Ground asparagus	N/A	N/A	0.2		
Asparagaceae	<i>Asparagus plumosus</i>	Climbing asparagus	N/A	N/A	0.3		
Asteraceae	<i>Bidens pilosa</i>	Cobbler's Pegs	N/A	N/A	0.1		
Poaceae	<i>Bromus spp.</i>		N/A	N/A			Y
Acanthaceae	<i>Brunoniella australis</i>	Blue trumpet	N/A	N/A	0.1		
Pittosporaceae	<i>Bursaria spinosa</i>	Blackthorn	N/A	N/A	6		
Myrtaceae	<i>Callistemon viminalis</i>	Weeping Bottlebrush	N/A	N/A			Y

Family	Scientific Name	Common name	Status		Cover in each plot*		
			BC Act	EPBC Act	Plot 1	Plot 2	Incidental observation
Casuarinaceae	<i>Casuarina glauca</i>	Swamp sheoak	E	N/A			Y
Poaceae	<i>Cenchrus clandestinus</i>	Kikuyu Grass	N/A	N/A		1	
Solanaceae	<i>Cestrum parqui</i>	Green cestrum	N/A	N/A	0.1		
Pteridaceae	<i>Cheilanthes sieberi</i>		N/A	N/A			Y
Lauraceae	<i>Cinnamomum camphora</i>	Camphor laurel	N/A	N/A			Y
Amaranthaceae	<i>Chenopodium album</i>	Fat Hen	N/A	N/A		0.1	
Poaceae	<i>Chloris gayana</i>	Rhodes grass	N/A	N/A	0.2		
Poaceae	<i>Chloris truncata</i>	Windmill grass	N/A	N/A	0.1	0.1	
Commelinaceae	<i>Commelina spp.</i>		N/A	N/A			Y
Asteraceae	<i>Conyza spp.</i>		N/A	N/A		0.1	
Myrtaceae	<i>Corymbia maculata</i>	Spotted gum	N/A	N/A		3	
Asteraceae	<i>Cotula australis</i>	Carrot weed	N/A	N/A		0.2	
Poaceae	<i>Cynodon dactylon</i>	Couch grass	N/A	N/A	0.1	5	
Cyperaceae	<i>Cyperus gracilis</i>	Slender flat-sedge	N/A	N/A	0.1	0.1	
Convolvulaceae	<i>Dichondra repens</i>	Kidney weed	N/A	N/A	0.5	0.1	
Poaceae	<i>Ehrharta erecta</i>	Panic Veldtgrass	N/A	N/A	0.1		

Family	Scientific Name	Common name	Status		Cover in each plot*		
			BC Act	EPBC Act	Plot 1	Plot 2	Incidental observation
Chenopodiaceae	<i>Einadia polygonoides</i>		N/A	N/A	0.1		
Chenopodiaceae	<i>Einadia trigonos</i>	Fishweed	N/A	N/A	0.1	0.2	
Poaceae	<i>Eleusine indica</i>	Crowsfoot Grass	N/A	N/A		0.1	
Poaceae	<i>Entolasia stricta</i>		N/A	N/A			Y
Poaceae	<i>Eragrostis curvula</i>	African Lovegrass	N/A	N/A	1	0.5	
Poaceae	<i>Eriochloa spp.</i>		N/A	N/A		0.1	
Myrtaceae	<i>Eucalyptus amplifolia</i>	Cabbage Gum	N/A	N/A	20		
Myrtaceae	<i>Eucalyptus eugenioides</i>	Thin-leaved Stringybark	N/A	N/A	4		
Myrtaceae	<i>Eucalyptus fibrosa</i>	Red Ironbark	N/A	N/A			Y
Myrtaceae	<i>Eucalyptus grandis</i>	Flooded gum	N/A	N/A			Y
Myrtaceae	<i>Eucalyptus melliodora</i>	Yellow box	N/A	N/A		0.5	
Myrtaceae	<i>Eucalyptus microcorys</i>	Tallowwood	N/A	N/A			Y
Myrtaceae	<i>Eucalyptus moluccana</i>	Grey box	N/A	N/A	8	20	
Myrtaceae	<i>Eucalyptus nicholii</i>	Narrow-leaved Black Peppermint	V	V			Y
Myrtaceae	<i>Eucalyptus punctata</i>	Grey gum	N/A	N/A			Y
Myrtaceae	<i>Eucalyptus sideroxylon</i>	Mugga Ironbark	N/A	N/A			Y

Family	Scientific Name	Common name	Status		Cover in each plot*		
			BC Act	EPBC Act	Plot 1	Plot 2	Incidental observation
Myrtaceae	<i>Eucalyptus tereticornis</i>	Forest Red Gum	N/A	N/A			Y
Fabaceae	<i>Glycine clandestina</i>		N/A	N/A			Y
Fabaceae	<i>Glycine microphylla</i>	Small-leaf glycine	N/A	N/A	0.1		
Asteraceae	<i>Hypochaeris radicata</i>	Cats ear	N/A	N/A		0.1	
Verbenaceae	<i>Lantana camara</i>	Lantana	N/A	N/A	7		
Oleaceae	<i>Ligustrum lucidum</i>	Large leaf privet	N/A	N/A	7		
Oleaceae	<i>Ligustrum sinense</i>	Small leaf privet	N/A	N/A	2		
Brassicaceae	<i>Lepidium spp.</i>		N/A	N/A		0.2	
Lomandraceae	<i>Lomandra filiformis</i> <i>subsp. filiformis</i>	Wattle Mat-Rush	N/A	N/A	0.1		
Asparagaceae	<i>Lomandra longifolia</i>		N/A	N/A			Y
Asparagaceae	<i>Lomandra spp.</i>		N/A	N/A			Y
Caprifoliaceae	<i>Lonicera japonica</i>	Japanese Honeysuckle	N/A	N/A			Y
Myrtaceae	<i>Lophostemon confertus</i>	Brush box	N/A	N/A			Y
Myrtaceae	<i>Lophostemon spp.</i>		N/A	N/A			Y
Myrtaceae	<i>Melaleuca linearifolia</i>	Flax-leaved Paperbark	N/A	N/A			Y
Meliaceae	<i>Melia azedarach</i>	White cedar	N/A	N/A	3		

Family	Scientific Name	Common name	Status		Cover in each plot*		
			BC Act	EPBC Act	Plot 1	Plot 2	Incidental observation
Poaceae	<i>Microlaena spp.</i>		N/A	N/A	1		
Fabaceae	<i>Mimosa pigra</i>	Giant sensitive plant	N/A	N/A			Y
Malvaceae	<i>Modiola caroliniana</i>	Red-flowered mallow	N/A	N/A		0.2	
Ochnaceae	<i>Ochna serrulata</i>	Mickey Mouse Plant	N/A	N/A	0.1		
Oleaceae	<i>Olea europaea subsp. cuspidata</i>	African Olive	N/A	N/A	3		
Poaceae	<i>Oplismenus aemulus</i>	Australian basket grass	N/A	N/A	0.5		
Cactaceae	<i>Opuntia stricta</i>	Prickly pear	N/A	N/A			Y
Poaceae	<i>Paspalum dilatatum</i>	Dallis grass	N/A	N/A		0.1	
Poaceae	<i>Paspalidium distans</i>		N/A	N/A	0.1		
Pittosporaceae	<i>Pittosporum undulatum</i>	Sweet pittosporum	N/A	N/A	0.1		
Plantaginaceae	<i>Plantago debilis</i>		N/A	N/A		0.1	
Plantaginaceae	<i>Plantago lanceolata</i>	Plantain	N/A	N/A		0.1	
Poaceae	<i>Poa annua</i>	Annual blue grass	N/A	N/A		0.1	
Portulacaceae	<i>Portulaca oleracea</i>	Pigweed	N/A	N/A		0.1	
Rubiaceae	<i>Richardia stellaris</i>		N/A	N/A		1	
Malvaceae	<i>Sida rhombifolia</i>	Paddy's Lucerne	N/A	N/A	0.1	0.1	

Family	Scientific Name	Common name	Status		Cover in each plot*		
			BC Act	EPBC Act	Plot 1	Plot 2	Incidental observation
Solanaceae	<i>Solanum nigrum</i>	Black-berry Nightshade	N/A	N/A		0.1	
Solanaceae	<i>Solanum seaforthianum</i>	Brazilian Nightshade	N/A	N/A	0.1		
Asteraceae	<i>Sonchus oleraceus</i>	Common Sowthistle	N/A	N/A		0.1	
Asteraceae	<i>Soliva sessilis</i>	Bindi	N/A	N/A		0.2	
Stackhousiaceae	<i>Stackhousia viminea</i>	Slender Stackhousia	N/A	N/A			Y
Asteraceae	<i>Taraxacum officinale</i>	Dandelion	N/A	N/A		0.1	
Cannabaceae	<i>Trema spp.</i>		N/A	N/A			Y
Typhaceae	<i>Typha spp.</i>		N/A	N/A			Y
Verbenaceae	<i>Verbena rigida var. rigida</i>	Veined Verbena	N/A	N/A	0.1	0.1	
Basellaceae	<i>Anredera cordifolia</i>	Madeira vine	N/A	N/A			Y

Recorded fauna

Taxa/Fauna group	Scientific Name	Common name	Status	
			BC Act	EPBC Act
Aves	<i>Cacatua galerita</i>	Sulphur-crested Cockatoo	N/A	N/A
Aves	<i>Cacatua sanguinea</i>	Little Corella	N/A	N/A
Aves	<i>Chenonetta jubata</i>	Australian Wood Duck	N/A	N/A
Aves	<i>Corvus coronoides</i>	Australian Raven	N/A	N/A
Aves	<i>Cracticus tibicen</i>	Australian Magpie	N/A	N/A
Aves	<i>Glossopsitta pusilla</i>	Little Lorikeet	Vulnerable	N/A
Aves	<i>Grallina cyanoleuca</i>	Magpie-lark	N/A	N/A
Reptilia	<i>Eulamprus quoyii</i>	Eastern Water Skink	N/A	N/A
Reptilia	<i>Intellagama lesueurii</i>	Australian Water Dragon	N/A	N/A
Mammalia	<i>Myotis macropus</i>	Southern Myotis	Vulnerable	N/A
Aves	<i>Manorina melanocephala</i>	Noisy Miner	N/A	N/A
Aves	<i>Phalacrocorax varius</i>	Pied Cormorant	N/A	N/A
Aves	<i>Psephotus haematonotus</i>	Red-rumped parrot	N/A	N/A
Aves	<i>Ptilonorhynchus violaceus</i>	Satin Bowerbird	N/A	N/A
Aves	<i>Sturnus tristis</i>	Common Myna	N/A	N/A
Aves	<i>Threskiornis molucca</i>	Australian White Ibis	N/A	N/A

Taxa/Fauna group	Scientific Name	Common name	Status	
			BC Act	EPBC Act
Aves	<i>Trichoglossus haematodus</i>	Rainbow Lorikeet	N/A	N/A

Annexure B

Likelihood of occurrence criteria

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 dependant on identified suitable habitat (ie. 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 (ie. 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.
Likelihood	Criteria

To be included in the habitat assessment, the following criteria need to be met:

- the species is known or predicted to occur within the IBRA subregion,
- the species is associated with a PCT identified in the study area,
- the study area meets the native vegetation cover criteria and minimum patch size for the species
- the study area contains any geographic constraints associated with the species
- the study area contains any habitat constraints associated with the occurrence of the threatened species
- past records of the species occur in the study area

Habitat assessment table

Common name	Scientific name	PCT association	Status		Habitat requirements (generally sourced from NSW OEH Threatened Species Profiles)	Number of records (Source: BioNet)	Likelihood of occurrence
			BC Act	EPBC Act			
Fauna							
Australian Bittern	<i>Botaurus poiciloptilus</i>	835 – Cumberland riverflat forest	E	E	<p>Brackish or freshwater wetlands.</p> <p>Favours permanent freshwater wetlands with tall, dense vegetation, particularly bullrushes (<i>Typha</i> spp.) and spike rushes (<i>Eleocharis</i> spp.).</p> <p>Hides during the day amongst dense reeds or rushes and feed mainly at night on frogs, fish, yabbies, spiders, insects and snails.</p> <p>Feeding platforms may be constructed over deeper water from reeds trampled by the bird; platforms are often littered with prey remains.</p>	0 (BioNet)	Low – no suitable habitat recorded within the study area
Barking Owl	<i>Ninox connivens</i>	835 – Cumberland riverflat forest	V	N/A	<p>Inhabits woodland and open forest, including fragmented remnants and partly cleared farmland. It is flexible in its habitat use, and hunting can extend in to closed forest and more open areas. Sometimes able to successfully breed along timbered watercourses in heavily cleared habitats (e.g. western NSW) due to the higher density of prey found on these fertile riparian soils.</p> <p>Roost in shaded portions of tree canopies, including tall midstorey trees with dense foliage such as Acacia and Casuarina species. During nesting season, the male perches in a nearby tree overlooking the hollow entrance</p>	0 (BioNet)	Moderate – may forage in vegetation but only marginally suitable as habitat

Common name	Scientific name	PCT association	Status		Habitat requirements (generally sourced from NSW OEH Threatened Species Profiles)	Number of records (Source: BioNet)	Likelihood of occurrence
			BC Act	EPBC Act			
Black Bittern	<i>Ixobrychus flavicollis</i>	835 – Cumberland riverflat forest 1800 – Cumberland Swamp Oak riparian forest	V	N/A	Land within 40 m of freshwater and estuarine wetlands, in areas of permanent water and dense vegetation. 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. During the day, roosts in trees or on the ground amongst dense reeds. When disturbed, freezes in a characteristic bittern posture (stretched tall, bill pointing up, so that shape and streaked pattern blend with upright stems of reeds), or will fly up to a branch or flush for cover where it will freeze again. Like other bitterns, but unlike most herons, nesting is solitary. Nests, built in spring are located on a branch overhanging water and consist of a bed of sticks and reeds on a base of larger sticks.	1 (BioNet)	Moderate – may occur within riparian corridors such as School House Creek

Common name	Scientific name	PCT association	Status		Habitat requirements (generally sourced from NSW OEH Threatened Species Profiles)	Number of records (Source: BioNet)	Likelihood of occurrence
			BC Act	EPBC Act			
Black-chinned Honeyeater (eastern subspecies)	<i>Melithreptus gularis gularis</i>	835 – Cumberland riverflat forest	V	N/A	Occupies mostly upper levels of drier open forests or woodlands dominated by box and ironbark eucalypts, especially Mugga Ironbark (<i>Eucalyptus sideroxylon</i>), White Box (<i>E. albens</i>), Inland Grey Box (<i>E. microcarpa</i>), Yellow Box (<i>E. melliodora</i>), Blakely's Red Gum (<i>E. blakelyi</i>) and Forest Red Gum (<i>E. tereticornis</i>). Also inhabits open forests of smooth-barked gums, stringybarks, ironbarks, river sheoaks (nesting habitat) and tea-trees. Feeding territories are large making the species locally nomadic. Recent studies have found that the Black-chinned Honeyeater tends to occur in the largest woodland patches in the landscape as birds forage over large home ranges of at least 5 hectares.	1 (BioNet)	Moderate – may forage in vegetation but only marginally suitable as habitat
Brown Treecreeper (eastern subspecies)	<i>Climacteris picumnus victoriae</i>	835 – Cumberland riverflat forest	V	N/A	Found in eucalypt woodlands (including Box-Gum Woodland) and dry open forest of the inland slopes and plains inland of the Great Dividing Range; mainly inhabits woodlands dominated by stringybarks or other rough-barked eucalypts, usually with	1 (2019 ALA)	Low – no suitable habitat recorded within the study area
		849 – Cumberland shale plains woodland					

Common name	Scientific name	PCT association	Status		Habitat requirements (generally sourced from NSW OEH Threatened Species Profiles)	Number of records (Source: BioNet)	Likelihood of occurrence
			BC Act	EPBC Act			
		1800 – Cumberland Swamp Oak riparian forest			an open grassy understorey, sometimes with one or more shrub species; also found in mallee and River Red Gum (<i>Eucalyptus camaldulensis</i>) Forest bordering wetlands with an open understorey of acacias, saltbush, lignum, cumbungi and grasses; usually not found in woodlands with a dense shrub layer; fallen timber is an important habitat component for foraging; also recorded, though less commonly, in similar woodland habitats on the coastal ranges and plains. Sedentary, considered to be resident in many locations throughout its range; present in all seasons or year-round at many sites; territorial year-round, though some birds may disperse locally after breeding. Gregarious and usually observed in pairs or small groups of 8 to 12 birds; terrestrial and arboreal in about equal proportions; active, noisy and conspicuous while foraging on trunks and branches of trees and amongst fallen timber; spend much more time foraging on the ground and fallen logs than other treecreepers. Hollows in standing dead or live trees and tree stumps are essential for nesting.		
Diamond Firetail	<i>Stagonopleura guttata</i>	835 – Cumberland riverflat forest 849 – Cumberland shale plains woodland	V	N/A	Found in grassy eucalypt woodlands, open forest, mallee, Natural Temperate Grassland, and in secondary grassland derived from other communities. Often found in riparian areas (rivers and creeks), and sometimes in lightly wooded farmland.	1 record since 2012 ALA	Moderate – may forage in riparian vegetation

Common name	Scientific name	PCT association	Status		Habitat requirements (generally sourced from NSW OEH Threatened Species Profiles)	Number of records (Source: BioNet)	Likelihood of occurrence
			BC Act	EPBC Act			
		1800 – Cumberland Swamp Oak riparian forest			Feeds exclusively on the ground, on ripe and partly-ripe grass and herb seeds and green leaves, and on insects (especially in the breeding season). Groups separate into small colonies to breed, between August and January. Nests are globular structures built either in the shrubby understorey, or higher up, especially under hawk's or raven's nests. Birds roost in dense shrubs or in smaller nests built especially for roosting. Appears to be sedentary, though some populations move locally, especially those in the south. Has been recorded in some towns and near farm houses.		
Dusky Woodswallow	<i>Artamus cyanopterus cyanopterus</i>	835 – Cumberland riverflat forest 849 – Cumberland shale plains woodland	V	N/A	Primarily inhabit dry, open eucalypt forests and woodlands, including mallee associations, with an open or sparse understorey of eucalypt saplings, acacias and other shrubs, and ground-cover of grasses or sedges and fallen woody debris.	Multiple records (2018 ALA)	Moderate – may visit the study area but vegetation patch size

Common name	Scientific name	PCT association	Status		Habitat requirements (generally sourced from NSW OEH Threatened Species Profiles)	Number of records (Source: BioNet)	Likelihood of occurrence
			BC Act	EPBC Act			
		1800 – Cumberland Swamp Oak riparian forest			It has also been recorded in shrublands, heathlands and very occasionally in moist forest or rainforest. Also found in farmland, usually at the edges of forest or woodland. Primarily eats invertebrates, mainly insects, which are captured whilst hovering or sallying above the canopy or over water. Also frequently hovers, sallies and pounces under the canopy, primarily over leaf litter and dead timber. Also occasionally take nectar, fruit and seed. Depending on location and local climatic conditions (primarily temperature and rainfall), the Dusky Woodswallow can be resident year round or migratory. In NSW, after breeding, birds migrate to the north of the state. Migrants generally depart between March and May, heading south to breed again in spring. There is some evidence of site fidelity for breeding.		too small to support the species
Eastern Coastal Free-tailed Bat	<i>Micronomus norfolkensis</i>	835 – Cumberland riverflat forest 849 – Cumberland shale plains woodland 1800 – Cumberland Swamp Oak riparian forest	V	N/A	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.	Multiple records (2014 BioNet & ALA)	Moderate–likely the species visits the study area though not detected during anabat survey. Roosting and breeding habitat is restricted

Common name	Scientific name	PCT association	Status		Habitat requirements (generally sourced from NSW OEH Threatened Species Profiles)	Number of records (Source: BioNet)	Likelihood of occurrence
			BC Act	EPBC Act			
Eastern False Pipistrelle	<i>Falsistrellus tasmaniensis</i>	835 – Cumberland riverflat forest	V	N/A	Prefers moist habitats, with trees taller than 20 m. Generally roosts in eucalypt hollows, but has also been found under loose bark on trees or in buildings.	1 record (2001 ALA)	Moderate – likely the species visits the study area though not detected during anabat survey. Roosting and breeding habitat is restricted
Eastern Osprey	<i>Pandion cristatus</i>	835 – Cumberland riverflat forest 1800 – Cumberland Swamp Oak riparian forest	V	N/A	Presence of stick-nests in living and dead trees (>15m) or artificial structures within 100m of a floodplain for nesting. This species can nest in isolated trees. Nests are distinctive but easiest to identify when birds are in attendance.	0 records since 2000	Low – suitable habitat not present

Common name	Scientific name	PCT association	Status		Habitat requirements (generally sourced from NSW OEH Threatened Species Profiles)	Number of records (Source: BioNet)	Likelihood of occurrence
			BC Act	EPBC Act			
Flame Robin	<i>Petroica phoenicea</i>	835 – Cumberland riverflat forest	V	N/A	Breeds in upland tall moist eucalypt forests and woodlands, often on ridges and slopes. Prefers clearings or areas with open understoreys. The groundlayer of the breeding habitat is dominated by native grasses and the shrub layer may be either sparse or dense. Occasionally occurs in temperate rainforest, and also in herbfields, heathlands, shrublands and sedgelands at high altitudes. In winter, birds migrate to drier more open habitats in the lowlands (i.e. valleys below the ranges, and to the western slopes and plains). Often occurs in recently burnt areas; however, habitat becomes unsuitable as vegetation closes up following regeneration. In winter lives in dry forests, open woodlands and in pastures and native grasslands, with or without scattered trees.	1 record since 2000 (ALA)	Moderate – may forage in riparian vegetation
		849 – Cumberland shale plains woodland					
		1800 – Cumberland Swamp Oak riparian forest					
Gang-gang Cockatoo	<i>Callocephalon fimbriatum</i>	835 – Cumberland riverflat forest	V	N/A	Eucalypt tree species with hollows greater than 9 cm diameter	1 record 2001 (ALA)	Moderate – may forage

Common name	Scientific name	PCT association	Status		Habitat requirements (generally sourced from NSW OEH Threatened Species Profiles)	Number of records (Source: BioNet)	Likelihood of occurrence
			BC Act	EPBC Act			
		849 – Cumberland shale plains woodland			<p>In spring and summer, generally found in tall mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. In autumn and winter, the species often moves to lower altitudes in drier more open eucalypt forests and woodlands, particularly box-gum and box-ironbark assemblages, or in dry forest in coastal areas and often found in urban areas.</p> <p>Favours old growth forest and woodland attributes for nesting and roosting. Nests are located in hollows that are 10 cm in diameter or larger and at least 9 m above the ground in eucalypts.</p>		in riparian vegetation
Greater Broad-nosed Bat	<i>Scoteanax rueppellii</i>	835 – Cumberland riverflat forest	V	N/A	<p>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.</p> <p>Although this species usually roosts in tree hollows, it has also been found in buildings.</p> <p>Forages after sunset, flying slowly and directly along creek and river corridors at an altitude of 3 - 6 m.</p> <p>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.</p>	3 records since 2014 (BioNet and ALA)	Moderate – may forage in riparian vegetation. Not detected during anabat survey.

Common name	Scientific name	PCT association	Status		Habitat requirements (generally sourced from NSW OEH Threatened Species Profiles)	Number of records (Source: BioNet)	Likelihood of occurrence
			BC Act	EPBC Act			
Grey-headed Flying- fox	<i>Pteropus poliocephalus</i>	835 – Cumberland riverflat forest	V	V	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. Individual camps may have tens of thousands of animals and are used for mating, and for giving birth and rearing young. 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.	Multiple records for foraging no breeding colonies present	Moderate – may forage in riparian vegetation however camps were not detected during searches
		849 – Cumberland shale plains woodland					
		1800 – Cumberland Swamp Oak riparian forest					
Hooded Robin (south-eastern form)	<i>Melanodryas cucullata cucullate</i>	835 – Cumberland riverflat forest	V	N/A	Prefers lightly wooded country, usually open eucalypt woodland, acacia scrub and mallee, often in or near clearings or open areas. Requires structurally diverse habitats featuring mature eucalypts, saplings, some small shrubs and a ground layer of	0 records since pre 2000	Moderate – may forage in patches of vegetation however may not be of
		849 – Cumberland shale plains woodland					

Common name	Scientific name	PCT association	Status		Habitat requirements (generally sourced from NSW OEH Threatened Species Profiles)	Number of records (Source: BioNet)	Likelihood of occurrence
			BC Act	EPBC Act			
		1800 – Cumberland Swamp Oak riparian forest			moderately tall native grasses. Often perches on low dead stumps and fallen timber or on low-hanging branches, using a perch-and-pounce method of hunting insect prey. Territories range from around 10 ha during the breeding season, to 30 ha in the non-breeding season. May breed any time between July and November, often rearing several broods. The nest is a small, neat cup of bark and grasses bound with webs, in a tree fork or crevice, from less than 1 m to 5 m above the ground.		appropriate patch size for breeding
Koala	<i>Phascolarctos cinereus</i>	835 – Cumberland riverflat forest	V	V	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. Home range size varies with quality of habitat, ranging from less than two ha to several hundred hectares in size.	1 record 2016 (BioNet)	Low – suitable habitat not present and poor connectivity with surrounding patches
		849 – Cumberland shale plains woodland					
		1800 – Cumberland Swamp Oak riparian forest					
Large Bent-winged Bat	<i>Miniopterus orianae oceanensis</i>	835 – Cumberland riverflat forest	V	N/A	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	6 records till 2016 (BioNet)	Moderate – may forage in riparian vegetation but breeding habitat not
		849 – Cumberland shale plains woodland					

Common name	Scientific name	PCT association	Status		Habitat requirements (generally sourced from NSW OEH Threatened Species Profiles)	Number of records (Source: BioNet)	Likelihood of occurrence
			BC Act	EPBC Act			
		1800 – Cumberland Swamp Oak riparian forest			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. Hunt in forested areas, catching moths and other flying insects above the tree tops.		present. Not detected during anabat survey.
Little Bent-winged Bat	<i>Miniopterus australis</i>	835 – Cumberland riverflat forest	V	N/A	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.	2 records 2018 (BioNet)	Moderate – may forage in riparian vegetation. Not detected during anabat survey.
		849 – Cumberland shale plains woodland					
		1800 – Cumberland Swamp Oak riparian forest					
Little Eagle	<i>Hieraaetus morphnoides</i>	835 – Cumberland riverflat forest	V	N/A	Occupies open eucalypt forest, woodland or open woodland. Sheoak or Acacia woodlands and riparian woodlands of interior NSW are also used. Nests in tall living trees within a remnant patch, where pairs build a large stick nest in winter.	1 record 2018 (BioNet)	
		849 – Cumberland shale plains woodland					
		1800 – Cumberland Swamp Oak riparian forest					

Common name	Scientific name	PCT association	Status		Habitat requirements (generally sourced from NSW OEH Threatened Species Profiles)	Number of records (Source: BioNet)	Likelihood of occurrence
			BC Act	EPBC Act			
Little Lorikeet	<i>Glossopsitta pusilla</i>	835 – Cumberland riverflat forest	V	N/A	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. Nests in proximity to feeding areas if possible, most typically selecting hollows in the limb or trunk of smooth-barked Eucalypts. Entrance is small (3 cm) and usually high above the ground (2–15 m). These nest sites are often used repeatedly for decades, suggesting that preferred sites are limited.	1 record 2019 (BioNet)	Recorded as an opportunistic sighting.
		849 – Cumberland shale plains woodland					
		1800 – Cumberland Swamp Oak riparian forest					
Masked Owl	<i>Tyto novaehollandiae</i>	835 – Cumberland riverflat forest	V	N/A	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. Pairs have a large home-range of 500 to 1000 hectares. Roosts and breeds in moist eucalypt forested gullies, using large tree hollows or sometimes caves for nesting.	1 record 2016 (BioNet)	Moderate – may forage in riparian vegetation. Not detected during site searches.
		849 – Cumberland shale plains woodland					
		1800 – Cumberland Swamp Oak riparian forest					

Common name	Scientific name	PCT association	Status		Habitat requirements (generally sourced from NSW OEH Threatened Species Profiles)	Number of records (Source: BioNet)	Likelihood of occurrence
			BC Act	EPBC Act			
Painted Honeyeater	<i>Grantiella picta</i>	835 – Cumberland riverflat forest	V	V	Inhabits Boree/ Weeping Myall (<i>Acacia pendula</i>), Brigalow (<i>A. harpophylla</i>) and Box-Gum Woodlands and Box-Ironbark Forests. A specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias. Prefers mistletoes of the genus <i>Amyema</i> . Mistletoes present at a density of greater than five mistletoes per hectare. Nest from spring to autumn in a small, delicate nest hanging within the outer canopy of drooping eucalypts, she-oak, paperbark or mistletoe branches.	Most recent record (1960 ALA)	Low – suitable habitat not present
		849 – Cumberland shale plains woodland					
		1800 – Cumberland Swamp Oak riparian forest					
Powerful Owl	<i>Ninox strenua</i>	835 – Cumberland riverflat forest	V	N/A	The Powerful Owl inhabits a range of vegetation types, from woodland and open sclerophyll forest to tall open wet forest and rainforest. Requires large tracts of forest or woodland habitat but can occur in fragmented landscapes as well. The	5 records (2017 BioNet)	Moderate – may forage in riparian vegetation. Not detected
		849 – Cumberland shale plains woodland					

Common name	Scientific name	PCT association	Status		Habitat requirements (generally sourced from NSW OEH Threatened Species Profiles)	Number of records (Source: BioNet)	Likelihood of occurrence
			BC Act	EPBC Act			
		1800 – Cumberland Swamp Oak riparian forest			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 (<i>Syncarpia glomulifera</i>), Black She-oak (<i>Allocasuarina littoralis</i>), Blackwood (<i>Acacia melanoxylon</i>), Rough-barked Apple (<i>Angophora floribunda</i>), Cherry Ballart (<i>Exocarpus cupressiformis</i>) and a number of eucalypt species. Powerful Owls nest in large tree hollows (at least 0.5 m deep), in large eucalypts (diameter at breast height of 80-240 cm) that are at least 150 years old. While the female and young are in the nest hollow the male Powerful Owl roosts nearby (10-200 m) guarding them, often choosing a dense "grove" of trees that provide concealment from other birds.		during site searches.
Regent Honeyeater	<i>Anthochaera phrygia</i>	835 – Cumberland riverflat forest 849 – Cumberland shale plains woodland	CE	CE	The species inhabits dry open forest and woodland, particularly Box-Ironbark woodland, and riparian forests of River Sheoak. Inhabit woodlands that support a significantly high abundance and species richness of bird species. These woodlands	1 record (2019 BioNet)	Low – suitable habitat not present

Common name	Scientific name	PCT association	Status		Habitat requirements (generally sourced from NSW OEH Threatened Species Profiles)	Number of records (Source: BioNet)	Likelihood of occurrence
			BC Act	EPBC Act			
		1800 – Cumberland Swamp Oak riparian forest			<p>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. 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, Lower Hunter Spotted Gum, Thin-leaved Stringybark, <i>Eucalyptus eugenioides</i> and other Stringybark species, and Broad-leaved Ironbark can also contribute important nectar flows at times. Nectar and fruit from the mistletoes <i>Amyema miquelii</i>, <i>A. pendula</i> and <i>A. cambagei</i> are also utilised. When nectar is scarce lerp and honeydew can comprise a large proportion of the diet. Insects make up about 15% of the total diet and are important components of the diet of nestlings. There are three known key breeding areas, two of them in NSW - Capertee Valley and Bundarra-Barraba regions. The species breeds between July and January in Box-Ironbark and other temperate woodlands and riparian gallery forest dominated by River Sheoak. Regent Honeyeaters usually nest in horizontal branches or forks in tall mature eucalypts and Sheoaks. Also nest in mistletoe haustoria.</p>		

Common name	Scientific name	PCT association	Status		Habitat requirements (generally sourced from NSW OEH Threatened Species Profiles)	Number of records (Source: BioNet)	Likelihood of occurrence
			BC Act	EPBC Act			
Scarlet Robin	<i>Petroica boodang</i>	835 – Cumberland riverflat forest	V	N/A	The Scarlet Robin lives in dry eucalypt forests and woodlands. The understorey is usually open and grassy with few scattered shrubs. This species lives in both mature and regrowth vegetation. It occasionally occurs in mallee or wet forest communities, or in wetlands and tea-tree swamps. Scarlet Robin habitat usually contains abundant logs and fallen timber: these are important components of its habitat. The Scarlet Robin breeds on ridges, hills and foothills of the western slopes, the Great Dividing Range and eastern coastal regions; this species is occasionally found up to 1000 metres in altitude.	1 record (1998 BioNet)	Moderate – may forage in riparian vegetation.
		849 – Cumberland shale plains woodland					
		1800 – Cumberland Swamp Oak riparian forest					
Speckled Warbler	<i>Chthonicola sagittata</i>	835 – Cumberland riverflat forest	V/	N/A	The Speckled Warbler lives in a wide range of Eucalyptus dominated communities that have a grassy understorey, often on rocky ridges or in gullies. Typical habitat would include scattered native tussock grasses, a sparse shrub layer, some eucalypt regrowth and an open canopy. Large, relatively undisturbed remnants are required for the species to persist in an area. The diet consists of seeds and insects, with most foraging taking place on the ground around tussocks and under bushes and trees.	5 records (2006 BioNet)	Moderate – may forage in riparian vegetation, though patch size may be too small for species persistence.
		849 – Cumberland shale plains woodland					
		1800 – Cumberland Swamp Oak riparian forest					

Common name	Scientific name	PCT association	Status		Habitat requirements (generally sourced from NSW OEH Threatened Species Profiles)	Number of records (Source: BioNet)	Likelihood of occurrence
			BC Act	EPBC Act			
Spotted Harrier	<i>Circus assimilis</i>	849-Cumberland shale plains woodland	V	N/A	Occurs in grassy open woodland including Acacia and mallee remnants, inland riparian woodland, grassland and shrub steppe. It is found most commonly in native grassland, but also occurs in agricultural land, foraging over open habitats including edges of inland wetlands. Builds a stick nest in a tree and lays eggs in spring (or sometimes autumn), with young remaining in the nest for several months.	Multiple records outside of 10 km radius (ALA)	Low – suitable habitat not present
Spotted-tailed Quoll	<i>Dasyurus maculatus</i>	835 – Cumberland riverflat forest <hr/> 849 – Cumberland shale plains woodland <hr/> 1800 – Cumberland Swamp Oak riparian forest	V	E	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. Quolls use hollow-bearing trees, fallen logs, other animal burrows, small caves and rock outcrops as den sites. Will spend most of the time on the ground, although also an excellent climber and will hunt possums and gliders in tree hollows and prey on roosting birds. Use communal 'latrine sites', often on flat rocks among boulder fields, rocky cliff-faces or along rocky stream beds or banks. Such sites may be visited by multiple individuals and can be recognised by the accumulation of the sometimes characteristic 'twisty-shaped' faeces deposited by animals. Females occupy home ranges of 200-500 hectares, while males occupy very large home ranges from 500 to over 4000 hectares. Are known to traverse their home ranges along densely vegetated creeklines.	2 records outside of 10km radius (1989 ALA)	Low – suitable habitat not present

Common name	Scientific name	PCT association	Status		Habitat requirements (generally sourced from NSW OEH Threatened Species Profiles)	Number of records (Source: BioNet)	Likelihood of occurrence
			BC Act	EPBC Act			
Square-tailed Kite	<i>Lophoictinia isura</i>	835 – Cumberland riverflat forest	V	N/A	Found in a variety of timbered habitats including dry woodlands and open forests. Shows a particular preference for timbered watercourses. Appears to occupy large hunting ranges of more than 100 km ² . Nest sites generally located along or near watercourses, in a fork or on large horizontal limbs.	1 record (2016 BioNet)	Moderate – may shelter in riparian vegetation, though patch size may be too small for species persistence.
		849 – Cumberland shale plains woodland					
		1800 – Cumberland Swamp Oak riparian forest					
Swift Parrot	<i>Lathamus discolor</i>	835 – Cumberland riverflat forest	E	CE	Migrates to the Australian south-east mainland between February and October. On the mainland they occur in areas where eucalypts are flowering profusely or where there are abundant lerp (from sap-sucking bugs) infestations. Favoured feed trees include winter flowering species such as Swamp Mahogany (<i>Eucalyptus robusta</i>), Spotted Gum (<i>Corymbia maculata</i>), Red Bloodwood (<i>C. gummifera</i>), Forest Red Gum (<i>E. tereticornis</i>), Mugga Ironbark (<i>E. sideroxylon</i>), and White Box (<i>E. albens</i>). Commonly used lerp infested trees include Inland Grey Box (<i>E. macrocarpa</i>), Grey Box (<i>E. moluccana</i>), Blackbutt (<i>E. pilularis</i>), and Yellow Box (<i>E. melliodora</i>). Breed in Tasmania after winter.	4 records (2015 BioNet)	Moderate – may forage in riparian vegetation, though patch size may be too small for species persistence.
		849 – Cumberland shale plains woodland					
		1800 – Cumberland Swamp Oak riparian forest					

Common name	Scientific name	PCT association	Status		Habitat requirements (generally sourced from NSW OEH Threatened Species Profiles)	Number of records (Source: BioNet)	Likelihood of occurrence
			BC Act	EPBC Act			
Turquoise Parrot	<i>Neophema pulchella</i>	835 – Cumberland riverflat forest	V	N/A	Lives on the edges of eucalypt woodland adjoining clearings, timbered ridges and creeks in farmland. Prefers to feed in the shade of a tree and spends most of the day on the ground searching for the seeds or grasses and herbaceous plants, or browsing on vegetable matter. Nests in tree hollows, logs or posts, from August to December. It lays four or five white, rounded eggs on a nest of decayed wood dust.	1 record outside of 10km (2001 ALA)	Low – suitable habitat not present
		849 – Cumberland shale plains woodland					
		1800 – Cumberland Swamp Oak riparian forest					
Varied Sittella	<i>Daphoenositta chrysoptera</i>	835 – Cumberland riverflat forest	V	N/A	Inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland. Feeds on arthropods gleaned from crevices in rough or decorticating bark, dead branches, standing dead trees and small branches and twigs in the tree canopy.	5 records (2007 BioNet)	Moderate – may forage in riparian vegetation, though patch size may be too small for species persistence.
		849 – Cumberland shale plains woodland					
		1800 – Cumberland Swamp Oak riparian forest					
White-bellied Sea-Eagle	<i>Haliaeetus leucogaster</i>	835 – Cumberland riverflat forest	V	N/A	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 sea-shore, such as around bays and inlets, beaches, reefs, lagoons, estuaries and mangroves;	4 records (2019 BioNet)	Moderate – may shelter in riparian vegetation
		849 – Cumberland shale plains woodland					

Common name	Scientific name	PCT association	Status		Habitat requirements (generally sourced from NSW OEH Threatened Species Profiles)	Number of records (Source: BioNet)	Likelihood of occurrence
			BC Act	EPBC Act			
		1800 – Cumberland Swamp Oak riparian forest			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.		
Yellow-bellied Sheathtail-bat	<i>Saccolaimus flaviventris</i>	835 – Cumberland riverflat forest 849 – Cumberland shale plains woodland 1800 – Cumberland Swamp Oak riparian forest	V	N/A	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	2 records outside of 10km (2014 ALA BioNet)	Moderate – may forage in riparian vegetation. Not detected during anabat survey.

Common name	Scientific name	PCT association	Status		Habitat requirements (generally sourced from NSW OEH Threatened Species Profiles)	Number of records (Source: BioNet)	Likelihood of occurrence
			BC Act	EPBC Act			
Red-crowned Toadlet	<i>Pseudophryne australis</i>	849 – Cumberland shale plains woodland	V	N/A	Occurs in open forests, periodically in wet drainage lines below sandstone ridges. Shelters under rocks and amongst dense vegetation or thick piles of leaf litter. Not recorded to breed in waters that are even mildly polluted or with pH outside the range of 5.5 to 6.5. Eggs are laid in moist leaf litter, from where they are washed by heavy rain.	8 records within 10km (BioNet)	Low – no sandstone habitat present
Green and Golden Bell Frog	<i>Litoria aurea</i>	835 – Cumberland riverflat forest 849 – Cumberland shale plains woodland 1800 – Cumberland Swamp Oak riparian forest	E	V	Within 1 km of ephemeral wet areas, swamps and waterbodies	4 records (1994 BioNet)	Low – suitable habitat not present
Broad-headed Snake	<i>Hoplocephalus bungaroides</i>		E	V	Shelters in sandstone rock crevices and under flat rocks on exposed cliff edges during autumn, winter and spring. In summer, this species moves to crevices or hollows in large trees within 500m of escarpments.	0 records (BioNet)	Low – suitable habitat not present

Common name	Scientific name	PCT association	Status		Habitat requirements (generally sourced from NSW OEH Threatened Species Profiles)	Number of records (Source: BioNet)	Likelihood of occurrence
			BC Act	EPBC Act			
Freckled Duck	<i>Stictonetta naevosa</i>	1800 – Cumberland Swamp Oak riparian forest	V	N/A	Generally occurs in permanent freshwater swamps and creeks within dense cover of vegetation such as Cumbungi, Lignum or Tea-tree. During drier conditions this species can move from ephemeral breeding swamps to lakes, reservoirs, dams and sewage ponds. Nests usually occur within dense vegetation.	0 records within 10km (BioNet)	Low – suitable habitat not present
White-throated Needletail	<i>Hirundapus caudacutus</i>		N/A	V	This swift is migratory and is usually seen in eastern Australia from October to April before storms, low pressure troughs and approaching cold fronts and occasionally bushfire. This species is more commonly found in coastal areas.	0 records within 10km (BioNet)	Moderate – may seek shelter in riparian areas however suitable foraging habitat not present
Black-necked Stork	<i>Ephippiorhynchus asiaticus</i>						
Bush Stone-curlew	<i>Burhinus grallarius</i>	849 – Cumberland shale plains woodland 1800 – Cumberland Swamp Oak riparian forest	E	N/A	Inhabits open forests and woodlands with a sparse grassy ground layer and fallen timber. Nest on the ground in a scrape or small bare patch.	1 record outside of 10km (2013 ALA)	Low – suitable habitat not present

Common name	Scientific name	PCT association	Status		Habitat requirements (generally sourced from NSW OEH Threatened Species Profiles)	Number of records (Source: BioNet)	Likelihood of occurrence
			BC Act	EPBC Act			
Glossy Black-Cockatoo	<i>Calyptorhynchus lathamii</i>	849 – Cumberland shale plains woodland	V	N/A	This species inhabits forest and woodlands of coastal areas.	14 records outside of 10km (2015 BioNet ALA)	Moderate – however no large patches of <i>Allocasuarina</i> woodland present
Sooty Owl	<i>Tyto tenebricosa</i>	849 – Cumberland shale plains woodland	V	N/A	This owl inhabits rainforests and moist eucalypt forests along the coast. During the day, this species roosts in hollows of tall forest trees or in heavy vegetation. Nests are also found in very large tree-hollows.	1 record within 10km of proposal (2003 BioNet ALA)	Moderate – may seek shelter in riparian areas however suitable breeding habitat not present
Eastern Pygmy-possum	<i>Cercartetus nanus</i>	835 – Cumberland riverflat forest	V	N/A	Found in a broad range of habitats from rainforest through sclerophyll (including	1 record outside of	Low – suitable

Common name	Scientific name	PCT association	Status		Habitat requirements (generally sourced from NSW OEH Threatened Species Profiles)	Number of records (Source: BioNet)	Likelihood of occurrence
			BC Act	EPBC Act			
		849 – Cumberland shale plains woodland			Box-Ironbark) forest and woodland to heath, but in most areas woodlands and heath appear to be preferred, except in north-eastern NSW where they are most frequently encountered in rainforest. Feeds largely on nectar and pollen collected from banksias, eucalypts and bottlebrushes; an important pollinator of heathland plants such as banksias; soft fruits are eaten when flowers are unavailable. Shelters in tree hollows, rotten stumps, holes in the ground, abandoned bird-nests, Ringtail Possum (<i>Pseudocheirus peregrinus</i>) dreys or thickets of vegetation, (e.g. grass-tree skirts); nest-building appears to be restricted to breeding females; tree hollows are favoured but spherical nests have been found under the bark of eucalypts and in shredded bark in tree forks.	10km range (2019 ALA BioNet)	habitat not present
Yellow-bellied Glider	<i>Petaurus australis</i>		V	N/A	Occurs in tall, mature eucalypt forests with high rainfall and nutrient rich soils.	1 record (2018 BioNet)	Low – suitable habitat not present
Squirrel Glider	<i>Petaurus norfolcensis</i>	835 – Cumberland riverflat forest 849 – Cumberland shale plains woodland 1800 – Cumberland Swamp Oak riparian forest	V	N/A	Survey year round but sites with bipinnate acacia, autumn winter flowering trees and shrubs such as <i>Eucalyptus robusta</i> and <i>Banksia</i> sp (<i>integrifolia</i> etc) should be subject to a more retracted survey period of between March-August. Relies on large old trees with hollows for breeding and nesting. These trees are also critical for movement and typically need to be closely-connected (i.e. no more than 50m apart).	1 record (2016 BioNet/ALA)	Low – suitable habitat not present

Common name	Scientific name	PCT association	Status		Habitat requirements (generally sourced from NSW OEH Threatened Species Profiles)	Number of records (Source: BioNet)	Likelihood of occurrence
			BC Act	EPBC Act			
Greater Glider	<i>Petauroides volanscoast</i>		N/A	V	Occurs most commonly in tall, moist eucalypt forests and woodlands with old trees and abundant hollows.	0 records within 10km (BioNet)	Low – suitable habitat not present
Large-eared Pied Bat	<i>Chalinolobus dwyeri</i>	835 – Cumberland riverflat forest 849 – Cumberland shale plains woodland 1800 – Cumberland Swamp Oak riparian forest	V	V	Roosts in caves (near their entrances), crevices in cliffs, old mine workings and in the disused, bottle-shaped mud nests of the Fairy Martin (<i>Petrochelidon ariel</i>), frequenting low to mid-elevation dry open forest and woodland close to these features. Females have been recorded raising young in maternity roosts (c. 20-40 females) from November through to January in roof domes in sandstone caves and overhangs. They remain loyal to the same cave over many years. Found in well-timbered areas containing gullies.	2 records from 2003	Moderate–likely the species visits the study area though not detected during anabat survey. Roosting and breeding habitat is restricted
Southern Myotis	<i>Myotis macropus</i>	835 – Cumberland riverflat forest 849 – Cumberland shale plains woodland 1800 – Cumberland Swamp Oak riparian forest	V	N/A	All habitat on the subject land where the subject land is within 200m of a waterbody with pools/ stretches 3m or wider including rivers, creeks, billabongs, lagoons, dams and other waterbodies on the subject land must be mapped. Use aerial imagery to map waterbodies with pools/ stretches 3m or wider on or within 200m of the subject land. Species polygon boundaries should align with PCTs on the subject land to which the species is associated that are within 200m of waterbodies mapped.	8 records (2014 BioNet)	Recorded from the study area during targeted anabat surveys

Common name	Scientific name	PCT association	Status		Habitat requirements (generally sourced from NSW OEH Threatened Species Profiles)	Number of records (Source: BioNet)	Likelihood of occurrence
			BC Act	EPBC Act			
Cumberland Plain Land Snail	<i>Meridolum corneovirens</i>	849-Cumberland shale plains woodland <hr/> 835-Cumberland riverflat	E	N/A	Identification of live specimens is required early morning or in the evening during or after rain, while the ground and vegetation surfaces are still wet from the rain. Presence of snail shells and can be detected all year round. Note for the purpose of survey, the presence of CPLS shells equals the presence of this species. It can occasionally be found around paddock trees, but rare. Predation by rats and mice are a key threat, but they do not have the impact on this species to the same extent that these rodents have on other species such as the Dural Woodland Snail. The species is reliant on a good cover of coarse woody debris, and uses soil cracks for shelter.	84 records (2019 BioNet)	Moderate–suitable habitat present in the study area though not detected during targeted searches

Flora

Downy Wattle	<i>Acacia pubescens</i>	849-Cumberland shale plains woodland	V	V	Occurs on alluviums, shales and at the intergrade between shales and sandstones. The soils are characteristically gravelly soils, often with ironstone. Occurs in open woodland and forest, in a variety of plant communities, including Cooks River/Castlereagh Ironbark Forest, Shale/Gravel Transition Forest and Cumberland Plain Woodland.	8 records 2018 (BioNet)	Low – not found during flora surveys
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Common name	Scientific name	PCT association	Status		Habitat requirements (generally sourced from NSW OEH Threatened Species Profiles)	Number of records (Source: BioNet)	Likelihood of occurrence
			BC Act	EPBC Act			
Dillwynia tenuifolia	<i>Dillwynia tenuifolia</i>	849-Cumberland shale plains woodland	V	N/A	<i>Eucalyptus fibrosa</i> is usually the dominant canopy species. <i>Eucalyptus globoidea</i> , <i>E. longifolia</i> , <i>E. parramattensis</i> , <i>E. sclerophylla</i> and <i>E. sideroxylon</i> may also be present or codominant, with <i>Melaleuca decora</i> frequently forming a secondary canopy layer. Associated species may include <i>Allocasuarina littoralis</i> , <i>Angophora bakeri</i> , <i>Aristida spp.</i> , <i>Banksia spinulosa</i> , <i>Cryptandra spp.</i> , <i>Daviesia ulicifolia</i> , <i>Entolasia stricta</i> , <i>Hakea sericea</i> , <i>Lissanthe strigosa</i> , <i>Melaleuca nodosa</i> , <i>Ozothamnus diosmifolius</i> and <i>Themeda australis</i> . <i>D. tenuifolia</i> is often found in association with other threatened species such as <i>Dodonaea falcata</i> , <i>Grevillea juniperina</i> , <i>Micromyrtus minutiflora</i> , <i>Pultenaea parviflora</i> and <i>Styphelia laeta</i> . At Yengo <i>D. tenuifolia</i> is reported to occur in disturbed escarpment woodland on Narrabeen sandstone. Associated tree species include <i>Eucalyptus eximia</i> , <i>E. punctata</i> , <i>E. sparsifolia</i> and <i>Callitris endlicheri</i> . The shrub layer is dominated by <i>D. tenuifolia</i> , <i>Leucopogon muticus</i> , <i>Leptospermum parvifolium</i> and <i>Pultenaea microphylla</i> (Maryott-Brown & Wilks 1993). Flowering occurs sporadically through the year with a peak from August to March depending on environmental conditions. Pollinators are unknown. The lifespan is estimated to be 20-30 years. It is thought a minimum of 3-4 years is required before seed is produced.	40+ records (2016 ALA/BioNet)	Low – not found during flora surveys

Common name	Scientific name	PCT association	Status		Habitat requirements (generally sourced from NSW OEH Threatened Species Profiles)	Number of records (Source: BioNet)	Likelihood of occurrence
			BC Act	EPBC Act			
Camden White Gum	<i>Eucalyptus benthamii</i>	849-Cumberland shale plains woodland 835-Cumberland riverflat forest	V	V	Requires a combination of deep alluvial sands and a flooding regime that permits seedling establishment. Recruitment of juveniles appears to be most successful on bare silt deposits in rivers and streams. Occurs in open forest. Associated species at the Bents Basin site include <i>Eucalyptus elata</i> , <i>E. bauerina</i> , <i>E. amplifolia</i> , <i>E. deanei</i> and <i>Angophora subvelutina</i> . Understorey species include <i>Bursaria spinosa</i> , <i>Pteridium esculentum</i> and a wide variety of agricultural weeds. The Kedumba Valley site lists <i>E. crebra</i> , <i>E. deanei</i> , <i>E. punctata</i> , <i>Leptospermum flavescens</i> , <i>Acacia filicifolia</i> and <i>Pteridium esculentum</i> among its associated species.	2 records (ALA/BioNet)	
Juniper-leaved Grevillea	<i>Grevillea juniperina</i> subsp. <i>juniperina</i>	849-Cumberland shale plains woodland	V	N/A	Associated canopy species within Cumberland Plain Woodland and Shale/Gravel Transition Forest include <i>Eucalyptus tereticornis</i> , <i>E. moluccana</i> , <i>E. crebra</i> , <i>E. fibrosa</i> and <i>E. eugenioides</i> . Understorey species include <i>Bursaria spinosa</i> , <i>Dillwynia sieberi</i> , <i>Ozothamnus diosmifolius</i> , <i>Daviesia ulicifolia</i> , <i>Acacia falcata</i> , <i>Acacia parramattensis</i> , <i>Themeda australis</i> , <i>Aristida ramosa</i> , <i>Cymbopogon refractus</i> , <i>Eragrostis brownii</i> , <i>Cheilanthes sieberi</i> , <i>Dianella revoluta</i> and <i>Goodenia hederacea</i> . Grows on reddish clay to sandy soils derived from Wianamatta Shale and Tertiary alluvium (often with shale influence), typically containing lateritic gravels.	100+ records (2019 BioNet)	Low – not found during flora surveys

Common name	Scientific name	PCT association	Status		Habitat requirements (generally sourced from NSW OEH Threatened Species Profiles)	Number of records (Source: BioNet)	Likelihood of occurrence
			BC Act	EPBC Act			
Marsdenia viridiflora R. Br. subsp. viridiflora	<i>Marsdenia viridiflora</i> subsp. <i>viridiflora</i>	835 – Cumberland riverflat forest 849 – Cumberland shale plains woodland 1800 – Cumberland Swamp Oak riparian forest	E	N/A	Grows in vine thickets and open shale woodland.	20 records (2015 ALA/BioNet)	Moderate – not found during flora surveys
	<i>Micromyrtus minutiflora</i>	849 – Cumberland shale plains woodland	E	V	Grows in Shale / Gravel Transition Forest, open forest on tertiary alluvium and consolidated river sediments. Found in derived shrubland on tertiary gravels of the Cumberland Plain. Distributed in the area between Richmond and Penrith, Sydney.	0 species within 10km (BioNet)	Low – not found during flora surveys
Nodding Geebung	<i>Persoonia nutans</i>	849 – Cumberland shale plains woodland	E	E	Found only within the Cumberland Plain in western Sydney, between Richmond and Macquarie Fields. Core distribution within the Penrith LGA. Associated with sclerophyll forest and woodland vegetation communities. Can also occupy tertiary alluvium or shale sandstone transition communities.	14 records (1966 BioNet)	Low – not found during flora surveys

Common name	Scientific name	PCT association	Status		Habitat requirements (generally sourced from NSW OEH Threatened Species Profiles)	Number of records (Source: BioNet)	Likelihood of occurrence
			BC Act	EPBC Act			
Spiked Rice-flower	<i>Pimelea spicata</i>	835-Cumberland riverflat forest 849-Cumberland shale plains woodland	E	E	In both the Cumberland Plain and Illawarra environments this species is found on well-structured clay soils. On the Cumberland Plain sites it is associated with Grey Box communities (particularly Cumberland Plain Woodland variants and Moist Shale Woodland) and in areas of ironbark. The co-occurring species in the Cumberland Plain sites are grey box (<i>Eucalyptus moluccana</i>), forest red gum (<i>E. tereticornis</i>) and narrow-leaved ironbark (<i>E. crebra</i>). Blackthorn (<i>Bursaria spinosa</i>) is often present at sites (and may be important in protection from grazing) and kangaroo grass (<i>Themeda australis</i>) is usually present in the groundcover (also indicative of a less intense grazing history).	Multiple records (2018 BioNet/ ALA)	Moderate—not found during flora surveys
Sydney Plains Greenhood	<i>Pterostylis saxicola</i>	849-Cumberland shale plains woodland	E	E	Most commonly found growing in small pockets of shallow soil in depressions on sandstone rock shelves above cliff lines. The vegetation communities above the shelves where <i>Pterostylis saxicola</i> occurs are sclerophyll forest or woodland on shale/sandstone transition soils or shale soils. All species of <i>Pterostylis</i> are deciduous and die back to fleshy, rounded underground tuberoids. The time of emergence and withering has not been recorded for this species, however flowering occurs from October to December and may vary due to climatic conditions. The above ground parts of the plant wither and die following seed dispersal and the plant persists as a tuberoid until the next year.	1 record 1835	Low –not found during October 2021 targeted surveys

Common name	Scientific name	PCT association	Status		Habitat requirements (generally sourced from NSW OEH Threatened Species Profiles)	Number of records (Source: BioNet)	Likelihood of occurrence
			BC Act	EPBC Act			
	<i>Pultenaea parviflora</i>		E	V	Found only within the Cumberland Plain. Abundant within Shale Gravel Transition Forests on tertiary alluvium or laterised clays. Commonly associated species include <i>Allocasuarina littoralis</i> , <i>Angophora bakeri</i> , <i>Aristida</i> spp., <i>Banksia spinulosa</i> , <i>Cryptandra</i> spp., <i>Daviesia ulicifolia</i> , <i>Dodonaea falcata</i> , <i>Entolasia stricta</i> , <i>Hakea sericea</i> , <i>Lissanthe strigosa</i> , <i>Melaleuca nodosa</i> , <i>Ozothamnus diosmifolius</i> , <i>Styphelia laeta</i> , <i>Themeda australis</i> , <i>Dillwynia tenuifolia</i> , <i>Grevillea juniperina</i> , <i>Micromyrtus minutiflora</i> and <i>Persoonia nutans</i> .	29 records within 10km (2016 BioNet)	Low – not found during flora surveys
Magenta Lilly Pilly	<i>Syzygium paniculatum</i>	835-Cumberland riverflat forest	E	V	Found only on the coast of NSW. Occurs on gravels, sands, slits and clays in riverside gallery rainforests and remnant littoral rainforest communities on the central coast.	19 records within 10km (BioNet)	Low – not found during flora surveys
Bynoe's Wattle	<i>Acacia bynoeana</i>	849-Cumberland shale plains woodland	E	V	Occurs in heath or dry sclerophyll forest on sandy soils. Seems to prefer open, sometimes slightly disturbed sites such as trail margins, edges of roadside spoil mounds and in recently burnt patches. Associated overstorey species include Red Bloodwood, Scribbly Gum, Parramatta Red Gum, Saw Banksia and Narrow-leaved Apple.	0 within 10 km (BioNet)	Low – not found during flora surveys

Common name	Scientific name	PCT association	Status		Habitat requirements (generally sourced from NSW OEH Threatened Species Profiles)	Number of records (Source: BioNet)	Likelihood of occurrence
			BC Act	EPBC Act			
Thick Lip Spider Orchid	<i>Caladenia tessellata</i>	849-Cumberland shale plains woodland 835-Cumberland riverflat forest	E	V	Generally found in grassy sclerophyll woodland on clay loam or sandy soils, though the population near Braidwood is in low woodland with stony soil. Flowers appear between September and November (but apparently generally late September or early October in extant southern populations).	0 records	Low
Netted Bottle Brush	<i>Callistemon linearifolius</i>	835-Cumberland riverflat forest	V	N/A	Grows in dry sclerophyll forest on the coast and adjacent ranges. Flowers in spring/summer.	1 record outside of 10 km range (2013 ALA)	Low
Deyeuxia appressa	<i>Deyeuxia appressa</i>	849-Cumberland shale plains woodland	E	E	Highly restricted to NSW. Only known from two pre-1942 records in the Sydney area however may be extinct in the wild. Little known about species' habitat requirements due to limited records. Occurs on moist soils and partial to dappled shade.	0 records (BioNet)	Low
Gyrostemon thesioides	<i>Gyrostemon thesioides</i>	1800-Cumberland Swamp Oak riparian forest	E	N/A	Grows on hillsides and riverbanks and may be restricted to fine sandy soils. A fire-opportunist, with recruitment occurring from a soil stored seed bank following fire. Adult plants are killed by fire. Plants reach maturity in less than a year and plants are presumably short-lived.	0 records within 10 km (BioNet)	Low
Hibbertia sp. Bankstown	<i>Hibbertia sp. Bankstown</i>	835-Cumberland riverflat forest	CE	CE	Species is endemic to NSW. Only one population known in Sydney at Bankstown Airport.	0 Records	Low

Common name	Scientific name	PCT association	Status		Habitat requirements (generally sourced from NSW OEH Threatened Species Profiles)	Number of records (Source: BioNet)	Likelihood of occurrence
			BC Act	EPBC Act			
	<i>Maundia triglochinooides</i>	1800-Cumberland Swamp Oak riparian forest	V	N/A	Grows in swamps, lagoons, dams, channels, creeks or shallow freshwater 30 - 60 cm deep on heavy clay, low nutrients. Associated with wetland species e.g. <i>Triglochin procerum</i> . General: Species is unpredictable. Appears to be somewhat dependent on water quality so a population can go from prolific to nothing and back again over time. It can be absent for many years and then flourish.	0 Records	Low
Tall Knotweed	<i>Persicaria elatior</i>	1800-Cumberland Swamp Oak riparian forest 835-Cumberland riverflat forest	V	V	Within 50m of swamps, wetlands or ephemeral wet areas	0 records	Low
Bargo Geebung	<i>Persoonia bargoensis</i>	849-Cumberland shale plains woodland	E	V	The Bargo Geebung occurs in woodland or dry sclerophyll forest on sandstone and on heavier, well drained, loamy, gravelly soils of the Wianamatta Shale and Hawkesbury Sandstone. It favours interface soil landscapes such as between the Blacktown Soil Landscape and the complex Mittagong Formation soils (Lucas Heights Soil Landscape) with the underlying sandstone (Hawkesbury Soil Landscape and Gynea Soil Landscape). Some of the vegetation the species occurs within would be recognised as the Shale/Sandstone Transition Forest, a listed community.	0 records	Low

Common name	Scientific name	PCT association	Status		Habitat requirements (generally sourced from NSW OEH Threatened Species Profiles)	Number of records (Source: BioNet)	Likelihood of occurrence
			BC Act	EPBC Act			
Hairy Geebung	<i>Persoonia hirsuta</i>	835-Cumberland riverflat forest	E	E	The Hairy Geebung is found in sandy soils in dry sclerophyll open forest, woodland and heath on sandstone.	0 records	Low
Austral Pillwort	<i>Pilularia novae-hollandiae</i>	1800-Cumberland Swamp Oak riparian forest	E	N/A	Austral Pillwort grows in shallow swamps and waterways, often among grasses and sedges. It is most often recorded in drying mud as this is when it is most conspicuous. This species is probably ephemeral (especially in the drier parts of its range), appearing when soils are moistened by rain.	1 record (1966 BioNet)	Low
		835-Cumberland riverflat forest					
	<i>Pimelea curviflora</i> var. <i>curviflora</i>	849-Cumberland shale plains woodland	V	V	Occurs on shaley/lateritic soils over sandstone and shale/sandstone transition soils on ridgetops and upper slopes amongst woodlands. Also recorded in Illawarra Lowland Grassy Woodland habitat at Albion Park on the Illawara coastal plain. Has an inconspicuous cryptic habit as it is fine and scraggly and often grows amongst dense grasses and sedges. It may not always be visible at a site as it appears to survive for some time without any foliage after fire or grazing, relying on energy reserves in its tuberous roots. Flowers October to May.	2 records (2018 BioNet)	Low

Common name	Scientific name	PCT association	Status		Habitat requirements (generally sourced from NSW OEH Threatened Species Profiles)	Number of records (Source: BioNet)	Likelihood of occurrence
			BC Act	EPBC Act			
Brown Pomaderris	<i>Brown Pomaderris</i>	1800-Cumberland Swamp Oak riparian forest	E	V	Brown Pomaderris grows in moist woodland or forest on clay and alluvial soils of flood plains and creek lines. Flowers appear in September and October. The species has been found in association with <i>Eucalyptus amplifolia</i> , <i>Angophora floribunda</i> , <i>Acacia parramattensis</i> , <i>Bursaria spinosa</i> and <i>Kunzea ambigua</i> .	0 records	Low
		835-Cumberland riverflat forest					
	<i>Pultenaea pedunculata</i>	849-Cumberland shale plains woodland	E	N/A	The Matted Bush-pea occurs in a range of habitats. NSW populations are generally among woodland vegetation but plants have also been found on road batters and coastal cliffs. Associated species in the Sydney area include include <i>Eucalyptus moluccana</i> , <i>E. fibrosa</i> , <i>E. crebra</i> , <i>E. longifolia</i> and <i>Melaleuca decora</i> . Understorey species include <i>Bursaria spinosa</i> , <i>Ozothamnus diosmifolius</i> , <i>Acacia parramattensis</i> , <i>A. falcata</i> , <i>Indigofera australis</i> , <i>Dillwynia sieberi</i> , <i>Olearia viscidula</i> , <i>Kunzea ambigua</i> , <i>Opercularia diphylla</i> , <i>Astroloma humifusum</i> , <i>Glycine tabacina</i> , <i>Hardenbergia violacea</i> , <i>Wahlenbergia gracilis</i> , <i>Aristida vagans</i> , <i>Gahnia aspera</i> , <i>Lomandra filiformis</i> , <i>Cheilanthes sieberi</i> and <i>Themeda australis</i> . Flowers appear in spring (August to December), with fruit maturing from October to January but sometimes persistent on the plant until April-May. Low frequency fire regime	0 records	Low

Common name	Scientific name	PCT association	Status		Habitat requirements (generally sourced from NSW OEH Threatened Species Profiles)	Number of records (Source: BioNet)	Likelihood of occurrence
			BC Act	EPBC Act			
Austral Toadflax	<i>Thesium australe</i>	849-Cumberland shale plains woodland	V	V	Species can occur within un-treed native grassland or heterogeneous native/exotic grassland if host flora for parasitisation are present. Usually associated with Kangaroo Grass	0 records	Low
Tadgell's Bluebell in the local government areas of Auburn, Bankstown, Baulkham Hills, Canterbury, Hornsby, Parramatta and Strathfield	<i>Wahlenbergia multicaulis</i>	835-Cumberland riverflat forest	E (population)	N/A	Generally situated in disturbed, ephemeral or frequently damp places	2 records (1998 BioNet)	Low
Allocasuarina glareicola	<i>Allocasuarina glareicola</i>		E	E	Mostly restricted to the north-western portion of the Cumberland Plain. Found in open woodlands with <i>Eucalyptus parramattensis</i> , <i>Eucalyptus fibrosa</i> , <i>Angophora bakeri</i> , <i>Eucalyptus sclerophylla</i> and <i>Melaleuca decora</i> Associated species include <i>Melaleuca nodosa</i> , <i>Hakea dactyloides</i> , <i>Hakea sericea</i> , <i>Dillwynia tenuifolia</i> , <i>Micromyrtus minutiflora</i> , <i>Acacia elongata</i> , <i>Acacia brownei</i> , <i>Themeda australis</i> and <i>Xanthorrhoea minor</i> .	PMST	Low

Common name	Scientific name	PCT association	Status		Habitat requirements (generally sourced from NSW OEH Threatened Species Profiles)	Number of records (Source: BioNet)	Likelihood of occurrence
			BC Act	EPBC Act			
Leafless Tongue Orchid	<i>Cryptostylis hunteriana</i>		V	V	Occurs in a range of vegetation communities including swamp-heath and woodland. Mostly occur in woodland with <i>Eucalyptus sclerophylla</i> , <i>E. sieberi</i> , <i>Corymbia gummifera</i> and <i>Allocasuarina littoralis</i> . Often found in association with <i>Cryptostylis subulate</i> and <i>C. erecta</i> . Prefers open areas in understorey.	PMST	Low
Black Gum	<i>Eucalyptus aggregata</i>		V	V	Grows in the lowest parts of the landscape, on alluvial soils and cold, poorly-drained flats adjacent to creeks and small rivers. Usually occurs in an open woodland formation with <i>Eucalyptus pauciflora</i> , <i>E. viminalis</i> , <i>E. rubida</i> , <i>E. stellulata</i> and <i>E. ovata</i> , with a grassy groundlayer of <i>Poa labillardierei</i> or <i>Themeda australis</i> . Can also occur as isolated paddock trees in modified native or exotic pastures.	PMST	Low
Bauer's Midge Orchid	<i>Genoplesium baueri</i>		E	E	Occurs in dry sclerophyll forests and moss gardens over sandstone.	PMST	Low
Square Raspwort	<i>Haloragis exalata</i> subsp. <i>exalata</i>		V	V	Occurs in protected and shaded, damp conditions in riparian habitats. Currently predicted to occur in the Cumberland Plains area.	PMST	Low
Haloragodendron lucasii	<i>Haloragodendron lucasii</i>		E	E	Grows in dry sclerophyll forests, in moist sandy loam soils. Prefers shelter with high soil moisture and found near creeks in low open woodlands.	PMST	Low

Common name	Scientific name	PCT association	Status		Habitat requirements (generally sourced from NSW OEH Threatened Species Profiles)	Number of records (Source: BioNet)	Likelihood of occurrence
			BC Act	EPBC Act			
Deane's Paperbark	<i>Melaleuca deanei</i>		V	V	Known within the Cumberland Plains. Occurs mostly in ridgetop woodland.	PMST	Low
Smooth Bush-Pea	<i>Pultenaea glabra</i>		V	V	Grows in swamp margins, hillslopes, gullies and creekbanks. Occurs in dry sclerophyll forests and tall damp heath on sandstone. Not known to occur in the Cumberland Plain.	PMST	Low
Eastern Australian Underground Orchid	<i>Rhizanthella slateri</i>		V	E	Known to occur in sclerophyll forest, however no particular vegetation type has been associated with species. Located when soil is disturbed as most of the plant, except the flower, grows below the soil surface. This species is predicted to occur within the Cumberland Plain.	PMST	Low
Scrub Turpentine	<i>Rhodamnia rubescens</i>		CE	N/A	Found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forests, usually on volcanic and sedimentary soils.	PMST	Low
Kangaloon Sun Orchid	<i>Thelymitra kangaloonica</i>		CE	CE	Found in swamps in sedgeland over grey silty grey loam soils. Not known to occur on the Cumberland Plain.	PMST	Low

Annexure C

River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions

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,

N/a

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

i. is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

ii. is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

i. The proposal will impact up to 0.66 ha of the critically endangered community. This community extends along School House creek and comprises over 2 ha within the locality (0.93 hectares within the study area).

ii. The proposal is likely to further exacerbate the impacts of exotic vegetation within the ecological community. However, it is unlikely that the impacts posed by the proposal will place the ecological community at risk of extinction as the vegetation has previously undergone significant disturbances such as clearing, edge effects and weed invasion.

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

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

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

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

i. The proposal will directly impact 0.66 ha of River-Flat Eucalypt Forest through vegetation clearing. Indirect impacts, including minor changes to hydrological features may affect River-Flat Eucalypt Forest habitat.

ii. The vegetation within the study area is highly fragmented. The proposal would not result in further fragmentation; however, the width of the fragmentation will be increased. The widening of Mulgoa Road is potentially likely to impact the ability of species within River-Flat Eucalypt Forest to exchange genetic material between fragments, thereby potentially altering the composition of the ecological community in the long-term.

iii. The proposal would impact 0.66 ha of habitat within the locality, amounting to 30 % of the local occurrence within and directly adjoining the study area at School Yard Creek. The habitat within the proposal area is in moderate condition as a result of historical disturbances and a lack of management. The riparian corridor vegetation is important in maintaining connectivity of the ecological community within the locality. The proposal will impact the ecological community by increasing fragmentation and isolation, however as the vegetation is already dissected by Mulgoa Road the impacts are not likely to be significant.

iv. 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),

iv. There are no AOBV within the study area.

v. whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

v. The proposal is likely to include or exacerbate the following Key Threatening Processes:

- Clearing of native vegetation
- Infection of native plants by *Phytophthora cinnamomi*
- Invasion and establishment of exotic vines and scramblers
- Invasion, establishment and spread of Lantana
- Invasion of native plant communities by African Olive *Olea europaea* subsp. *cuspidata*
- Invasion of native plant communities by exotic perennial grasses
- Loss of hollow-bearing trees
- Removal of dead wood and dead trees

Cumberland Plain Woodland in the Sydney Basin Bioregion

- 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,

N/a

i. in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

ii. 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

iii. 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 proposal will impact up to 0.66 ha of the critically endangered community. This community is fragmented within the locality and comprises a total of approximately 2 ha in the direct locality of School House Creek.

The composition of this ecological community within the proposal area has been impacted by historical and ongoing disturbances such as slashing and land clearing. As a result, the shrub layer is largely absent from existing remnants.

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

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

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

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

i. The proposal will directly impact 0.13 ha of Cumberland Plain Woodland through vegetation removal.

ii. The vegetation within the proposal area is already fragmented by Mulgoa Road. The proposal will not result in further fragmentation; however, the width of the fragmentation will be increased.

iii. The proposal will impact 0.13 ha of habitat within the locality, amounting to approximately 18 % of the patch occurring at Penrith Park. The habitat within the proposal area is in moderate condition as a result of historical disturbances.

iv. 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),

There are no AOBV within the study area.

v. whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

The proposal is potentially likely to include or exacerbate the following Key Threatening Processes:

- Clearing of native vegetation
- Infection of native plants by *Phytophthora cinnamomi*
- Invasion and establishment of exotic vines and scramblers
- Invasion, establishment and spread of Lantana
- Invasion of native plant communities by African Olive (*Olea europaea* subsp. *cuspidata*)
- Invasion of native plant communities by exotic perennial grasses
- Loss of hollow-bearing trees
- Removal of dead wood and dead trees

Grey-headed Flying-fox (*Pteropus poliocephalus*) - vulnerable

- 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 proposal would result in the loss of 9 ha of potential foraging habitat (including native vegetation (0.79 ha), planted and exotic vegetation, gardens, street trees and revegetation areas) for the Grey-Headed Flying Fox. This habitat is comprised of native and planted vegetation. No camps are present within the study area, with the closest camp occurring at Emu Plains, 3 km away. Therefore, it is unlikely that the proposal would have an adverse impact upon the lifecycle of the Grey-Headed Flying Fox.

- in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:
 - i. **is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or**
 - ii. **is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,**

N/a

- in relation to the habitat of a threatened species or ecological community:
 - i. **the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and**
 - 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**
 - iii. **the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality,**

(i) No camps are located within the proposal area, with works removing 9ha of potential foraging habitat (including native vegetation (0.79 ha), planted and exotic vegetation, gardens, street trees and revegetation areas). The Grey-Headed Flying Fox is a highly mobile species with a large home range, as such the impacts associated with the proposal are unlikely to have a significant impact upon the species.

(ii) As the habitat within the proposal area is already highly fragmented, it is unlikely that the Grey-Headed Flying Fox may be further impacted by vegetation clearing and fragmentation.

(iii) Given the mobility and the large home range of the Grey-Headed Flying Fox it is unlikely that the removal of 9 ha of foraging habitat within the proposal area (including native vegetation (0.79 ha), planted and exotic vegetation, gardens, street trees and revegetation areas) may impact the long-term survival of the species in the long-term.

iv. 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),

There are no AOBV within the study area.

v. whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

In relation to the Grey-Headed Flying Fox, the proposal is likely to include or exacerbate the following Key Threatening Processes:

- Clearing of native vegetation.

Woodland birds: Varied Sittella, Speckled Warbler, Brown Treecreeper (eastern subspecies), Painted Honeyeater, Hooded robin, Black-chinned Honeyeater, Scarlet Robin, Diamond Firetail

- 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 proposal will remove 0.79 ha of potential habitat. Much of the vegetation within the proposal area has lost a native shrub layer and is not considered likely to support a resident population of the species. Therefore, the proposal is unlikely to place the local population at risk of extinction.

- in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:
 - i. is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or**
 - ii. is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,**

N/a

- in relation to the habitat of a threatened species or ecological community:
 - i. the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and**
 - 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**
 - iii. the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality,**

- i. The proposal would clear 0.79 ha of native vegetation. Only 0.1 ha of this habitat is considered favourable to supporting the threatened woodland species.
- ii. The native vegetation within the study area is highly fragmented, with the proposal having a negatable impact on the habitat for the woodland species.
- iii. The majority of the native vegetation within the proposal area lacks the preferred habitat features required by the woodland species, thereby the removal of 0.79 ha of potential habitat is unlikely to have a significant impact upon the long-term survival of the species.

iv. 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),

There are no AOBV within the study area.

v. whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

In relation to the threatened woodland species, the proposal is likely to include or exacerbate the following Key Threatening Processes:

- Clearing of native vegetation
- Removal of dead wood and dead trees

Regent Honeyeater (*Anthochaera phrygia*)

- 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 proposal would remove of 9 ha of foraging habitat (including native vegetation (0.79 ha), planted and exotic vegetation, gardens, street trees and revegetation areas). Mistletoes were observed to be absent or in low density within native vegetation within the proposal area. There are at least 30 records of Regent Honeyeater within the locality (within the last 20 years), none of which were in the proposal area. The proposal will impact 9 ha of foraging habitat (including native vegetation (0.79 ha), planted and exotic vegetation, gardens, street trees and revegetation areas) with no impacts to key breeding areas. Therefore, is not likely to place the local population at risk of extinction.

- i. **in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:**
- ii. **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**
- iii. **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,**

N/a

- in relation to the habitat of a threatened species or ecological community:
 - i. **the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and**
 - 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**
 - iii. **the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality**

- i. The proposal will remove 9 ha of potential habitat for the Regent Honeyeater (including native vegetation (0.79 ha), planted and exotic vegetation, gardens, street trees and revegetation areas) . A low density of preferred feed trees and mistletoes were present within the vegetation.
- ii. The existing vegetation is fragmented by Mulgoa Road and the proposed widening is unlikely to significantly impact the habitat present within the proposal area.
- iii. No records of the species have been recorded within the proposal area. In addition, the three key breeding areas located outside of the Sydney Basin. Therefore, it is unlikely the proposed works will impact the long-term survival of the species.

iv. 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),

There are no AOBV within the study area.

v. whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

In relation to the Regent Honeyeater, the proposal is likely to include or exacerbate the following Key Threatening Processes:

- Clearing of native vegetation
- Invasion of native plant communities by African Olive *Olea europaea* subsp. *cuspidata*
- Invasion and establishment of exotic vines and scramblers

Little Lorikeet (*Glossopsitta pusilla*)

- 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 proposal would remove 9 ha of potential foraging habitat (including native vegetation (0.79 ha), planted and exotic vegetation, gardens, street trees and revegetation areas). One individual was observed flying over the proposal area during on ground surveys. Given that the study area is heavily urbanised, the removal of 9 ha of foraging habitat is unlikely to place the local population at risk.

The loss of hollow bearing trees from road-side verges due to road works is considered an on-going threat to the long-term survival of the species (DPIE 2009) however only a relatively small number (5) of trees are proposed for removal.

- i. **in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:**
- ii. **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**
- iii. **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,**

N/A

- in relation to the habitat of a threatened species or ecological community:
 - i. **the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and**
 - 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**
 - iii. **the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality,**

- i. The proposal would clear 9 ha of foraging habitat (including native vegetation (0.79 ha), planted and exotic vegetation, gardens, street trees and revegetation areas) .
- ii. The habitat within the study area is fragmented and the widening of Mulgoa Road and the removal of 9 ha of foraging habitat is unlikely to significantly impact the habitat within the proposal area.
- iii. The habitat is fragmented within a highly urbanised landscape and is not considered to be optimal habitat for the species. The proposal is unlikely to significantly impact the long-term survival of the species.

iv. 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),

There are no AOBV within the study area.

v. whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

In relation to the Little Lorikeet, the proposal is likely to include or exacerbate the following Key Threatening Processes:

- **Clearing of native vegetation**
- **Loss of hollow bearing trees.**
- **Invasion of native plant communities by African Olive *Olea europaea* subsp. *cuspidata***
- **Invasion and establishment of exotic vines and scramblers**

Hollow-dependent Microbats - Little Bent-winged Bat, Eastern Freetail-bat, Eastern False Pipistrelle, Greater Broad-nosed Bat, Southern Myotis, Yellow-bellied Sheath-tail-bat

- 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 study area is highly urbanised and contains degraded vegetation. The proposal would remove 9 ha of vegetation, most of which is comprised of street trees and exotic vegetation. Eleven hollow bearing trees occur within study area, of which five will be impacted by the proposal. The study area is connected to larger areas of vegetation which represent higher quality foraging and roosting habitat. Given the small-scale impacts from proposal it is unlikely that these actions will result in a significant impact on the local hollow-dependent bats.

- i. **in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:**
- ii. **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**
- iii. **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,**

N/a

- in relation to the habitat of a threatened species or ecological community:
 - ii. **the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and**
 - iii. **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**

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

- i. Approximately 9 ha of exotic and native vegetation is to be removed by the proposal and includes 5 hollow bearing trees. Potential foraging habitat within the study area is degraded and urbanised. Much larger extents of native vegetation are present within 5 km of the study area.
- ii. The vegetation within the study area is fragmented and comprised of corridors and isolated patches. The removal of 0.79 ha of remnant native vegetation is unlikely to significantly fragment the local extent of habitat for the hollow-dependent bats. Impacts will be limited to the edges of remnant vegetation.
- iii. The vegetation to be removed by the proposal consists largely of street trees and exotic plantings (9 ha). Remnant vegetation is fragmented and of moderate condition with a total 0.79 ha to be removed. As larger and more intact stands of native vegetation are present within 5 km of the study area it is unlikely that the proposal will significantly impact the long-term survival of the species.

v. 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),

There are no AOBV within the study area.

i. whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

In relation to the hollow-dependent bats, the proposal is likely to include or exacerbate the following Key Threatening Processes:

- Clearing of native vegetation
- removal of hollow bearing trees

Cave, bridge and culverts dependent Microbats; Little Bent-winged Bat, Large Bent-winged Bat, Southern Myotis, Large-eared Pied Bat

- 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 study area contains potential roosting habitat (culverts and bridges) and potential foraging habitat. Due to the high volume of traffic along Mulgoa Road and the relatively small dimensions of the low level drainage structures it is unlikely that the structures provide important roosting habitat for cave-dwelling microchiropteran bats.

The study area and broader locality contains foraging habitat for these species. The proposal would remove 9 ha of foraging habitat, of which the majority is comprised of street trees and exotic vegetation. Large extents of native vegetation occur within 5 km of the site and represent higher quality foraging habitat.

Therefore, the project is unlikely to cause significant impacts upon these species due to the low quality of the habitat, the removal of a relatively small area of vegetation and the minimal roosting habitat features.

- i. **in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:**
- ii. **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**

- iii. **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,**

N/A

- in relation to the habitat of a threatened species or ecological community:
 - i. **the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and**
 - 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**
 - iii. **the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality,**

i. The proposal would remove 9 ha of potential foraging habitat the majority of which is exotic vegetation, gardens and revegetation areas. Culverts and bridges are unlikely to support important roosting habitat due to the high volume of traffic, and relatively small dimensions of these low level structures.

ii. The vegetation within the study area is fragmented and comprised of corridors and isolated patches. The removal of 0.79 ha of remnant native vegetation along parts of the linear project area is unlikely to significantly fragment the local extent of habitat for the cave-dependent bats given the species are highly mobile and the large extent of vegetation within 5 km of the study area. Impacts will be limited to the edges of remnant vegetation.

iii. The foraging habitat within the proposal area to be impacted is relatively small (4 ha) and the low level culverts and bridges are unlikely to support important roosting habitat for the species due to the high volume of traffic of Mulgoa Road and the relatively small dimensions of the crossing structures. No microbats were observed during inspections of the bridge and culverts. Therefore, it is unlikely that the proposal would significantly impact the long-term survival of the species.

- iv. **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),**

There are no AOBV within the study area.

- v. **whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.**

In relation to the cave-dependent bats, the proposal is likely to include or exacerbate the following Key Threatening Processes:

- Clearing of native vegetation

Swift Parrot

- 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 proposal would remove 9 ha of potential habitat, the majority of which is exotic and native plantings. The Swift Parrot breeds in Tasmania and is would utilise the area for foraging. Given that the study area is heavily urbanised, the removal of 9 ha of foraging habitat is unlikely to place the local population at risk.

- i. **in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:**
- ii. **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**

- iii. **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,**

N/A

- in relation to the habit of a threatened species or ecological community:
 - i. **the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and**
 - 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**
 - iii. **the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality,**

i. The proposal would clear 9 ha of foraging habitat, primarily consisting of exotic vegetation, gardens and native plantings.

ii. The habitat within the study area is fragmented and the widening of Mulgoa Road and the removal of 9 ha of potential foraging habitat is unlikely to significantly impact the habitat within the proposal area.

iii. The habitat is fragmented within a highly urbanised landscape and is not considered to be optimal habitat for the species. The proposal is unlikely to significantly impact the long-term survival of the species.

iv. 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),

There are no AOBV within the study area.

v. whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

In relation to the Swift Parrot, the proposal is likely to include or exacerbate the following Key Threatening Processes:

- Clearing of native vegetation

Turquoise Parrot

- 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 proposal would remove 9 ha of potential foraging habitat. Given that the study area is heavily urbanised, the removal of 9 ha of foraging habitat is unlikely to place the local population at risk.

- in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:
 - i. **is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or**
 - ii. **is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,**

N/A

- in relation to the habit of a threatened species or ecological community:

- i. **the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and**
- 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**
- iii. **the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality,**

i. The proposal would remove 9 ha of potential foraging habitat primarily consisting of exotic gardens, plantings and native revegetation.

ii. The habitat within the study area is fragmented and the widening of Mulgoa Road and the removal of 4 ha of foraging habitat is unlikely to significantly impact the habitat within the proposal area.

iii. The habitat is fragmented within a highly urbanised landscape and is not considered to be optimal habitat for the species. The proposal is unlikely to significantly impact the long-term survival of the species.

- iv. **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),**

There are no AOBV within the study area.

- v. **whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.**

In relation to the Turquoise Parrot, the proposal is likely to include or exacerbate the following Key Threatening Processes:

- Clearing of native vegetation

Raptors: White-bellied Sea-Eagle, Little Eagle, Eastern Osprey, Square-tailed Kite, Spotted harrier

- 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 proposal would remove 0.79 ha of native vegetation. None of the vegetation within the study area was observed to support a raptor nest. The study area would support foraging habitat. The removal of 0.79 ha of native vegetation is not likely to put the local population at risk of extinction.

- in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:
 - i. **is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or**
 - ii. **is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,**

N/A

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

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

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

i) The proposal would remove 0.79 ha of potential foraging habitat

ii) The foraging habitat within the proposal area is already fragmented. The widening of Mulgoa Road would increase the distance between fragments; however, this impact is considered negligible.

iii) The proposal would remove of 0.79 ha of habitat. This habitat is in the urban landscape and is considered suboptimal and is not expected to impact breeding or other important habitat to the survival of the species.

iv. **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),**

There are no AOBV within the study area.

- (v) **whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.**

The proposal is expected to exacerbate the following key threatening processes:

- clearing of native vegetation

Owls: Barking owl, Powerful Owl, Sooty Owl and Masked Owl

- 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 proposal would remove 0.79 ha of native vegetation. None of the vegetation within the study area was contain hollows large enough to support any of the above listed threatened owls. The study area would support foraging habitat. As the species have large home ranges the removal of 0.79 ha of native vegetation is not likely to put the local population at risk of extinction.

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

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

N/A

- in relation to the habitat of a threatened species or ecological community:
 - i. **the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and**
 - 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**
 - iii. **the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality,**

i) The proposal would remove 0.79 ha of potential foraging habitat. Potential roosting habitat occurs within the proposal area, particularly along School House Creek, although roosts were not detected during site searches.

ii) The foraging habitat within the proposal area is already fragmented. The widening of Mulgoa Road would increase the distance between fragments, however, this impact is considered negligible.

iii) The proposal would remove of 0.79 ha of habitat. This habitat is within the urban landscape and is considered suboptimal (exposed to high levels of artificial light and noise) and is not expected to impact breeding or other important habitat to the survival of the species.

iv. 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),

There are no AOBV within the study area.

v. whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

The proposal is expected to exacerbate the following key threatening processes:

- clearing of native vegetation

Australian Bittern and Black Bittern

- 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 proposal would remove 0.17 ha of potential habitat. Habitat within the study area is degraded and impacted by close proximity to Mulgoa Road and associated traffic noise. The channel within Surveyors creek is concreted and does not habitat for the two species of Bittern. School House creek is likely to be ephemeral in dry seasons and may not represent favoured habitat as both species of Bittern prefer permanent waterways.

- i. in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:**
- ii. 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**
- iii. 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,**

N/a

- in relation to the habitat of a threatened species or ecological community:
 - i. the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and**
 - 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**
 - iii. the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality,**

i. The proposal would remove 0.17 ha of potential habitat

ii. As the habitat within the proposal area is already highly fragmented, it is unlikely that the two Bittern species will be further impacted by minor vegetation clearing and fragmentation of habitat.

iii. Given the mobility of the two species of Bittern and the degraded habitat it is unlikely that the removal of 0.17 ha of habitat within the proposal area will impact the long-term survival of the species in the long-term.

iv. 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),

There are no AOBV within the study area.

v. whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

In relation to the Australasian Bittern and Black Bittern, the proposal is likely to include or exacerbate the following Key Threatening Processes:

- Clearing of native vegetation.
- Alteration to the natural flow regimes of rivers, streams, floodplains & wetlands.

EPBC Act Assessment of significance

Cumberland Plain Shale Woodlands

Reduce the extent of an ecological community

The proposal would remove 0.13 ha of the CEEC within the proposal area. The vegetation within the study area is already impacted by fragmentation, edge effects and an absence of fire. The impact from the proposal is unlikely to reduce the survival of the community in the long-term.

Fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines

The vegetation within the proposal is already highly fragmented. Road widening will increase the width between fragments but will not create new fragments.

Adversely affect habitat critical to the survival of an ecological community

The habitat within the proposal area has undergone disturbances and is not considered critical to the survival of the community.

Modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns

The proposal is likely to adversely impact soil and surface hydrology as a result of vegetation clearing. The impacts are to be minimised by the mitigation measures and restricted to the edges of the vegetation.

Cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting

The proposal is unlikely to impact the composition of the vegetation as past disturbances and absence of fire have reduced the floristic composition of the community.

Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to:

— assisting invasive species, that are harmful to the listed ecological community, to become established, or

— causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community

The occurrence of the community is unlikely to undergo a substantial reduction in the quality of the vegetation has been impacted by past disturbance events such as vegetation clearing and grazing. The occurrence undergoes regular slashing, under these conditions only mature trees and low-lying forbs and grasses are likely to persist. The spread of invasive species is unlikely to be exacerbated if mitigation measure such as pre- and post-weed control are undertaken by AABR accredited bush regenerators. Therefore, the proposal is unlikely to impact on the quality or integrity of the vegetation.

Interfere with the recovery of an ecological community

The occurrence of the vegetation is likely to decline overtime due to the impacts associated with regular slashing under the current management regime. As the proposal will not impact upon the continuing management of the occurrence it is therefore unlikely to interfere with the recovery of the ecological community.

River-Flat Eucalypt Forest

Reduce the extent of an ecological community

A total of 0.66 ha of the CEEC River-Flat Eucalypt Forest will be removed by the proposal. Significant stands of the community are present on within the locality (particularly Mulgoa and School House Creeks). The proposal has been designed so that vegetation clearing has been limited. The impact with the proposed works is unlikely to significantly reduce the extent and the long-term survival of the community.

Fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines

The vegetation is already intersected by Mulgoa Road. The proposal will increase the distance between fragments; however, this additional distance is it is unlikely to significantly impact the long-term survival of the occurrence.

Adversely affect habitat critical to the survival of an ecological community

The occurrence of the ecological community is impacted by fragmentation, edge effects, weed invasion and an absence of fire for regeneration. Vegetation removal would be restricted to the edges of the vegetation where the occurrence is already impacted by edge effects and weed invasion.

Modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns

The proposal is likely to adversely impact soil and surface hydrology as a result of vegetation clearing. The impacts are to be minimised by the mitigation measures and restricted to the edges of the vegetation.

Cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting

The vegetation contains a reduced ground and shrub layer as a result of grazing, vegetation clearing, invasion of exotics and the exclusion of fire. Therefore, the removal of 0.66 ha vegetation on the edge is unlikely to substantially alter the composition of the occurrence.

Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to:

— assisting invasive species, that are harmful to the listed ecological community, to become established, or

— causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community

The occurrence is impacted by weeds, edge effects and absence of fire. The proposal is likely to further increase the spread of weeds due to impacts associated with vegetation clearing and soil disturbance. Provided mitigation measures are followed, including pre- and post-construction weed control the proposal is not likely to have a significant impact upon the quality and longevity of the occurrence.

Interfere with the recovery of an ecological community

Past disturbances such as grazing, logging, exclusion of fire and the invasion of exotics have impacted the vegetation. Presently, the condition of the occurrence is declining due to an absence of management. Furthermore, the vegetation is fragmented by Mulgoa Road. Increasing the distance between fragments is unlikely to adversely impact upon the recovery of the occurrence provided mitigation measures are implemented.

Regent Honeyeater

lead to a long-term decrease in the size of a population

As no key breeding areas occur within the study area, the habitat is likely to be limited to foraging. The proposal would remove 9 ha of potential foraging habitat that is highly urbanised, fragmented and degraded. Given the low number of recent records in the locality and the presence of higher quality habitat within the locality the proposal is unlikely to lead to a long-term decrease in population size.

reduce the area of occupancy of the species

Potential foraging habitat would be removed by 9 ha, which comprises a small fraction of habitat within the locality. The habitat is degraded and highly urbanised and no breeding habitat occurs within the study area the proposal.

fragment an existing population into two or more populations

No key breeding areas occur within the locality. The proposal would see a minor reduction of low-quality foraging habitat for the species. Given the regent honeyeater is highly nomadic and the locality supports patches of high-quality foraging habitat the removal of 4 ha vegetation proposal is unlikely to fragment the population into two or more.

adversely affect habitat critical to the survival of a species

No critical habitat occurs within the study area.

disrupt the breeding cycle of a population

The regent honeyeater breeds in three main areas north-east Victoria (Chiltern-Albury), and in NSW at Capertee Valley and the Bundarra-Barraba region. Given that the proposal would remove 9 ha of potential foraging habitat, it is unlikely to disrupt the breeding cycle of the population.

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

The proposal would remove 9 ha of potential foraging habitat. As large areas of quality habitat occur in the locality it is unlikely that the proposal would cause a decline in the species due to the vegetation clearing.

result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat

The proposal occurs within a highly modified and disturbed area. Invasive species of flora and fauna are already common within the urbanised environment. It is unlikely that the works associated with the proposal would further result in establishment of an invasive species in the habitat of the Regent Honeyeater.

introduce disease that may cause the species to decline

No, it is unlikely that the proposal would introduce a disease.

interfere with the recovery of the species.

The proposal is unlikely to interfere with the recovery of the Regent Honeyeater given that no key breeding areas occur within the study area, the species has been recorded in the locality in low numbers in the past 20 years.

White-throated Needletail

lead to a long-term decrease in the size of a population

The White-throated needletail is an aerial feeding species hunts over forests and cities. Breeding is undertaken in Asia. The removal of 0.79 ha of native vegetation is unlikely to impact the species.

reduce the area of occupancy of the species

The White-throated needletail foraging habitat will not be directly impacted as it is an aerial feeder, 0.79 ha of potential roosting habitat would impacted.

fragment an existing population into two or more populations

The White-throated needle tail is migratory and breeds in Asia. The removal of 4 ha of roosting habitat is unlikely to fragment the population into two or more populations.

adversely affect habitat critical to the survival of a species

No critical habitat has been declared for the White-throated needletail.

disrupt the breeding cycle of a population

The White-throated needletail breeds in Asia, as such the proposal is unlikely to impact upon the breeding cycle of the species.

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

The proposal would remove 0.79 ha of native vegetation. Given that the species is an aerial feeder, the proposal is unlikely to cause a decline in the species.

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

The proposal occurs within a highly modified and disturbed area. Invasive species of flora and fauna are already common within the urbanised environment. It is unlikely that the works associated with the proposal would result in the further establishment of an invasive species in the habitat of the White-Throated Needletail.

introduce disease that may cause the species to decline

The proposal is unlikely to introduce diseases that would cause the species to decline.

interfere with the recovery of the species.

The proposal is unlikely to interfere with the recovery of the species given that the species breeds in Asia and that the species feeds aerially.

Australasian Bittern

lead to a long-term decrease in the size of a population

The proposal would remove only 0.66 ha of potential Australasian Bittern habitat. Given the study area is highly fragmented and urbanised and the low number of recent records in the locality, the proposal is unlikely to lead to a long-term decrease in population size.

reduce the area of occupancy of the species

The proposal would remove 0.66 ha of potential habitat for the Australasian Bittern. The vegetation to be removed is adjacent a four-lane road and is unlikely to contain a resident population of Australasian Bittern. Given the large extent of habitat within the locality and the sub-optimal habitat within the study area, the proposal is unlikely to impact upon the species.

fragment an existing population into two or more populations

The proposal is unlikely to fragment an existing population as the study area is highly urbanised and contains sub-optimal habitat. The proposal would remove 0.66 ha of this roadside habitat.

adversely affect habitat critical to the survival of a species

No critical habitat has been declared for this species.

disrupt the breeding cycle of a population

The species breeds in densely vegetated wetlands and is therefore unlikely to breed within the study area.

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

The proposal would remove 0.66 ha of potential habitat. Given the highly urbanised environment and the close proximity to a four-lane road, the proposal is unlikely to impact the habitat of the species to the extent that it would cause a decline.

result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat

The proposal occurs within a highly modified and disturbed area. Invasive species of flora and fauna are already common within the urbanised environment. It is unlikely that the works associated with the proposal would result in establishment of an invasive species in the habitat of the Australian Bittern.

introduce disease that may cause the species to decline

The proposal is unlikely to introduce a disease that may cause a decline in the species.

interfere with the recovery of the species.

The proposal would result in a minor reduction in habitat. This habitat is highly urbanised and adjacent to a four-lane road, as such the proposal is unlikely to significantly impact the recovery of the species.

Grey-headed Flying-fox (GHFF)

lead to a long-term decrease in the size of a population

No GHFF camps occur within the study area. The proposal would remove 9 ha of potential foraging habitat. It is unlikely that the removal of vegetation will lead to a long-term decrease in the size of the population.

reduce the area of occupancy of the species

The proposal would remove 9 ha of potential foraging habitat. As the species is highly mobile travelling up to 50 km per night, the landscape supports thousands of hectares of potential foraging habitat. The removal of 4 ha of habitat is not likely to have a significant impact on the area of occupancy of the species.

fragment an existing population into two or more populations

The GHFF is a highly mobile species with multiple camps within 20 km from the study area. The removal of 9 ha of foraging habitat would not fragment the population into two or more populations.

adversely affect habitat critical to the survival of a species

No camps occur within the study area. Approximately 9 ha of foraging habitat is present within the study area. The study area contains foraging habitat that is critical to the survival of the species, however as the GHFF can forage over distances of 50 km or more it is unlikely that the removal of 9 ha of foraging habitat will adversely affect habitat critical to the survival of the species.

disrupt the breeding cycle of a population

No GHFF camps occur within the study area. While the study area does contain foraging habitat, the small amount of vegetation to be removed and the large home range of the species it is therefore unlikely to adversely disrupt the breeding success of the local populations.

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

The proposal would remove 9 ha of foraging habitat. Given the GHFF is a highly mobile species and there are thousands of hectares of foraging habitat available within 50 km, it is unlikely that the proposal will result in a decline in the species.

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

The proposal occurs within a highly modified and disturbed area. Invasive species of flora and fauna are already common within the urbanised environment. It is unlikely that the works associated with the proposal would result in further establishment of an invasive species in the habitat of the GHFF.

introduce disease that may cause the species to decline

The proposal is unlikely to spread any disease that may cause the GHFF to decline.

interfere with the recovery of the species.

The GHFF has the capacity to travel large distances (>50 km) for foraging. The study areas contained no camps and given that the vegetation is likely to be used for foraging, it is unlikely that the proposal will interfere with the recovery of the species.

Swift Parrot

lead to a long-term decrease in the size of a population

Swift Parrots breed in Tasmania, therefore habitat within the study area is limited to foraging. The proposal would remove 4 ha of foraging habitat that is highly urbanised, fragmented and degraded. Given the low number of recent records in the locality and the presence of higher quality habitat within the locality the proposal is unlikely to lead to a long-term decrease in population size.

reduce the area of occupancy of the species

The proposal would remove 9 ha of potential foraging habitat. Of this 0.66 ha of remnant Cumberland River-Flat Forest mapped as Important Habitat (BAM 2020) for the Swift Parrot. Given that the majority of the vegetation within the study area does not provide a source of winter nectar it is unlikely that the loss of habitat will have a significant impact upon the species.

fragment an existing population into two or more populations

The proposal is unlikely to fragment a population as the Swift Parrot is highly mobile species and sub-optimal foraging habitat occurs within the study area. The proposal would remove 4 ha of this habitat.

adversely affect habitat critical to the survival of a species

No critical habitat has been declared for this species.

disrupt the breeding cycle of a population

The proposal is unlikely to disrupt the breeding of this species as the Swift Parrot is known to only breed in Tasmania.

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

The proposal would remove 9 ha of foraging habitat. The majority of this habitat is flowers outside of winter. Given that study area is highly urbanised and high-quality habitat occurs within the locality, it is unlikely that the proposal will cause a decline the Swift Parrot.

result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat

The proposal occurs within a highly modified and disturbed area. Invasive species of flora and fauna are already common within the urbanised environment. It is unlikely that the works associated with the proposal would result in further establishment of an invasive species in the habitat of the Swift Parrot.

introduce disease that may cause the species to decline

No, it is unlikely that the proposal would introduce a disease.

interfere with the recovery of the species.

The proposal is unlikely to interfere with the recovery of the Swift Parrot given that species breeds in Tasmania and that the species has been recorded in the locality low numbers in the past 20 years.

Large-eared Pied Bat

lead to a long-term decrease in the size of a population

The proposal would remove approximately 9 ha of potential foraging habitat. This habitat is urbanised, fragmented and consists largely of street trees and exotic vegetation. Potential roosting habitat is present within the proposal; however, no microbats were observed during surveys under the Surveyors creek bridge and culverts of School House creek. As large extents of native vegetation occur within 5 km of the study area, representing high quality foraging and roosting habitat it is unlikely that the proposal would lead to a long-term decrease in the population size of the Large-eared Pied bat.

reduce the area of occupancy of the species

The proposal would remove approximately 9 ha of foraging habitat, including 0.79 ha of native vegetation. Within 5 km of the proposal, large areas of remnant native vegetation occur and provide higher quality foraging habitat. While the proposal would remove a small area of habitat, it is unlikely that the species would be significantly impacted.

fragment an existing population into two or more populations

The large-eared pied bat is a highly mobile species that has a patchy distribution within NSW. The vegetation within the proposal is highly fragmented. The removal of 9 ha of roadside vegetation within the urban environment of the proposal area is unlikely to result in fragmenting the population into two or more.

adversely affect habitat critical to the survival of a species

The Large-eared pied bat has a patchy distribution within NSW. Areas of higher quality habitat (roosting and foraging) occur outside of the study area. The proposal would remove 9 ha of sub-optimal foraging habitat.

disrupt the breeding cycle of a population

The species breeds in caves, cliff crevices and old mines, none of which occur within the study area. The proposal would remove potential roosting habitat (culverts and bridges) and foraging habitat, however it is not considered likely to disrupt the breeding cycle of the species.

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

Given the large areas of native vegetation within 5 km of the study area, the removal of 9 ha of potential foraging habitat is unlikely to cause the species to decline. Adjacent the Nepean River large extents of sandstone geology provides opportunities for roosting habitat such as caves and over hangs.

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

An abundance of exotic flora and fauna are present within the highly modified and disturbed environment of the study area. It is unlikely that the works associated with the proposal would result in establishment of an invasive species in the habitat of the Large-eared Pied Bat.

introduce disease that may cause the species to decline

No, it is unlikely that the proposal would introduce a disease.

interfere with the recovery of the species.

The Large-eared pied bat has a patchy distribution within NSW. The impacts associated with the proposal are small and given the extent of habitat within 5 km of the study area (potential breeding, roosting and foraging) it is unlikely that the proposal would significantly interfere with the recovery of the species.

Painted Honeyeater

lead to a long-term decrease in the size of a population

No important populations occur within the study area, the Painted Honeyeater is a vagrant to Sydney. The removal of 9 ha of potential habitat is unlikely to cause a long-term decrease in population size of the Painted Honeyeater.

reduce the area of occupancy of the species

No important populations occur within the study area. The species is a vagrant and the proposal will impact 9 ha of foraging habitat. Most of which is highly urbanised and fragmented.

fragment an existing population into two or more populations

As the species is a vagrant, no important populations occur within the study area and therefore the proposal will not fragment a population.

adversely affect habitat critical to the survival of a species

The proposal would remove 9 ha of foraging habitat in a highly urbanised area with a low abundance of mistletoes, of which is not considered to be habitat critical to the survival of the species.

disrupt the breeding cycle of a population

The Painted Honeyeater is a vagrant to Sydney with most breeding occurring in inland NSW, Queensland and Victoria. It is unlikely that the proposal will disrupt the breeding cycle of any population.

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

The proposal would remove 9 ha of potential habitat, the majority of which is highly urbanised and lacks mistletoe. Therefore, it is unlikely that the species would decline from the removal of vegetation with the proposal area.

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

The study area is highly modified with a large number of weeds within the vegetation remnants. A large number of invasive species are expected to be present given the highly urbanised environment. Therefore, it is unlikely that the proposal would increase the number of invasive species that have the potential to adversely impact upon the Painted Honeyeater within the study area.

introduce disease that may cause the species to decline

The proposal is highly unlikely to introduce a disease that would cause the Painted Honeyeater to decline.

interfere with the recovery of the species.

The Painted Honeyeater is a vagrant to the region, occurring infrequently in small numbers within Sydney. It is unlikely that the proposal will interfere with the recovery of the species as the Painted Honeyeater inhabits a large range extending from Victoria to Queensland; and the habitat occurring within the study area is small, urbanised and fragmented.

Black-faced Monarch

substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species

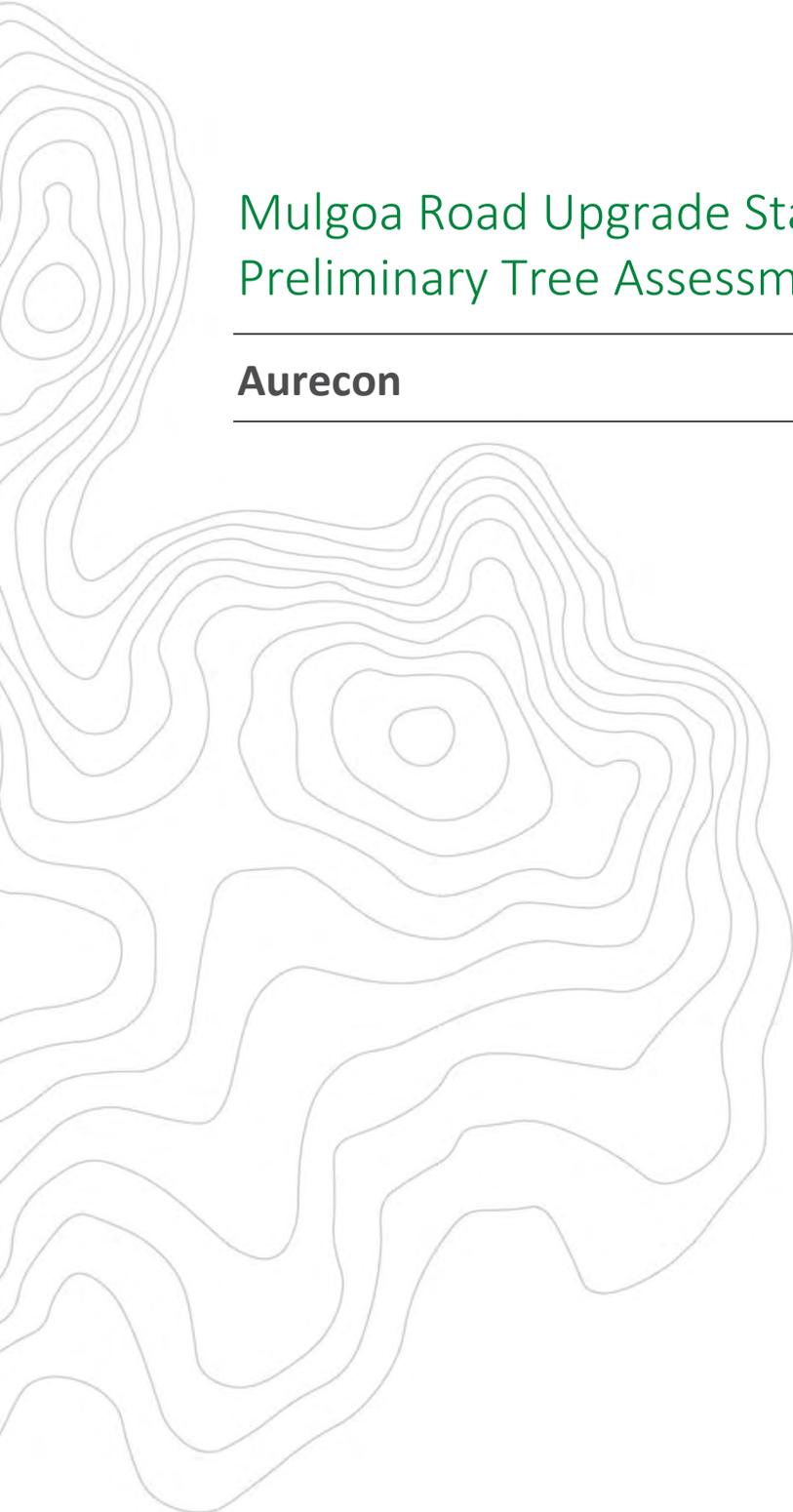
The proposal would remove 0.66 ha of road edge potential habitat for the Black-face Monarch. As this habitat is highly urbanised and in close proximity to a four-lane road it is unlikely that the proposal would significantly impact upon important habitat for the Black-face Monarch.

result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species

The study area is highly modified and urbanised environment and as such a large number of invasive species are expected to be present. Therefore, it is unlikely that the proposal would increase the number of invasive species that have the potential to adversely impact upon the Black-faced Monarch within the study area.

seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species

The removal of 4 ha of habitat is unlikely to seriously disrupt the lifecycle of an ecologically significant proportion of the population of the Black-faced Monarch as the environment is largely urbanised and fragmented. Only 0.66 ha of Cumberland River-Flat Forest is likely to contain habitat suitable for the species.



Mulgoa Road Upgrade Stage 2 5A & 5B Preliminary Tree Assessment

Aurecon

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Template 2.8.1

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Abbreviations

Abbreviation	Description
AQF	Australian Qualifications Framework
AS	Australian Standards
DBH	Diameter at Breast Height
ELA	Eco Logical Australia
m	Metre
mm	Millimetre
NDE	Non-Destructive Excavation
NO	Number
NSW	New South Wales
SP	Species
SRZ	Structural Root Zone
TPZ	Tree Protection Zone
VTA	Visual Tree Assessment

1. Background

This Preliminary Tree Assessment (PTA) was prepared for Aurecon to inform the master planning of the Mulgoa Road Upgrade Stage 2 5A & 5B, Penrith. The assessment was conducted across two sites as shown in Figure 1. The address of the subject sites, along with additional information is detailed in Table 1.

The purpose of this report is to:

- Identify the trees within the site
- Assess the current overall health and condition of the subject trees
- Evaluate the significance of the subject trees and assess their suitability for retention.

Features of the subject site are tabulated below.

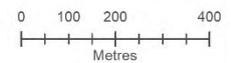
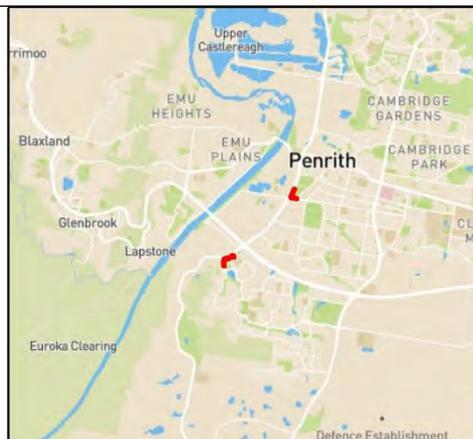
Table 1: Development site

Criteria	Description
SITE 1	
Street address	Mulgoa Rd, Woodbrook Grove, Cedar Court, School House Road & Glenmore Parkway Glenmore Park
Lot and DP	Lot 1 DP839433, Lot 201 DP1027600 & Lot 21-29 DP1051616
Local Government Area	Penrith City Council
General land use	R2 Low Density Residential, SP2 Infrastructure (Water Supply System) & RE1 Public Recreation
SITE 2	
Street address	Mulgoa Road and Jamison Road, South Penrith
Lot and DP	Lot 2 DP1147219, Lot 31 DP 1144930 & Lot 32 DP 1144930
Local Government Area	Penrith City Council
General land use	RE1 Public Recreation & R4 High Density Residential



Field Map

- Study Area
- Proposal Area
- Stage 2 5A & 5B Impacts



Datum/Projection:
GDA 1994 MGA Zone 56
Project: 18987-SC Date: 11/25/2021



Figure 1: Study area

2. Method

2.1 Definition of a tree

A tree is defined under the Australian Standard, *AS 4970-2009, Protection of Trees on Development Sites* as a long lived woody perennial plant greater than (or usually greater than) 3 m in height with one or relatively few main stems or trunks.

Penrith City Council defines a tree as:

‘a living perennial plant that has a height of three (3) metres or more or a trunk circumference exceeding 300 mm at 400 mm above ground level’ (Penrith City Council 2014).

2.2 Visual tree assessment

The subject trees were assessed in accordance with a stage one visual tree assessment (VTA) as formulated by Mattheck and Breloer (1994) and practices consistent with modern arboriculture.

A total of **873 trees** were inspected in September and October 2021 by AQF Level 5 Consulting Arborist, David Bidwell.

The following limitations apply to this methodology:

- Tree height was measured using a laser clinometer.
- Diameter at breast height (DBH) was measured using DBH tape.
- Trees were inspected from ground level, without the use of any invasive or diagnostic tools and testing.
- No aerial inspections or root mapping was undertaken.
- Trees of the same species, with similar dimensions growing near each other were documented as a group and presented under a single waypoint.
- Trees were inspected within limits of site access as outlined below.
 - There was limited access to site 1 due to dense Lantana (this area has been mapped in Appendix B)
 - Trees 64 to 70 surveyed from side of road
 - Trees 71 to 81 surveyed from side of road
 - Trees 280 to 287 not directly accessed and were assessed/surveyed from side of road
- Tree identification was based on broad taxonomical features present and visible from ground level at the time of inspection.
- Tree locations were recorded using hand-held GPS units and were moved to the locations recorded by Cadence Consulting Surveyors (2021)
- Six dead trees were observed in the field. Of these, only one (Tree 122) was included in this assessment due to its large size and habitat value. The remaining five have not been included in this assessment. Details of these trees are as follows:
 - Dead tree between trees 124 and 125 (Site 1)
 - Dead tree immediately north of tree 287 (Site 1)
 - Dead tree between trees 294 and 295 (Site 1)

- Dead tree between trees 299 and 301 (Site 1)
- Dead tree between trees 539 and 540 (Site 2)
- Site 1 consists of trees 1 to 317
- Site 2 consists of trees 500 to 814, 1500 and 1514
- Some tree ID numbers were not used and therefore no data was collected for these records. This includes the following numbers: 318 to 499, 802, 1501 to 1513.

2.3 Retention value & landscape significance

The retention value or importance of a tree or group of trees, is determined in accordance with the Institute of Australian Consulting Arborists (IACA) Significance of a Tree Assessment Rating System (STARSCO), which is summarised in Appendix A. The method considers the Safe Useful Life Expectancy (SULE) and landscape significance of a tree. Trees are provided one of the following ratings:

- **High - priority for retention:** These trees are considered important and should be retained and protected. Design modification or re-location of building/s should be considered to accommodate the setbacks as prescribed by Australian Standard AS 4970–2009 Protection of trees on development sites.
- **Medium - consider for retention:** These trees are moderately important for retention. Their removal should only be considered if adversely affected by the proposed works and all other alternatives have been considered and exhausted.
- **Low - consider for removal:** These trees are not considered important for retention, nor require special works or design modification to be implemented for their retention.
- **Priority for removal:** These trees are considered hazardous, or in irreversible decline, or weeds and should be removed irrespective of development.

2.4 Protection zones

2.4.1 Tree protection zone (TPZ)

The TPZ is a specific radius area above and below ground and at a distance from the trunk set aside for the protection of a tree's roots and crown to provide for the viability and stability of a tree to be retained where it is potentially subject to damage by the development. The TPZ (as defined by AS 4970-2009) requires restriction of access during the development process. Groups of trees with overlapping TPZs may be included within a single protection area. Tree sensitive measures must be implemented if works are to proceed within the TPZ. The TPZ radius is determined by multiplying its DBH by 12 however, the TPZ of palms and monocots should not be less than 1 m outside the crown projection.

2.4.2 Structural root zone (SRZ)

The SRZ is the area of the root system (as defined by AS 4970-2009) used for stability, mechanical support and anchorage of the tree. It is critical for the support and stability of trees. Severance of roots within the SRZ is not recommended as it may lead to the destabilisation and/or decline of the tree. The SRZ does not apply for palms and monocots (as outlined in AS 4970-2009).

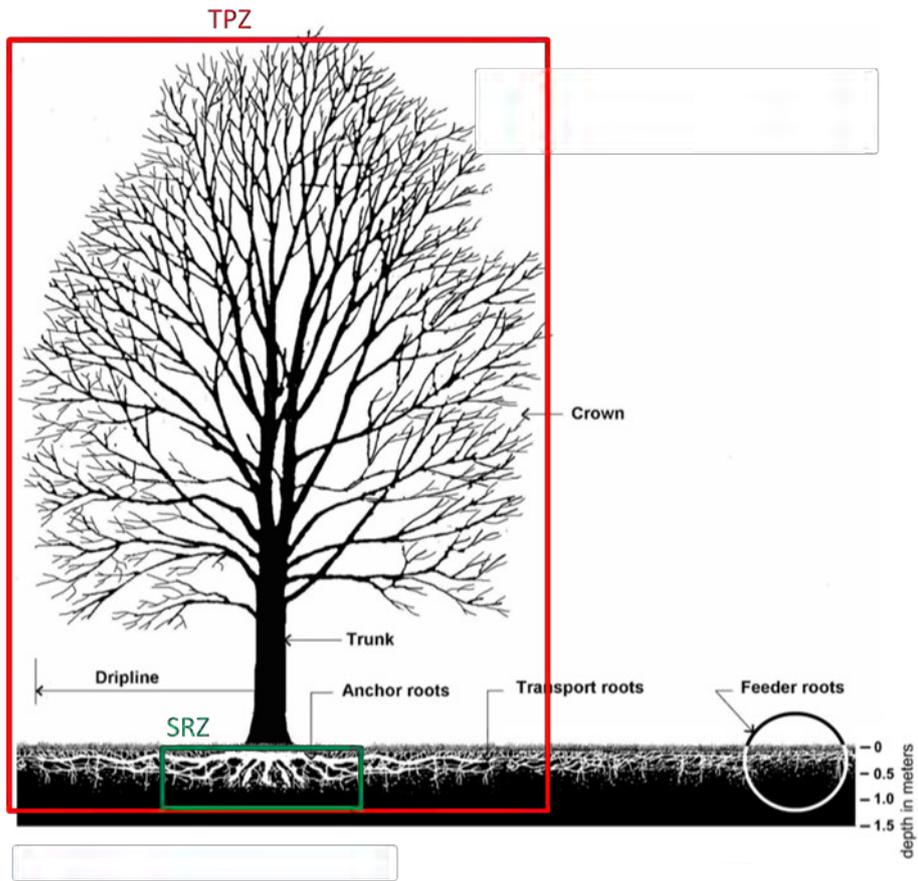


Figure 2: Representative tree structure and indicative TPZ and SRZ

3. Results and discussion

Results of the preliminary tree assessment are summarised below. Detailed results are included in Appendices C and D.

HIGH RETENTION VALUE TREES

A total of **48 high retention value trees** were assessed. These trees are considered important and should be retained and protected. Design modification or re-location of building/s should be considered to accommodate the setbacks as prescribed by *Australian Standard AS 4970–2009 Protection of trees on development sites*.

MEDIUM RETENTION VALUE TREES

A total of **562 medium retention value trees** were assessed. These trees are moderately important for retention. Their removal should only be considered if adversely affected by the proposed works and all other alternatives have been considered and exhausted.

LOW RETENTION VALUES TREES

A total of **263 low retention value trees** were assessed. These trees are not considered important for retention, nor require special works or design modification to be implemented for their retention.

4. References

4.1 General references

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- Mattheck, C. 2007. *Updated Field Guide for Visual Tree Assessment*. Karlsruhe: Forschungszentrum Karlsruhe.
- IACA 2010. *IACA Significance of a Tree, Assessment Rating System (STARS)*, Institute of Australian Consulting Arboriculturalists, Australia, www.iaca.org.au.
- Robinson L, 2003. *Field Guide to the Native Plants of Sydney*, 3rd ed, Kangaroo Press, East Roseville NSW
- Standards Australia 2007. *Australian Standard: Pruning of amenity trees, AS 4373 (2007)*, Standards Australia, Sydney.
- Standards Australia 2009. *Australian Standard: Protection of trees on development sites, AS 4970 (2009)*. Standards Australia, Sydney.

4.2 Project specific references

- Cadence Consulting Surveyors 2021. *1867 Trees Field Map 1 211008*
- Cadence Consulting Surveyors 2021. *1867 Trees Field Map 2 210920*
- Hawkesbury River Country Council 2015. *Priority Weeds List*. Updated December 2019. <http://hrcc.nsw.gov.au/weed-information/priority-weeds-list/>
- Penrith City Council 2014. *Appendix F1 Definition, Penrith Development Control Plan 2014*. Page F1-22

Appendix A Tree retention assessment method

A1 Tree Significance Assessment Criteria - STARS©

The tree is to have a minimum of three criteria in a category to be classified in that group.

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

A2 Matrix assessment - STARS©

		Tree significance				
		High	Medium	Low		
		Significance in Landscape	Significance in Landscape	Significance in Landscape	Environmental Pest/Noxious Weed Species	Hazardous/ Irreversible Decline
Useful Life Expectancy	Long >40 years					
	Medium 15-40 years					
	Short <1-15 years					
	Dead					

	<p>Priority for retention (High): Tree considered important so should be retained and protected. Design modification or re-location of structure should be considered to accommodate the setbacks as prescribed by the <i>Australian Standard AS4970 Protection of trees on development sites</i>. Tree sensitive construction measures must be implemented if works are to proceed within the Tree Protection Zone.</p>
	<p>Consider for retention (Medium): Tree considered less important, however, retention should remain priority. Removal considered only if adversely affecting the proposed building/works and all other alternatives have been considered and exhausted.</p>
	<p>Consider for removal (Low): Tree not considered important for retention, nor requiring special works or design modification to be implemented for their retention.</p>
	<p>Priority for removal: These trees are considered hazardous, or in irreversible decline, or weeds and should be removed irrespective of development.</p>

Appendix B Maps



Figure 3: Site 1 tree locations, north

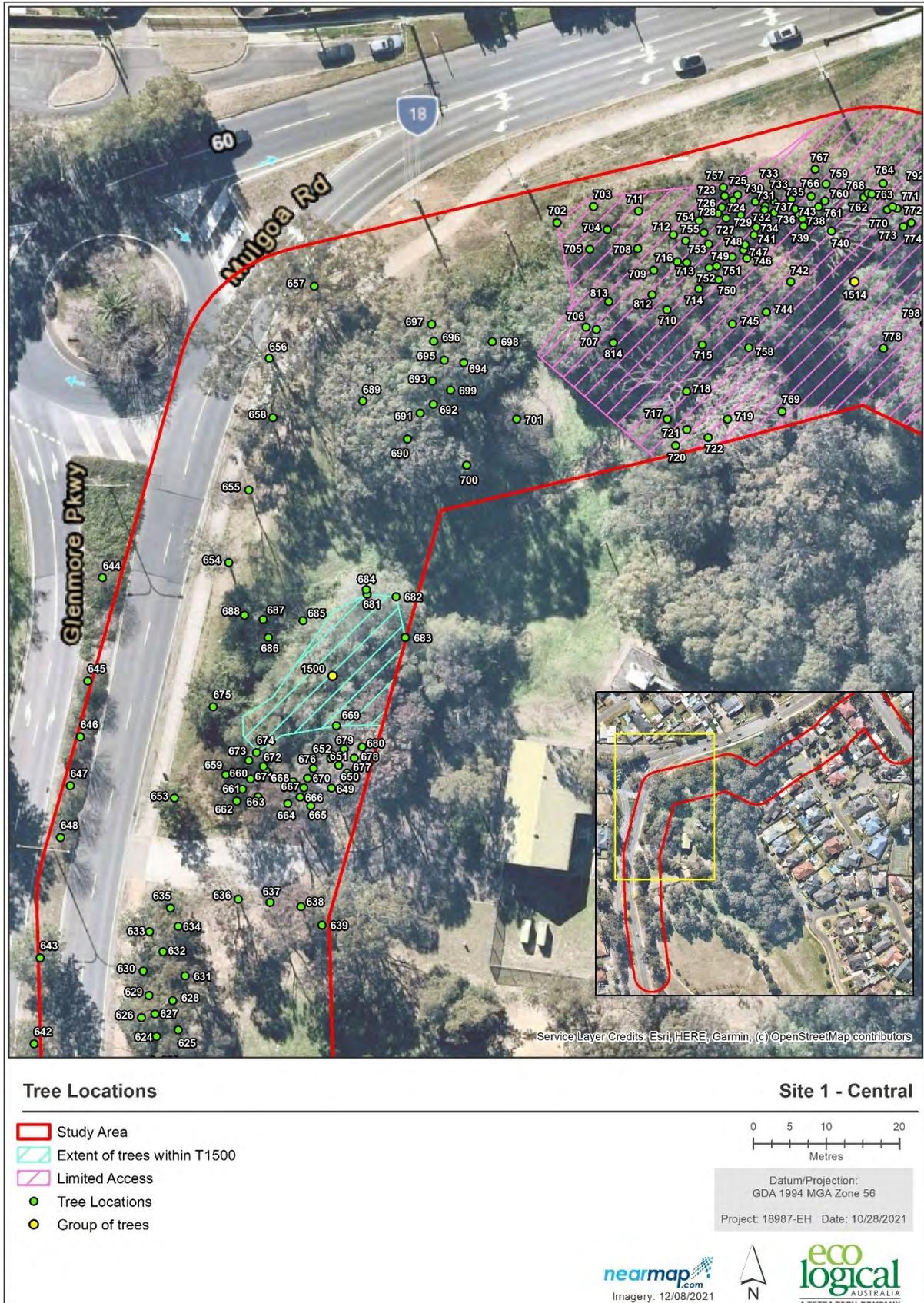


Figure 4: Site 1 tree locations, central



Figure 5: Site 1 tree locations, south



Figure 6: Site 2 tree locations, north



Figure 7: Site 2 tree locations, central

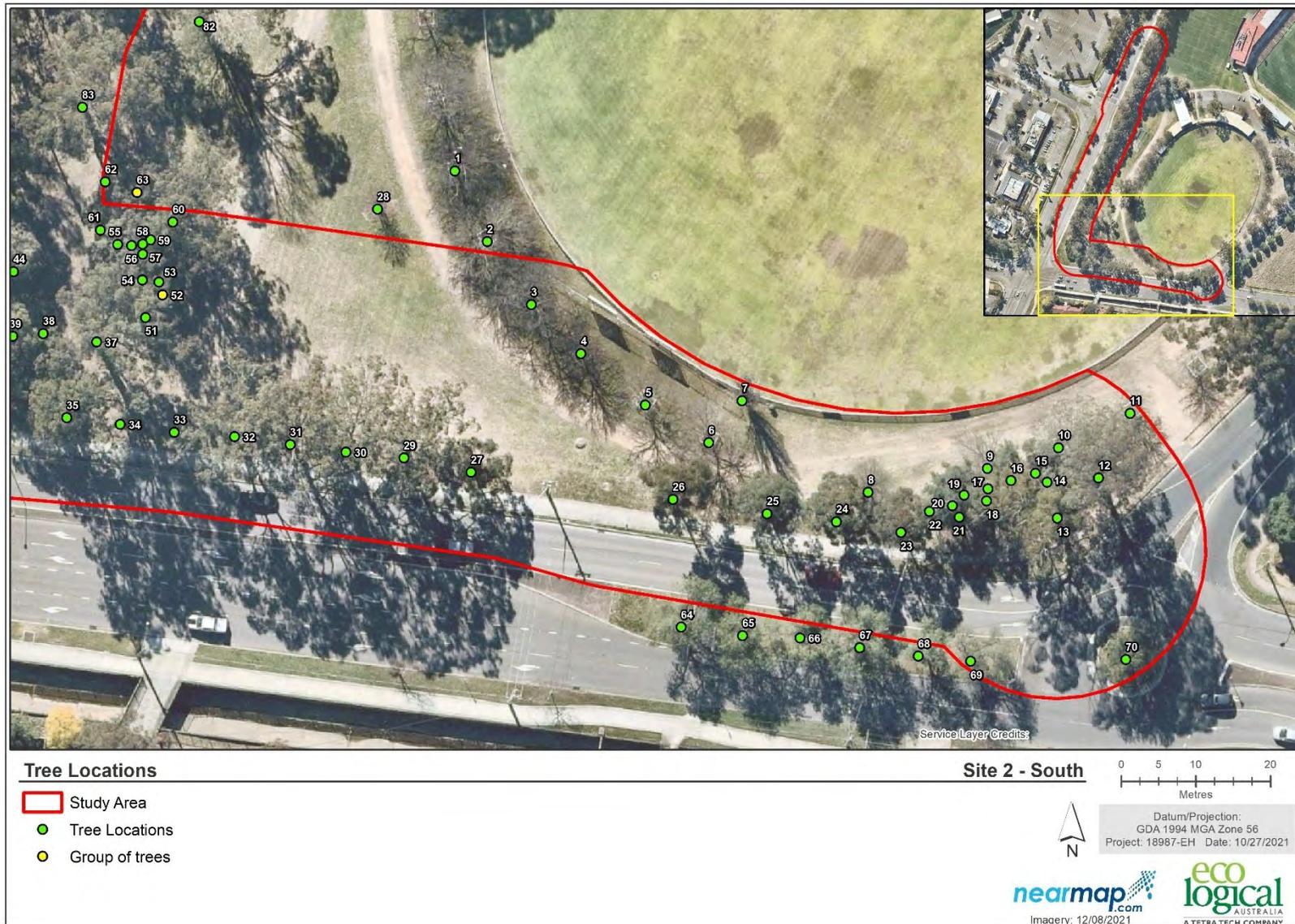


Figure 8: Site 2 tree locations, south

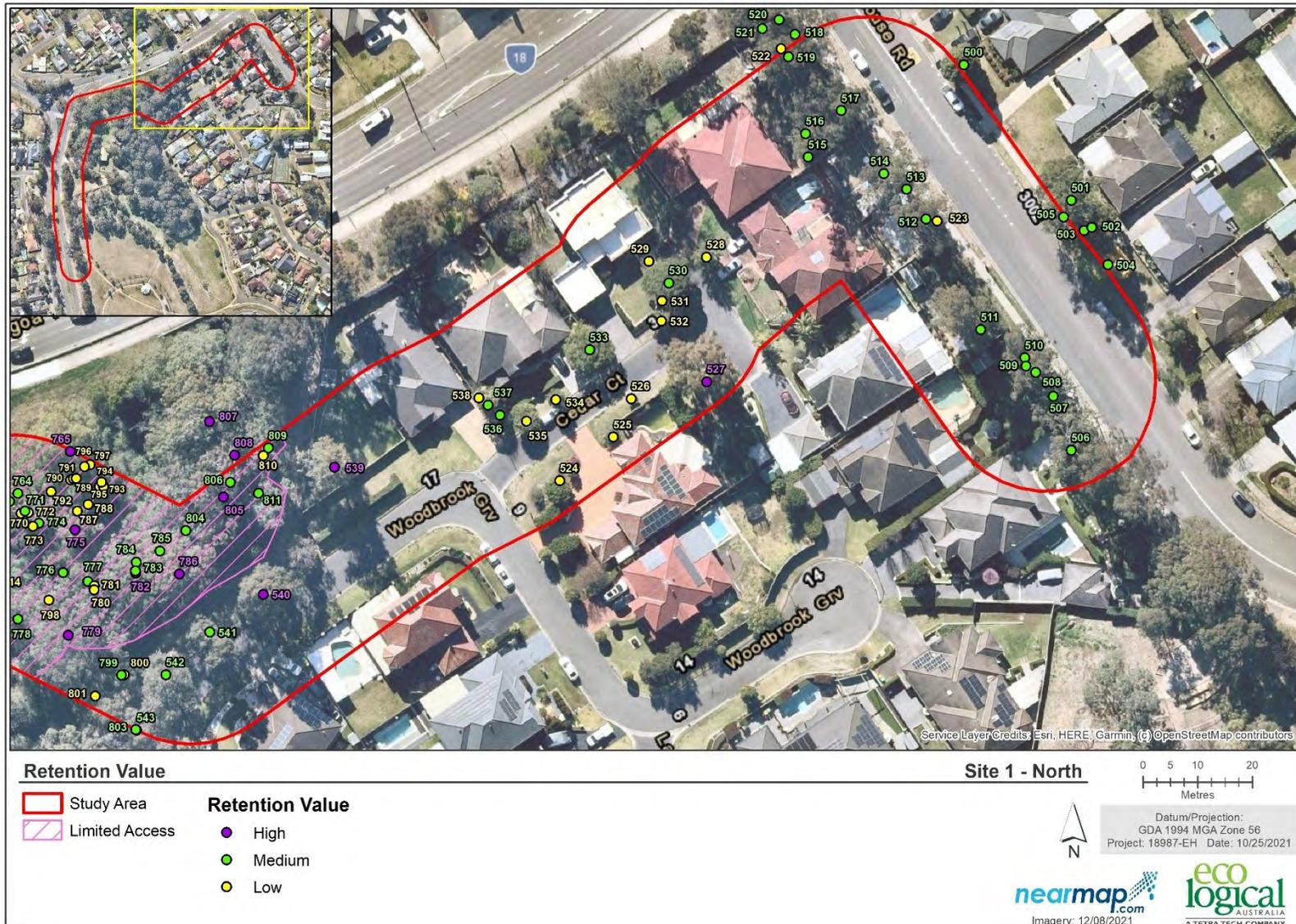


Figure 9: Site 1 retention values, north

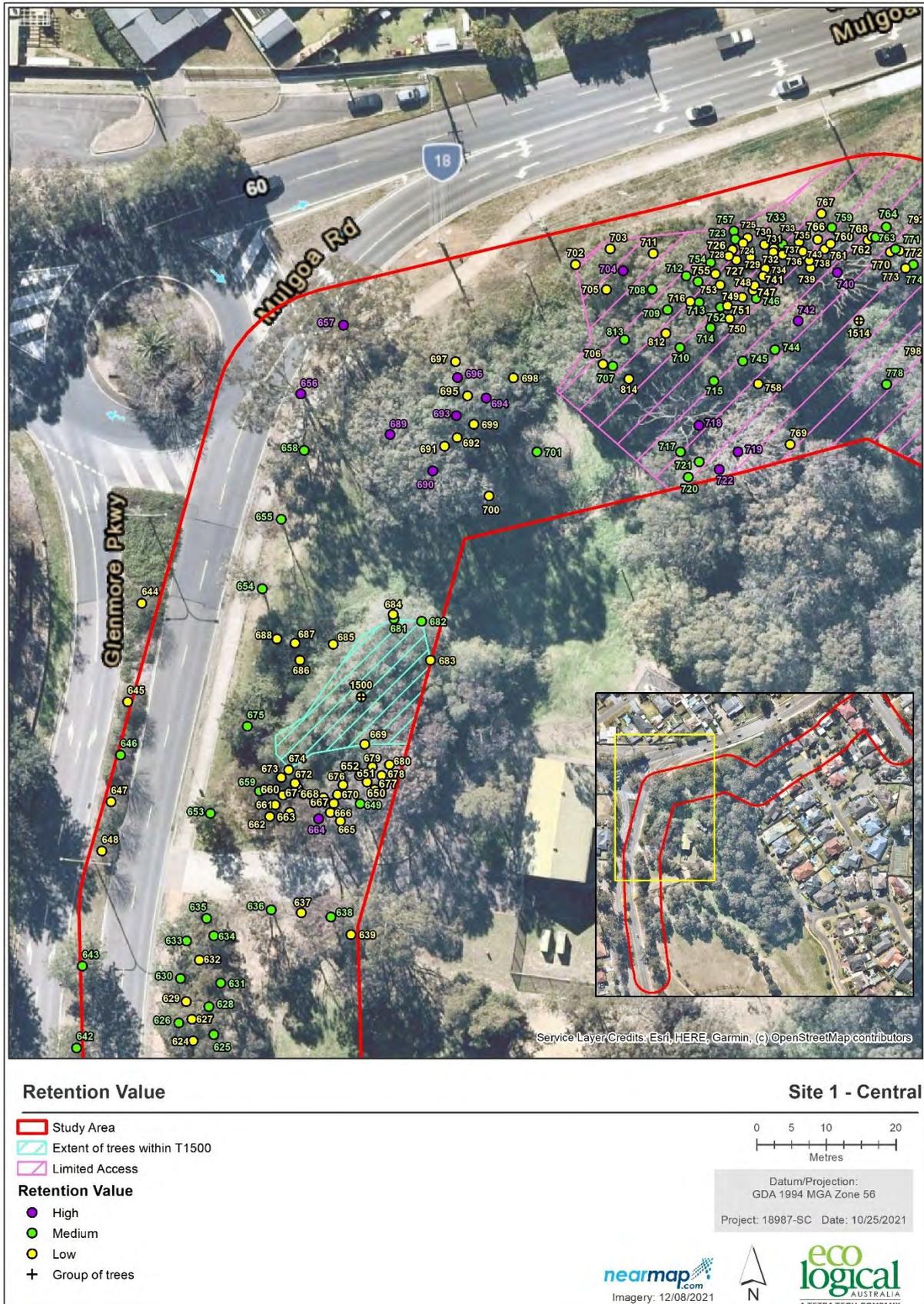


Figure 10: Site 1 retention values, central



Figure 11: Site 1 retention values, south



Figure 12: Site 2 retention values, north

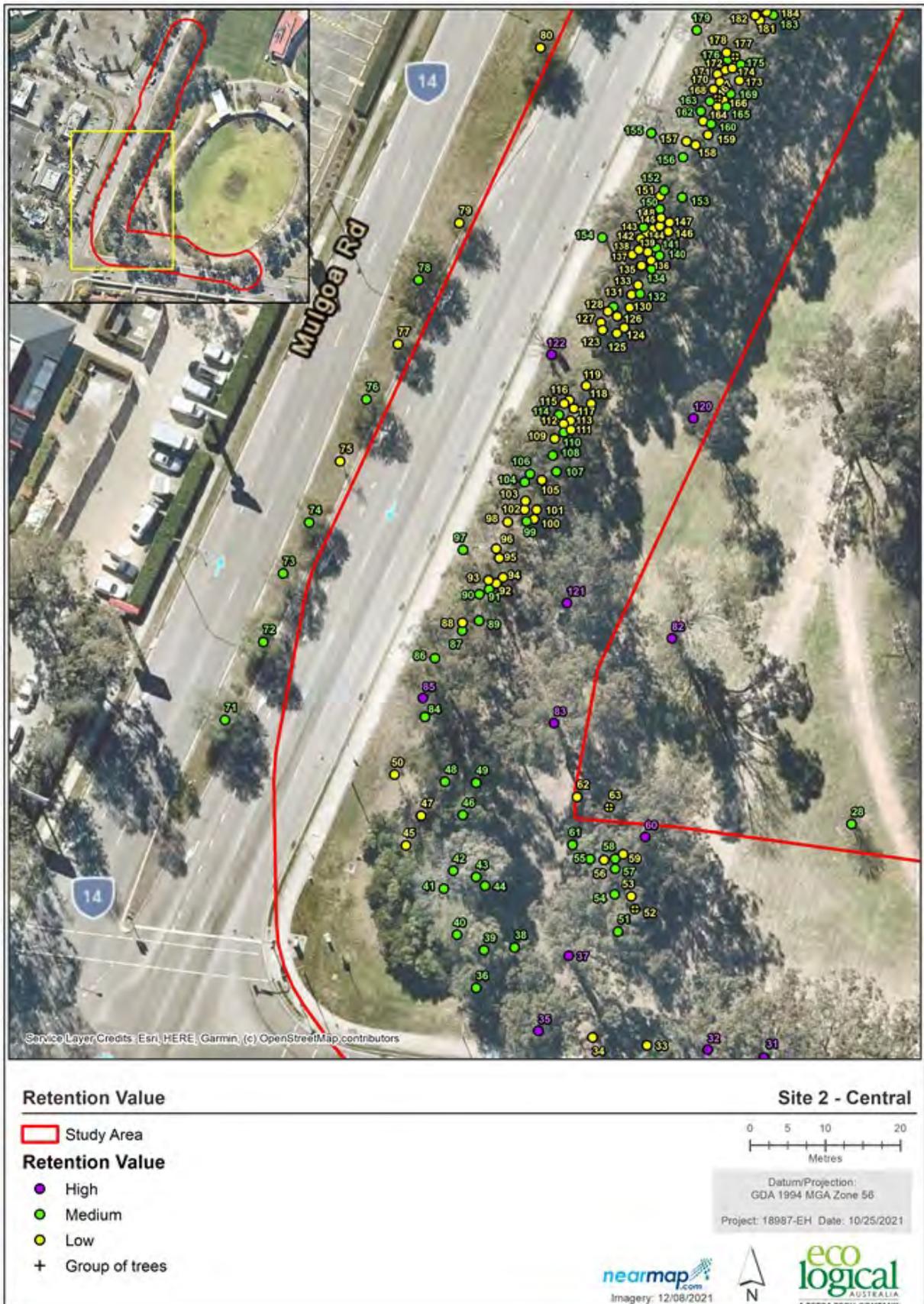


Figure 13: Site 2 retention values, central

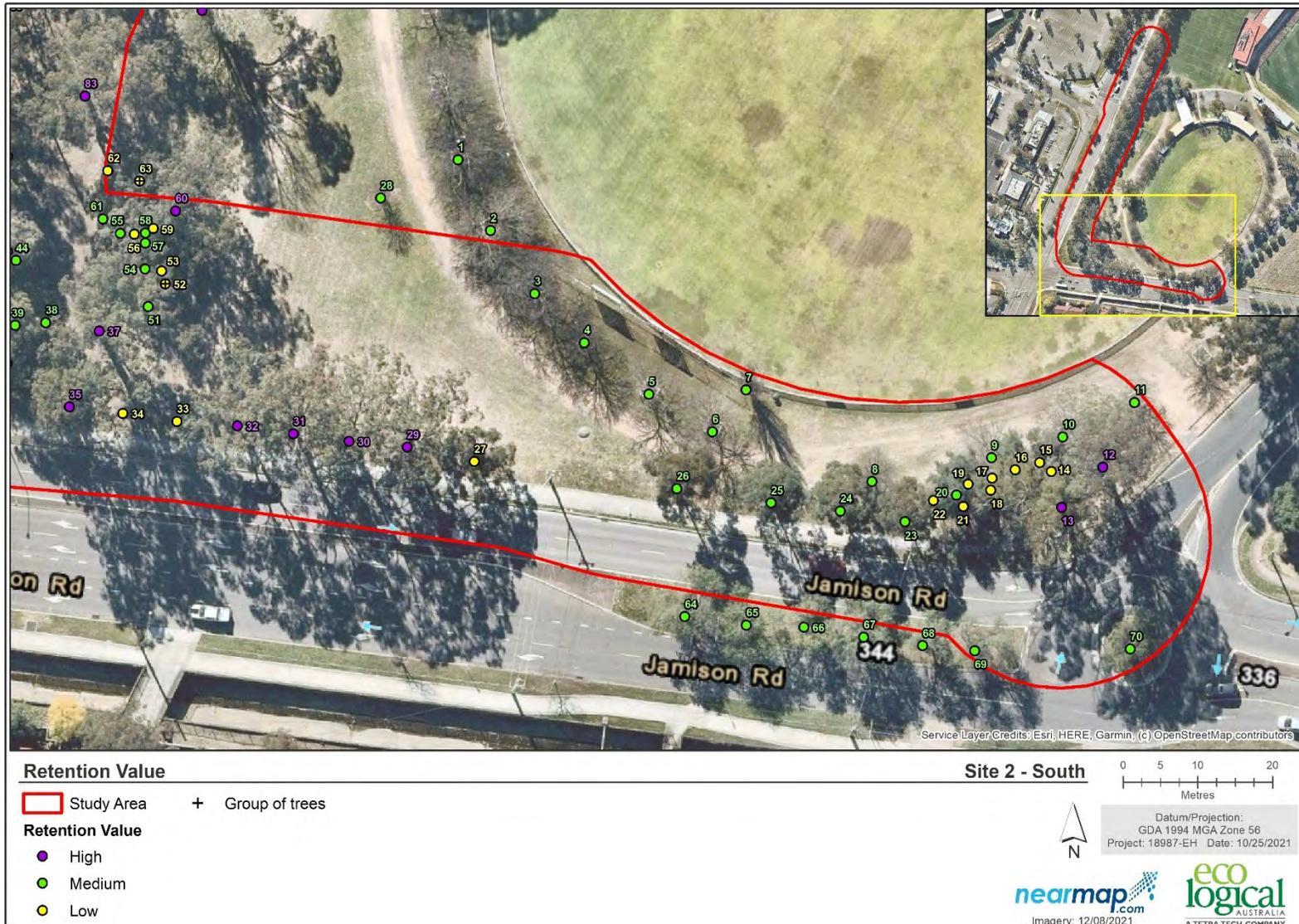


Figure 14: Site 2 retention values, south

Appendix C Tabulated results of arboricultural assessment

Tree	Botanical name	Trees in Group	Height (m)	Spread (m)	DHB (mm)	Health	Structure	TPZ (m)	SRZ (m)	SULE	Landscape significance	Retention value	Notes
1	<i>Ulmus parvifolia</i>	1	9	12	460	Good	Good	5.5	2.4	Long (>40 years)	Medium	Medium	
2	<i>Ulmus parvifolia</i>	1	8	12	410	Good	Good	4.9	2.3	Long (>40 years)	Medium	Medium	
3	<i>Ulmus parvifolia</i>	1	9	11	360	Good	Good	4.3	2.2	Long (>40 years)	Medium	Medium	
4	<i>Ulmus parvifolia</i>	1	9	10	290	Good	Good	3.5	2.0	Long (>40 years)	Medium	Medium	
5	<i>Ulmus parvifolia</i>	1	10	12	280	Good	Good	3.4	1.9	Long (>40 years)	Medium	Medium	
6	<i>Ulmus parvifolia</i>	1	8	12	320	Good	Good	3.8	2.1	Long (>40 years)	Medium	Medium	
7	<i>Populus nigra</i>	1	16	6	630	Poor	Fair	7.6	2.7	Short (5-15 years)	Medium	Medium	<i>P. nigra var italica</i> . Some dieback at top
8	<i>Quercus robur</i>	1	7	8	300	Good	Good	3.6	2.0	Long (>40 years)	Medium	Medium	
9	<i>Ulmus parvifolia</i>	1	8	8	250	Good	Good	3.0	1.8	Long (>40 years)	Medium	Medium	
10	<i>Ulmus parvifolia</i>	1	7	8	230	Good	Good	2.8	1.8	Long (>40 years)	Medium	Medium	
11	<i>Ulmus parvifolia</i>	1	5	8	200	Good	Good	2.4	1.7	Long (>40 years)	Medium	Medium	
12	<i>Eucalyptus sieberi</i>	1	27	18	870	Good	Good	10.4	3.1	Long (>40 years)	High	High	
13	<i>Eucalyptus parramattensis</i>	1	24	19	820	Fair	Fair	9.8	3.0	Medium (15-40 years)	High	High	Some decay in base trunk and scaffold limbs. Large dead branches.
14	<i>Quercus ilex</i>	1	7	6	150	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
15	<i>Quercus ilex</i>	1	7	7	180	Good	Fair	2.2	1.6	Medium (15-40 years)	Low	Low	Large tear out on trunk
16	<i>Quercus ilex</i>	1	10	5	180	Good	Good	2.2	1.6	Long (>40 years)	Low	Low	
17	<i>Quercus ilex</i>	1	3	3	50	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	
18	<i>Quercus ilex</i>	1	9	7	210	Good	Good	2.5	1.7	Long (>40 years)	Low	Low	One small broken branch lodged in canopy
19	<i>Quercus ilex</i>	1	8	6	200	Good	Good	2.4	1.7	Long (>40 years)	Low	Low	
20	<i>Quercus ilex</i>	1	9	8	300	Good	Good	3.6	2.0	Long (>40 years)	Medium	Medium	
21	<i>Lagerstroemia indica</i>	1	5	3	100	Good	Good	2.0	1.5	Medium (15-40 years)	Low	Low	
22	<i>Lagerstroemia indica</i>	1	5	3	100	Poor	Fair	2.0	1.5	Short (5-15 years)	Low	Low	Multi trunked
23	<i>Eucalyptus saligna</i>	1	13	8	280	Good	Good	3.4	1.9	Long (>40 years)	Medium	Medium	
24	<i>Eucalyptus saligna</i>	1	15	10	320	Good	Fair	3.8	2.1	Long (>40 years)	Medium	Medium	Codominant fork with included bark
25	<i>Eucalyptus saligna</i>	1	13	9	340	Good	Good	4.1	2.1	Long (>40 years)	Medium	Medium	
26	<i>Eucalyptus saligna</i>	1	15	10	330	Good	Good	4.0	2.1	Long (>40 years)	Medium	Medium	
27	<i>Eucalyptus saligna</i>	1	12	10	320	Good	Poor	3.8	2.1	Short (5-15 years)	Medium	Low	Major tear out in upper fork.
28	<i>Quercus robur</i>	1	7	6	280	Good	Good	3.4	1.9	Long (>40 years)	Medium	Medium	Multi trunked
29	<i>Eucalyptus crebra</i>	1	23	18	729	Fair	Fair	8.7	2.9	Long (>40 years)	High	High	Some damage from tear outs on eastern side
30	<i>Eucalyptus crebra</i>	1	24	18	600	Good	Fair	7.2	2.7	Long (>40 years)	High	High	Tear outs
31	<i>Eucalyptus crebra</i>	1	25	19	760	Good	Fair	9.1	2.9	Long (>40 years)	High	High	

Tree	Botanical name	Trees in Group	Height (m)	Spread (m)	DHB (mm)	Health	Structure	TPZ (m)	SRZ (m)	SULE	Landscape significance	Retention value	Notes
32	<i>Eucalyptus crebra</i>	1	24	18	770	Fair	Fair	9.2	3.0	Medium (15-40 years)	High	High	Basal wound which may conceal some decay. Delamination of bark on upper trunk
33	<i>Eucalyptus tereticornis</i>	1	5	3	50	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
34	<i>Eucalyptus tereticornis</i>	1	5	2	50	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
35	<i>Eucalyptus crebra</i>	1	26	18	680	Good	Good	8.2	2.8	Long (>40 years)	High	High	
36	<i>Eucalyptus saligna</i>	1	12	7	240	Good	Fair	2.9	1.8	Medium (15-40 years)	Medium	Medium	Borer damage at base
37	<i>Eucalyptus moluccana</i>	1	29	25	1001	Fair	Fair	12.0	3.3	Long (>40 years)	High	High	Large dead branches
38	<i>Melia azedarach</i>	1	10	10	270	Good	Good	3.2	1.9	Medium (15-40 years)	Medium	Medium	
39	<i>Eucalyptus moluccana</i>	1	18	12	300	Good	Fair	3.6	2.0	Long (>40 years)	Medium	Medium	Top has torn out and is lodged in tree
40	<i>Casuarina glauca</i>	1	14	8	260	Good	Good	3.1	1.9	Long (>40 years)	Medium	Medium	
41	<i>Ulmus glabra</i>	1	8	8	240	Poor	Poor	2.9	1.8	Short (5-15 years)	Medium	Medium	Crown dieback
42	<i>Ulmus glabra</i>	1	10	8	220	Fair	Fair	2.6	1.8	Medium (15-40 years)	Medium	Medium	Decay in trunk
43	<i>Eucalyptus moluccana</i>	1	16	10	510	Good	Fair	6.1	2.5	Long (>40 years)	Medium	Medium	Bifurcated stem
44	<i>Eucalyptus moluccana</i>	1	12	4	220	Good	Good	2.6	1.8	Long (>40 years)	Medium	Medium	
45	<i>Ulmus glabra</i>	1	5	4	190	Poor	Fair	2.3	1.6	Short (5-15 years)	Low	Low	Dieback
46	<i>Casuarina cunninghamiana</i>	1	18	10	480	Good	Good	5.8	2.4	Long (>40 years)	Medium	Medium	
47	<i>Syzygium sp.</i>	1	7	4	120	Poor	Poor	2.0	1.5	Short (5-15 years)	Low	Low	Severe dieback
48	<i>Eucalyptus moluccana</i>	1	15	9	340	Good	Good	4.1	2.1	Long (>40 years)	Medium	Medium	
49	<i>Eucalyptus moluccana</i>	1	15	5	180	Good	Good	2.2	1.6	Long (>40 years)	Medium	Medium	
50	<i>Eucalyptus tereticornis</i>	1	10	4	120	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
51	<i>Ulmus glabra</i>	1	7	5	220	Fair	Fair	2.6	1.8	Medium (15-40 years)	Medium	Medium	
52	<i>Casuarina glauca</i>	3	4	3	100	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	Clump of 3 small trees growing together
53	<i>Casuarina glauca</i>	1	3	2	50	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
54	<i>Ulmus glabra</i>	1	8	8	240	Fair	Fair	2.9	1.8	Medium (15-40 years)	Medium	Medium	
55	<i>Eucalyptus crebra</i>	1	13	5	220	Good	Good	2.6	1.8	Long (>40 years)	Medium	Medium	
56	<i>Acacia elata</i>	1	4	5	200	Poor	Poor	2.4	1.7	Short (5-15 years)	Low	Low	Severe dieback
57	<i>Casuarina glauca</i>	1	12	5	250	Good	Good	3.0	1.8	Long (>40 years)	Medium	Medium	
58	<i>Casuarina cunninghamiana</i>	1	12	4	250	Good	Good	3.0	1.8	Long (>40 years)	Medium	Medium	
59	<i>Jacaranda mimosifolia</i>	1	6	3	80	Fair	Fair	2.0	1.5	Medium (15-40 years)	Low	Low	Some minor basal movement
60	<i>Eucalyptus moluccana</i>	1	22	18	880	Good	Good	10.6	3.1	Long (>40 years)	High	High	
61	<i>Casuarina glauca</i>	1	10	5	240	Good	Good	2.9	1.8	Long (>40 years)	Medium	Medium	
62	<i>Melia azedarach</i>	1	5	5	120	Good	Fair	2.0	1.5	Medium (15-40 years)	Low	Low	

Tree	Botanical name	Trees in Group	Height (m)	Spread (m)	DHB (mm)	Health	Structure	TPZ (m)	SRZ (m)	SULE	Landscape significance	Retention value	Notes
63	<i>Casuarina glauca</i>	10	5	5	100	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	Group of 10 trees growing in a close clump
64	<i>Schinus molle</i>	1	10	10	550	Fair	Fair	6.6	2.6	Medium (15-40 years)	Medium	Medium	Trees 64 to 70 surveyed from side of road
65	<i>Schinus molle</i>	1	10	10	350	Fair	Fair	4.2	2.1	Medium (15-40 years)	Medium	Medium	Trees 64 to 70 surveyed from side of road
66	<i>Schinus molle</i>	1	9	8	350	Fair	Fair	4.2	2.1	Medium (15-40 years)	Medium	Medium	Trees 64 to 70 surveyed from side of road. Some wounding at base
67	<i>Schinus molle</i>	1	11	10	400	Fair	Fair	4.8	2.3	Medium (15-40 years)	Medium	Medium	Trees 64 to 70 surveyed from side of road. Large pruning wound on trunk
68	<i>Schinus molle</i>	1	9	8	320	Fair	Fair	3.8	2.1	Medium (15-40 years)	Medium	Medium	Trees 64 to 70 surveyed from side of road. Pruning wound on trunk
69	<i>Schinus molle</i>	1	9	9	350	Poor	Fair	4.2	2.1	Short (5-15 years)	Medium	Medium	Trees 64 to 70 surveyed from side of road. Sparse foliage
70	<i>Schinus molle</i>	1	10	12	350	Fair	Fair	4.2	2.1	Medium (15-40 years)	Medium	Medium	Trees 64 to 70 surveyed from side of road
71	<i>Schinus molle</i>	1	9	9	250	Fair	Fair	3.0	1.8	Medium (15-40 years)	Medium	Medium	Trees 71 to 81 surveyed from side of road
72	<i>Schinus molle</i>	1	7	7	250	Fair	Fair	3.0	1.8	Medium (15-40 years)	Medium	Medium	Trees 71 to 81 surveyed from side of road
73	<i>Schinus molle</i>	1	7	6	220	Poor	Fair	2.6	1.8	Short (5-15 years)	Medium	Medium	Trees 71 to 81 surveyed from side of road. Sparse canopy
74	<i>Schinus molle</i>	1	6	6	220	Fair	Fair	2.6	1.8	Medium (15-40 years)	Medium	Medium	Trees 71 to 81 surveyed from side of road
75	<i>Schinus molle</i>	1	3	1	100	Poor	Poor	2.0	1.5	Remove (<5 years)	Low	Low	Trees 71 to 81 surveyed from side of road. Poor tree
76	<i>Schinus molle</i>	1	6	6	240	Fair	Fair	2.9	1.8	Medium (15-40 years)	Medium	Medium	Trees 71 to 81 surveyed from side of road
77	<i>Schinus molle</i>	1	5	5	200	Poor	Fair	2.4	1.7	Short (5-15 years)	Low	Low	Trees 71 to 81 surveyed from side of road
78	<i>Schinus molle</i>	1	7	8	250	Fair	Fair	3.0	1.8	Medium (15-40 years)	Medium	Medium	Trees 71 to 81 surveyed from side of road
79	<i>Schinus molle</i>	1	5	5	160	Poor	Fair	2.0	1.5	Short (5-15 years)	Low	Low	Trees 71 to 81 surveyed from side of road
80	<i>Schinus molle</i>	1	6	5	200	Fair	Fair	2.4	1.7	Medium (15-40 years)	Low	Low	Trees 71 to 81 surveyed from side of road
81	<i>Schinus molle</i>	1	9	10	400	Fair	Fair	4.8	2.3	Medium (15-40 years)	Medium	Medium	Trees 71 to 81 surveyed from side of road
82	<i>Eucalyptus moluccana</i>	1	20	19	930	Poor	Poor	11.2	3.2	Medium (15-40 years)	High	High	Dead top needs pruning out
83	<i>Eucalyptus moluccana</i>	1	26	23	910	Good	Good	10.9	3.2	Long (>40 years)	High	High	Large dead branches
84	<i>Eucalyptus tereticornis</i>	1	12	8	310	Poor	Fair	3.7	2.0	Medium (15-40 years)	Medium	Medium	
85	<i>Eucalyptus moluccana</i>	1	25	17	990	Good	Good	11.9	3.3	Long (>40 years)	High	High	Large dead branches
86	<i>Eucalyptus tereticornis</i>	1	22	9	530	Fair	Good	6.4	2.5	Long (>40 years)	Medium	Medium	
87	<i>Corymbia maculata</i>	1	15	8	240	Good	Good	2.9	1.8	Long (>40 years)	Medium	Medium	
88	<i>Corymbia maculata</i>	1	9	3	120	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	

Tree	Botanical name	Trees in Group	Height (m)	Spread (m)	DHB (mm)	Health	Structure	TPZ (m)	SRZ (m)	SULE	Landscape significance	Retention value	Notes
89	<i>Corymbia maculata</i>	1	16	5	200	Good	Good	2.4	1.7	Long (>40 years)	Medium	Medium	
90	<i>Corymbia maculata</i>	1	16	5	350	Good	Good	4.2	2.1	Long (>40 years)	Medium	Medium	
91	<i>Corymbia maculata</i>	1	16	3	220	Good	Good	2.6	1.8	Long (>40 years)	Medium	Medium	
92	<i>Corymbia maculata</i>	1	3	1	50	Fair	Poor	2.0	1.5	Short (5-15 years)	Low	Low	
93	<i>Corymbia maculata</i>	1	5	2	50	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	Twin stems
94	<i>Corymbia maculata</i>	1	14	5	150	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
95	<i>Corymbia maculata</i>	1	15	5	200	Good	Good	2.4	1.7	Long (>40 years)	Low	Low	
96	<i>Corymbia maculata</i>	1	14	5	180	Good	Good	2.2	1.6	Long (>40 years)	Low	Low	
97	<i>Eucalyptus melliodora</i>	1	15	8	350	Poor	Fair	4.2	2.1	Medium (15-40 years)	Medium	Medium	Sparse canopy. Avenue tree
98	<i>Corymbia maculata</i>	1	10	2	120	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
99	<i>Corymbia maculata</i>	1	17	5	260	Good	Good	3.1	1.9	Long (>40 years)	Medium	Medium	
100	<i>Corymbia maculata</i>	1	5	1	50	Poor	Poor	2.0	1.5	Remove (<5 years)	Low	Low	
101	<i>Corymbia maculata</i>	1	12	5	180	Fair	Good	2.2	1.6	Long (>40 years)	Low	Low	
102	<i>Corymbia maculata</i>	1	13	5	200	Good	Good	2.4	1.7	Long (>40 years)	Low	Low	
103	<i>Corymbia maculata</i>	1	4	3	50	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	Multi trunked
104	<i>Corymbia maculata</i>	1	16	8	250	Good	Good	3.0	1.8	Long (>40 years)	Medium	Medium	
105	<i>Corymbia maculata</i>	1	10	4	140	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
106	<i>Corymbia maculata</i>	1	18	7	270	Good	Good	3.2	1.9	Long (>40 years)	Medium	Medium	
107	<i>Corymbia maculata</i>	1	14	6	230	Good	Good	2.8	1.8	Long (>40 years)	Medium	Medium	
108	<i>Corymbia maculata</i>	1	16	6	220	Good	Good	2.6	1.8	Long (>40 years)	Medium	Medium	
109	<i>Corymbia maculata</i>	1	9	4	140	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
110	<i>Corymbia maculata</i>	1	16	4	210	Good	Good	2.5	1.7	Long (>40 years)	Medium	Medium	
111	<i>Corymbia maculata</i>	1	15	5	200	Good	Good	2.4	1.7	Long (>40 years)	Low	Low	
112	<i>Corymbia maculata</i>	1	5	1	50	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	
113	<i>Corymbia maculata</i>	1	8	5	140	Fair	Fair	2.0	1.5	Medium (15-40 years)	Low	Low	
114	<i>Corymbia maculata</i>	1	14	5	200	Good	Good	2.4	1.7	Long (>40 years)	Medium	Medium	
115	<i>Corymbia maculata</i>	1	5	2	60	Fair	Fair	2.0	1.5	Medium (15-40 years)	Low	Low	
116	<i>Corymbia maculata</i>	1	12	5	150	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
117	<i>Corymbia maculata</i>	1	16	5	210	Good	Good	2.5	1.7	Long (>40 years)	Low	Low	
118	<i>Corymbia maculata</i>	1	9	5	200	Good	Good	2.4	1.7	Long (>40 years)	Low	Low	Multi trunked
119	<i>Corymbia maculata</i>	1	12	4	180	Good	Good	2.2	1.6	Long (>40 years)	Low	Low	Twin stems
120	<i>Eucalyptus moluccana</i>	1	15	10	810	Fair	Fair	9.7	3.0	Medium (15-40 years)	High	High	1 tree has hollows throughout base and trunk but appears to be stable
121	<i>Eucalyptus moluccana</i>	1	19	18	840	Good	Fair	10.1	3.1	Long (>40 years)	High	High	Large tear out on trunk but tree appears to be compartmentalising well

Tree	Botanical name	Trees in Group	Height (m)	Spread (m)	DHB (mm)	Health	Structure	TPZ (m)	SRZ (m)	SULE	Landscape significance	Retention value	Notes
122	<i>Dead tree</i>	1	12	12	1200	Poor	Poor	14.4	3.6	Long (>40 years)	High	High	Very large dead tree. May wish to retain for habitat. Top branches will require pruning down
123	<i>Corymbia maculata</i>	1	14	5	180	Good	Good	2.2	1.6	Long (>40 years)	Low	Low	
124	<i>Corymbia maculata</i>	1	8	5	210	Fair	Poor	2.5	1.7	Short (5-15 years)	Low	Low	Old tear out
125	<i>Corymbia maculata</i>	1	9	3	100	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
126	<i>Corymbia maculata</i>	1	12	3	119	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
127	<i>Corymbia maculata</i>	1	5	2	80	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
128	<i>Corymbia maculata</i>	1	6	2	80	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
129	<i>Corymbia maculata</i>	1	15	5	220	Good	Good	2.6	1.8	Long (>40 years)	Medium	Medium	
130	<i>Corymbia maculata</i>	1	10	4	150	Good	Fair	2.0	1.5	Medium (15-40 years)	Low	Low	Wound on trunk occluding well
131	<i>Corymbia maculata</i>	1	14	4	150	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
132	<i>Corymbia maculata</i>	1	15	6	280	Good	Good	3.4	1.9	Long (>40 years)	Medium	Medium	
133	<i>Corymbia maculata</i>	1	12	4	150	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
134	<i>Corymbia maculata</i>	1	16	5	290	Good	Good	3.5	2.0	Long (>40 years)	Medium	Medium	
135	<i>Corymbia maculata</i>	1	5	1	50	Poor	Poor	2.0	1.5	Short (5-15 years)	Low	Low	Dead top
136	<i>Corymbia maculata</i>	1	4	1	50	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	
137	<i>Corymbia maculata</i>	1	14	5	160	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
138	<i>Corymbia maculata</i>	1	13	4	160	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
139	<i>Corymbia maculata</i>	1	5	2	50	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	
140	<i>Corymbia maculata</i>	1	15	5	240	Good	Good	2.9	1.8	Long (>40 years)	Medium	Medium	
141	<i>Corymbia maculata</i>	1	16	5	260	Good	Fair	3.1	1.9	Long (>40 years)	Medium	Medium	Wound at base with possible borer infestation
142	<i>Corymbia maculata</i>	1	4	2	50	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	Wound on stem
143	<i>Corymbia maculata</i>	1	10	3	110	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
144	<i>Corymbia maculata</i>	1	12	5	180	Good	Good	2.2	1.6	Long (>40 years)	Low	Low	
145	<i>Corymbia maculata</i>	1	6	4	80	Good	Fair	2.0	1.5	Short (5-15 years)	Low	Low	
146	<i>Corymbia maculata</i>	1	3	1	50	Poor	Poor	2.0	1.5	Short (5-15 years)	Low	Low	
147	<i>Corymbia maculata</i>	1	14	5	190	Fair	Fair	2.3	1.6	Short (5-15 years)	Low	Low	Wound on trunk, sparse canopy, termites
148	<i>Corymbia maculata</i>	1	3	1	50	Poor	Poor	2.0	1.5	Short (5-15 years)	Low	Low	
149	<i>Corymbia maculata</i>	1	16	5	210	Good	Good	2.5	1.7	Long (>40 years)	Medium	Medium	
150	<i>Corymbia maculata</i>	1	17	5	240	Good	Good	2.9	1.8	Long (>40 years)	Medium	Medium	
151	<i>Corymbia maculata</i>	1	8	2	80	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
152	<i>Corymbia maculata</i>	1	17	5	240	Good	Good	2.9	1.8	Long (>40 years)	Medium	Medium	
153	<i>Corymbia maculata</i>	1	17	10	450	Good	Good	5.4	2.4	Long (>40 years)	Medium	Medium	Bifurcation of main stem
154	<i>Eucalyptus melliodora</i>	1	18	8	420	Fair	Fair	5.0	2.3	Medium (15-40 years)	Medium	Medium	Sparse canopy. Avenue tree
155	<i>Eucalyptus melliodora</i>	1	18	10	550	Poor	Poor	6.6	2.6	Short (5-15 years)	Medium	Medium	Decay just below main fork with significant hollows. Possible termite infestation. Avenue tree

Tree	Botanical name	Trees in Group	Height (m)	Spread (m)	DHB (mm)	Health	Structure	TPZ (m)	SRZ (m)	SULE	Landscape significance	Retention value	Notes
156	<i>Corymbia maculata</i>	1	18	6	310	Good	Good	3.7	2.0	Long (>40 years)	Medium	Medium	
157	<i>Corymbia maculata</i>	1	8	2	80	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
158	<i>Corymbia maculata</i>	1	10	5	180	Fair	Fair	2.2	1.6	Medium (15-40 years)	Low	Low	
159	<i>Corymbia maculata</i>	1	4	1	50	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	
160	<i>Corymbia maculata</i>	1	17	5	300	Good	Good	3.6	2.0	Long (>40 years)	Medium	Medium	
161	<i>Corymbia maculata</i>	1	5	2	50	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	
162	<i>Corymbia maculata</i>	1	17	6	280	Good	Good	3.4	1.9	Long (>40 years)	Medium	Medium	
163	<i>Corymbia maculata</i>	1	16	5	250	Good	Good	3.0	1.8	Long (>40 years)	Medium	Medium	
164	<i>Corymbia maculata</i>	1	9	4	130	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
165	<i>Corymbia maculata</i>	1	16	6	310	Good	Good	3.7	2.0	Long (>40 years)	Medium	Medium	
166	<i>Corymbia maculata</i>	1	4	1	50	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	
167	<i>Corymbia maculata</i>	2	3	1	50	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	Two very small trees growing together
168	<i>Corymbia maculata</i>	1	4	2	50	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	
169	<i>Corymbia maculata</i>	1	18	5	370	Good	Good	4.4	2.2	Long (>40 years)	Medium	Medium	
170	<i>Corymbia maculata</i>	1	9	3	80	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
171	<i>Corymbia maculata</i>	1	5	2	80	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	Wound on trunk
172	<i>Corymbia maculata</i>	1	12	4	140	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
173	<i>Melia azedarach</i>	1	4	4	180	Good	Fair	2.2	1.6	Medium (15-40 years)	Low	Low	
174	<i>Corymbia maculata</i>	1	5	2	60	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	
175	<i>Corymbia maculata</i>	1	17	9	380	Good	Good	4.6	2.2	Long (>40 years)	Medium	Medium	
176	<i>Corymbia maculata</i>	1	13	5	280	Good	Good	3.4	1.9	Long (>40 years)	Medium	Medium	
177	<i>Corymbia maculata</i>	2	4	1	50	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	Two very small trees growing together
178	<i>Corymbia maculata</i>	1	6	2	70	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	
179	<i>Eucalyptus melliodora</i>	1	18	12	350	Poor	Fair	4.2	2.1	Short (5-15 years)	Medium	Medium	Appears to have been impacted by footpath works. Avenue tree
180	<i>Eucalyptus melliodora</i>	1	20	14	470	Fair	Fair	5.6	2.4	Medium (15-40 years)	Medium	Medium	Avenue tree
181	<i>Corymbia maculata</i>	1	6	2	70	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	
182	<i>Corymbia maculata</i>	1	11	4	180	Good	Good	2.2	1.6	Long (>40 years)	Low	Low	
183	<i>Corymbia maculata</i>	1	18	8	360	Good	Good	4.3	2.2	Long (>40 years)	Medium	Medium	
184	<i>Corymbia maculata</i>	1	7	3	100	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
185	<i>Corymbia maculata</i>	1	10	2	120	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
186	<i>Corymbia maculata</i>	2	10	5	130	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	Two trees growing close together
187	<i>Corymbia maculata</i>	1	7	4	90	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
188	<i>Corymbia maculata</i>	1	9	2	100	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	
189	<i>Corymbia maculata</i>	1	18	5	370	Good	Good	4.4	2.2	Long (>40 years)	Medium	Medium	

Tree	Botanical name	Trees in Group	Height (m)	Spread (m)	DHB (mm)	Health	Structure	TPZ (m)	SRZ (m)	SULE	Landscape significance	Retention value	Notes
190	<i>Corymbia maculata</i>	1	10	3	120	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	
191	<i>Corymbia maculata</i>	1	10	5	120	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
192	<i>Corymbia maculata</i>	1	12	4	180	Good	Good	2.2	1.6	Long (>40 years)	Low	Low	
193	<i>Corymbia maculata</i>	1	4	2	50	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	
194	<i>Corymbia maculata</i>	1	8	2	70	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	
195	<i>Corymbia maculata</i>	1	18	6	370	Good	Good	4.4	2.2	Long (>40 years)	Medium	Medium	
196	<i>Corymbia maculata</i>	1	5	2	50	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	
197	<i>Corymbia maculata</i>	1	16	5	240	Good	Good	2.9	1.8	Long (>40 years)	Medium	Medium	
198	<i>Corymbia maculata</i>	1	4	2	70	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	
199	<i>Corymbia maculata</i>	1	4	2	50	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	
200	<i>Corymbia maculata</i>	1	17	5	260	Good	Good	3.1	1.9	Long (>40 years)	Medium	Medium	
201	<i>Corymbia maculata</i>	1	18	6	330	Good	Good	4.0	2.1	Long (>40 years)	Medium	Medium	
202	<i>Corymbia maculata</i>	1	7	5	210	Good	Good	2.5	1.7	Long (>40 years)	Low	Low	
203	<i>Corymbia maculata</i>	1	4	2	70	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	
204	<i>Eucalyptus melliodora</i>	1	16	8	410	Poor	Fair	4.9	2.3	Short (5-15 years)	Medium	Medium	Possibly impacted by work on footpath. Sparse canopy. Avenue tree
205	<i>Corymbia maculata</i>	1	12	5	200	Good	Good	2.4	1.7	Long (>40 years)	Low	Low	
206	<i>Corymbia maculata</i>	1	16	4	240	Good	Good	2.9	1.8	Long (>40 years)	Medium	Medium	
207	<i>Corymbia maculata</i>	1	13	4	180	Good	Good	2.2	1.6	Long (>40 years)	Low	Low	
208	<i>Corymbia maculata</i>	1	14	4	290	Good	Good	3.5	2.0	Long (>40 years)	Medium	Medium	
209	<i>Corymbia maculata</i>	1	7	4	160	Fair	Fair	2.0	1.5	Long (>40 years)	Low	Low	
210	<i>Corymbia maculata</i>	1	7	2	100	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	
211	<i>Corymbia maculata</i>	1	18	6	390	Good	Good	4.7	2.2	Long (>40 years)	Medium	Medium	
212	<i>Corymbia maculata</i>	1	17	8	330	Good	Good	4.0	2.1	Long (>40 years)	Medium	Medium	
213	<i>Corymbia maculata</i>	1	4	1	50	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	
214	<i>Eucalyptus melliodora</i>	1	12	8	420	Fair	Fair	5.0	2.3	Medium (15-40 years)	Medium	Medium	Avenue tree
215	<i>Corymbia maculata</i>	1	12	6	230	Good	Good	2.8	1.8	Long (>40 years)	Medium	Medium	
216	<i>Corymbia maculata</i>	1	17	8	380	Good	Good	4.6	2.2	Long (>40 years)	Medium	Medium	
217	<i>Corymbia maculata</i>	1	4	1	70	Poor	Fair	2.0	1.5	Short (5-15 years)	Low	Low	Dead top
218	<i>Corymbia maculata</i>	1	5	3	80	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	
219	<i>Corymbia maculata</i>	1	15	5	270	Fair	Good	3.2	1.9	Medium (15-40 years)	Medium	Medium	
220	<i>Corymbia maculata</i>	1	18	7	320	Good	Good	3.8	2.1	Long (>40 years)	Medium	Medium	
221	<i>Corymbia maculata</i>	1	17	7	320	Good	Good	3.8	2.1	Long (>40 years)	Medium	Medium	
222	<i>Corymbia maculata</i>	1	18	8	390	Good	Good	4.7	2.2	Long (>40 years)	Medium	Medium	
223	<i>Corymbia maculata</i>	1	16	7	320	Good	Good	3.8	2.1	Long (>40 years)	Medium	Medium	
224	<i>Corymbia maculata</i>	1	6	2	80	Fair	Poor	2.0	1.5	Short (5-15 years)	Low	Low	

Tree	Botanical name	Trees in Group	Height (m)	Spread (m)	DHB (mm)	Health	Structure	TPZ (m)	SRZ (m)	SULE	Landscape significance	Retention value	Notes
225	<i>Corymbia maculata</i>	1	14	7	320	Good	Good	3.8	2.1	Long (>40 years)	Medium	Medium	
226	<i>Eucalyptus melliodora</i>	1	18	15	690	Poor	Fair	8.3	2.8	Medium (15-40 years)	High	High	Avenue tree
227	<i>Ulmus parvifolia</i>	1	6	9	210	Fair	Fair	2.5	1.7	Long (>40 years)	Medium	Medium	
228	<i>Eucalyptus sieberi</i>	1	18	6	260	Good	Good	3.1	1.9	Long (>40 years)	Medium	Medium	
229	<i>Corymbia maculata</i>	1	10	5	180	Good	Good	2.2	1.6	Long (>40 years)	Low	Low	
230	<i>Eucalyptus tereticornis</i>	1	12	6	300	Good	Good	3.6	2.0	Long (>40 years)	Medium	Medium	
231	<i>Eucalyptus moluccana</i>	1	7	5	180	Fair	Good	2.2	1.6	Long (>40 years)	Low	Low	
232	<i>Melia azedarach</i>	1	5	5	140	Good	Good	2.0	1.5	Medium (15-40 years)	Low	Low	
233	<i>Eucalyptus tereticornis</i>	1	16	8	350	Good	Good	4.2	2.1	Long (>40 years)	Medium	Medium	
234	<i>Eucalyptus moluccana</i>	1	8	4	120	Fair	Good	2.0	1.5	Long (>40 years)	Low	Low	
235	<i>Melia azedarach</i>	1	5	4	130	Good	Fair	2.0	1.5	Medium (15-40 years)	Low	Low	
236	<i>Melia azedarach</i>	1	8	7	220	Good	Fair	2.6	1.8	Medium (15-40 years)	Medium	Medium	
237	<i>Melia azedarach</i>	1	10	8	260	Good	Fair	3.1	1.9	Medium (15-40 years)	Medium	Medium	Bifurcated stem
238	<i>Harpephyllum caffrum</i>	1	9	4	140	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
239	<i>Harpephyllum caffrum</i>	1	10	8	220	Good	Fair	2.6	1.8	Medium (15-40 years)	Medium	Medium	
240	<i>Melia azedarach</i>	1	3	4	80	Good	Fair	2.0	1.5	Medium (15-40 years)	Low	Low	Maybe considered a weed
241	<i>Corymbia maculata</i>	1	17	6	300	Good	Good	3.6	2.0	Long (>40 years)	Medium	Medium	
242	<i>Corymbia maculata</i>	1	20	10	400	Good	Good	4.8	2.3	Long (>40 years)	Medium	Medium	
243	<i>Corymbia maculata</i>	1	10	4	110	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	Twin stems
244	<i>Corymbia maculata</i>	1	3	1	50	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	
245	<i>Corymbia maculata</i>	1	12	4	180	Good	Good	2.2	1.6	Long (>40 years)	Low	Low	
246	<i>Corymbia maculata</i>	1	4	1	50	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	
247	<i>Corymbia maculata</i>	1	12	3	150	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
248	<i>Corymbia maculata</i>	1	8	6	150	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
249	<i>Corymbia maculata</i>	1	12	5	180	Good	Good	2.2	1.6	Long (>40 years)	Low	Low	
250	<i>Corymbia maculata</i>	1	7	2	60	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	
251	<i>Corymbia maculata</i>	1	20	12	480	Good	Good	5.8	2.4	Long (>40 years)	Medium	Medium	
252	<i>Eucalyptus melliodora</i>	1	20	20	760	Fair	Fair	9.1	2.9	Medium (15-40 years)	High	High	Avenue tree
253	<i>Corymbia maculata</i>	1	10	4	100	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
254	<i>Corymbia maculata</i>	1	12	6	180	Good	Good	2.2	1.6	Long (>40 years)	Low	Low	
255	<i>Corymbia maculata</i>	1	4	1	50	Poor	Fair	2.0	1.5	Short (5-15 years)	Low	Low	

Tree	Botanical name	Trees in Group	Height (m)	Spread (m)	DHB (mm)	Health	Structure	TPZ (m)	SRZ (m)	SULE	Landscape significance	Retention value	Notes
256	<i>Corymbia maculata</i>	1	6	3	60	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
257	<i>Corymbia maculata</i>	1	15	5	250	Good	Good	3.0	1.8	Long (>40 years)	Medium	Medium	
258	<i>Corymbia citriodora</i>	1	14	7	280	Good	Good	3.4	1.9	Long (>40 years)	Medium	Medium	
259	<i>Corymbia maculata</i>	1	16	8	260	Good	Good	3.1	1.9	Long (>40 years)	Medium	Medium	
260	<i>Corymbia maculata</i>	1	4	1	50	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	
261	<i>Corymbia maculata</i>	1	10	4	120	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
262	<i>Corymbia maculata</i>	2	10	5	150	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	Two trees growing close together
263	<i>Corymbia maculata</i>	1	12	5	180	Good	Good	2.2	1.6	Long (>40 years)	Low	Low	
264	<i>Corymbia citriodora</i>	1	20	12	360	Good	Good	4.3	2.2	Long (>40 years)	Medium	Medium	
265	<i>Corymbia maculata</i>	1	12	5	200	Good	Good	2.4	1.7	Long (>40 years)	Medium	Medium	
266	<i>Corymbia maculata</i>	1	12	5	200	Good	Good	2.4	1.7	Long (>40 years)	Medium	Medium	
267	<i>Corymbia maculata</i>	1	8	2	110	Poor	Fair	2.0	1.5	Short (5-15 years)	Low	Low	
268	<i>Eucalyptus melliodora</i>	1	20	12	840	Poor	Fair	10.1	3.1	Medium (15-40 years)	High	High	Avenue tree. Sparse canopy
269	<i>Corymbia citriodora</i>	1	20	12	330	Good	Good	4.0	2.1	Long (>40 years)	Medium	Medium	
270	<i>Corymbia maculata</i>	3	3	2	50	Poor	Poor	2.0	1.5	Short (5-15 years)	Low	Low	Three small trees growing close together
271	<i>Corymbia maculata</i>	1	4	2	60	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	
272	<i>Corymbia citriodora</i>	1	22	12	530	Good	Good	6.4	2.5	Long (>40 years)	Medium	Medium	
273	<i>Corymbia maculata</i>	1	12	5	140	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	
274	<i>Corymbia maculata</i>	1	5	2	50	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	
275	<i>Corymbia maculata</i>	1	14	8	300	Good	Good	3.6	2.0	Long (>40 years)	Medium	Medium	
276	<i>Corymbia citriodora</i>	1	15	12	320	Good	Good	3.8	2.1	Long (>40 years)	Medium	Medium	
277	<i>Corymbia citriodora</i>	1	20	8	320	Good	Good	3.8	2.1	Long (>40 years)	Medium	Medium	
278	<i>Corymbia maculata</i>	1	16	8	350	Good	Good	4.2	2.1	Long (>40 years)	Medium	Medium	
279	<i>Eucalyptus melliodora</i>	1	20	15	650	Fair	Fair	7.8	2.8	Medium (15-40 years)	High	High	Avenue tree. 3 stems
280	<i>Schinus molle</i>	1	4	3	200	Fair	Fair	2.4	1.7	Medium (15-40 years)	Low	Low	
281	<i>Schinus molle</i>	1	9	8	350	Fair	Fair	4.2	2.1	Medium (15-40 years)	Medium	Medium	
282	<i>Schinus molle</i>	1	6	7	220	Fair	Fair	2.6	1.8	Medium (15-40 years)	Medium	Medium	
283	<i>Schinus molle</i>	1	7	8	250	Fair	Fair	3.0	1.8	Medium (15-40 years)	Medium	Medium	
284	<i>Schinus molle</i>	1	7	7	280	Fair	Fair	3.4	1.9	Medium (15-40 years)	Medium	Medium	
285	<i>Schinus molle</i>	1	8	5	180	Fair	Fair	2.2	1.6	Medium (15-40 years)	Medium	Medium	

Tree	Botanical name	Trees in Group	Height (m)	Spread (m)	DHB (mm)	Health	Structure	TPZ (m)	SRZ (m)	SULE	Landscape significance	Retention value	Notes
286	<i>Schinus molle</i>	1	10	12	450	Fair	Fair	5.4	2.4	Medium (15-40 years)	Medium	Medium	
287	<i>Schinus molle</i>	1	7	5	200	Fair	Fair	2.4	1.7	Medium (15-40 years)	Medium	Medium	
288	<i>Corymbia maculata</i>	1	19	9	340	Good	Good	4.1	2.1	Long (>40 years)	Medium	Medium	
289	<i>Corymbia maculata</i>	1	14	6	250	Good	Good	3.0	1.8	Long (>40 years)	Medium	Medium	
290	<i>Corymbia maculata</i>	1	10	3	130	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
291	<i>Corymbia maculata</i>	1	12	4	160	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
292	<i>Corymbia maculata</i>	1	8	2	100	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
293	<i>Corymbia maculata</i>	1	13	4	150	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
294	<i>Corymbia maculata</i>	1	12	5	200	Good	Fair	2.4	1.7	Long (>40 years)	Low	Low	Bifurcation
295	<i>Corymbia maculata</i>	1	10	3	100	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
296	<i>Corymbia maculata</i>	1	10	4	140	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
297	<i>Eucalyptus melliodora</i>	1	25	25	840	Good	Good	10.1	3.1	Long (>40 years)	High	High	
298	<i>Corymbia maculata</i>	1	10	4	180	Fair	Good	2.2	1.6	Long (>40 years)	Low	Low	Dead stem
299	<i>Corymbia maculata</i>	1	8	2	80	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	
300	<i>Corymbia maculata</i>	1	10	2	100	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
301	<i>Corymbia maculata</i>	1	12	4	120	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
302	<i>Corymbia maculata</i>	1	6	2	80	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	
303	<i>Corymbia maculata</i>	1	16	7	290	Good	Good	3.5	2.0	Long (>40 years)	Medium	Medium	
304	<i>Corymbia maculata</i>	1	13	5	180	Good	Good	2.2	1.6	Long (>40 years)	Low	Low	
305	<i>Eucalyptus melliodora</i>	1	23	18	670	Fair	Good	8.0	2.8	Long (>40 years)	High	High	Sparse canopy
306	<i>Corymbia maculata</i>	1	5	2	60	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	
307	<i>Corymbia maculata</i>	1	10	8	180	Good	Good	2.2	1.6	Long (>40 years)	Low	Low	
308	<i>Corymbia maculata</i>	1	10	4	100	Good	Good	2.0	1.5	Short (5-15 years)	Low	Low	
309	<i>Corymbia maculata</i>	1	10	6	160	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	Sparse canopy
310	<i>Corymbia maculata</i>	1	12	4	150	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
311	<i>Corymbia maculata</i>	1	17	8	310	Good	Good	3.7	2.0	Long (>40 years)	Medium	Medium	
312	<i>Corymbia maculata</i>	1	14	4	160	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
313	<i>Corymbia maculata</i>	1	14	5	240	Good	Good	2.9	1.8	Long (>40 years)	Medium	Medium	
314	<i>Corymbia maculata</i>	1	15	9	340	Good	Good	4.1	2.1	Long (>40 years)	Medium	Medium	
315	<i>Corymbia maculata</i>	1	15	5	260	Good	Good	3.1	1.9	Long (>40 years)	Medium	Medium	
316	<i>Corymbia maculata</i>	1	15	7	220	Good	Good	2.6	1.8	Long (>40 years)	Medium	Medium	
317	<i>Eucalyptus melliodora</i>	1	17	14	380	Fair	Good	4.6	2.2	Long (>40 years)	Medium	Medium	Sparse canopy
500	<i>Syzygium francissii</i>	1	14	8	380	Good	Good	4.6	2.2	Long (>40 years)	Medium	Medium	
501	<i>Eucalyptus saligna</i>	1	20	12	450	Good	Good	5.4	2.4	Long (>40 years)	Medium	Medium	

Tree	Botanical name	Trees in Group	Height (m)	Spread (m)	DHB (mm)	Health	Structure	TPZ (m)	SRZ (m)	SULE	Landscape significance	Retention value	Notes
502	<i>Melaleuca bracteata</i>	1	10	8	300	Good	Fair	3.6	2.0	Medium (15-40 years)	Medium	Medium	Multi trunked
503	<i>Melaleuca bracteata</i>	1	10	8	280	Good	Fair	3.4	1.9	Medium (15-40 years)	Medium	Medium	Twin stems
504	<i>Jacaranda mimosifolia</i>	1	8	7	280	Good	Good	3.4	1.9	Medium (15-40 years)	Medium	Medium	
505	<i>Callistemon viminalis</i>	1	8	7	250	Fair	Fair	3.0	1.8	Medium (15-40 years)	Medium	Medium	
506	<i>Eucalyptus tereticornis</i>	1	25	12	350	Fair	Fair	4.2	2.1	Long (>40 years)	Medium	Medium	
507	<i>Grevillea robusta</i>	1	12	8	300	Good	Good	3.6	2.0	Medium (15-40 years)	Medium	Medium	
508	<i>Brachychiton populneus</i>	1	8	7	250	Good	Good	3.0	1.8	Medium (15-40 years)	Medium	Medium	
509	<i>Eucalyptus piperita</i>	1	22	8	250	Good	Good	3.0	1.8	Medium (15-40 years)	Medium	Medium	
510	<i>Eucalyptus piperita</i>	1	20	7	350	Good	Good	4.2	2.1	Medium (15-40 years)	Medium	Medium	
511	<i>Eucalyptus piperita</i>	1	20	9	380	Good	Good	4.6	2.2	Medium (15-40 years)	Medium	Medium	
512	<i>Eucalyptus piperita</i>	1	20	7	400	Good	Good	4.8	2.3	Medium (15-40 years)	Medium	Medium	
513	<i>Eucalyptus piperita</i>	1	20	8	400	Good	Good	4.8	2.3	Medium (15-40 years)	Medium	Medium	
514	<i>Eucalyptus piperita</i>	1	18	10	350	Good	Good	4.2	2.1	Medium (15-40 years)	Medium	Medium	
515	<i>Eucalyptus piperita</i>	1	22	5	350	Fair	Fair	4.2	2.1	Medium (15-40 years)	Medium	Medium	
516	<i>Eucalyptus piperita</i>	1	18	6	350	Good	Good	4.2	2.1	Medium (15-40 years)	Medium	Medium	
517	<i>Eucalyptus piperita</i>	1	20	7	450	Good	Good	5.4	2.4	Medium (15-40 years)	Medium	Medium	
518	<i>Eucalyptus piperita</i>	1	20	15	350	Fair	Fair	4.2	2.1	Medium (15-40 years)	Medium	Medium	
519	<i>Eucalyptus piperita</i>	1	20	12	500	Good	Fair	6.0	2.5	Medium (15-40 years)	Medium	Medium	Multi trunked
520	<i>Eucalyptus piperita</i>	1	20	12	350	Fair	Fair	4.2	2.1	Medium (15-40 years)	Medium	Medium	Sparse canopy, bifurcation
521	<i>Eucalyptus piperita</i>	1	10	8	200	Fair	Fair	2.4	1.7	Medium (15-40 years)	Medium	Medium	
522	<i>Geijera parviflora</i>	1	5	6	150	Good	Fair	2.0	1.5	Medium (15-40 years)	Low	Low	
523	<i>Olea africana</i>	1	5	5	150	Good	Fair	2.0	1.5	Short (5-15 years)	Low	Low	Multi stemmed. Considered a weed

Tree	Botanical name	Trees in Group	Height (m)	Spread (m)	DHB (mm)	Health	Structure	TPZ (m)	SRZ (m)	SULE	Landscape significance	Retention value	Notes
524	<i>Viburnum odoratissimum</i>	1	5	4	200	Good	Good	2.4	1.7	Medium (15-40 years)	Low	Low	Multi trunked
525	<i>Magnolia grandiflora</i> and CV's	1	5	3	80	Good	Good	2.0	1.5	Medium (15-40 years)	Low	Low	
526	<i>Podocarpus elatus</i>	1	4	3	100	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
527	<i>Eucalyptus tereticornis</i>	1	20	14	550	Good	Fair	6.6	2.6	Medium (15-40 years)	High	High	
528	<i>Podocarpus elatus</i>	1	8	4	200	Good	Good	2.4	1.7	Long (>40 years)	Low	Low	
529	<i>Robinia 'Frisia'</i>	1	4	2	300	Fair	Fair	3.6	2.0	Medium (15-40 years)	Low	Low	Lopped
530	<i>Fraxinus griffithii</i>	1	7	8	300	Good	Good	3.6	2.0	Medium (15-40 years)	Medium	Medium	
531	<i>Robinia 'Frisia'</i>	1	3	2	280	Fair	Fair	3.4	1.9	Medium (15-40 years)	Low	Low	Lopped
532	<i>Podocarpus elatus</i>	1	7	4	150	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
533	<i>Fraxinus griffithii</i>	1	6	8	350	Good	Good	4.2	2.1	Long (>40 years)	Medium	Medium	
534	<i>Podocarpus elatus</i>	1	7	3	140	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
535	<i>Fraxinus griffithii</i>	1	4	6	140	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
536	<i>Prunus sp.</i>	1	6	3	250	Good	Fair	3.0	1.8	Medium (15-40 years)	Medium	Medium	Multi trunked
537	<i>Fraxinus griffithii</i>	1	6	5	250	Fair	Fair	3.0	1.8	Medium (15-40 years)	Medium	Medium	
538	<i>Prunus sp.</i>	1	6	4	150	Fair	Fair	2.0	1.5	Medium (15-40 years)	Low	Low	
539	<i>Eucalyptus tereticornis</i>	1	28	10	500	Good	Fair	6.0	2.5	Medium (15-40 years)	High	High	
540	<i>Corymbia maculata</i>	1	28	12	560	Good	Good	6.7	2.6	Long (>40 years)	High	High	Minor basal wounds
541	<i>Corymbia maculata</i>	1	20	9	400	Fair	Fair	4.8	2.3	Medium (15-40 years)	Medium	Medium	Sparse canopy, wound in main fork
542	<i>Corymbia maculata</i>	1	20	10	500	Fair	Good	6.0	2.5	Long (>40 years)	Medium	Medium	
543	<i>Eucalyptus moluccana</i>	1	18	10	380	Good	Good	4.6	2.2	Long (>40 years)	Medium	Medium	
544	<i>Eucalyptus moluccana</i>	1	12	8	410	Good	Good	4.9	2.3	Long (>40 years)	Medium	Medium	
545	<i>Eucalyptus tereticornis</i>	1	8	5	200	Fair	Fair	2.4	1.7	Medium (15-40 years)	Low	Low	
546	<i>Eucalyptus tereticornis</i>	1	10	6	250	Fair	Good	3.0	1.8	Medium (15-40 years)	Medium	Medium	Sparse canopy
547	<i>Eucalyptus tereticornis</i>	1	8	5	160	Good	Fair	2.0	1.5	Medium (15-40 years)	Low	Low	
548	<i>Eucalyptus tereticornis</i>	1	10	4	160	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
549	<i>Eucalyptus crebra</i>	1	25	22	930	Fair	Fair	11.2	3.2	Long (>40 years)	High	High	
550	<i>Eucalyptus moluccana</i>	1	7	2	50	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	

Tree	Botanical name	Trees in Group	Height (m)	Spread (m)	DHB (mm)	Health	Structure	TPZ (m)	SRZ (m)	SULE	Landscape significance	Retention value	Notes
551	<i>Eucalyptus moluccana</i>	1	16	15	860	Good	Fair	10.3	3.1	Long (>40 years)	High	High	Decay, wounds on trunk
552	<i>Eucalyptus tereticornis</i>	1	9	5	280	Fair	Fair	3.4	1.9	Short (5-15 years)	Low	Low	
553	<i>Eucalyptus crebra</i>	1	6	2	50	Fair	Fair	2.0	1.5	Long (>40 years)	Low	Low	
554	<i>Eucalyptus tereticornis</i>	1	10	4	120	Good	Fair	2.0	1.5	Long (>40 years)	Low	Low	Bifurcated stem
555	<i>Eucalyptus crebra</i>	1	10	3	150	Fair	Good	2.0	1.5	Long (>40 years)	Low	Low	
556	<i>Eucalyptus tereticornis</i>	1	14	8	340	Good	Fair	4.1	2.1	Medium (15-40 years)	Medium	Medium	Wounds on trunk
557	<i>Eucalyptus tereticornis</i>	1	10	4	180	Good	Good	2.2	1.6	Long (>40 years)	Low	Low	
558	<i>Eucalyptus tereticornis</i>	1	12	6	220	Good	Fair	2.6	1.8	Long (>40 years)	Medium	Medium	Bifurcation of stem
559	<i>Eucalyptus tereticornis</i>	1	14	8	280	Good	Fair	3.4	1.9	Long (>40 years)	Medium	Medium	Bifurcation of main stem
560	<i>Eucalyptus crebra</i>	1	8	3	150	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
561	<i>Eucalyptus crebra</i>	1	10	4	300	Poor	Poor	3.6	2.0	Short (5-15 years)	Medium	Low	Tree has almost died
562	<i>Eucalyptus tereticornis</i>	1	12	4	160	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
563	<i>Jacaranda mimosifolia</i>	1	3	2	50	Fair	Fair	2.0	1.5	Long (>40 years)	Low	Low	
564	<i>Jacaranda mimosifolia</i>	1	5	4	80	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
565	<i>Eucalyptus tereticornis</i>	1	10	3	140	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
566	<i>Jacaranda mimosifolia</i>	1	6	4	100	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	Multi trunked
567	<i>Eucalyptus tereticornis</i>	1	15	11	350	Good	Good	4.2	2.1	Long (>40 years)	Medium	Medium	
568	<i>Eucalyptus moluccana</i>	1	12	4	200	Good	Good	2.4	1.7	Long (>40 years)	Medium	Medium	
569	<i>Eucalyptus tereticornis</i>	1	5	2	50	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
570	<i>Eucalyptus tereticornis</i>	1	4	2	50	Fair	Good	2.0	1.5	Short (5-15 years)	Low	Low	
571	<i>Eucalyptus moluccana</i>	1	13	4	200	Good	Good	2.4	1.7	Long (>40 years)	Medium	Medium	
572	<i>Eucalyptus moluccana</i>	1	8	3	120	Good	Fair	2.0	1.5	Long (>40 years)	Low	Low	
573	<i>Eucalyptus moluccana</i>	1	14	6	360	Good	Fair	4.3	2.2	Long (>40 years)	Medium	Medium	Twin bifurcated stem
574	<i>Eucalyptus moluccana</i>	1	14	6	320	Good	Good	3.8	2.1	Long (>40 years)	Medium	Medium	
575	<i>Eucalyptus moluccana</i>	1	10	3	120	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
576	<i>Eucalyptus moluccana</i>	1	14	8	240	Good	Good	2.9	1.8	Long (>40 years)	Medium	Medium	Twin stems
577	<i>Eucalyptus tereticornis</i>	1	5	2	50	Poor	Poor	2.0	1.5	Short (5-15 years)	Low	Low	
578	<i>Eucalyptus moluccana</i>	1	14	4	200	Good	Good	2.4	1.7	Long (>40 years)	Medium	Medium	
579	<i>Eucalyptus crebra</i>	1	7	2	100	Fair	Good	2.0	1.5	Medium (15-40 years)	Low	Low	
580	<i>Casuarina glauca</i>	1	12	4	100	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
581	<i>Eucalyptus crebra</i>	1	6	2	50	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
582	<i>Melaleuca decora</i>	1	3	1	50	Good	Good	2.0	1.5	Medium (15-40 years)	Low	Low	
583	<i>Casuarina glauca</i>	1	14	4	120	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
584	<i>Eucalyptus moluccana</i>	1	15	5	310	Good	Good	3.7	2.0	Long (>40 years)	Medium	Medium	

Tree	Botanical name	Trees in Group	Height (m)	Spread (m)	DHB (mm)	Health	Structure	TPZ (m)	SRZ (m)	SULE	Landscape significance	Retention value	Notes
585	<i>Eucalyptus moluccana</i>	1	15	6	400	Good	Poor	4.8	2.3	Short (5-15 years)	Medium	Low	Split in stem
586	<i>Melaleuca decora</i>	1	3	2	50	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	
587	<i>Melaleuca decora</i>	1	3	2	50	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	
588	<i>Melaleuca decora</i>	1	3	3	50	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	
589	<i>Casuarina glauca</i>	1	12	6	280	Good	Good	3.4	1.9	Long (>40 years)	Medium	Medium	Multi trunked
590	<i>Melaleuca decora</i>	1	4	2	80	Poor	Fair	2.0	1.5	Short (5-15 years)	Low	Low	
591	<i>Melaleuca decora</i>	1	3	1	50	Poor	Fair	2.0	1.5	Short (5-15 years)	Low	Low	
592	<i>Eucalyptus sideroxylon</i>	1	14	5	240	Good	Fair	2.9	1.8	Medium (15-40 years)	Medium	Medium	Bifurcated stem
593	<i>Eucalyptus tereticornis</i>	1	12	6	180	Fair	Good	2.2	1.6	Medium (15-40 years)	Low	Low	
594	<i>Jacaranda mimosifolia</i>	1	3	4	70	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
595	<i>Jacaranda mimosifolia</i>	1	5	4	100	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
596	<i>Eucalyptus tereticornis</i>	1	17	2	50	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	
597	<i>Eucalyptus crebra</i>	1	17	7	400	Poor	Fair	4.8	2.3	Short (5-15 years)	Medium	Low	Top dying
598	<i>Eucalyptus tereticornis</i>	1	12	5	150	Fair	Fair	2.0	1.5	Medium (15-40 years)	Low	Low	
599	<i>Jacaranda mimosifolia</i>	1	4	3	60	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
600	<i>Jacaranda mimosifolia</i>	1	6	5	160	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	Multi trunked
601	<i>Eucalyptus tereticornis</i>	1	18	6	300	Fair	Good	3.6	2.0	Long (>40 years)	Medium	Medium	Sparse canopy
602	<i>Eucalyptus sideroxylon</i>	1	10	4	150	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
603	<i>Eucalyptus sideroxylon</i>	1	14	7	300	Fair	Good	3.6	2.0	Long (>40 years)	Medium	Medium	Sparse canopy
604	<i>Eucalyptus moluccana</i>	1	17	6	300	Good	Good	3.6	2.0	Long (>40 years)	Medium	Medium	
605	<i>Eucalyptus sideroxylon</i>	1	17	5	260	Good	Fair	3.1	1.9	Long (>40 years)	Medium	Medium	Bifurcation of main stem
606	<i>Eucalyptus sideroxylon</i>	1	18	9	320	Good	Good	3.8	2.1	Long (>40 years)	Medium	Medium	Possible termite infestation
607	<i>Eucalyptus tereticornis</i>	1	16	6	300	Fair	Good	3.6	2.0	Long (>40 years)	Medium	Medium	Sparse canopy
608	<i>Jacaranda mimosifolia</i>	1	5	3	100	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
609	<i>Jacaranda mimosifolia</i>	1	5	4	100	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
610	<i>Jacaranda mimosifolia</i>	1	4	1	50	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
611	<i>Jacaranda mimosifolia</i>	1	8	6	160	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
612	<i>Eucalyptus tereticornis</i>	1	18	10	320	Good	Good	3.8	2.1	Long (>40 years)	Medium	Medium	
613	<i>Eucalyptus tereticornis</i>	1	14	6	300	Good	Good	3.6	2.0	Long (>40 years)	Medium	Medium	
614	<i>Jacaranda mimosifolia</i>	1	10	8	260	Good	Good	3.1	1.9	Long (>40 years)	Medium	Medium	
615	<i>Eucalyptus tereticornis</i>	1	19	7	310	Fair	Fair	3.7	2.0	Long (>40 years)	Medium	Medium	Minor basal wound, Sparse canopy
616	<i>Eucalyptus tereticornis</i>	1	10	4	140	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
617	<i>Eucalyptus tereticornis</i>	1	14	5	260	Good	Good	3.1	1.9	Long (>40 years)	Medium	Medium	
618	<i>Eucalyptus tereticornis</i>	1	10	7	300	Good	Good	3.6	2.0	Long (>40 years)	Medium	Medium	

Tree	Botanical name	Trees in Group	Height (m)	Spread (m)	DHB (mm)	Health	Structure	TPZ (m)	SRZ (m)	SULE	Landscape significance	Retention value	Notes
619	<i>Eucalyptus tereticornis</i>	1	18	6	400	Good	Fair	4.8	2.3	Long (>40 years)	Medium	Medium	Bifurcation of main stem
620	<i>Eucalyptus tereticornis</i>	1	4	2	120	Poor	Poor	2.0	1.5	Short (5-15 years)	Low	Low	Top has died back
621	<i>Eucalyptus tereticornis</i>	1	18	12	360	Good	Fair	4.3	2.2	Long (>40 years)	Medium	Medium	Minor basal wound
622	<i>Melia azedarach</i>	1	12	12	350	Good	Good	4.2	2.1	Long (>40 years)	Medium	Medium	
623	<i>Melia azedarach</i>	1	4	6	160	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	Multi trunked
624	<i>Grevillea robusta</i>	1	14	5	280	Good	Good	3.4	1.9	Long (>40 years)	Low	Low	
625	<i>Corymbia gummifera</i>	1	14	10	350	Fair	Fair	4.2	2.1	Long (>40 years)	Medium	Medium	Hanging branch Lodged up
626	<i>Grevillea robusta</i>	1	12	8	300	Good	Good	3.6	2.0	Long (>40 years)	Medium	Medium	
627	<i>Melia azedarach</i>	1	3	4	80	Good	Good	2.0	1.5	Short (5-15 years)	Low	Low	
628	<i>Eucalyptus tereticornis</i>	1	16	8	340	Good	Fair	4.1	2.1	Long (>40 years)	Medium	Medium	Borers, basal wound
629	<i>Grevillea robusta</i>	1	4	1	50	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
630	<i>Grevillea robusta</i>	1	12	5	260	Good	Good	3.1	1.9	Long (>40 years)	Medium	Medium	
631	<i>Eucalyptus tereticornis</i>	1	17	5	250	Good	Fair	3.0	1.8	Long (>40 years)	Medium	Medium	Basal wound
632	<i>Grevillea robusta</i>	1	8	4	180	Fair	Good	2.2	1.6	Medium (15-40 years)	Low	Low	Sparse at top
633	<i>Grevillea robusta</i>	1	15	6	280	Fair	Good	3.4	1.9	Long (>40 years)	Medium	Medium	
634	<i>Eucalyptus tereticornis</i>	1	16	7	340	Fair	Fair	4.1	2.1	Long (>40 years)	Medium	Medium	Bifurcated stem
635	<i>Grevillea robusta</i>	1	14	8	329	Good	Good	3.9	2.1	Long (>40 years)	Medium	Medium	
636	<i>Eucalyptus sideroxylon</i>	1	17	10	470	Good	Fair	5.6	2.4	Medium (15-40 years)	Medium	Medium	Twin stems, wound at base
637	<i>Eucalyptus sideroxylon</i>	1	15	6	320	Poor	Fair	3.8	2.1	Remove (<5 years)	Low	Low	Dead tree
638	<i>Eucalyptus sideroxylon</i>	1	18	8	400	Good	Good	4.8	2.3	Long (>40 years)	Medium	Medium	
639	<i>Eucalyptus sideroxylon</i>	1	5	3	150	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	
640	<i>Jacaranda mimosifolia</i>	1	7	6	200	Good	Fair	2.4	1.7	Long (>40 years)	Medium	Medium	
641	<i>Jacaranda mimosifolia</i>	1	9	7	240	Good	Good	2.9	1.8	Long (>40 years)	Medium	Medium	
642	<i>Grevillea robusta</i>	1	12	6	300	Good	Good	3.6	2.0	Long (>40 years)	Medium	Medium	
643	<i>Grevillea robusta</i>	1	14	8	320	Good	Fair	3.8	2.1	Long (>40 years)	Medium	Medium	Bifurcated stem
644	<i>Lagerstroemia indica</i>	1	6	5	150	Good	Good	2.0	1.5	Medium (15-40 years)	Low	Low	Multi trunked
645	<i>Lagerstroemia indica</i>	1	5	4	140	Poor	Fair	2.0	1.5	Short (5-15 years)	Low	Low	
646	<i>Lagerstroemia indica</i>	1	8	6	220	Good	Good	2.6	1.8	Medium (15-40 years)	Medium	Medium	Multi trunked
647	<i>Lagerstroemia indica</i>	1	6	5	170	Good	Good	2.0	1.6	Medium (15-40 years)	Low	Low	Bifurcation of stem
648	<i>Lagerstroemia indica</i>	1	6	6	140	Good	Fair	2.0	1.5	Medium (15-40 years)	Low	Low	Bifurcation of stem
649	<i>Eucalyptus sideroxylon</i>	1	17	7	320	Good	Good	3.8	2.1	Long (>40 years)	Medium	Medium	
650	<i>Casuarina glauca</i>	1	7	1	70	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	

Tree	Botanical name	Trees in Group	Height (m)	Spread (m)	DHB (mm)	Health	Structure	TPZ (m)	SRZ (m)	SULE	Landscape significance	Retention value	Notes
651	<i>Casuarina glauca</i>	1	8	1	60	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
652	<i>Casuarina glauca</i>	1	8	1	60	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
653	<i>Grevillea robusta</i>	1	11	4	210	Good	Fair	2.5	1.7	Medium (15-40 years)	Medium	Medium	Basal wound
654	<i>Eucalyptus sideroxylon</i>	1	12	6	340	Good	Fair	4.1	2.1	Long (>40 years)	Medium	Medium	Mechanical damage
655	<i>Eucalyptus sideroxylon</i>	1	14	7	320	Fair	Good	3.8	2.1	Medium (15-40 years)	Medium	Medium	Low branches dying back
656	<i>Eucalyptus tereticornis</i>	1	20	18	950	Fair	Fair	11.4	3.2	Medium (15-40 years)	High	High	Basal wounds
657	<i>Eucalyptus tereticornis</i>	1	16	20	1000	Good	Fair	12.0	3.3	Medium (15-40 years)	High	High	Some wounding at base and lower trunk
658	<i>Eucalyptus sideroxylon</i>	1	13	6	280	Good	Good	3.4	1.9	Long (>40 years)	Medium	Medium	
659	<i>Eucalyptus tereticornis</i>	1	12	6	300	Good	Fair	3.6	2.0	Long (>40 years)	Medium	Medium	Borers
660	<i>Eucalyptus moluccana</i>	1	10	3	140	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
661	<i>Eucalyptus tereticornis</i>	1	8	3	140	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
662	<i>Eucalyptus tereticornis</i>	1	6	1	100	Poor	Poor	2.0	1.5	Short (5-15 years)	Low	Low	Dying back
663	<i>Eucalyptus tereticornis</i>	1	6	2	120	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	Low branch torn out
664	<i>Eucalyptus sideroxylon</i>	1	20	10	630	Fair	Fair	7.6	2.7	Long (>40 years)	High	High	Wounds on lower trunk
665	<i>Casuarina glauca</i>	1	9	3	140	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
666	<i>Casuarina glauca</i>	1	7	2	50	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
667	<i>Casuarina glauca</i>	1	6	1	50	Poor	Fair	2.0	1.5	Short (5-15 years)	Low	Low	
668	<i>Casuarina glauca</i>	1	10	4	140	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
669	<i>Casuarina glauca</i>	1	10	3	120	Fair	Fair	2.0	1.5	Long (>40 years)	Low	Low	
670	<i>Casuarina glauca</i>	1	8	2	60	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	
671	<i>Casuarina glauca</i>	1	4	1	50	Fair	Fair	2.0	1.5	Long (>40 years)	Low	Low	
672	<i>Casuarina glauca</i>	1	4	1	50	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
673	<i>Casuarina glauca</i>	1	10	3	100	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	Twin stemmed
674	<i>Casuarina glauca</i>	1	14	4	160	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
675	<i>Grevillea robusta</i>	1	12	10	340	Good	Good	4.1	2.1	Long (>40 years)	Medium	Medium	
676	<i>Casuarina glauca</i>	1	10	3	150	Fair	Fair	2.0	1.5	Long (>40 years)	Low	Low	
677	<i>Casuarina glauca</i>	1	10	2	80	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
678	<i>Casuarina glauca</i>	1	10	3	120	Poor	Poor	2.0	1.5	Remove (<5 years)	Low	Low	
679	<i>Casuarina glauca</i>	1	12	3	150	Poor	Poor	2.0	1.5	Remove (<5 years)	Low	Low	Dead tree
680	<i>Casuarina glauca</i>	1	8	4	150	Fair	Fair	2.0	1.5	Long (>40 years)	Low	Low	Twin stems
681	<i>Casuarina glauca</i>	1	20	5	220	Good	Good	2.6	1.8	Long (>40 years)	Medium	Medium	
682	<i>Casuarina glauca</i>	1	22	6	320	Good	Good	3.8	2.1	Long (>40 years)	Medium	Medium	
683	<i>Casuarina glauca</i>	1	12	4	160	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
684	<i>Melia azedarach</i>	1	5	5	120	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	

Tree	Botanical name	Trees in Group	Height (m)	Spread (m)	DHB (mm)	Health	Structure	TPZ (m)	SRZ (m)	SULE	Landscape significance	Retention value	Notes
685	<i>Melia azedarach</i>	1	6	6	180	Good	Good	2.2	1.6	Long (>40 years)	Low	Low	
686	<i>Melia azedarach</i>	1	8	7	160	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	Twin stems
687	<i>Grevillea robusta</i>	1	9	2	80	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
688	<i>Olea africana</i>	1	5	5	80	Good	Good	2.0	1.5	Remove (<5 years)	Low	Low	Multi stemmed, considered a weed
689	<i>Eucalyptus tereticornis</i>	1	16	20	770	Good	Fair	9.2	3.0	Long (>40 years)	High	High	Multi stemmed, borers and wounds on stems
690	<i>Eucalyptus tereticornis</i>	1	20	18	1000	Good	Fair	12.0	3.3	Long (>40 years)	High	High	Base of tree not accessed due to dense Lantana. Multi trunked
691	<i>Olea africana</i>	1	4	3	70	Good	Good	2.0	1.5	Remove (<5 years)	Low	Low	Considered a weed. No access to the base of the tree due to dense Lantana
692	<i>Melia azedarach</i>	1	4	4	50	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	No access to the base of the tree due to dense Lantana
693	<i>Eucalyptus tereticornis</i>	1	22	12	600	Good	Good	7.2	2.7	Long (>40 years)	High	High	Twin stemmed. No access to the base of the tree due to dense Lantana
694	<i>Eucalyptus tereticornis</i>	1	26	12	700	Good	Good	8.4	2.8	Long (>40 years)	High	High	No access to the base of the tree due to dense Lantana
695	<i>Eucalyptus tereticornis</i>	1	10	4	180	Fair	Fair	2.2	1.6	Short (5-15 years)	Low	Low	No access to the base of the tree due to dense Lantana
696	<i>Eucalyptus tereticornis</i>	1	25	25	1000	Good	Good	12.0	3.3	Long (>40 years)	High	High	No access to the base of the tree due to dense Lantana
697	<i>Melia azedarach</i>	1	4	4	50	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	No access to the base of the tree due to dense Lantana
698	<i>Ligustrum lucidum</i>	1	7	4	150	Good	Good	2.0	1.5	Remove (<5 years)	Low	Low	No access to the base of the tree due to dense Lantana. Considered a weed
699	<i>Olea africana</i>	1	6	3	80	Good	Good	2.0	1.5	Remove (<5 years)	Low	Low	No access to the base of the tree due to dense Lantana. Considered a weed
700	<i>Acacia parramattensis</i>	1	12	8	140	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	Borer in trunk
701	<i>Morus nigra</i>	1	10	10	300	Good	Good	3.6	2.0	Medium (15-40 years)	Medium	Medium	
702	<i>Acacia parramattensis</i>	1	4	2	50	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	No access to the base of the tree due to dense Lantana
703	<i>Melia azedarach</i>	1	4	5	100	Good	Good	2.0	1.5	Medium (15-40 years)	Low	Low	No access to the base of the tree due to dense Lantana. Multi stemmed
704	<i>Eucalyptus tereticornis</i>	1	25	20	800	Good	Fair	9.6	3.0	Long (>40 years)	High	High	No access to the base of the tree due to dense Lantana
705	<i>Ligustrum lucidum</i>	1	6	6	150	Good	Good	2.0	1.5	Remove (<5 years)	Low	Low	No access to the base of the tree due to dense Lantana. Considered a weed
706	<i>Ligustrum lucidum</i>	1	6	3	100	Fair	Fair	2.0	1.5	Remove (<5 years)	Low	Low	By base of Tree 707. Considered a weed
707	<i>Eucalyptus tereticornis</i>	1	22	10	500	Good	Good	6.0	2.5	Medium (15-40 years)	Medium	Medium	
708	<i>Eucalyptus tereticornis</i>	1	28	8	340	Good	Good	4.1	2.1	Long (>40 years)	Medium	Medium	No access to the base of the tree due to dense Lantana
709	<i>Eucalyptus tereticornis</i>	1	28	10	400	Good	Good	4.8	2.3	Long (>40 years)	Medium	Medium	No access to the base of the tree due to dense Lantana
710	<i>Eucalyptus tereticornis</i>	1	30	15	400	Good	Good	4.8	2.3	Long (>40 years)	Medium	Medium	
711	<i>Melia azedarach</i>	1	5	4	70	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	No access to the base of the tree due to dense Lantana.
712	<i>Eucalyptus tereticornis</i>	1	22	5	300	Good	Fair	3.6	2.0	Long (>40 years)	Medium	Medium	No access to the base of the tree due to dense Lantana. Twin stems
713	<i>Eucalyptus tereticornis</i>	1	22	6	300	Good	Good	3.6	2.0	Long (>40 years)	Medium	Medium	No access to the base of the tree due to dense Lantana
714	<i>Eucalyptus tereticornis</i>	1	26	6	350	Good	Good	4.2	2.1	Long (>40 years)	Medium	Medium	
715	<i>Eucalyptus tereticornis</i>	1	25	8	300	Good	Good	3.6	2.0	Long (>40 years)	Medium	Medium	
716	<i>Ligustrum lucidum</i>	1	6	4	100	Good	Good	2.0	1.5	Remove (<5 years)	Low	Low	No access to the base of the tree due to dense Lantana. Considered a weed
717	<i>Eucalyptus tereticornis</i>	1	12	5	290	Fair	Fair	3.5	2.0	Medium (15-40 years)	Medium	Medium	
718	Dead tree	1	30	15	980	Poor	Fair	11.8	3.3	Long (>40 years)	High	High	Large dead tree. Consider retaining and pruning for habitat

Tree	Botanical name	Trees in Group	Height (m)	Spread (m)	DHB (mm)	Health	Structure	TPZ (m)	SRZ (m)	SULE	Landscape significance	Retention value	Notes
719	<i>Eucalyptus saligna</i>	1	35	15	880	Poor	Fair	10.6	3.1	Long (>40 years)	High	High	Very large tree appears to be dying. Consider pruning and retaining for habitat
720	<i>Eucalyptus saligna</i>	1	12	5	220	Fair	Fair	2.6	1.8	Medium (15-40 years)	Medium	Medium	
721	<i>Eucalyptus saligna</i>	1	14	5	200	Fair	Fair	2.4	1.7	Medium (15-40 years)	Medium	Medium	
722	<i>Eucalyptus microcorys</i>	1	30	15	730	Good	Good	8.8	2.9	Long (>40 years)	High	High	
723	<i>Eucalyptus moluccana</i>	1	23	12	480	Good	Good	5.8	2.4	Long (>40 years)	Medium	Medium	
724	<i>Eucalyptus saligna</i>	1	5	2	50	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	
725	<i>Eucalyptus saligna</i>	1	6	2	120	Fair	Fair	2.0	1.5	Medium (15-40 years)	Low	Low	
726	<i>Eucalyptus saligna</i>	1	8	2	80	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	
727	<i>Eucalyptus saligna</i>	1	7	2	80	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	
728	<i>Eucalyptus saligna</i>	1	4	1	50	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	
729	<i>Eucalyptus saligna</i>	1	10	4	150	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
730	<i>Eucalyptus saligna</i>	1	10	4	180	Fair	Fair	2.2	1.6	Long (>40 years)	Low	Low	
731	<i>Eucalyptus microcorys</i>	1	12	4	150	Good	Fair	2.0	1.5	Medium (15-40 years)	Low	Low	
732	<i>Eucalyptus saligna</i>	1	6	1	60	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	
733	<i>Eucalyptus saligna</i>	1	20	8	400	Good	Good	4.8	2.3	Long (>40 years)	Medium	Medium	
734	<i>Eucalyptus saligna</i>	1	10	3	110	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	
735	<i>Eucalyptus saligna</i>	1	12	4	160	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
736	<i>Eucalyptus microcorys</i>	1	7	2	100	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
737	<i>Eucalyptus saligna</i>	1	12	4	180	Good	Good	2.2	1.6	Long (>40 years)	Low	Low	
738	<i>Eucalyptus saligna</i>	1	8	3	120	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	
739	<i>Eucalyptus saligna</i>	1	10	3	110	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	
740	Dead tree	1	18	15	700	Poor	Poor	8.4	2.8	Long (>40 years)	High	High	Dead tree consider pruning and retaining for habitat
741	<i>Eucalyptus microcorys</i>	1	12	4	140	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
742	<i>Eucalyptus saligna</i>	1	25	10	650	Good	Good	7.8	2.8	Long (>40 years)	High	High	
743	<i>Eucalyptus saligna</i>	1	4	2	50	Poor	Fair	2.0	1.5	Short (5-15 years)	Low	Low	
744	<i>Eucalyptus microcorys</i>	1	22	10	350	Good	Fair	4.2	2.1	Long (>40 years)	Medium	Medium	Twin stemmed
745	<i>Eucalyptus moluccana</i>	1	18	15	550	Good	Good	6.6	2.6	Long (>40 years)	Medium	Medium	
746	<i>Eucalyptus saligna</i>	1	20	5	320	Good	Good	3.8	2.1	Long (>40 years)	Medium	Medium	
747	<i>Eucalyptus microcorys</i>	1	15	4	150	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
748	<i>Eucalyptus tereticornis</i>	1	5	1	50	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	
749	<i>Eucalyptus microcorys</i>	1	5	3	80	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	
750	<i>Eucalyptus tereticornis</i>	1	8	2	90	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	
751	<i>Eucalyptus tereticornis</i>	1	15	5	160	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
752	<i>Eucalyptus tereticornis</i>	1	16	5	200	Good	Good	2.4	1.7	Long (>40 years)	Medium	Medium	

Tree	Botanical name	Trees in Group	Height (m)	Spread (m)	DHB (mm)	Health	Structure	TPZ (m)	SRZ (m)	SULE	Landscape significance	Retention value	Notes
753	<i>Eucalyptus tereticornis</i>	1	5	1	50	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	
754	<i>Eucalyptus saligna</i>	1	16	5	30	Good	Good	2.0	1.5	Long (>40 years)	Medium	Medium	
755	<i>Eucalyptus tereticornis</i>	1	15	5	180	Poor	Fair	2.2	1.6	Short (5-15 years)	Low	Low	
756	<i>Eucalyptus tereticornis</i>	1	18	8	300	Good	Good	3.6	2.0	Long (>40 years)	Medium	Medium	
757	<i>Eucalyptus saligna</i>	1	16	6	320	Good	Good	3.8	2.1	Long (>40 years)	Medium	Medium	Growing very close to tree number 723. Twin stemmed
758	<i>Eucalyptus moluccana</i>	1	12	4	150	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
759	<i>Eucalyptus tereticornis</i>	1	12	6	240	Good	Good	2.9	1.8	Long (>40 years)	Medium	Medium	
760	<i>Eucalyptus tereticornis</i>	1	10	4	140	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
761	<i>Eucalyptus tereticornis</i>	1	5	1	70	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	
762	<i>Eucalyptus punctata</i>	1	7	2	100	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	
763	<i>Eucalyptus microcorys</i>	1	20	8	380	Good	Good	4.6	2.2	Long (>40 years)	Medium	Medium	
764	<i>Eucalyptus microcorys</i>	1	14	5	260	Fair	Good	3.1	1.9	Long (>40 years)	Medium	Medium	
765	<i>Eucalyptus tereticornis</i>	1	28	12	800	Good	Fair	9.6	3.0	Long (>40 years)	High	High	Not directly accessed due to dense Lantana
766	<i>Eucalyptus tereticornis</i>	1	5	3	80	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	
767	<i>Eucalyptus tereticornis</i>	1	8	3	120	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
768	<i>Eucalyptus punctata</i>	1	15	10	200	Good	Good	2.4	1.7	Long (>40 years)	Low	Low	
769	<i>Eucalyptus tereticornis</i>	1	10	5	140	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
770	<i>Eucalyptus moluccana</i>	1	14	5	180	Good	Good	2.2	1.6	Long (>40 years)	Low	Low	
771	<i>Eucalyptus punctata</i>	1	25	15	380	Good	Good	4.6	2.2	Long (>40 years)	Medium	Medium	
772	<i>Ligustrum lucidum</i>	1	10	6	240	Good	Fair	2.9	1.8	Remove (<5 years)	Low	Low	Considered a weed
773	<i>Eucalyptus moluccana</i>	1	14	5	140	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
774	<i>Eucalyptus punctata</i>	1	18	8	320	Good	Good	3.8	2.1	Long (>40 years)	Medium	Medium	
775	<i>Eucalyptus microcorys</i>	1	28	15	500	Good	Good	6.0	2.5	Long (>40 years)	High	High	
776	<i>Eucalyptus tereticornis</i>	1	20	8	300	Good	Good	3.6	2.0	Long (>40 years)	Medium	Medium	
777	<i>Eucalyptus tereticornis</i>	1	20	6	300	Good	Good	3.6	2.0	Long (>40 years)	Medium	Medium	
778	<i>Eucalyptus tereticornis</i>	1	22	6	400	Fair	Good	4.8	2.3	Long (>40 years)	Medium	Medium	
779	<i>Eucalyptus moluccana</i>	1	26	15	940	Good	Good	11.3	3.2	Long (>40 years)	High	High	Bifurcation
780	<i>Eucalyptus tereticornis</i>	1	12	4	100	Fair	Fair	2.0	1.5	Long (>40 years)	Low	Low	
781	<i>Eucalyptus moluccana</i>	1	8	2	80	Good	Good	2.0	1.5	Short (5-15 years)	Low	Low	
782	<i>Eucalyptus microcorys</i>	1	25	15	560	Good	Good	6.7	2.6	Long (>40 years)	High	High	
783	<i>Eucalyptus tereticornis</i>	1	16	8	320	Good	Good	3.8	2.1	Long (>40 years)	Medium	Medium	
784	<i>Eucalyptus tereticornis</i>	1	14	5	280	Good	Good	3.4	1.9	Long (>40 years)	Medium	Medium	
785	<i>Eucalyptus moluccana</i>	1	16	5	300	Good	Good	3.6	2.0	Long (>40 years)	Medium	Medium	
786	<i>Eucalyptus tereticornis</i>	1	25	15	930	Good	Good	11.2	3.2	Long (>40 years)	High	High	
787	<i>Acacia parramattensis</i>	1	8	3	100	Good	Good	2.0	1.5	Short (5-15 years)	Low	Low	
788	<i>Acacia parramattensis</i>	1	10	2	120	Good	Good	2.0	1.5	Short (5-15 years)	Low	Low	

Tree	Botanical name	Trees in Group	Height (m)	Spread (m)	DHB (mm)	Health	Structure	TPZ (m)	SRZ (m)	SULE	Landscape significance	Retention value	Notes
789	<i>Acacia parramattensis</i>	1	5	1	50	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	No direct access due to dense Lantana
790	<i>Acacia parramattensis</i>	1	5	1	50	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	No direct access due to dense Lantana
791	<i>Acacia parramattensis</i>	1	5	1	50	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	No direct access due to dense Lantana
792	<i>Eucalyptus microcorys</i>	1	7	2	70	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	
793	<i>Acacia parramattensis</i>	1	10	2	50	Good	Good	2.0	1.5	Short (5-15 years)	Low	Low	
794	<i>Ligustrum sinense</i>	1	4	1	50	Good	Good	2.0	1.5	Remove (<5 years)	Low	Low	Considered a weed
795	<i>Acacia parramattensis</i>	1	5	1	50	Good	Good	2.0	1.5	Short (5-15 years)	Low	Low	
796	<i>Acacia parramattensis</i>	1	8	2	50	Good	Good	2.0	1.5	Short (5-15 years)	Low	Low	
797	<i>Acacia parramattensis</i>	1	8	2	50	Poor	Fair	2.0	1.5	Short (5-15 years)	Low	Low	Dying
798	<i>Melia azedarach</i>	1	14	5	160	Fair	Fair	2.0	1.5	Medium (15-40 years)	Low	Low	
799	<i>Eucalyptus tereticornis</i>	1	15	5	270	Fair	Fair	3.2	1.9	Long (>40 years)	Medium	Medium	
800	<i>Eucalyptus moluccana</i>	1	12	4	130	Good	Good	2.0	1.5	Short (5-15 years)	Low	Low	
801	<i>Eucalyptus moluccana</i>	1	10	4	120	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
803	<i>Corymbia maculata</i>	1	18	10	380	Good	Fair	4.6	2.2	Long (>40 years)	Medium	Medium	Bifurcation of stem at 10m
804	<i>Eucalyptus microcorys</i>	1	17	15	380	Good	Good	4.6	2.2	Long (>40 years)	Medium	Medium	
805	<i>Eucalyptus tereticornis</i>	1	22	15	1120	Good	Good	13.4	3.5	Long (>40 years)	High	High	Bifurcation
806	<i>Eucalyptus microcorys</i>	1	12	6	280	Good	Good	3.4	1.9	Long (>40 years)	Medium	Medium	
807	<i>Eucalyptus saligna</i>	1	30	20	700	Good	Good	8.4	2.8	Long (>40 years)	High	High	
808	<i>Eucalyptus saligna</i>	1	25	15	800	Good	Good	9.6	3.0	Long (>40 years)	High	High	
809	<i>Melia azedarach</i>	1	10	10	300	Good	Good	3.6	2.0	Long (>40 years)	Medium	Medium	
810	<i>Angophora floribunda</i>	1	11	3	150	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	
811	<i>Angophora floribunda</i>	1	16	10	450	Good	Good	5.4	2.4	Long (>40 years)	Medium	Medium	No direct access due to dense Lantana
812	<i>Eucalyptus tereticornis</i>	1	7	2	80	Poor	Poor	2.0	1.5	Short (5-15 years)	Low	Low	
813	<i>Eucalyptus tereticornis</i>	1	18	10	400	Good	Good	4.8	2.3	Long (>40 years)	Medium	Medium	No direct access due to dense Lantana
814	<i>Eucalyptus tereticornis</i>	1	12	5	150	Fair	Good	2.0	1.5	Long (>40 years)	Low	Low	
1500	<i>Casuarina glauca</i>	25	12	3	150	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	Group of approximately 25 trees. See separate notes
1514	Mixed group	200	10	3	100	Fair	Fair	2.0	1.5	Remove (<5 years)	Low	Low	Mixed weeds of <i>Ligustrum lucidum</i> and <i>Melia azedarach</i> . Dimensions provided show average

Appendix D Tree protection guidelines

The following tree protection guidelines must be implemented during the construction period if no tree-specific recommendations are detailed.

D1 Tree protection fencing

The TPZ is a restricted area delineated by protective fencing or the use of an existing structure (such as a wall or fence).

Trees that are to be retained must have protective fencing erected around the TPZ (or as specified in the body of the report) to protect and isolate it from the construction works. Fencing must comply with the Australian Standard, AS 4687-2007, Temporary fencing and hoardings.

Tree protection fencing must be installed prior to site establishment and remain intact until completion of works. Once erected, protective fencing must not be removed or altered without the approval of the project arborist.

If the protective fencing requires temporary removal, trunk, branch and ground protection must be installed and must comply with AS 4970-2009, Protection of Trees on Development Sites.

Tree protection fencing shall be:

- Enclosed to the full extent of the TPZ (or as specified in the Recommendations and Tree Protection Plan).
- Cyclone chain wire link fence or similar, with lockable access gates.
- Certified and Inspected by the Project Arborist.
- Installed prior to any machinery or material are brought to site and before the commencement of works.
- Prominently sign posted with 300 mm x 450 mm boards stating, "NO ACCESS - TREE PROTECTION ZONE".

D2 Crown protection

Tree crowns/canopy may be injured or damaged by machinery such as; excavators, drilling rigs, trucks, cranes, plant and vehicles. Where crown protection is required, it will usually be located at least one meter outside the perimeter of the crown.

Crown protection may include the installation of a physical barrier, pruning selected branches to establish clearance, or the tying/bracing of branches.

D3 Trunk protection

Where provision of tree protection fencing is impractical or must be temporarily removed, trunk protection shall be installed for the nominated trees to avoid accidental mechanical damage.

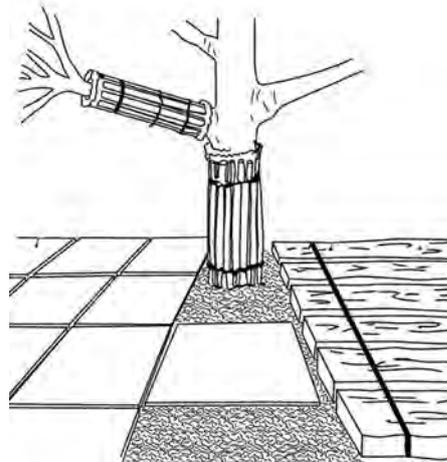
The removal of bark or branches allows the potential ingress of micro-organisms which may cause decay. Furthermore, the removal of bark restricts the trees' ability to distribute water, mineral ions (solutes), and glucose.

Trunk protection shall consist of a layer of either carpet underfelt, geotextile fabric or similar wrapped around the trunk, followed by 1.8 m lengths of softwood timbers aligned vertically and spaced evenly around the trunk (with an approx. 50 mm gap between the timbers).

The timbers must be secured using galvanised hoop strap (aluminium strapping). The timbers shall be wrapped around the trunk but not fixed to the tree, as this will cause injury/damage to the tree.



Tree protection fencing



Trunk protection fencing

D4 Ground protection

Tree roots are essential for the uptake/absorption of water, oxygen and mineral ions (solutes). It is essential to prevent the disturbance of the soil beneath the dripline and within the TPZ of trees that are to be retained. Soil compaction within the TPZ will adversely affect the ability of roots to function correctly.

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. Maintain a thick layer of mulch around all retained trees to a depth of 100 mm using coarse pine bark or wood chip material that complies with AS 4454. Where the existing landscape within the TPZ is to remain unaltered (e.g. garden beds or turf) mulch may not be required.

For heavy vehicle access within TPZ, ground protection may include a permeable membrane such as geotextile fabric beneath a layer of crushed rock or rumble boards.

If the grade is to be raised within the TPZ, the material should be coarser or more porous than the underlying material.

D5 Root protection and investigation

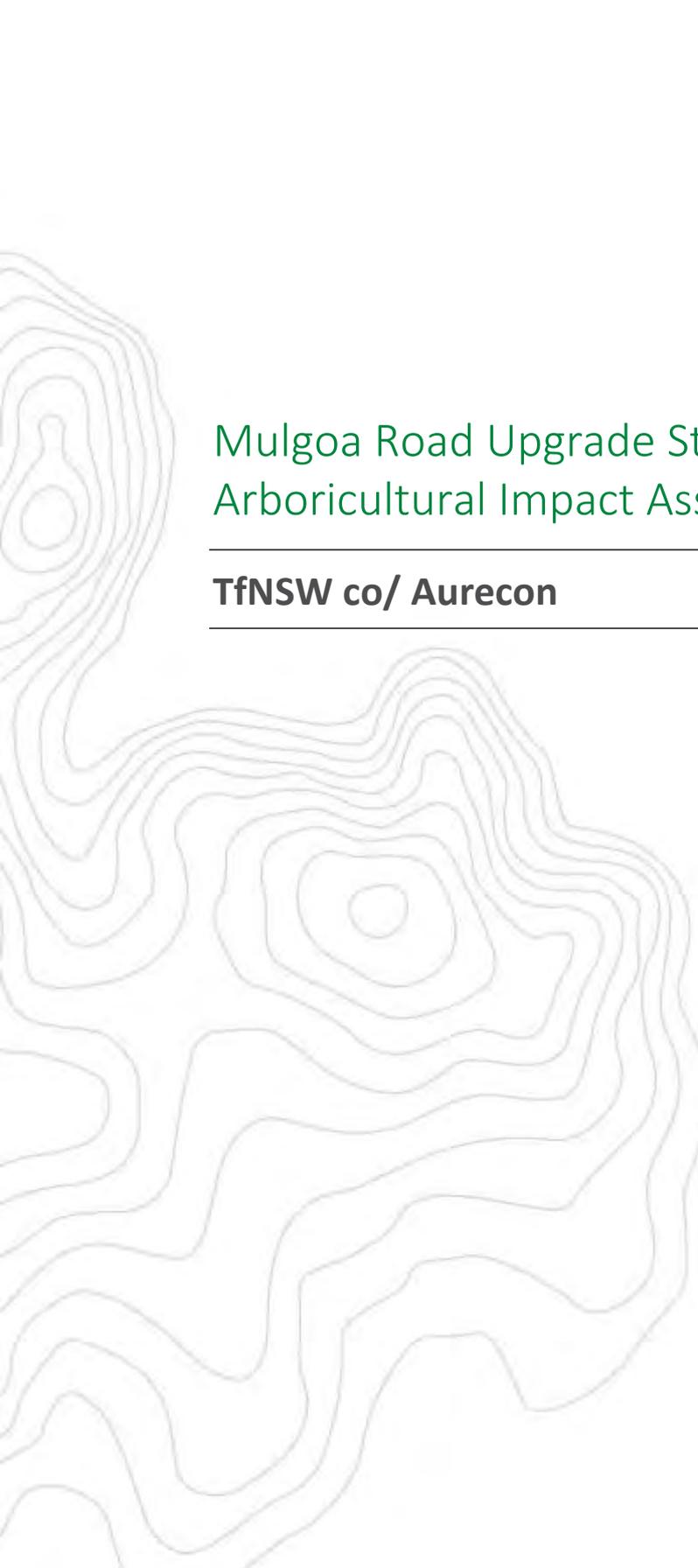
If incursions/excavation within the TPZ are unavoidable, root investigation may be needed to determine the extent and location of roots within the area of construction activity. The location and distribution of roots are found through non-destructive excavation (NDE) methods such as hydro-vacuum excavation (sucker truck), air spade and manual excavation. Root investigation does not guarantee the retention of the tree.

If the project arborist identifies conflicting roots that requiring pruning, they must be pruned with a sharp implement such as; secateurs, pruners, handsaws or a chainsaw back to undamaged tissue. The final cut must be a clean cut.

D6 Underground services

All underground services should be routed outside of the TPZ. If underground services need to be installed within the TPZ, they should be installed using horizontal directional drilling (HDD), non-destructive excavation (NDE) methods such as hydro-vacuum, Air Spade or manually excavated trenches. The horizontal drilling/boring must be at minimum depth of 600 mm below grade. Trenching for services is to be regarded as “excavation”. The project arborist should assess the likely impacts of boring and bore pits on retained trees.





Mulgoa Road Upgrade Stage 2 5A & 5B
Arboricultural Impact Assessment

TfNSW co/ Aurecon

DOCUMENT TRACKING

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Template 2.8.1

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Abbreviations

Abbreviation	Description
AIA	Arboricultural Impact Assessment
AQF	Australian Qualifications Framework
AS	Australian Standards
DBH	Diameter at Breast Height
ELA	Eco Logical Australia
m	Metre
mm	Millimetre
NDE	Non-Destructive Excavation

Abbreviation	Description
NO	Number
NSW	New South Wales
REF	Review of Environmental Factors
SP	Species
SRZ	Structural Root Zone
TPZ	Tree Protection Zone
VTA	Visual Tree Assessment

1. Introduction

1.1 Background

The NSW Government has started planning for a future upgrade of Mulgoa Road as part of a plan to progressively upgrade a number of major arterial roads in the Western Sydney region. It is anticipated that there would be significant traffic growth in future years to increased residential and commercial development in the Western Sydney growth centres and the Broader Western Sydney Employment Area. Mulgoa Road is a State arterial road and is one of two main access points from Penrith to the M4 Motorway. Mulgoa Road together with Parker Street / The Northern Road connects Penrith Local Government Area (LGA) including its Central Business District (CBD) with other parts of Greater Sydney. It carries significant traffic (3,600-3,800 vehicles/ hour) during morning and afternoon peak periods. There are a number of developments served by Mulgoa Road that have increased population and employment in its immediate vicinity including Penrith Panthers Entertainment Precinct, Penrith Station Precinct, Riverlink and Nepean River Precincts, Sporting Bet Stadium, Penrith Lakes and Bulky Good Precinct as well as the new urban land releases at Glenmore Park and Thornton. Mulgoa Road is under increasing pressure to service these developments (Scape Design 2021).

1.2 Proposal overview

The Proposal aims to reduce travel times and improve traffic flow between Glenmore Parkway to Jeane Street (Stage 2), Blaikie Road to Jamison Road (5A) and from Jamison Road to Union Street Road (5B). The site is located at Penrith and is an important arterial road that connects Penrith to the M4 Motorway. This upgrade would take Mulgoa Road from two lanes to three in each direction, easing congestion and facilitating future development of the community and services in the region.

Features of the proposal include:

- About 3.0 (kilometres) km of six lane carriageway road with three lanes in each direction and a central median
- Signalised intersections for Stage 2 at Glenmore Parkway, and Spencer Street/ School House Road
- Signalised intersections for Stage 5A at Batt Street, Old Masters Site (referred to on this proposal as Freedom Furniture Site) and Jamison Road
- Signalised intersections for Stage 5B at Panthers Place, Ransley Street and Union Road
- Bridge structures over waterways, including Surveyors Creek and School House Creek
- Integration of design with the existing culvert crossing that is to be retained at the intersection with Jamison Road (Scape Design 2021).

The description of the proposed activity in Table 1 is based on information available at the time of preparing this report.

Table 1: Proposed activity

Activities that can impact trees	Description of proposed activities
Clearing vegetation	Yes, 307 trees are proposed to be cleared

Activities that can impact trees	Description of proposed activities
Pruning vegetation	No
Earthworks including regrading, excavation and trenching	Yes, proposed road widening/upgrade
Compaction	Yes, all onsite parking, temporary site compounds, storage of materials, installing of structures, stockpiling fill or materials will be positioned outside of the TPZ of trees to be retained.
Refuelling and chemical use (e.g. herbicides)	Yes, all onsite chemicals will be positioned outside of the TPZ of trees to be retained and all vehicle wash down will be completed off site
Erection of scaffolding	Yes, erection of scaffolding for the construction of buildings will be positioned within the impact area outlined in Appendix C.
Vehicle movements	Yes, access for construction machinery will be positioned within the impact area outlined in Appendix C.
Changes to stormwater management	Yes, changes to stormwater infrastructure will be positioned within the impact area shown in Appendix C
Landscaping	Yes, please refer to the Urban and Landscape Design report (Scape Design 2021)

1.3 Purpose of this report

This Arboricultural Impact Assessment (AIA) was prepared for Aurecon on behalf of Transport NSW to accompany the Review of Environmental Factors (REF) in relation to the future Stage 2 5A & 5B Upgrade of Mulgoa Road, Penrith. The purpose of this report is to:

- Identify the trees within the Study Area that are likely to be affected by the proposed works
- Undertake a visual tree assessment of the subject trees
- Assess the current overall health and condition of the subject trees
- Evaluate the retention value of the subject trees
- Identify trees to be removed, retained or transplanted
- Determine the likely impacts on trees to be retained
- Recommend tree protection measures to minimise adverse impacts.

1.4 Study area

The address of the subject site, along with additional information is detailed in Table 2, with the location of the subject site mapped in Figure 1. Features of the subject site are tabulated below.

Table 2: Development site

Criteria	Description
SITE 1	
Street address	Mulgoa Rd, Woodbrook Grove, Cedar Court, School House Road & Glenmore Parkway Glenmore Park
Lot and DP	Lot 1 DP839433, Lot 201 DP1027600 & Lot 21-29 DP1051616
Local Government Area	Penrith City Council
General land use	R2 Low Density Residential, SP2 Infrastructure (Water Supply System) & RE1 Public Recreation

Criteria	Description
SITE 2	
Street address	Mulgoa Road and Jamison Road, South Penrith
Lot and DP	Lot 2 DP1147219, Lot 31 DP 1144930 & Lot 32 DP 1144930
Local Government Area	Penrith City Council
General land use	RE1 Public Recreation & R4 High Density Residential



Figure 1: Study area

2. Method

2.1 Definition of a tree

A tree is defined under the Australian Standard, *AS 4970-2009, Protection of Trees on Development Sites* as a long lived woody perennial plant greater than (or usually greater than) 3 m in height with one or relatively few main stems or trunks.

For the purpose of this report this AIA has assessed trees in line with the local Councils definition of a tree. Penrith City Council defines a tree as:

'a living perennial plant that has a height of three (3) metres or more or a trunk circumference exceeding 300 mm at 400 mm above ground level' (Penrith City Council 2014).

2.2 Visual tree assessment

The subject trees were assessed in accordance with a stage one visual tree assessment (VTA) as formulated by Mattheck and Breloer (1994) and practices consistent with modern arboriculture.

The assessment was undertaken within the Study Area identified in Figure 1 and a total of **873 trees** were inspected in September and October 2021 by AQF Level 5 Consulting Arborist, David Bidwell. Tree impacts were determined for all trees identified in the within the Study Area or immediate surrounds. Tree encroachment was determined from the construction footprint impact area provided by Aurecon (19/11/2021). Trees not within the study area were not considered in the scope of this assessment.

The following limitations apply to this methodology:

- Tree height was measured using a laser clinometer.
- Diameter at breast height (DBH) was measured using DBH tape.
- Trees were inspected from ground level, without the use of any invasive or diagnostic tools and testing.
- No aerial inspections or root mapping was undertaken.
- Trees of the same species, with similar dimensions growing near each other were documented as a group and presented under a single waypoint.
- Trees were inspected within limits of site access as outlined below.
 - There was limited access to site 1 due to dense Lantana (this area has been mapped in Appendix B)
 - Trees 64 to 70 surveyed from side of road
 - Trees 71 to 81 surveyed from side of road
 - Trees 280 to 287 not directly accessed and were assessed/surveyed from side of road
- Tree identification was based on broad taxonomical features present and visible from ground level at the time of inspection.
- Tree locations were recorded using hand-held GPS units and were moved to the locations recorded by Cadence Consulting Surveyors (2021)
- Six dead trees were observed in the field. Of these, only one (Tree 122) was included in this assessment due to its large size and habitat value. The remaining five have not been included in this assessment. Details of these trees are as follows:

- Dead tree between trees 124 and 125 (Site 1)
- Dead tree immediately north of tree 287 (Site 1)
- Dead tree between trees 294 and 295 (Site 1)
- Dead tree between trees 299 and 301 (Site 1)
- Dead tree between trees 539 and 540 (Site 2)
- Site 1 consists of trees 1 to 317
- Site 2 consists of trees 500 to 814, 1500 and 1514. Some trees within site 2 were located on private property and were not directly accessed i.e. Trees 500, 501-504, 506-522, 524-525, 527, 536-539.
- Some tree ID numbers were not used and therefore no data was collected for these records. This includes the following numbers: 318 to 499, 802, 1501 to 1513.

2.3 Retention value & landscape significance

The retention value or importance of a tree or group of trees, is determined in accordance with the Institute of Australian Consulting Arborists (IACA) Significance of a Tree Assessment Rating System (STARS®), which is summarised in Appendix A. The method considers the Safe Useful Life Expectancy (SULE) and landscape significance of a tree. Trees are provided one of the following ratings:

- **High - priority for retention:** These trees are considered important and should be retained and protected. Design modification or re-location of building/s should be considered to accommodate the setbacks as prescribed by Australian Standard AS 4970–2009 Protection of trees on development sites.
- **Medium - consider for retention:** These trees are moderately important for retention. Their removal should only be considered if adversely affected by the proposed works and all other alternatives have been considered and exhausted.
- **Low - consider for removal:** These trees are not considered important for retention, nor require special works or design modification to be implemented for their retention.
- **Priority for removal:** These trees are considered hazardous, or in irreversible decline, or weeds and should be removed irrespective of development.

2.4 Protection zones

2.4.1 Tree protection zone (TPZ)

The TPZ is a specific radius area above and below ground and at a distance from the trunk set aside for the protection of a tree's roots and crown to provide for the viability and stability of a tree to be retained where it is potentially subject to damage by the development. The TPZ (as defined by AS 4970-2009) requires restriction of access during the development process. Groups of trees with overlapping TPZs may be included within a single protection area. Tree sensitive measures must be implemented if works are to proceed within the TPZ. The TPZ radius is determined by multiplying its DBH by 12 however, the TPZ of palms and monocots should not be less than 1 m outside the crown projection.

2.4.2 Structural root zone (SRZ)

The SRZ is the area of the root system (as defined by AS 4970-2009) used for stability, mechanical support and anchorage of the tree. It is critical for the support and stability of trees. Severance of roots

within the SRZ is not recommended as it may lead to the destabilisation and/or decline of the tree. The SRZ does not apply for palms and monocots (as outlined in AS 4970-2009).

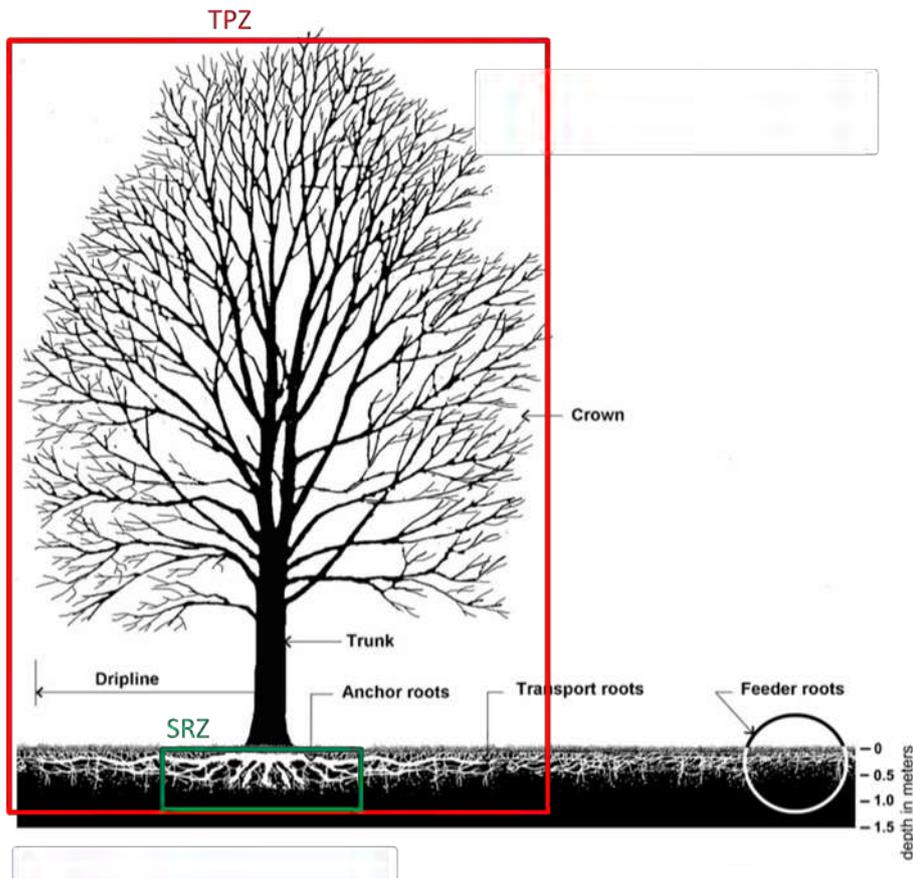


Figure 2: Representative tree structure and indicative TPZ and SRZ

2.5 Potential impacts

Trees may be impacted by physical or chemical damage to roots or above tree parts. Examples include impacts associated with site grading, soil compaction, excavation, stock piling within TPZ as well as changes in site hydrology, changes in soil level and site contamination. The extent of encroachment to the TPZ and SRZ determines the level of potential impact. AS 4970-2009 defines types of encroachment as follows and as illustrated in Appendix B:

- **Major encroachment** - 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 location and distribution of roots may be determined through non-destructive excavation (NDE) methods such as hydro-vacuum excavation (sucker truck), Air Spade or manual extraction. The area lost to this encroachment should be compensated for elsewhere and contiguous with the TPZ.
- **Minor encroachment** – If the proposed encroachment is less than 10% of the TPZ, and outside of 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.

For the purposes of this Arboricultural Impact Assessment, impacts were calculated using GIS techniques and defined as follows:

- **High impact:** The SRZ is directly affected, or the proposed encroachment is greater than 20% of the TPZ. Trees may not remain viable if they are subject to high impact. These trees cannot be retained unless the proposal is changed.
- **Medium impact:** If the proposed encroachment is greater than 10% of the TPZ (but less than 20% of the TPZ) and outside of the SRZ, the project arborist may require detailed root investigation to demonstrate that the tree(s) would remain viable. These trees may be retained subject to further investigation and mitigation measures.
- **Low impact:** If the proposed encroachment is less than 10% (total area) of the TPZ, and outside of the SRZ, detailed root investigations should not be required. These trees can be retained.
- **No impact:** No likely or foreseeable encroachment within the TPZ. These trees can be retained.

Impacts are calculated using GIS techniques.

3. Results and discussion

Results of the arboricultural assessment for both sites is summarised in Table 3 and impacts per site are broken down in section 3.1 and 3.2. Detailed results are included in Appendices C and D. Tree protection guidelines are provided in Appendix E.

Table 3: Summary of overall tree retention values and impacts

	High Impact	Medium Impact	Low Impact	No impact	Grand Total
Priority for retention (High)	35		3	10	48
Consider for retention (Medium)	139	7	18	99	263
Consider for removal (Low)	133		17	412	562
Grand Total	307	7	38	521	873

A breakdown of tree impacts per site is outlined below.

3.1 Site 1

A total of 334 tree (Trees 1 to 317) are located within Site 1. All trees appear to be planted specimens, planted in a suburban roadside/parkland setting. Trees 97, 154, 155, 179, 180, 204, 214, 226, 252, 268 and 279 are mostly in poor health and difficult to identify. One tree (122) has died recently. Most appear to have been impacted by ground works and have sparse canopies and many juvenile leaves, and no fruit, flower buds or capsules, to assist with identification. They are probably *Eucalyptus melliodora*.

Results of the arboricultural assessment for Site 1 is summarised in Table 4.

Table 4: Summary of tree retention values and impacts within Site 1

	High Impact	Medium Impact	Low Impact	No impact	Total
Priority for retention (High)	15	-	1	5	21
Consider for retention (Medium)	53	6	14	68	141
Consider for removal (Low)	32	-	15	125	172
Total	100	6	30	198	334

A breakdown of tree retention values per impact within Site 1 is provided below.

TREES PROPOSED FOR REMOVAL (HIGH IMPACT)

A total of **100 trees** are proposed to be removed within site 1. These trees will be subject to high impact (>20% TPZ encroachment) from the proposed development. Tree IDs and retention values are as follows:

- **High retention:** 15 high retention value trees (Trees 13, 29, 30, 31, 32, 35, 37, 85, 122, 226, 252, 268, 279, 297 and 305)

- **Medium retention:** 53 medium retention value trees (Trees 6, 8, 20, 23, 24, 25, 26, 36, 39, 64 to 69, 71 to 76, 78, 81, 84, 86, 87, 90, 97, 104, 106, 114, 129, 149, 150, 152, 154, 155, 156, 162, 163, 176, 179, 180, 204, 208, 214, 281 to 287 and 317)
- **Low retention:** 32 low retention value trees (Trees 18, 19, 21, 22, 27, 33, 34, 45, 50, 75, 77, 79, 80, 88, 96, 98, 115, 127, 128, 137, 138, 142, 143, 151, 171, 178, 186 (group of 2 trees), 205 and 280).

Any loss of trees should be offset with replacement planting in accordance with the relevant offset policy.

TREES POTENTIAL TO BE RETAINED SUBJECT TO MITIGATION MEASURES (MEDIUM IMPACT)

A total **six medium retention value trees** (Trees 38, 40, 48, 189, 195 and 206) have potential to be retained subject to further investigation. These trees will be subject to medium impact (<20% TPZ but >10% TPZ encroachment) from the proposed works and have potential to be retained subject to further investigation (i.e., root mapping) and mitigation measures (i.e. no excavation to be completed within the TPZ of these trees).

TREES PROPOSED TO BE RETAINED (LOW/NO IMPACT)

A total of **228 trees** are proposed to be retained within site 1. Of these, 30 trees will be subject to low impact (<10% TPZ encroachment) and 198 trees will be subject to no impact (0% TPZ encroachment) from the proposed works. Tree IDs are provided in Appendices C and D.

The tree protection plan for these trees is provided in section 4 and tree protection guidelines outlined in Appendix E.

3.2 Site 2

A total of 539 trees (Trees 500 to 814, 1500 and 1514) are located within Site 1. Trees at the eastern end of the subject area were all planted trees in suburban setting (Trees 500 to 543). Trees at the southern end of the group, were planted in a suburban roadside/parkland setting (Trees 544 to 639). The remaining trees were situated in a semi natural woodland setting.

Results of the arboricultural assessment for Site 2 is summarised in Table 5.

Table 5: Summary of tree retention values and impacts within Site 2

	High Impact	Medium Impact	Low Impact	No impact	Total
Priority for retention (High)	20		2	5	27
Consider for retention (Medium)	86	1	4	31	122
Consider for removal (Low)	101		2	287	390
Total	207	1	8	323	539

A breakdown of tree retention values per impact within Site 2 is provided below.

TREES PROPOSED FOR REMOVAL (HIGH IMPACT)

A total of **207 trees** are proposed to be removed within site 2. These trees will be subject to high impact (>20% TPZ encroachment) from the proposed development. Tree IDs and retention values are as follows:

- **High retention:** 20 high retention value trees (Trees 539, 540, 549, 551, 656, 657, 689, 693, 694, 696, 704, 740, 742, 765, 775, 782, 786, 805, 807 and 808)
- **Medium retention:** 86 medium retention value trees (Trees 501 to 505, 508, 509, 510, 512, 513, 515 to 521, 530, 533, 536, 537, 541, 556, 558, 559, 567, 601, 607, 612, 613, 614, 615, 617, 618, 619, 621, 622, 625, 626, 628, 630, 631, 633, 634, 635, 640, 641, 642, 643, 646, 653, 654, 655, 658, 659, 675, 707, 708, 709, 710, 712, 713, 714, 723, 733, 746, 752, 754, 756, 757, 759, 763, 764, 771, 774, 776, 777, 783, 784, 785, 804, 806, 809, 811 and 813)
- **Low retention:** 101 low retention value trees (Tree IDs are provided in Appendices C and D). Of these, eight trees are exempt species *Olea africana* (Trees 523 and 688) and *Ligustrum lucidum* (Trees 698, 705, 706, 716, 772 and 794) and can be removed without approval.

Any loss of trees should be offset with replacement planting in accordance with the relevant offset policy.

TREES POTENTIAL TO BE RETAINED SUBJECT TO MITIGATION MEASURES (MEDIUM IMPACT)

One medium retention value tree (Trees 514) has potential to be retained subject to further investigation. This tree will be subject to medium impact (<20% TPZ but >10% TPZ encroachment) from the proposed works and has potential to be retained subject to further investigation (i.e., root mapping) and mitigation measures (i.e. no excavation to be completed within the TPZ of these trees).

TREES PROPOSED TO BE RETAINED (LOW/NO IMPACT)

A total of **331 trees** are proposed to be retained within site 2. Of these, 8 trees will be subject to low impact (<10% TPZ encroachment) and 323 trees will be subject to no impact (0% TPZ encroachment) from the proposed works. Tree IDs are provided in Appendices C and D. Of these, two trees are exempt species *Olea africana* (Trees 691 and 699).

The tree protection plan for these trees is provided in section 4 and tree protection guidelines outlined in Appendix E.

4. Tree protection plan

- All tree pruning and removal is to be carried out by an arborist with a minimum AQF Level 3 qualification in Arboriculture.
- All tree work must be in accordance with Australian Standard AS 4373-2007, Pruning of Amenity Trees and the NSW Work Cover Code of Practice for the Amenity Tree Industry (1998).
- Permission must be granted from the relevant consent authority prior to removing or pruning of any of the subject trees. Approved tree works should not be carried out before the installation of tree protection measures.
- Any additional construction activities within the TPZ of the subject trees must be assessed and approved by the project arborist and must comply with *AS 4970-2009 - Protection of trees on development sites*.

Tree protection measures are summarised in Table 4 and further information is in Appendix E.

Table 6: Summary of tree protection measures

Type	More details	Comment
Signage	Appendix E1	Prominently sign posted with 300 mm x 450 mm boards stating, "NO ACCESS - TREE PROTECTION ZONE".
Tree protection fencing	Appendix E1	Protective cyclone chain wire link fence to be erected around the TPZ to protect and isolate retained trees from the construction works. Existing boundary fencing may be used.
Crown protection	Appendix E2	Where required, crown protection may include the installation of a physical barrier, pruning selected branches to establish clearance, or the tying/bracing of branches.
Trunk and branch protection	Appendix E3	When fencing is not practical or prior to any activities within the TPZ, trunk protection is required and consist of a layer geotextile fabric or similar followed by 1.8 m lengths of softwood timbers spaced evenly around the trunk and secured with a galvanised hoop strap.
Ground protection	Appendix E4	Install and maintain 100mm thick layer of mulch around tree in TPZ. For machine or vehicle access within TPZ geotextile fabric beneath crushed rock or rumble boards may be required.
Soil moisture		Soil moisture levels should be regularly monitored by the project arborist. Temporary irrigation or watering may be required within TPZ.
Root protection and investigation	Appendix E5	If incursions/excavation within the TPZ are unavoidable, root investigation may be needed to determine the extent and location of roots within the area of construction activity using non-destructive excavation (NDE) methods.
Underground services	Appendix E6	All underground services should be routed outside of the TPZ. If underground services need to be installed within the TPZ, they should be installed using horizontal directional drilling (HDD), non-destructive excavation (NDE) methods such as hydro-vacuum, Air Spade or manually excavated trenches.

5. Hold points, inspection and certification

An AQF Level 5 Consulting Arborist needs to be engaged to supervise work within the TPZ of trees to be retained, provide advice regarding tree protection and monitor compliance. Once each stage is reached, the work will be inspected and certified by the project arborist and the next stage may commence. Alterations to this schedule may be required due to necessity, however, this shall be through consultation with the project arborist only.

A copy of this report must be available on-site prior to the commencement of works, and throughout the entirety of the project. Hold points have been specified in the schedule of works below to ensure trees are adequately protected during construction. It is the responsibility of the principal contractor to complete each of the tasks.

Pre-construction

Prior to any construction, an onsite meeting should be conducted with attendee's subject but not limited to the project arborist (AQF Level 5 Consulting Arborist), site manager and construction personnel team to walkthrough the tree protection measures requirements. All trees approved for removal are to be indicated clearly with spray paint on trunks.

To ensure the viable retention of the seven medium retention value trees proposed to be subject to medium impact (<20% TPZ encroachment), construction methods will need to be in consultation with the project arborist (AQF Level 5) prior to construction. In addition to consulting with the Project Arborist, root mapping is also required to be undertaken to ensure retention is viable.

Permission to remove trees located outside the site boundary is to be sought by the land owner prior to construction and permission must be granted from the relevant consent authority prior to removing any of the subject trees.

During construction

Monthly inspection of trees by the project arborist (or other timing as agreed with the project arborist).

Post-construction

Final inspection of trees by project arborist after all major construction has ceased and following the removal of tree protection measures.

6. References

6.1 General references

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6.2 Project specific references

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Appendix A Tree retention assessment method

A1 Tree Significance Assessment Criteria - STARS©

The tree is to have a minimum of three criteria in a category to be classified in that group.

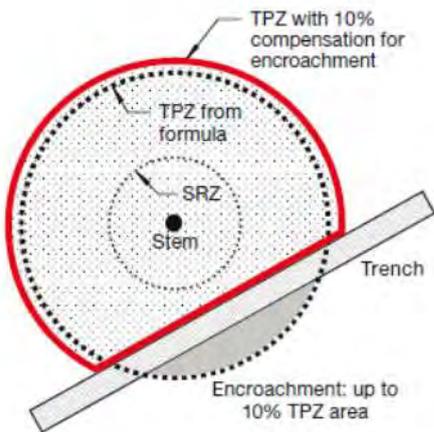
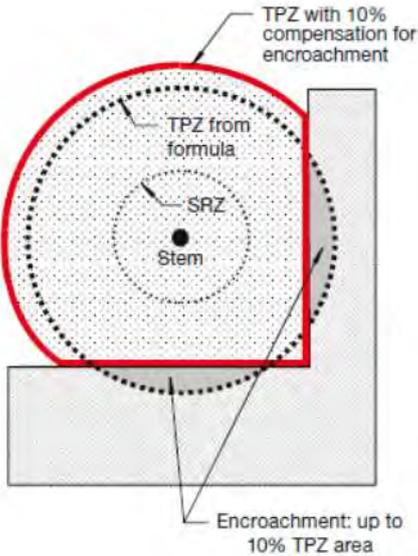
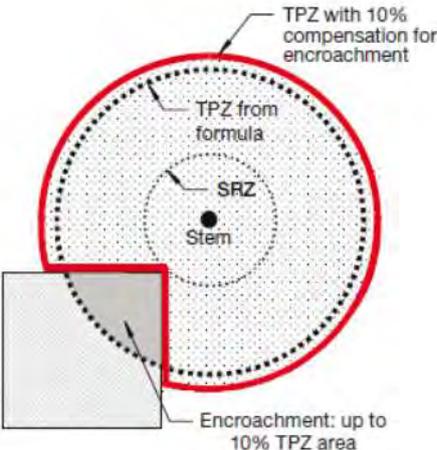
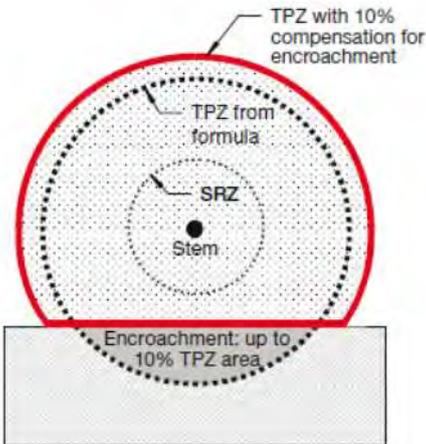
Low	Medium	High
<p>The tree is in fair-poor condition and good or low vigour.</p> <p>The tree has form atypical of the species</p> <p>The tree is not visible or is partly visible from the surrounding properties or obstructed by other vegetation or buildings</p> <p>The tree provides a minor contribution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

A2 Matrix assessment - STARS©

		Tree significance				
		High	Medium	Low		
		Significance in Landscape	Significance in Landscape	Significance in Landscape	Environmental Pest/Noxious Weed Species	Hazardous/ Irreversible Decline
Useful Life Expectancy	Long >40 years					
	Medium 15-40 years					
	Short <1-15 years					
	Dead					

	<p>Priority for retention (High): Tree considered important so should be retained and protected. Design modification or re-location of structure should be considered to accommodate the setbacks as prescribed by the <i>Australian Standard AS4970 Protection of trees on development sites</i>. Tree sensitive construction measures must be implemented if works are to proceed within the Tree Protection Zone.</p>
	<p>Consider for retention (Medium): Tree considered less important, however, retention should remain priority. Removal considered only if adversely affecting the proposed building/works and all other alternatives have been considered and exhausted.</p>
	<p>Consider for removal (Low): Tree not considered important for retention, nor requiring special works or design modification to be implemented for their retention.</p>
	<p>Priority for removal: These trees are considered hazardous, or in irreversible decline, or weeds and should be removed irrespective of development.</p>

Appendix B Encroachment into tree protection zones - AS 4970-2009



Appendix C Maps

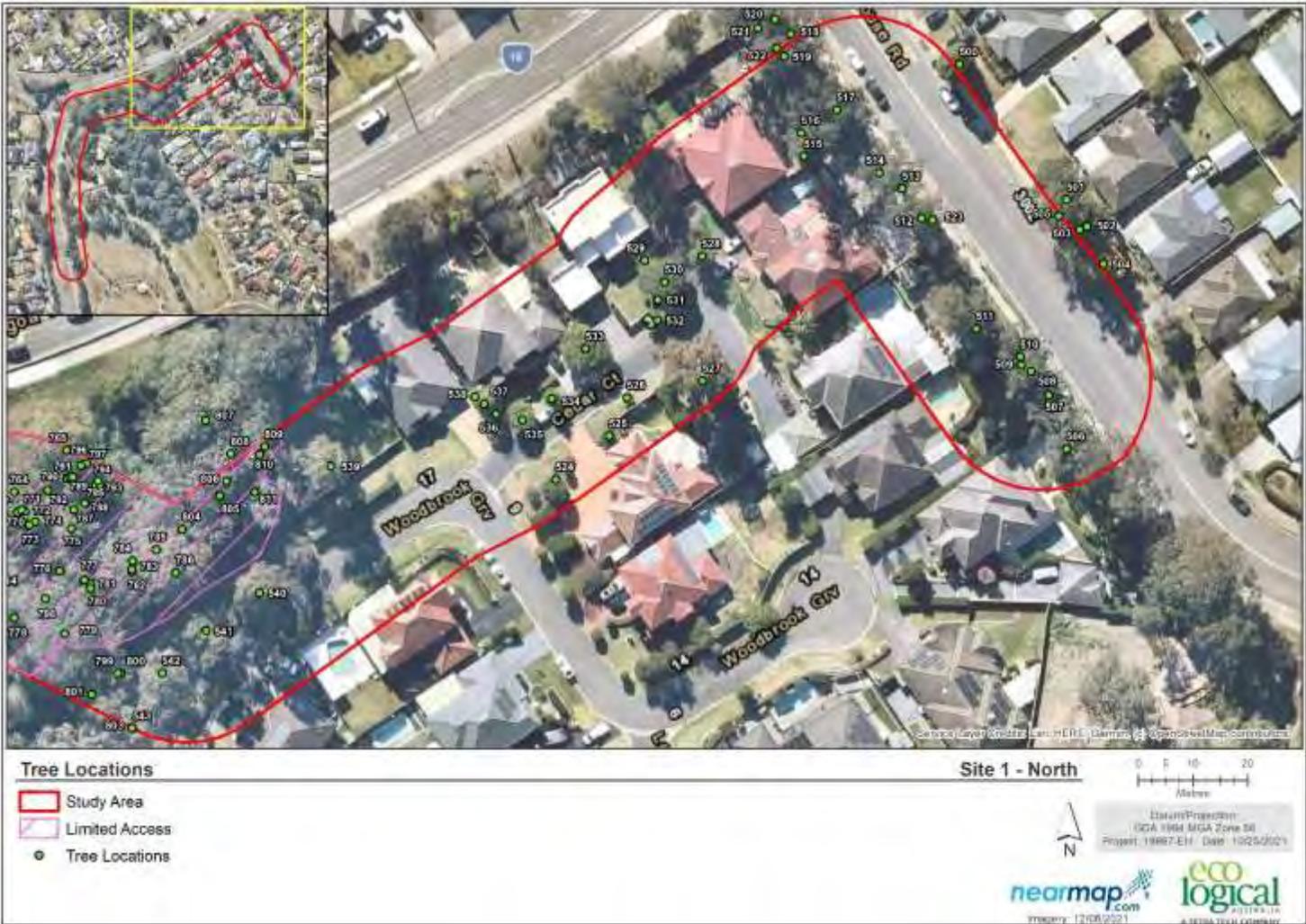


Figure 3: Site 1 tree locations, north



Figure 4: Site 1 tree locations, central



Figure 5: Site 1 tree locations, south

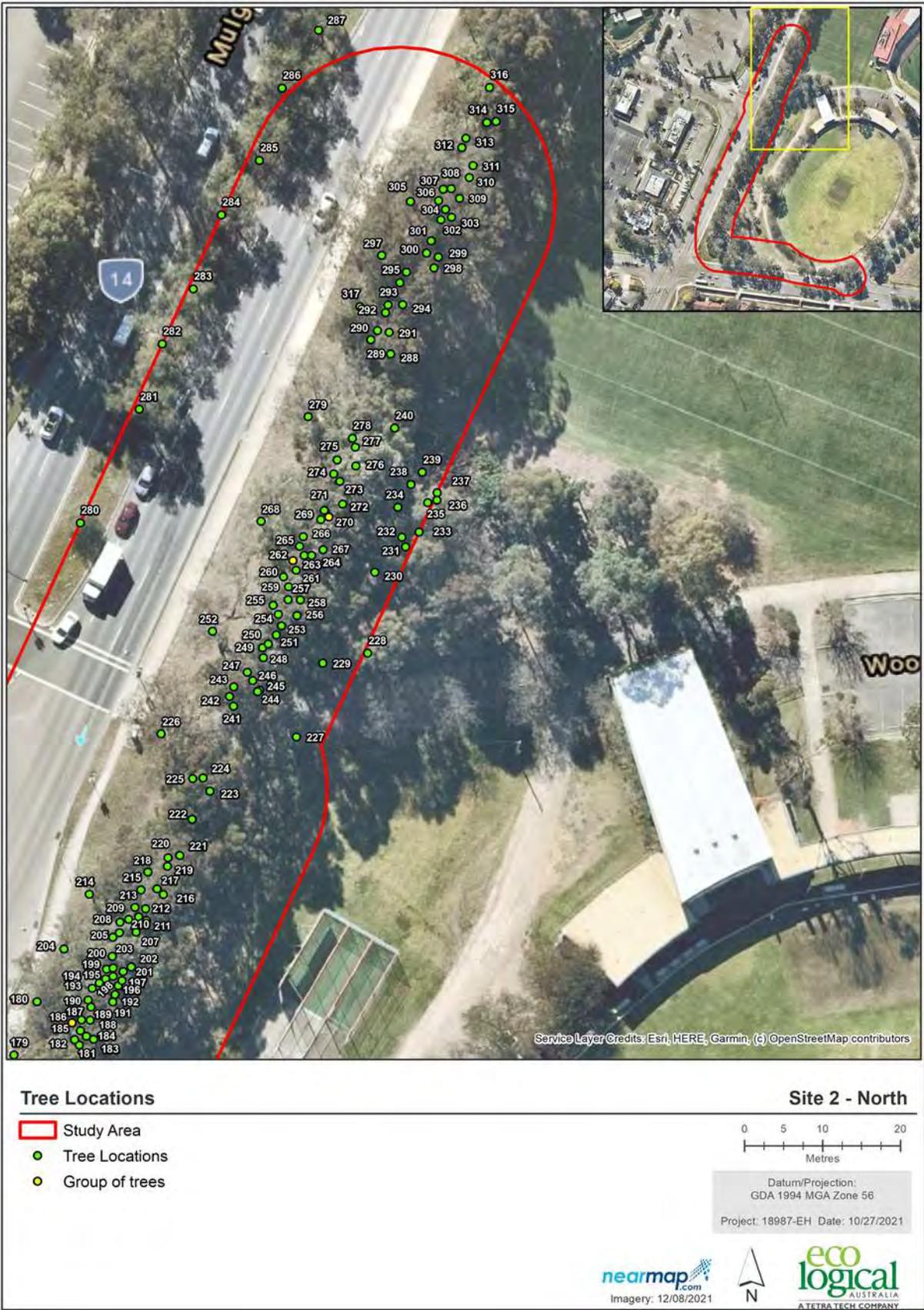


Figure 6: Site 2 tree locations, north



Figure 7: Site 2 tree locations, central



Figure 8: Site 2 tree locations, south



Figure 9: Site 1 retention values, north



Figure 10: Site 1 retention values, central



Figure 11: Site 1 retention values, south



Figure 12: Site 2 retention values, north

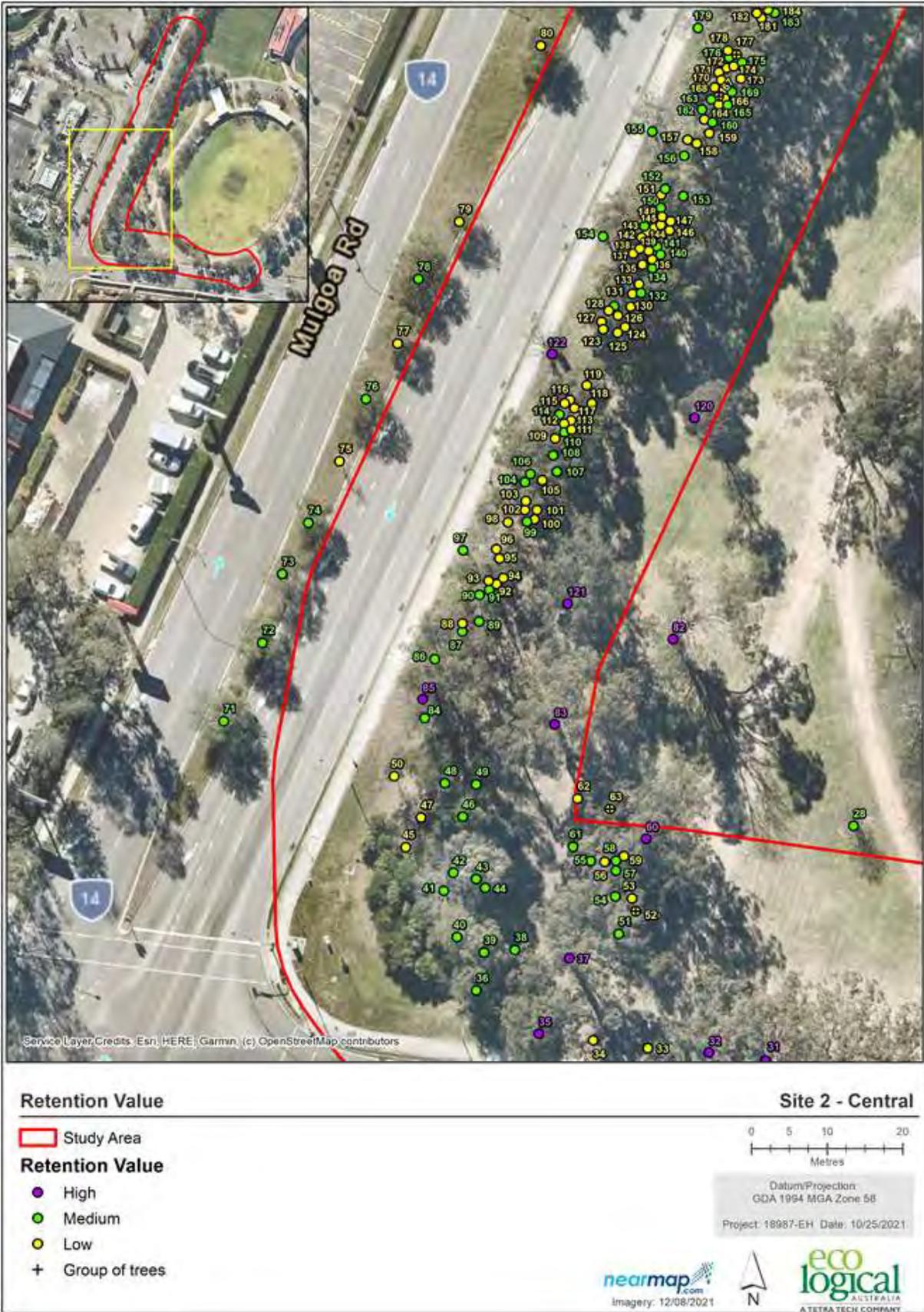


Figure 13: Site 2 retention values, central



Figure 14: Site 2 retention values, south



Figure 15: Site 1 arboricultural impact assessment, north

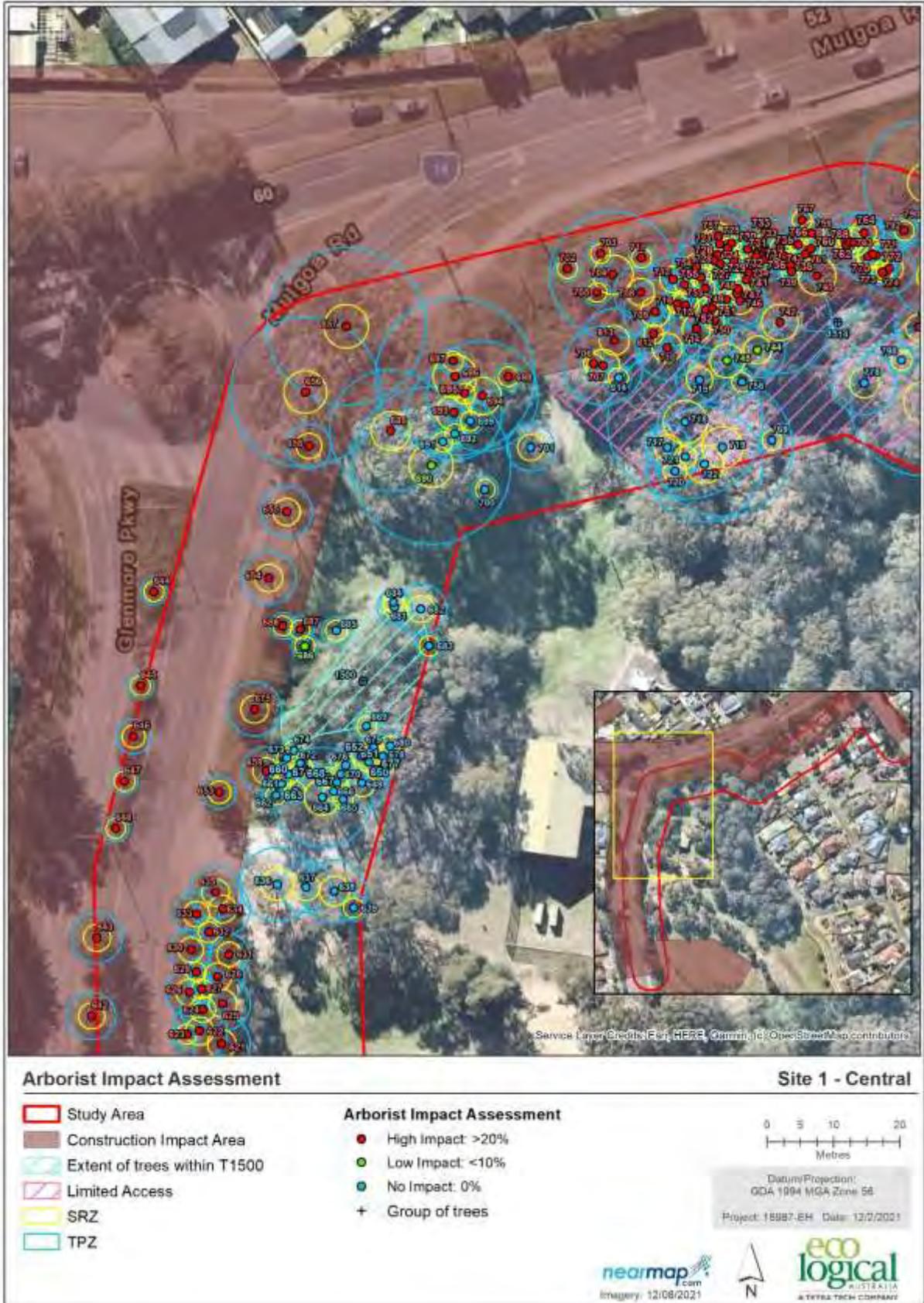


Figure 16: Site 1 arboricultural impact assessment, central



Figure 17: Site 1 arboricultural impact assessment, south

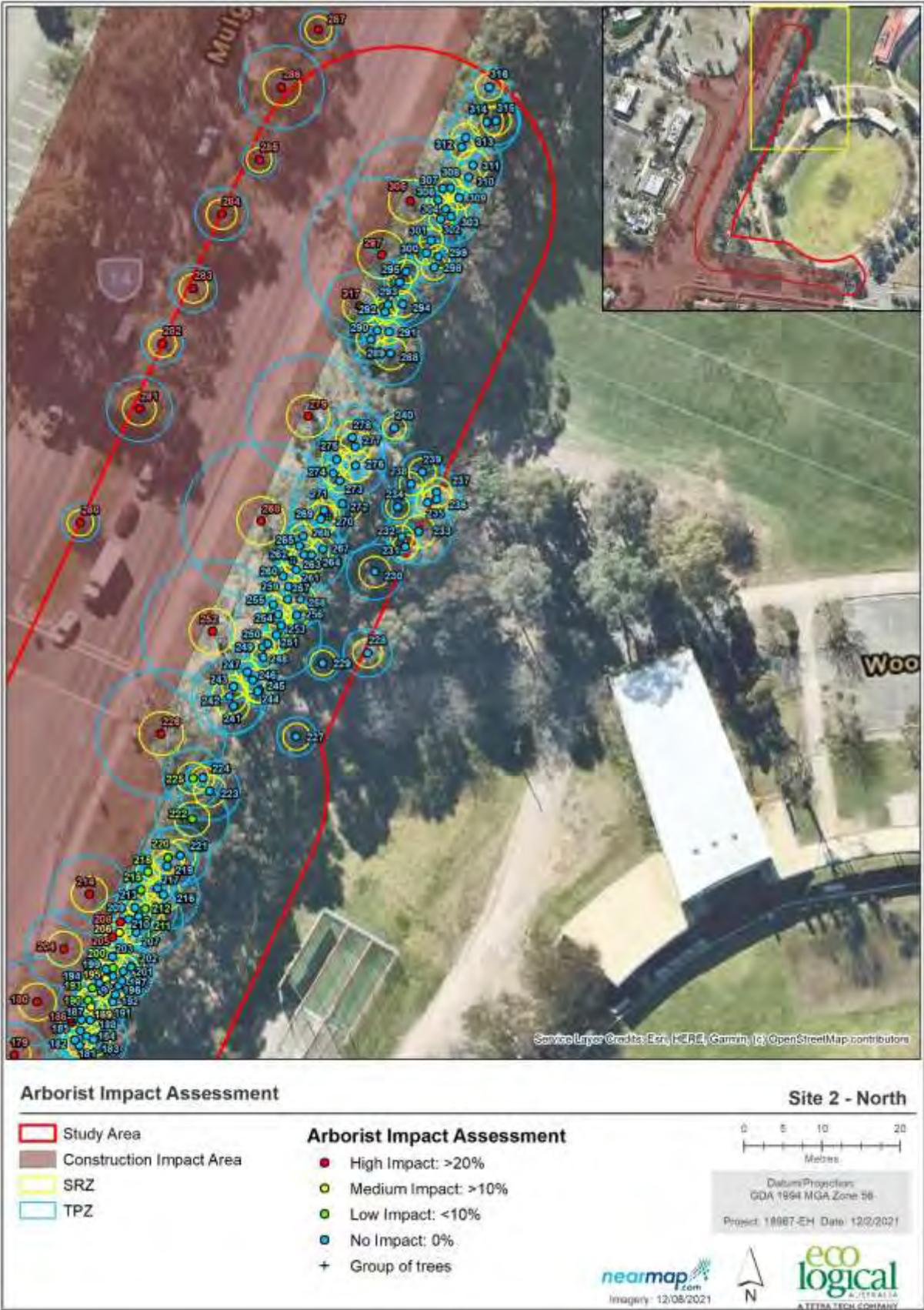


Figure 18: Site 2 arboricultural impact assessment, north



Figure 19: Site 2 arboricultural impact assessment, central

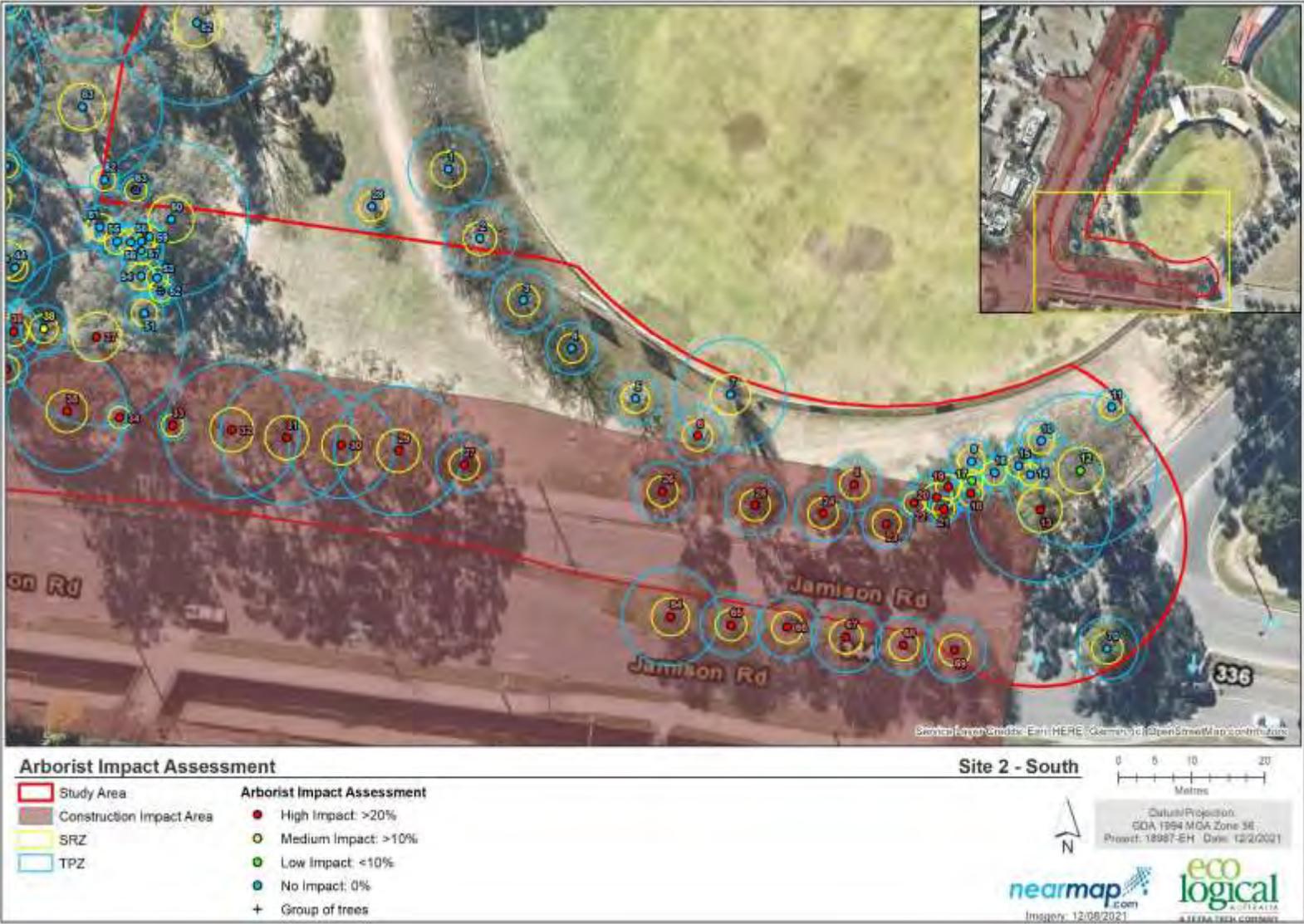


Figure 20: Site 2 arboricultural impact assessment, south

Appendix D Tabulated results of arboricultural assessment

Tree	Botanical name	Trees in Group	Height (m)	Spread (m)	DBH (mm)	Health	Structure	TPZ (m)	SRZ (m)	SULE	Landscape significance	Retention value	Impact	TPZ% encroachment	SRZ encroached	Notes
1	<i>Ulmus parvifolia</i>	1	9	12	460	Good	Good	5.5	2.4	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	
2	<i>Ulmus parvifolia</i>	1	8	12	410	Good	Good	4.9	2.3	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	
3	<i>Ulmus parvifolia</i>	1	9	11	360	Good	Good	4.3	2.2	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	
4	<i>Ulmus parvifolia</i>	1	9	10	290	Good	Good	3.5	2.0	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	
5	<i>Ulmus parvifolia</i>	1	10	12	280	Good	Good	3.4	1.9	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	
6	<i>Ulmus parvifolia</i>	1	8	12	320	Good	Good	3.8	2.1	Long (>40 years)	Medium	Medium	High Impact: >20%	29	Yes	
7	<i>Populus nigra</i>	1	16	6	630	Poor	Fair	7.6	2.7	Short (5-15 years)	Medium	Medium	No Impact: 0%	0	No	<i>P. nigra var italica</i> . Some dieback at top
8	<i>Quercus robur</i>	1	7	8	300	Good	Good	3.6	2.0	Long (>40 years)	Medium	Medium	High Impact: >20%	77	Yes	
9	<i>Ulmus parvifolia</i>	1	8	8	250	Good	Good	3.0	1.8	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	
10	<i>Ulmus parvifolia</i>	1	7	8	230	Good	Good	2.8	1.8	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	
11	<i>Ulmus parvifolia</i>	1	5	8	200	Good	Good	2.4	1.7	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	
12	<i>Eucalyptus sieberi</i>	1	27	18	870	Good	Good	10.4	3.1	Long (>40 years)	High	High	Low Impact: <10%	0	No	
13	<i>Eucalyptus parramattensis</i>	1	24	19	820	Fair	Fair	9.8	3.0	Medium (15-40 years)	High	High	High Impact: >20%	25	Yes	Some decay in base trunk and scaffold limbs. Large dead branches.
14	<i>Quercus ilex</i>	1	7	6	150	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	No Impact: 0%	0	No	
15	<i>Quercus ilex</i>	1	7	7	180	Good	Fair	2.2	1.6	Medium (15-40 years)	Low	Low	No Impact: 0%	0	No	Large tear out on trunk
16	<i>Quercus ilex</i>	1	10	5	180	Good	Good	2.2	1.6	Long (>40 years)	Low	Low	No Impact: 0%	0	No	
17	<i>Quercus ilex</i>	1	3	3	50	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	Low Impact: <10%	5	No	
18	<i>Quercus ilex</i>	1	9	7	210	Good	Good	2.5	1.7	Long (>40 years)	Low	Low	High Impact: >20%	51	Yes	One small broken branch lodged in canopy
19	<i>Quercus ilex</i>	1	8	6	200	Good	Good	2.4	1.7	Long (>40 years)	Low	Low	High Impact: >20%	43	Yes	
20	<i>Quercus ilex</i>	1	9	8	300	Good	Good	3.6	2.0	Long (>40 years)	Medium	Medium	High Impact: >20%	75	Yes	

Tree	Botanical name	Trees in Group	Height (m)	Spread (m)	DBH (mm)	Health	Structure	TPZ (m)	SRZ (m)	SULE	Landscape significance	Retention value	Impact	TPZ% encroachment	SRZ encroached	Notes
21	<i>Lagerstroemia indica</i>	1	5	3	100	Good	Good	2.0	1.5	Medium (15-40 years)	Low	Low	High Impact: >20%	100	Yes	
22	<i>Lagerstroemia indica</i>	1	5	3	100	Poor	Fair	2.0	1.5	Short (5-15 years)	Low	Low	High Impact: >20%	100	Yes	Multi trunked
23	<i>Eucalyptus saligna</i>	1	13	8	280	Good	Good	3.4	1.9	Long (>40 years)	Medium	Medium	High Impact: >20%	100	Yes	
24	<i>Eucalyptus saligna</i>	1	15	10	320	Good	Fair	3.8	2.1	Long (>40 years)	Medium	Medium	High Impact: >20%	100	Yes	Codominant fork with included bark
25	<i>Eucalyptus saligna</i>	1	13	9	340	Good	Good	4.1	2.1	Long (>40 years)	Medium	Medium	High Impact: >20%	100	Yes	
26	<i>Eucalyptus saligna</i>	1	15	10	330	Good	Good	4.0	2.1	Long (>40 years)	Medium	Medium	High Impact: >20%	100	Yes	
27	<i>Eucalyptus saligna</i>	1	12	10	320	Good	Poor	3.8	2.1	Short (5-15 years)	Medium	Low	High Impact: >20%	100	Yes	Major tear out in upper fork.
28	<i>Quercus robur</i>	1	7	6	280	Good	Good	3.4	1.9	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	Multi trunked
29	<i>Eucalyptus crebra</i>	1	23	18	729	Fair	Fair	8.7	2.9	Long (>40 years)	High	High	High Impact: >20%	100	Yes	Some damage from tear outs on eastern side
30	<i>Eucalyptus crebra</i>	1	24	18	600	Good	Fair	7.2	2.7	Long (>40 years)	High	High	High Impact: >20%	100	Yes	Tear outs
31	<i>Eucalyptus crebra</i>	1	25	19	760	Good	Fair	9.1	2.9	Long (>40 years)	High	High	High Impact: >20%	100	Yes	
32	<i>Eucalyptus crebra</i>	1	24	18	770	Fair	Fair	9.2	3.0	Medium (15-40 years)	High	High	High Impact: >20%	100	Yes	Basal wound which may conceal some decay. Delamination of bark on upper trunk
33	<i>Eucalyptus tereticornis</i>	1	5	3	50	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	High Impact: >20%	100	Yes	
34	<i>Eucalyptus tereticornis</i>	1	5	2	50	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	High Impact: >20%	100	Yes	
35	<i>Eucalyptus crebra</i>	1	26	18	680	Good	Good	8.2	2.8	Long (>40 years)	High	High	High Impact: >20%	100	Yes	
36	<i>Eucalyptus saligna</i>	1	12	7	240	Good	Fair	2.9	1.8	Medium (15-40 years)	Medium	Medium	High Impact: >20%	100	Yes	Borer damage at base
37	<i>Eucalyptus moluccana</i>	1	29	25	1001	Fair	Fair	12.0	3.3	Long (>40 years)	High	High	High Impact: >20%	41	Yes	Large dead branches
38	<i>Melia azedarach</i>	1	10	10	270	Good	Good	3.2	1.9	Medium (15-40 years)	Medium	Medium	Medium Impact: >10%	12	No	
39	<i>Eucalyptus moluccana</i>	1	18	12	300	Good	Fair	3.6	2.0	Long (>40 years)	Medium	Medium	High Impact: >20%	26	Yes	Top has torn out and is lodged in tree
40	<i>Casuarina glauca</i>	1	14	8	260	Good	Good	3.1	1.9	Long (>40 years)	Medium	Medium	Medium Impact: >10%	12	No	
41	<i>Ulmus glabra</i>	1	8	8	240	Poor	Poor	2.9	1.8	Short (5-15 years)	Medium	Medium	Low Impact: <10%	4	No	Crown dieback

Tree	Botanical name	Trees in Group	Height (m)	Spread (m)	DBH (mm)	Health	Structure	TPZ (m)	SRZ (m)	SULE	Landscape significance	Retention value	Impact	TPZ% encroachment	SRZ encroached	Notes
42	<i>Ulmus glabra</i>	1	10	8	220	Fair	Fair	2.6	1.8	Medium (15-40 years)	Medium	Medium	No Impact: 0%	0	No	Decay in trunk
43	<i>Eucalyptus moluccana</i>	1	16	10	510	Good	Fair	6.1	2.5	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	Bifurcated stem
44	<i>Eucalyptus moluccana</i>	1	12	4	220	Good	Good	2.6	1.8	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	
45	<i>Ulmus glabra</i>	1	5	4	190	Poor	Fair	2.3	1.6	Short (5-15 years)	Low	Low	High Impact: >20%	100	Yes	Dieback
46	<i>Casuarina cunninghamiana</i>	1	18	10	480	Good	Good	5.8	2.4	Long (>40 years)	Medium	Medium	Low Impact: <10%	2	No	
47	<i>Syzygium sp.</i>	1	7	4	120	Poor	Poor	2.0	1.5	Short (5-15 years)	Low	Low	High Impact: >20%	66	Yes	Severe dieback
48	<i>Eucalyptus moluccana</i>	1	15	9	340	Good	Good	4.1	2.1	Long (>40 years)	Medium	Medium	Medium Impact: >10%	12	No	
49	<i>Eucalyptus moluccana</i>	1	15	5	180	Good	Good	2.2	1.6	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	
50	<i>Eucalyptus tereticornis</i>	1	10	4	120	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	High Impact: >20%	100	Yes	
51	<i>Ulmus glabra</i>	1	7	5	220	Fair	Fair	2.6	1.8	Medium (15-40 years)	Medium	Medium	No Impact: 0%	0	No	
52	<i>Casuarina glauca</i>	3	4	3	100	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	No Impact: 0%	0	No	Clump of 3 small trees growing together
53	<i>Casuarina glauca</i>	1	3	2	50	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	No Impact: 0%	0	No	
54	<i>Ulmus glabra</i>	1	8	8	240	Fair	Fair	2.9	1.8	Medium (15-40 years)	Medium	Medium	No Impact: 0%	0	No	
55	<i>Eucalyptus crebra</i>	1	13	5	220	Good	Good	2.6	1.8	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	
56	<i>Acacia elata</i>	1	4	5	200	Poor	Poor	2.4	1.7	Short (5-15 years)	Low	Low	No Impact: 0%	0	No	Severe dieback
57	<i>Casuarina glauca</i>	1	12	5	250	Good	Good	3.0	1.8	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	
58	<i>Casuarina cunninghamiana</i>	1	12	4	250	Good	Good	3.0	1.8	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	
59	<i>Jacaranda mimosifolia</i>	1	6	3	80	Fair	Fair	2.0	1.5	Medium (15-40 years)	Low	Low	No Impact: 0%	0	No	Some minor basal movement
60	<i>Eucalyptus moluccana</i>	1	22	18	880	Good	Good	10.6	3.1	Long (>40 years)	High	High	No Impact: 0%	0	No	
61	<i>Casuarina glauca</i>	1	10	5	240	Good	Good	2.9	1.8	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	
62	<i>Melia azedarach</i>	1	5	5	120	Good	Fair	2.0	1.5	Medium (15-40 years)	Low	Low	No Impact: 0%	0	No	

Tree	Botanical name	Trees in Group	Height (m)	Spread (m)	DBH (mm)	Health	Structure	TPZ (m)	SRZ (m)	SULE	Landscape significance	Retention value	Impact	TPZ% encroachment	SRZ encroached	Notes
63	<i>Casuarina glauca</i>	10	5	5	100	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	No Impact: 0%	0	No	Group of 10 trees growing in a close clump
64	<i>Schinus molle</i>	1	10	10	550	Fair	Fair	6.6	2.6	Medium (15-40 years)	Medium	Medium	High Impact: >20%	100	Yes	Trees 64 to 70 surveyed from side of road
65	<i>Schinus molle</i>	1	10	10	350	Fair	Fair	4.2	2.1	Medium (15-40 years)	Medium	Medium	High Impact: >20%	100	Yes	Trees 64 to 70 surveyed from side of road
66	<i>Schinus molle</i>	1	9	8	350	Fair	Fair	4.2	2.1	Medium (15-40 years)	Medium	Medium	High Impact: >20%	100	Yes	Trees 64 to 70 surveyed from side of road. Some wounding at base
67	<i>Schinus molle</i>	1	11	10	400	Fair	Fair	4.8	2.3	Medium (15-40 years)	Medium	Medium	High Impact: >20%	100	Yes	Trees 64 to 70 surveyed from side of road. Large pruning wound on trunk
68	<i>Schinus molle</i>	1	9	8	320	Fair	Fair	3.8	2.1	Medium (15-40 years)	Medium	Medium	High Impact: >20%	100	Yes	Trees 64 to 70 surveyed from side of road. Pruning wound on trunk
69	<i>Schinus molle</i>	1	9	9	350	Poor	Fair	4.2	2.1	Short (5-15 years)	Medium	Medium	High Impact: >20%	100	Yes	Trees 64 to 70 surveyed from side of road. Sparse foliage
70	<i>Schinus molle</i>	1	10	12	350	Fair	Fair	4.2	2.1	Medium (15-40 years)	Medium	Medium	No Impact: 0%	0	No	Trees 64 to 70 surveyed from side of road
71	<i>Schinus molle</i>	1	9	9	250	Fair	Fair	3.0	1.8	Medium (15-40 years)	Medium	Medium	High Impact: >20%	100	Yes	Trees 71 to 81 surveyed from side of road
72	<i>Schinus molle</i>	1	7	7	250	Fair	Fair	3.0	1.8	Medium (15-40 years)	Medium	Medium	High Impact: >20%	100	Yes	Trees 71 to 81 surveyed from side of road
73	<i>Schinus molle</i>	1	7	6	220	Poor	Fair	2.6	1.8	Short (5-15 years)	Medium	Medium	High Impact: >20%	100	Yes	Trees 71 to 81 surveyed from side of road. Sparse canopy
74	<i>Schinus molle</i>	1	6	6	220	Fair	Fair	2.6	1.8	Medium (15-40 years)	Medium	Medium	High Impact: >20%	100	Yes	Trees 71 to 81 surveyed from side of road
75	<i>Schinus molle</i>	1	3	1	100	Poor	Poor	2.0	1.5	Remove (<5 years)	Low	Low	High Impact: >20%	100	Yes	Trees 71 to 81 surveyed from side of road. Poor tree
76	<i>Schinus molle</i>	1	6	6	240	Fair	Fair	2.9	1.8	Medium (15-40 years)	Medium	Medium	High Impact: >20%	100	Yes	Trees 71 to 81 surveyed from side of road
77	<i>Schinus molle</i>	1	5	5	200	Poor	Fair	2.4	1.7	Short (5-15 years)	Low	Low	High Impact: >20%	100	Yes	Trees 71 to 81 surveyed from side of road
78	<i>Schinus molle</i>	1	7	8	250	Fair	Fair	3.0	1.8	Medium (15-40 years)	Medium	Medium	High Impact: >20%	100	Yes	Trees 71 to 81 surveyed from side of road
79	<i>Schinus molle</i>	1	5	5	160	Poor	Fair	2.0	1.5	Short (5-15 years)	Low	Low	High Impact: >20%	100	Yes	Trees 71 to 81 surveyed from side of road
80	<i>Schinus molle</i>	1	6	5	200	Fair	Fair	2.4	1.7	Medium (15-40 years)	Low	Low	High Impact: >20%	100	Yes	Trees 71 to 81 surveyed from side of road
81	<i>Schinus molle</i>	1	9	10	400	Fair	Fair	4.8	2.3	Medium (15-40 years)	Medium	Medium	High Impact: >20%	100	Yes	Trees 71 to 81 surveyed from side of road
82	<i>Eucalyptus moluccana</i>	1	20	19	930	Poor	Poor	11.2	3.2	Medium (15-40 years)	High	High	No Impact: 0%	0	No	Dead top needs pruning out
83	<i>Eucalyptus moluccana</i>	1	26	23	910	Good	Good	10.9	3.2	Long (>40 years)	High	High	No Impact: 0%	0	No	Large dead branches

Tree	Botanical name	Trees in Group	Height (m)	Spread (m)	DBH (mm)	Health	Structure	TPZ (m)	SRZ (m)	SULE	Landscape significance	Retention value	Impact	TPZ% encroachment	SRZ encroached	Notes
84	<i>Eucalyptus tereticornis</i>	1	12	8	310	Poor	Fair	3.7	2.0	Medium (15-40 years)	Medium	Medium	High Impact: >20%	74	Yes	
85	<i>Eucalyptus moluccana</i>	1	25	17	990	Good	Good	11.9	3.3	Long (>40 years)	High	High	High Impact: >20%	61	Yes	Large dead branches
86	<i>Eucalyptus tereticornis</i>	1	22	9	530	Fair	Good	6.4	2.5	Long (>40 years)	Medium	Medium	High Impact: >20%	65	Yes	
87	<i>Corymbia maculata</i>	1	15	8	240	Good	Good	2.9	1.8	Long (>40 years)	Medium	Medium	High Impact: >20%	22	Yes	
88	<i>Corymbia maculata</i>	1	9	3	120	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	High Impact: >20%	18	Yes	
89	<i>Corymbia maculata</i>	1	16	5	200	Good	Good	2.4	1.7	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	
90	<i>Corymbia maculata</i>	1	16	5	350	Good	Good	4.2	2.1	Long (>40 years)	Medium	Medium	High Impact: >20%	27	Yes	
91	<i>Corymbia maculata</i>	1	16	3	220	Good	Good	2.6	1.8	Long (>40 years)	Medium	Medium	Low Impact: <10%	1	No	
92	<i>Corymbia maculata</i>	1	3	1	50	Fair	Poor	2.0	1.5	Short (5-15 years)	Low	Low	No Impact: 0%	0	No	
93	<i>Corymbia maculata</i>	1	5	2	50	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	Low Impact: <10%	1	No	Twin stems
94	<i>Corymbia maculata</i>	1	14	5	150	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	No Impact: 0%	0	No	
95	<i>Corymbia maculata</i>	1	15	5	200	Good	Good	2.4	1.7	Long (>40 years)	Low	Low	Low Impact: <10%	5	No	
96	<i>Corymbia maculata</i>	1	14	5	180	Good	Good	2.2	1.6	Long (>40 years)	Low	Low	High Impact: >20%	20	Yes	
97	<i>Eucalyptus melliodora</i>	1	15	8	350	Poor	Fair	4.2	2.1	Medium (15-40 years)	Medium	Medium	High Impact: >20%	90	Yes	Sparse canopy. Avenue tree
98	<i>Corymbia maculata</i>	1	10	2	120	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	High Impact: >20%	22	Yes	
99	<i>Corymbia maculata</i>	1	17	5	260	Good	Good	3.1	1.9	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	
100	<i>Corymbia maculata</i>	1	5	1	50	Poor	Poor	2.0	1.5	Remove (<5 years)	Low	Low	No Impact: 0%	0	No	
101	<i>Corymbia maculata</i>	1	12	5	180	Fair	Good	2.2	1.6	Long (>40 years)	Low	Low	No Impact: 0%	0	No	
102	<i>Corymbia maculata</i>	1	13	5	200	Good	Good	2.4	1.7	Long (>40 years)	Low	Low	Low Impact: <10%	1	No	
103	<i>Corymbia maculata</i>	1	4	3	50	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	Low Impact: <10%	1	No	Multi trunked
104	<i>Corymbia maculata</i>	1	16	8	250	Good	Good	3.0	1.8	Long (>40 years)	Medium	Medium	High Impact: >20%	34	Yes	

Tree	Botanical name	Trees in Group	Height (m)	Spread (m)	DBH (mm)	Health	Structure	TPZ (m)	SRZ (m)	SULE	Landscape significance	Retention value	Impact	TPZ% encroachment	SRZ encroached	Notes
105	<i>Corymbia maculata</i>	1	10	4	140	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	No Impact: 0%	0	No	
106	<i>Corymbia maculata</i>	1	18	7	270	Good	Good	3.2	1.9	Long (>40 years)	Medium	Medium	High Impact: >20%	32	Yes	
107	<i>Corymbia maculata</i>	1	14	6	230	Good	Good	2.8	1.8	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	
108	<i>Corymbia maculata</i>	1	16	6	220	Good	Good	2.6	1.8	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	
109	<i>Corymbia maculata</i>	1	9	4	140	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	Low Impact: <10%	0	No	
110	<i>Corymbia maculata</i>	1	16	4	210	Good	Good	2.5	1.7	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	
111	<i>Corymbia maculata</i>	1	15	5	200	Good	Good	2.4	1.7	Long (>40 years)	Low	Low	No Impact: 0%	0	No	
112	<i>Corymbia maculata</i>	1	5	1	50	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	No Impact: 0%	0	No	
113	<i>Corymbia maculata</i>	1	8	5	140	Fair	Fair	2.0	1.5	Medium (15-40 years)	Low	Low	No Impact: 0%	0	No	
114	<i>Corymbia maculata</i>	1	14	5	200	Good	Good	2.4	1.7	Long (>40 years)	Medium	Medium	High Impact: >20%	21	Yes	
115	<i>Corymbia maculata</i>	1	5	2	60	Fair	Fair	2.0	1.5	Medium (15-40 years)	Low	Low	High Impact: >20%	17	Yes	
116	<i>Corymbia maculata</i>	1	12	5	150	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	Low Impact: <10%	6	No	
117	<i>Corymbia maculata</i>	1	16	5	210	Good	Good	2.5	1.7	Long (>40 years)	Low	Low	No Impact: 0%	0	No	
118	<i>Corymbia maculata</i>	1	9	5	200	Good	Good	2.4	1.7	Long (>40 years)	Low	Low	No Impact: 0%	0	No	Multi trunked
119	<i>Corymbia maculata</i>	1	12	4	180	Good	Good	2.2	1.6	Long (>40 years)	Low	Low	No Impact: 0%	0	No	Twin stems
120	<i>Eucalyptus moluccana</i>	1	15	10	810	Fair	Fair	9.7	3.0	Medium (15-40 years)	High	High	No Impact: 0%	0	No	1 tree has hollows throughout base and trunk but appears to be stable
121	<i>Eucalyptus moluccana</i>	1	19	18	840	Good	Fair	10.1	3.1	Long (>40 years)	High	High	No Impact: 0%	0	No	Large tear out on trunk but tree appears to be compartmentalising well
122	Dead tree	1	12	12	1200	Poor	Poor	14.4	3.6	Long (>40 years)	High	High	High Impact: >20%	64	Yes	Very large dead tree. May wish to retain for habitat. Top branches will require pruning down
123	<i>Corymbia maculata</i>	1	14	5	180	Good	Good	2.2	1.6	Long (>40 years)	Low	Low	Low Impact: <10%	7	No	
124	<i>Corymbia maculata</i>	1	8	5	210	Fair	Poor	2.5	1.7	Short (5-15 years)	Low	Low	No Impact: 0%	0	No	Old tear out
125	<i>Corymbia maculata</i>	1	9	3	100	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	No Impact: 0%	0	No	

Tree	Botanical name	Trees in Group	Height (m)	Spread (m)	DBH (mm)	Health	Structure	TPZ (m)	SRZ (m)	SULE	Landscape significance	Retention value	Impact	TPZ% encroachment	SRZ encroached	Notes
126	<i>Corymbia maculata</i>	1	12	3	119	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	No Impact: 0%	0	No	
127	<i>Corymbia maculata</i>	1	5	2	80	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	High Impact: >20%	19	Yes	
128	<i>Corymbia maculata</i>	1	6	2	80	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	High Impact: >20%	13	Yes	
129	<i>Corymbia maculata</i>	1	15	5	220	Good	Good	2.6	1.8	Long (>40 years)	Medium	Medium	High Impact: >20%	13	Yes	
130	<i>Corymbia maculata</i>	1	10	4	150	Good	Fair	2.0	1.5	Medium (15-40 years)	Low	Low	No Impact: 0%	0	No	Wound on trunk occluding well
131	<i>Corymbia maculata</i>	1	14	4	150	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	No Impact: 0%	0	No	
132	<i>Corymbia maculata</i>	1	15	6	280	Good	Good	3.4	1.9	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	
133	<i>Corymbia maculata</i>	1	12	4	150	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	No Impact: 0%	0	No	
134	<i>Corymbia maculata</i>	1	16	5	290	Good	Good	3.5	2.0	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	
135	<i>Corymbia maculata</i>	1	5	1	50	Poor	Poor	2.0	1.5	Short (5-15 years)	Low	Low	No Impact: 0%	0	No	Dead top
136	<i>Corymbia maculata</i>	1	4	1	50	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	No Impact: 0%	0	No	
137	<i>Corymbia maculata</i>	1	14	5	160	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	High Impact: >20%	19	Yes	
138	<i>Corymbia maculata</i>	1	13	4	160	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	High Impact: >20%	7	Yes	
139	<i>Corymbia maculata</i>	1	5	2	50	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	No Impact: 0%	0	No	
140	<i>Corymbia maculata</i>	1	15	5	240	Good	Good	2.9	1.8	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	
141	<i>Corymbia maculata</i>	1	16	5	260	Good	Fair	3.1	1.9	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	Wound at base with possible borer infestation
142	<i>Corymbia maculata</i>	1	4	2	50	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	High Impact: >20%	16	Yes	Wound on stem
143	<i>Corymbia maculata</i>	1	10	3	110	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	High Impact: >20%	8	Yes	
144	<i>Corymbia maculata</i>	1	12	5	180	Good	Good	2.2	1.6	Long (>40 years)	Low	Low	Low Impact: <10%	0	No	
145	<i>Corymbia maculata</i>	1	6	4	80	Good	Fair	2.0	1.5	Short (5-15 years)	Low	Low	No Impact: 0%	0	No	
146	<i>Corymbia maculata</i>	1	3	1	50	Poor	Poor	2.0	1.5	Short (5-15 years)	Low	Low	No Impact: 0%	0	No	

Tree	Botanical name	Trees in Group	Height (m)	Spread (m)	DBH (mm)	Health	Structure	TPZ (m)	SRZ (m)	SULE	Landscape significance	Retention value	Impact	TPZ% encroachment	SRZ encroached	Notes
147	<i>Corymbia maculata</i>	1	14	5	190	Fair	Fair	2.3	1.6	Short (5-15 years)	Low	Low	No Impact: 0%	0	No	Wound on trunk, sparse canopy, termites
148	<i>Corymbia maculata</i>	1	3	1	50	Poor	Poor	2.0	1.5	Short (5-15 years)	Low	Low	No Impact: 0%	0	No	
149	<i>Corymbia maculata</i>	1	16	5	210	Good	Good	2.5	1.7	Long (>40 years)	Medium	Medium	High Impact: >20%	29	Yes	
150	<i>Corymbia maculata</i>	1	17	5	240	Good	Good	2.9	1.8	Long (>40 years)	Medium	Medium	High Impact: >20%	13	Yes	
151	<i>Corymbia maculata</i>	1	8	2	80	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	High Impact: >20%	17	Yes	
152	<i>Corymbia maculata</i>	1	17	5	240	Good	Good	2.9	1.8	Long (>40 years)	Medium	Medium	High Impact: >20%	23	Yes	
153	<i>Corymbia maculata</i>	1	17	10	450	Good	Good	5.4	2.4	Long (>40 years)	Medium	Medium	Low Impact: <10%	9	No	Bifurcation of main stem
154	<i>Eucalyptus melliodora</i>	1	18	8	420	Fair	Fair	5.0	2.3	Medium (15-40 years)	Medium	Medium	High Impact: >20%	91	Yes	Sparse canopy. Avenue tree
155	<i>Eucalyptus melliodora</i>	1	18	10	550	Poor	Poor	6.6	2.6	Short (5-15 years)	Medium	Medium	High Impact: >20%	82	Yes	Decay just below main fork with significant hollows. Possible termite infestation. Avenue tree
156	<i>Corymbia maculata</i>	1	18	6	310	Good	Good	3.7	2.0	Long (>40 years)	Medium	Medium	High Impact: >20%	22	Yes	
157	<i>Corymbia maculata</i>	1	8	2	80	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	High Impact: >20%	14	Yes	
158	<i>Corymbia maculata</i>	1	10	5	180	Fair	Fair	2.2	1.6	Medium (15-40 years)	Low	Low	No Impact: 0%	0	No	
159	<i>Corymbia maculata</i>	1	4	1	50	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	No Impact: 0%	0	No	
160	<i>Corymbia maculata</i>	1	17	5	300	Good	Good	3.6	2.0	Long (>40 years)	Medium	Medium	Low Impact: <10%	2	No	
161	<i>Corymbia maculata</i>	1	5	2	50	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	No Impact: 0%	0	No	
162	<i>Corymbia maculata</i>	1	17	6	280	Good	Good	3.4	1.9	Long (>40 years)	Medium	Medium	High Impact: >20%	27	Yes	
163	<i>Corymbia maculata</i>	1	16	5	250	Good	Good	3.0	1.8	Long (>40 years)	Medium	Medium	High Impact: >20%	14	Yes	
164	<i>Corymbia maculata</i>	1	9	4	130	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	No Impact: 0%	0	No	
165	<i>Corymbia maculata</i>	1	16	6	310	Good	Good	3.7	2.0	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	
166	<i>Corymbia maculata</i>	1	4	1	50	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	No Impact: 0%	0	No	
167	<i>Corymbia maculata</i>	2	3	1	50	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	No Impact: 0%	0	No	Two very small trees growing together

Tree	Botanical name	Trees in Group	Height (m)	Spread (m)	DBH (mm)	Health	Structure	TPZ (m)	SRZ (m)	SULE	Landscape significance	Retention value	Impact	TPZ% encroachment	SRZ encroached	Notes
168	<i>Corymbia maculata</i>	1	4	2	50	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	Low Impact: <10%	6	No	
169	<i>Corymbia maculata</i>	1	18	5	370	Good	Good	4.4	2.2	Long (>40 years)	Medium	Medium	Low Impact: <10%	3	No	
170	<i>Corymbia maculata</i>	1	9	3	80	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	Low Impact: <10%	0	No	
171	<i>Corymbia maculata</i>	1	5	2	80	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	High Impact: >20%	15	Yes	Wound on trunk
172	<i>Corymbia maculata</i>	1	12	4	140	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	Low Impact: <10%	1	No	
173	<i>Melia azedarach</i>	1	4	4	180	Good	Fair	2.2	1.6	Medium (15-40 years)	Low	Low	No Impact: 0%	0	No	
174	<i>Corymbia maculata</i>	1	5	2	60	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	No Impact: 0%	0	No	
175	<i>Corymbia maculata</i>	1	17	9	380	Good	Good	4.6	2.2	Long (>40 years)	Medium	Medium	Low Impact: <10%	7	No	
176	<i>Corymbia maculata</i>	1	13	5	280	Good	Good	3.4	1.9	Long (>40 years)	Medium	Medium	High Impact: >20%	21	Yes	
177	<i>Corymbia maculata</i>	2	4	1	50	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	No Impact: 0%	0	No	Two very small trees growing together
178	<i>Corymbia maculata</i>	1	6	2	70	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	High Impact: >20%	18	Yes	
179	<i>Eucalyptus melliodora</i>	1	18	12	350	Poor	Fair	4.2	2.1	Short (5-15 years)	Medium	Medium	High Impact: >20%	98	Yes	Appears to have been impacted by footpath works. Avenue tree
180	<i>Eucalyptus melliodora</i>	1	20	14	470	Fair	Fair	5.6	2.4	Medium (15-40 years)	Medium	Medium	High Impact: >20%	91	Yes	Avenue tree
181	<i>Corymbia maculata</i>	1	6	2	70	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	No Impact: 0%	0	No	
182	<i>Corymbia maculata</i>	1	11	4	180	Good	Good	2.2	1.6	Long (>40 years)	Low	Low	No Impact: 0%	0	No	
183	<i>Corymbia maculata</i>	1	18	8	360	Good	Good	4.3	2.2	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	
184	<i>Corymbia maculata</i>	1	7	3	100	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	No Impact: 0%	0	No	
185	<i>Corymbia maculata</i>	1	10	2	120	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	No Impact: 0%	0	No	
186	<i>Corymbia maculata</i>	2	10	5	130	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	High Impact: >20%	14	Yes	Two trees growing close together
187	<i>Corymbia maculata</i>	1	7	4	90	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	No Impact: 0%	0	No	
188	<i>Corymbia maculata</i>	1	9	2	100	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	No Impact: 0%	0	No	

Tree	Botanical name	Trees in Group	Height (m)	Spread (m)	DBH (mm)	Health	Structure	TPZ (m)	SRZ (m)	SULE	Landscape significance	Retention value	Impact	TPZ% encroachment	SRZ encroached	Notes
189	<i>Corymbia maculata</i>	1	18	5	370	Good	Good	4.4	2.2	Long (>40 years)	Medium	Medium	Medium Impact: >10%	15	No	
190	<i>Corymbia maculata</i>	1	10	3	120	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	Low Impact: <10%	1	No	
191	<i>Corymbia maculata</i>	1	10	5	120	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	No Impact: 0%	0	No	
192	<i>Corymbia maculata</i>	1	12	4	180	Good	Good	2.2	1.6	Long (>40 years)	Low	Low	No Impact: 0%	0	No	
193	<i>Corymbia maculata</i>	1	4	2	50	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	Low Impact: <10%	4	No	
194	<i>Corymbia maculata</i>	1	8	2	70	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	No Impact: 0%	0	No	
195	<i>Corymbia maculata</i>	1	18	6	370	Good	Good	4.4	2.2	Long (>40 years)	Medium	Medium	Medium Impact: >10%	13	No	
196	<i>Corymbia maculata</i>	1	5	2	50	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	No Impact: 0%	0	No	
197	<i>Corymbia maculata</i>	1	16	5	240	Good	Good	2.9	1.8	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	
198	<i>Corymbia maculata</i>	1	4	2	70	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	No Impact: 0%	0	No	
199	<i>Corymbia maculata</i>	1	4	2	50	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	No Impact: 0%	0	No	
200	<i>Corymbia maculata</i>	1	17	5	260	Good	Good	3.1	1.9	Long (>40 years)	Medium	Medium	Low Impact: <10%	0	No	
201	<i>Corymbia maculata</i>	1	18	6	330	Good	Good	4.0	2.1	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	
202	<i>Corymbia maculata</i>	1	7	5	210	Good	Good	2.5	1.7	Long (>40 years)	Low	Low	No Impact: 0%	0	No	
203	<i>Corymbia maculata</i>	1	4	2	70	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	No Impact: 0%	0	No	
204	<i>Eucalyptus melliodora</i>	1	16	8	410	Poor	Fair	4.9	2.3	Short (5-15 years)	Medium	Medium	High Impact: >20%	93	Yes	Possibly impacted by work on footpath. Sparse canopy. Avenue tree
205	<i>Corymbia maculata</i>	1	12	5	200	Good	Good	2.4	1.7	Long (>40 years)	Low	Low	High Impact: >20%	16	Yes	
206	<i>Corymbia maculata</i>	1	16	4	240	Good	Good	2.9	1.8	Long (>40 years)	Medium	Medium	Medium Impact: >10%	12	No	
207	<i>Corymbia maculata</i>	1	13	4	180	Good	Good	2.2	1.6	Long (>40 years)	Low	Low	No Impact: 0%	0	No	
208	<i>Corymbia maculata</i>	1	14	4	290	Good	Good	3.5	2.0	Long (>40 years)	Medium	Medium	High Impact: >20%	26	Yes	
209	<i>Corymbia maculata</i>	1	7	4	160	Fair	Fair	2.0	1.5	Long (>40 years)	Low	Low	No Impact: 0%	0	No	

Tree	Botanical name	Trees in Group	Height (m)	Spread (m)	DBH (mm)	Health	Structure	TPZ (m)	SRZ (m)	SULE	Landscape significance	Retention value	Impact	TPZ% encroachment	SRZ encroached	Notes
210	<i>Corymbia maculata</i>	1	7	2	100	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	No Impact: 0%	0	No	
211	<i>Corymbia maculata</i>	1	18	6	390	Good	Good	4.7	2.2	Long (>40 years)	Medium	Medium	Low Impact: <10%	1	No	
212	<i>Corymbia maculata</i>	1	17	8	330	Good	Good	4.0	2.1	Long (>40 years)	Medium	Medium	Low Impact: <10%	2	No	
213	<i>Corymbia maculata</i>	1	4	1	50	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	No Impact: 0%	0	No	
214	<i>Eucalyptus melliodora</i>	1	12	8	420	Fair	Fair	5.0	2.3	Medium (15-40 years)	Medium	Medium	High Impact: >20%	92	Yes	Avenue tree
215	<i>Corymbia maculata</i>	1	12	6	230	Good	Good	2.8	1.8	Long (>40 years)	Medium	Medium	Low Impact: <10%	7	No	
216	<i>Corymbia maculata</i>	1	17	8	380	Good	Good	4.6	2.2	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	
217	<i>Corymbia maculata</i>	1	4	1	70	Poor	Fair	2.0	1.5	Short (5-15 years)	Low	Low	No Impact: 0%	0	No	Dead top
218	<i>Corymbia maculata</i>	1	5	3	80	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	Low Impact: <10%	1	No	
219	<i>Corymbia maculata</i>	1	15	5	270	Fair	Good	3.2	1.9	Medium (15-40 years)	Medium	Medium	No Impact: 0%	0	No	
220	<i>Corymbia maculata</i>	1	18	7	320	Good	Good	3.8	2.1	Long (>40 years)	Medium	Medium	Low Impact: <10%	2	No	
221	<i>Corymbia maculata</i>	1	17	7	320	Good	Good	3.8	2.1	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	
222	<i>Corymbia maculata</i>	1	18	8	390	Good	Good	4.7	2.2	Long (>40 years)	Medium	Medium	Low Impact: <10%	2	No	
223	<i>Corymbia maculata</i>	1	16	7	320	Good	Good	3.8	2.1	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	
224	<i>Corymbia maculata</i>	1	6	2	80	Fair	Poor	2.0	1.5	Short (5-15 years)	Low	Low	No Impact: 0%	0	No	
225	<i>Corymbia maculata</i>	1	14	7	320	Good	Good	3.8	2.1	Long (>40 years)	Medium	Medium	Low Impact: <10%	3	No	
226	<i>Eucalyptus melliodora</i>	1	18	15	690	Poor	Fair	8.3	2.8	Medium (15-40 years)	High	High	High Impact: >20%	53	Yes	Avenue tree
227	<i>Ulmus parvifolia</i>	1	6	9	210	Fair	Fair	2.5	1.7	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	
228	<i>Eucalyptus sieberi</i>	1	18	6	260	Good	Good	3.1	1.9	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	
229	<i>Corymbia maculata</i>	1	10	5	180	Good	Good	2.2	1.6	Long (>40 years)	Low	Low	No Impact: 0%	0	No	
230	<i>Eucalyptus tereticornis</i>	1	12	6	300	Good	Good	3.6	2.0	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	

Tree	Botanical name	Trees in Group	Height (m)	Spread (m)	DBH (mm)	Health	Structure	TPZ (m)	SRZ (m)	SULE	Landscape significance	Retention value	Impact	TPZ% encroachment	SRZ encroached	Notes
231	<i>Eucalyptus moluccana</i>	1	7	5	180	Fair	Good	2.2	1.6	Long (>40 years)	Low	Low	No Impact: 0%	0	No	
232	<i>Melia azedarach</i>	1	5	5	140	Good	Good	2.0	1.5	Medium (15-40 years)	Low	Low	No Impact: 0%	0	No	
233	<i>Eucalyptus tereticornis</i>	1	16	8	350	Good	Good	4.2	2.1	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	
234	<i>Eucalyptus moluccana</i>	1	8	4	120	Fair	Good	2.0	1.5	Long (>40 years)	Low	Low	No Impact: 0%	0	No	
235	<i>Melia azedarach</i>	1	5	4	130	Good	Fair	2.0	1.5	Medium (15-40 years)	Low	Low	No Impact: 0%	0	No	
236	<i>Melia azedarach</i>	1	8	7	220	Good	Fair	2.6	1.8	Medium (15-40 years)	Medium	Medium	No Impact: 0%	0	No	
237	<i>Melia azedarach</i>	1	10	8	260	Good	Fair	3.1	1.9	Medium (15-40 years)	Medium	Medium	No Impact: 0%	0	No	Bifurcated stem
238	<i>Harpephyllum caffrum</i>	1	9	4	140	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	No Impact: 0%	0	No	
239	<i>Harpephyllum caffrum</i>	1	10	8	220	Good	Fair	2.6	1.8	Medium (15-40 years)	Medium	Medium	No Impact: 0%	0	No	
240	<i>Melia azedarach</i>	1	3	4	80	Good	Fair	2.0	1.5	Medium (15-40 years)	Low	Low	No Impact: 0%	0	No	Maybe considered a weed
241	<i>Corymbia maculata</i>	1	17	6	300	Good	Good	3.6	2.0	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	
242	<i>Corymbia maculata</i>	1	20	10	400	Good	Good	4.8	2.3	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	
243	<i>Corymbia maculata</i>	1	10	4	110	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	No Impact: 0%	0	No	Twin stems
244	<i>Corymbia maculata</i>	1	3	1	50	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	No Impact: 0%	0	No	
245	<i>Corymbia maculata</i>	1	12	4	180	Good	Good	2.2	1.6	Long (>40 years)	Low	Low	No Impact: 0%	0	No	
246	<i>Corymbia maculata</i>	1	4	1	50	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	No Impact: 0%	0	No	
247	<i>Corymbia maculata</i>	1	12	3	150	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	No Impact: 0%	0	No	
248	<i>Corymbia maculata</i>	1	8	6	150	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	No Impact: 0%	0	No	
249	<i>Corymbia maculata</i>	1	12	5	180	Good	Good	2.2	1.6	Long (>40 years)	Low	Low	No Impact: 0%	0	No	
250	<i>Corymbia maculata</i>	1	7	2	60	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	No Impact: 0%	0	No	
251	<i>Corymbia maculata</i>	1	20	12	480	Good	Good	5.8	2.4	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	

Tree	Botanical name	Trees in Group	Height (m)	Spread (m)	DBH (mm)	Health	Structure	TPZ (m)	SRZ (m)	SULE	Landscape significance	Retention value	Impact	TPZ% encroachment	SRZ encroached	Notes
252	<i>Eucalyptus melliodora</i>	1	20	20	760	Fair	Fair	9.1	2.9	Medium (15-40 years)	High	High	High Impact: >20%	41	Yes	Avenue tree
253	<i>Corymbia maculata</i>	1	10	4	100	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	No Impact: 0%	0	No	
254	<i>Corymbia maculata</i>	1	12	6	180	Good	Good	2.2	1.6	Long (>40 years)	Low	Low	No Impact: 0%	0	No	
255	<i>Corymbia maculata</i>	1	4	1	50	Poor	Fair	2.0	1.5	Short (5-15 years)	Low	Low	No Impact: 0%	0	No	
256	<i>Corymbia maculata</i>	1	6	3	60	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	No Impact: 0%	0	No	
257	<i>Corymbia maculata</i>	1	15	5	250	Good	Good	3.0	1.8	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	
258	<i>Corymbia citriodora</i>	1	14	7	280	Good	Good	3.4	1.9	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	
259	<i>Corymbia maculata</i>	1	16	8	260	Good	Good	3.1	1.9	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	
260	<i>Corymbia maculata</i>	1	4	1	50	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	No Impact: 0%	0	No	
261	<i>Corymbia maculata</i>	1	10	4	120	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	No Impact: 0%	0	No	
262	<i>Corymbia maculata</i>	2	10	5	150	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	No Impact: 0%	0	No	Two trees growing close together
263	<i>Corymbia maculata</i>	1	12	5	180	Good	Good	2.2	1.6	Long (>40 years)	Low	Low	No Impact: 0%	0	No	
264	<i>Corymbia citriodora</i>	1	20	12	360	Good	Good	4.3	2.2	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	
265	<i>Corymbia maculata</i>	1	12	5	200	Good	Good	2.4	1.7	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	
266	<i>Corymbia maculata</i>	1	12	5	200	Good	Good	2.4	1.7	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	
267	<i>Corymbia maculata</i>	1	8	2	110	Poor	Fair	2.0	1.5	Short (5-15 years)	Low	Low	No Impact: 0%	0	No	
268	<i>Eucalyptus melliodora</i>	1	20	12	840	Poor	Fair	10.1	3.1	Medium (15-40 years)	High	High	High Impact: >20%	44	Yes	Avenue tree. Sparse canopy
269	<i>Corymbia citriodora</i>	1	20	12	330	Good	Good	4.0	2.1	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	
270	<i>Corymbia maculata</i>	3	3	2	50	Poor	Poor	2.0	1.5	Short (5-15 years)	Low	Low	No Impact: 0%	0	No	Three small trees growing close together
271	<i>Corymbia maculata</i>	1	4	2	60	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	No Impact: 0%	0	No	
272	<i>Corymbia citriodora</i>	1	22	12	530	Good	Good	6.4	2.5	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	

Tree	Botanical name	Trees in Group	Height (m)	Spread (m)	DBH (mm)	Health	Structure	TPZ (m)	SRZ (m)	SULE	Landscape significance	Retention value	Impact	TPZ% encroachment	SRZ encroached	Notes
273	<i>Corymbia maculata</i>	1	12	5	140	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	No Impact: 0%	0	No	
274	<i>Corymbia maculata</i>	1	5	2	50	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	No Impact: 0%	0	No	
275	<i>Corymbia maculata</i>	1	14	8	300	Good	Good	3.6	2.0	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	
276	<i>Corymbia citriodora</i>	1	15	12	320	Good	Good	3.8	2.1	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	
277	<i>Corymbia citriodora</i>	1	20	8	320	Good	Good	3.8	2.1	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	
278	<i>Corymbia maculata</i>	1	16	8	350	Good	Good	4.2	2.1	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	
279	<i>Eucalyptus melliodora</i>	1	20	15	650	Fair	Fair	7.8	2.8	Medium (15-40 years)	High	High	High Impact: >20%	43	Yes	Avenue tree. 3 stems
280	<i>Schinus molle</i>	1	4	3	200	Fair	Fair	2.4	1.7	Medium (15-40 years)	Low	Low	High Impact: >20%	100	Yes	
281	<i>Schinus molle</i>	1	9	8	350	Fair	Fair	4.2	2.1	Medium (15-40 years)	Medium	Medium	High Impact: >20%	100	Yes	
282	<i>Schinus molle</i>	1	6	7	220	Fair	Fair	2.6	1.8	Medium (15-40 years)	Medium	Medium	High Impact: >20%	100	Yes	
283	<i>Schinus molle</i>	1	7	8	250	Fair	Fair	3.0	1.8	Medium (15-40 years)	Medium	Medium	High Impact: >20%	100	Yes	
284	<i>Schinus molle</i>	1	7	7	280	Fair	Fair	3.4	1.9	Medium (15-40 years)	Medium	Medium	High Impact: >20%	100	Yes	
285	<i>Schinus molle</i>	1	8	5	180	Fair	Fair	2.2	1.6	Medium (15-40 years)	Medium	Medium	High Impact: >20%	100	Yes	
286	<i>Schinus molle</i>	1	10	12	450	Fair	Fair	5.4	2.4	Medium (15-40 years)	Medium	Medium	High Impact: >20%	100	Yes	
287	<i>Schinus molle</i>	1	7	5	200	Fair	Fair	2.4	1.7	Medium (15-40 years)	Medium	Medium	High Impact: >20%	100	Yes	
288	<i>Corymbia maculata</i>	1	19	9	340	Good	Good	4.1	2.1	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	
289	<i>Corymbia maculata</i>	1	14	6	250	Good	Good	3.0	1.8	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	
290	<i>Corymbia maculata</i>	1	10	3	130	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	No Impact: 0%	0	No	
291	<i>Corymbia maculata</i>	1	12	4	160	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	No Impact: 0%	0	No	
292	<i>Corymbia maculata</i>	1	8	2	100	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	No Impact: 0%	0	No	
293	<i>Corymbia maculata</i>	1	13	4	150	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	No Impact: 0%	0	No	

Tree	Botanical name	Trees in Group	Height (m)	Spread (m)	DBH (mm)	Health	Structure	TPZ (m)	SRZ (m)	SULE	Landscape significance	Retention value	Impact	TPZ% encroachment	SRZ encroached	Notes
294	<i>Corymbia maculata</i>	1	12	5	200	Good	Fair	2.4	1.7	Long (>40 years)	Low	Low	No Impact: 0%	0	No	Bifurcation
295	<i>Corymbia maculata</i>	1	10	3	100	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	No Impact: 0%	0	No	
296	<i>Corymbia maculata</i>	1	10	4	140	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	No Impact: 0%	0	No	
297	<i>Eucalyptus melliodora</i>	1	25	25	840	Good	Good	10.1	3.1	Long (>40 years)	High	High	High Impact: >20%	45	Yes	
298	<i>Corymbia maculata</i>	1	10	4	180	Fair	Good	2.2	1.6	Long (>40 years)	Low	Low	No Impact: 0%	0	No	Dead stem
299	<i>Corymbia maculata</i>	1	8	2	80	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	No Impact: 0%	0	No	
300	<i>Corymbia maculata</i>	1	10	2	100	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	No Impact: 0%	0	No	
301	<i>Corymbia maculata</i>	1	12	4	120	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	No Impact: 0%	0	No	
302	<i>Corymbia maculata</i>	1	6	2	80	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	No Impact: 0%	0	No	
303	<i>Corymbia maculata</i>	1	16	7	290	Good	Good	3.5	2.0	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	
304	<i>Corymbia maculata</i>	1	13	5	180	Good	Good	2.2	1.6	Long (>40 years)	Low	Low	No Impact: 0%	0	No	
305	<i>Eucalyptus melliodora</i>	1	23	18	670	Fair	Good	8.0	2.8	Long (>40 years)	High	High	High Impact: >20%	40	Yes	Sparse canopy
306	<i>Corymbia maculata</i>	1	5	2	60	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	No Impact: 0%	0	No	
307	<i>Corymbia maculata</i>	1	10	8	180	Good	Good	2.2	1.6	Long (>40 years)	Low	Low	No Impact: 0%	0	No	
308	<i>Corymbia maculata</i>	1	10	4	100	Good	Good	2.0	1.5	Short (5-15 years)	Low	Low	No Impact: 0%	0	No	
309	<i>Corymbia maculata</i>	1	10	6	160	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	No Impact: 0%	0	No	Sparse canopy
310	<i>Corymbia maculata</i>	1	12	4	150	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	No Impact: 0%	0	No	
311	<i>Corymbia maculata</i>	1	17	8	310	Good	Good	3.7	2.0	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	
312	<i>Corymbia maculata</i>	1	14	4	160	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	No Impact: 0%	0	No	
313	<i>Corymbia maculata</i>	1	14	5	240	Good	Good	2.9	1.8	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	
314	<i>Corymbia maculata</i>	1	15	9	340	Good	Good	4.1	2.1	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	

Tree	Botanical name	Trees in Group	Height (m)	Spread (m)	DBH (mm)	Health	Structure	TPZ (m)	SRZ (m)	SULE	Landscape significance	Retention value	Impact	TPZ% encroachment	SRZ encroached	Notes
315	<i>Corymbia maculata</i>	1	15	5	260	Good	Good	3.1	1.9	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	
316	<i>Corymbia maculata</i>	1	15	7	220	Good	Good	2.6	1.8	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	
317	<i>Eucalyptus melliodora</i>	1	17	14	380	Fair	Good	4.6	2.2	Long (>40 years)	Medium	Medium	High Impact: >20%	35	Yes	Sparse canopy
500	<i>Syzygium francissii</i>	1	14	8	380	Good	Good	4.6	2.2	Long (>40 years)	Medium	Medium	High Impact: >20%	42	Yes	
501	<i>Eucalyptus saligna</i>	1	20	12	450	Good	Good	5.4	2.4	Long (>40 years)	Medium	Medium	High Impact: >20%	39	Yes	
502	<i>Melaleuca bracteata</i>	1	10	8	300	Good	Fair	3.6	2.0	Medium (15-40 years)	Medium	Medium	High Impact: >20%	35	Yes	Multi trunked
503	<i>Melaleuca bracteata</i>	1	10	8	280	Good	Fair	3.4	1.9	Medium (15-40 years)	Medium	Medium	High Impact: >20%	62	Yes	Twin stems
504	<i>Jacaranda mimosifolia</i>	1	8	7	280	Good	Good	3.4	1.9	Medium (15-40 years)	Medium	Medium	High Impact: >20%	69	Yes	
505	<i>Callistemon viminalis</i>	1	8	7	250	Fair	Fair	3.0	1.8	Medium (15-40 years)	Medium	Medium	High Impact: >20%	91	Yes	
506	<i>Eucalyptus tereticornis</i>	1	25	12	350	Fair	Fair	4.2	2.1	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	
507	<i>Grevillea robusta</i>	1	12	8	300	Good	Good	3.6	2.0	Medium (15-40 years)	Medium	Medium	Low Impact: <10%	1	No	
508	<i>Brachychiton populneus</i>	1	8	7	250	Good	Good	3.0	1.8	Medium (15-40 years)	Medium	Medium	High Impact: >20%	33	Yes	
509	<i>Eucalyptus piperita</i>	1	22	8	250	Good	Good	3.0	1.8	Medium (15-40 years)	Medium	Medium	High Impact: >20%	19	Yes	
510	<i>Eucalyptus piperita</i>	1	20	7	350	Good	Good	4.2	2.1	Medium (15-40 years)	Medium	Medium	High Impact: >20%	37	Yes	
511	<i>Eucalyptus piperita</i>	1	20	9	380	Good	Good	4.6	2.2	Medium (15-40 years)	Medium	Medium	Low Impact: <10%	0	No	
512	<i>Eucalyptus piperita</i>	1	20	7	400	Good	Good	4.8	2.3	Medium (15-40 years)	Medium	Medium	High Impact: >20%	39	Yes	
513	<i>Eucalyptus piperita</i>	1	20	8	400	Good	Good	4.8	2.3	Medium (15-40 years)	Medium	Medium	High Impact: >20%	42	Yes	
514	<i>Eucalyptus piperita</i>	1	18	10	350	Good	Good	4.2	2.1	Medium (15-40 years)	Medium	Medium	Medium Impact: >10%	16	No	
515	<i>Eucalyptus piperita</i>	1	22	5	350	Fair	Fair	4.2	2.1	Medium (15-40 years)	Medium	Medium	High Impact: >20%	75	Yes	
516	<i>Eucalyptus piperita</i>	1	18	6	350	Good	Good	4.2	2.1	Medium (15-40 years)	Medium	Medium	High Impact: >20%	100	Yes	
517	<i>Eucalyptus piperita</i>	1	20	7	450	Good	Good	5.4	2.4	Medium (15-40 years)	Medium	Medium	High Impact: >20%	99	Yes	

Tree	Botanical name	Trees in Group	Height (m)	Spread (m)	DBH (mm)	Health	Structure	TPZ (m)	SRZ (m)	SULE	Landscape significance	Retention value	Impact	TPZ% encroachment	SRZ encroached	Notes
518	<i>Eucalyptus piperita</i>	1	20	15	350	Fair	Fair	4.2	2.1	Medium (15-40 years)	Medium	Medium	High Impact: >20%	100	Yes	
519	<i>Eucalyptus piperita</i>	1	20	12	500	Good	Fair	6.0	2.5	Medium (15-40 years)	Medium	Medium	High Impact: >20%	100	Yes	Multi trunked
520	<i>Eucalyptus piperita</i>	1	20	12	350	Fair	Fair	4.2	2.1	Medium (15-40 years)	Medium	Medium	High Impact: >20%	100	Yes	Sparse canopy, bifurcation
521	<i>Eucalyptus piperita</i>	1	10	8	200	Fair	Fair	2.4	1.7	Medium (15-40 years)	Medium	Medium	High Impact: >20%	100	Yes	
522	<i>Geijera parviflora</i>	1	5	6	150	Good	Fair	2.0	1.5	Medium (15-40 years)	Low	Low	High Impact: >20%	100	Yes	
523	<i>Olea africana</i>	1	5	5	150	Good	Fair	2.0	1.5	Short (5-15 years)	Low	Low	High Impact: >20%	68	Yes	Multi stemmed. Exempt species, considered a weed.
524	<i>Viburnum odoratissimum</i>	1	5	4	200	Good	Good	2.4	1.7	Medium (15-40 years)	Low	Low	No Impact: 0%	0	No	Multi trunked
525	<i>Magnolia grandiflora</i> and Cv's	1	5	3	80	Good	Good	2.0	1.5	Medium (15-40 years)	Low	Low	No Impact: 0%	0	No	
526	<i>Podocarpus elatus</i>	1	4	3	100	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	No Impact: 0%	0	No	
527	<i>Eucalyptus tereticornis</i>	1	20	14	550	Good	Fair	6.6	2.6	Medium (15-40 years)	High	High	No Impact: 0%	0	No	
528	<i>Podocarpus elatus</i>	1	8	4	200	Good	Good	2.4	1.7	Long (>40 years)	Low	Low	High Impact: >20%	22	Yes	
529	<i>Robinia 'Frisia'</i>	1	4	2	300	Fair	Fair	3.6	2.0	Medium (15-40 years)	Low	Low	High Impact: >20%	100	Yes	Lopped
530	<i>Fraxinus griffithii</i>	1	7	8	300	Good	Good	3.6	2.0	Medium (15-40 years)	Medium	Medium	High Impact: >20%	48	Yes	
531	<i>Robinia 'Frisia'</i>	1	3	2	280	Fair	Fair	3.4	1.9	Medium (15-40 years)	Low	Low	High Impact: >20%	36	Yes	Lopped
532	<i>Podocarpus elatus</i>	1	7	4	150	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	Low Impact: <10%	0	No	
533	<i>Fraxinus griffithii</i>	1	6	8	350	Good	Good	4.2	2.1	Long (>40 years)	Medium	Medium	High Impact: >20%	71	Yes	
534	<i>Podocarpus elatus</i>	1	7	3	140	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	No Impact: 0%	0	No	
535	<i>Fraxinus griffithii</i>	1	4	6	140	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	No Impact: 0%	0	No	
536	<i>Prunus sp.</i>	1	6	3	250	Good	Fair	3.0	1.8	Medium (15-40 years)	Medium	Medium	High Impact: >20%	76	Yes	Multi trunked
537	<i>Fraxinus griffithii</i>	1	6	5	250	Fair	Fair	3.0	1.8	Medium (15-40 years)	Medium	Medium	High Impact: >20%	100	Yes	
538	<i>Prunus sp.</i>	1	6	4	150	Fair	Fair	2.0	1.5	Medium (15-40 years)	Low	Low	High Impact: >20%	100	Yes	

Tree	Botanical name	Trees in Group	Height (m)	Spread (m)	DBH (mm)	Health	Structure	TPZ (m)	SRZ (m)	SULE	Landscape significance	Retention value	Impact	TPZ% encroachment	SRZ encroached	Notes
539	<i>Eucalyptus tereticornis</i>	1	28	10	500	Good	Fair	6.0	2.5	Medium (15-40 years)	High	High	High Impact: >20%	100	Yes	
540	<i>Corymbia maculata</i>	1	28	12	560	Good	Good	6.7	2.6	Long (>40 years)	High	High	High Impact: >20%	31	Yes	Minor basal wounds
541	<i>Corymbia maculata</i>	1	20	9	400	Fair	Fair	4.8	2.3	Medium (15-40 years)	Medium	Medium	High Impact: >20%	24	Yes	Sparse canopy, wound in main fork
542	<i>Corymbia maculata</i>	1	20	10	500	Fair	Good	6.0	2.5	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	
543	<i>Eucalyptus moluccana</i>	1	18	10	380	Good	Good	4.6	2.2	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	
544	<i>Eucalyptus moluccana</i>	1	12	8	410	Good	Good	4.9	2.3	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	
545	<i>Eucalyptus tereticornis</i>	1	8	5	200	Fair	Fair	2.4	1.7	Medium (15-40 years)	Low	Low	No Impact: 0%	0	No	
546	<i>Eucalyptus tereticornis</i>	1	10	6	250	Fair	Good	3.0	1.8	Medium (15-40 years)	Medium	Medium	No Impact: 0%	0	No	Sparse canopy
547	<i>Eucalyptus tereticornis</i>	1	8	5	160	Good	Fair	2.0	1.5	Medium (15-40 years)	Low	Low	High Impact: >20%	100	Yes	
548	<i>Eucalyptus tereticornis</i>	1	10	4	160	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	High Impact: >20%	100	Yes	
549	<i>Eucalyptus crebra</i>	1	25	22	930	Fair	Fair	11.2	3.2	Long (>40 years)	High	High	High Impact: >20%	100	Yes	
550	<i>Eucalyptus moluccana</i>	1	7	2	50	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	High Impact: >20%	100	Yes	
551	<i>Eucalyptus moluccana</i>	1	16	15	860	Good	Fair	10.3	3.1	Long (>40 years)	High	High	High Impact: >20%	100	Yes	Decay, wounds on trunk
552	<i>Eucalyptus tereticornis</i>	1	9	5	280	Fair	Fair	3.4	1.9	Short (5-15 years)	Low	Low	High Impact: >20%	96	Yes	
553	<i>Eucalyptus crebra</i>	1	6	2	50	Fair	Fair	2.0	1.5	Long (>40 years)	Low	Low	High Impact: >20%	100	Yes	
554	<i>Eucalyptus tereticornis</i>	1	10	4	120	Good	Fair	2.0	1.5	Long (>40 years)	Low	Low	High Impact: >20%	10	Yes	Bifurcated stem
555	<i>Eucalyptus crebra</i>	1	10	3	150	Fair	Good	2.0	1.5	Long (>40 years)	Low	Low	High Impact: >20%	89	Yes	
556	<i>Eucalyptus tereticornis</i>	1	14	8	340	Good	Fair	4.1	2.1	Medium (15-40 years)	Medium	Medium	High Impact: >20%	48	Yes	Wounds on trunk
557	<i>Eucalyptus tereticornis</i>	1	10	4	180	Good	Good	2.2	1.6	Long (>40 years)	Low	Low	High Impact: >20%	49	Yes	
558	<i>Eucalyptus tereticornis</i>	1	12	6	220	Good	Fair	2.6	1.8	Long (>40 years)	Medium	Medium	High Impact: >20%	19	Yes	Bifurcation of stem
559	<i>Eucalyptus tereticornis</i>	1	14	8	280	Good	Fair	3.4	1.9	Long (>40 years)	Medium	Medium	High Impact: >20%	35	Yes	Bifurcation of main stem

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560	<i>Eucalyptus crebra</i>	1	8	3	150	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	High Impact: >20%	85	Yes	
561	<i>Eucalyptus crebra</i>	1	10	4	300	Poor	Poor	3.6	2.0	Short (5-15 years)	Medium	Low	High Impact: >20%	42	Yes	Tree has almost died
562	<i>Eucalyptus tereticornis</i>	1	12	4	160	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	High Impact: >20%	59	Yes	
563	<i>Jacaranda mimosifolia</i>	1	3	2	50	Fair	Fair	2.0	1.5	Long (>40 years)	Low	Low	High Impact: >20%	100	Yes	
564	<i>Jacaranda mimosifolia</i>	1	5	4	80	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	High Impact: >20%	100	Yes	
565	<i>Eucalyptus tereticornis</i>	1	10	3	140	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	High Impact: >20%	81	Yes	
566	<i>Jacaranda mimosifolia</i>	1	6	4	100	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	High Impact: >20%	83	Yes	Multi trunked
567	<i>Eucalyptus tereticornis</i>	1	15	11	350	Good	Good	4.2	2.1	Long (>40 years)	Medium	Medium	High Impact: >20%	92	Yes	
568	<i>Eucalyptus moluccana</i>	1	12	4	200	Good	Good	2.4	1.7	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	
569	<i>Eucalyptus tereticornis</i>	1	5	2	50	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	No Impact: 0%	0	No	
570	<i>Eucalyptus tereticornis</i>	1	4	2	50	Fair	Good	2.0	1.5	Short (5-15 years)	Low	Low	No Impact: 0%	0	No	
571	<i>Eucalyptus moluccana</i>	1	13	4	200	Good	Good	2.4	1.7	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	
572	<i>Eucalyptus moluccana</i>	1	8	3	120	Good	Fair	2.0	1.5	Long (>40 years)	Low	Low	No Impact: 0%	0	No	
573	<i>Eucalyptus moluccana</i>	1	14	6	360	Good	Fair	4.3	2.2	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	Twin bifurcated stem
574	<i>Eucalyptus moluccana</i>	1	14	6	320	Good	Good	3.8	2.1	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	
575	<i>Eucalyptus moluccana</i>	1	10	3	120	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	No Impact: 0%	0	No	
576	<i>Eucalyptus moluccana</i>	1	14	8	240	Good	Good	2.9	1.8	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	Twin stems
577	<i>Eucalyptus tereticornis</i>	1	5	2	50	Poor	Poor	2.0	1.5	Short (5-15 years)	Low	Low	No Impact: 0%	0	No	
578	<i>Eucalyptus moluccana</i>	1	14	4	200	Good	Good	2.4	1.7	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	
579	<i>Eucalyptus crebra</i>	1	7	2	100	Fair	Good	2.0	1.5	Medium (15-40 years)	Low	Low	No Impact: 0%	0	No	
580	<i>Casuarina glauca</i>	1	12	4	100	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	No Impact: 0%	0	No	

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581	<i>Eucalyptus crebra</i>	1	6	2	50	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	No Impact: 0%	0	No	
582	<i>Melaleuca decora</i>	1	3	1	50	Good	Good	2.0	1.5	Medium (15-40 years)	Low	Low	No Impact: 0%	0	No	
583	<i>Casuarina glauca</i>	1	14	4	120	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	No Impact: 0%	0	No	
584	<i>Eucalyptus moluccana</i>	1	15	5	310	Good	Good	3.7	2.0	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	
585	<i>Eucalyptus moluccana</i>	1	15	6	400	Good	Poor	4.8	2.3	Short (5-15 years)	Medium	Low	No Impact: 0%	0	No	Split in stem
586	<i>Melaleuca decora</i>	1	3	2	50	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	No Impact: 0%	0	No	
587	<i>Melaleuca decora</i>	1	3	2	50	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	No Impact: 0%	0	No	
588	<i>Melaleuca decora</i>	1	3	3	50	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	No Impact: 0%	0	No	
589	<i>Casuarina glauca</i>	1	12	6	280	Good	Good	3.4	1.9	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	Multi trunked
590	<i>Melaleuca decora</i>	1	4	2	80	Poor	Fair	2.0	1.5	Short (5-15 years)	Low	Low	No Impact: 0%	0	No	
591	<i>Melaleuca decora</i>	1	3	1	50	Poor	Fair	2.0	1.5	Short (5-15 years)	Low	Low	No Impact: 0%	0	No	
592	<i>Eucalyptus sideroxylon</i>	1	14	5	240	Good	Fair	2.9	1.8	Medium (15-40 years)	Medium	Medium	No Impact: 0%	0	No	Bifurcated stem
593	<i>Eucalyptus tereticornis</i>	1	12	6	180	Fair	Good	2.2	1.6	Medium (15-40 years)	Low	Low	No Impact: 0%	0	No	
594	<i>Jacaranda mimosifolia</i>	1	3	4	70	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	High Impact: >20%	82	Yes	
595	<i>Jacaranda mimosifolia</i>	1	5	4	100	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	High Impact: >20%	100	Yes	
596	<i>Eucalyptus tereticornis</i>	1	17	2	50	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	High Impact: >20%	100	Yes	
597	<i>Eucalyptus crebra</i>	1	17	7	400	Poor	Fair	4.8	2.3	Short (5-15 years)	Medium	Low	High Impact: >20%	51	Yes	Top dying
598	<i>Eucalyptus tereticornis</i>	1	12	5	150	Fair	Fair	2.0	1.5	Medium (15-40 years)	Low	Low	High Impact: >20%	33	Yes	
599	<i>Jacaranda mimosifolia</i>	1	4	3	60	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	High Impact: >20%	100	Yes	
600	<i>Jacaranda mimosifolia</i>	1	6	5	160	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	High Impact: >20%	100	Yes	Multi trunked
601	<i>Eucalyptus tereticornis</i>	1	18	6	300	Fair	Good	3.6	2.0	Long (>40 years)	Medium	Medium	High Impact: >20%	50	Yes	Sparse canopy

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602	<i>Eucalyptus sideroxylon</i>	1	10	4	150	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	No Impact: 0%	0	No	
603	<i>Eucalyptus sideroxylon</i>	1	14	7	300	Fair	Good	3.6	2.0	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	Sparse canopy
604	<i>Eucalyptus moluccana</i>	1	17	6	300	Good	Good	3.6	2.0	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	
605	<i>Eucalyptus sideroxylon</i>	1	17	5	260	Good	Fair	3.1	1.9	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	Bifurcation of main stem
606	<i>Eucalyptus sideroxylon</i>	1	18	9	320	Good	Good	3.8	2.1	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	Possible termite infestation
607	<i>Eucalyptus tereticornis</i>	1	16	6	300	Fair	Good	3.6	2.0	Long (>40 years)	Medium	Medium	High Impact: >20%	63	Yes	Sparse canopy
608	<i>Jacaranda mimosifolia</i>	1	5	3	100	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	High Impact: >20%	100	Yes	
609	<i>Jacaranda mimosifolia</i>	1	5	4	100	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	High Impact: >20%	100	Yes	
610	<i>Jacaranda mimosifolia</i>	1	4	1	50	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	High Impact: >20%	100	Yes	
611	<i>Jacaranda mimosifolia</i>	1	8	6	160	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	High Impact: >20%	100	Yes	
612	<i>Eucalyptus tereticornis</i>	1	18	10	320	Good	Good	3.8	2.1	Long (>40 years)	Medium	Medium	High Impact: >20%	86	Yes	
613	<i>Eucalyptus tereticornis</i>	1	14	6	300	Good	Good	3.6	2.0	Long (>40 years)	Medium	Medium	High Impact: >20%	95	Yes	
614	<i>Jacaranda mimosifolia</i>	1	10	8	260	Good	Good	3.1	1.9	Long (>40 years)	Medium	Medium	High Impact: >20%	100	Yes	
615	<i>Eucalyptus tereticornis</i>	1	19	7	310	Fair	Fair	3.7	2.0	Long (>40 years)	Medium	Medium	High Impact: >20%	99	Yes	Minor basal wound, Sparse canopy
616	<i>Eucalyptus tereticornis</i>	1	10	4	140	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	No Impact: 0%	0	No	
617	<i>Eucalyptus tereticornis</i>	1	14	5	260	Good	Good	3.1	1.9	Long (>40 years)	Medium	Medium	High Impact: >20%	92	Yes	
618	<i>Eucalyptus tereticornis</i>	1	10	7	300	Good	Good	3.6	2.0	Long (>40 years)	Medium	Medium	High Impact: >20%	100	Yes	
619	<i>Eucalyptus tereticornis</i>	1	18	6	400	Good	Fair	4.8	2.3	Long (>40 years)	Medium	Medium	High Impact: >20%	84	Yes	Bifurcation of main stem
620	<i>Eucalyptus tereticornis</i>	1	4	2	120	Poor	Poor	2.0	1.5	Short (5-15 years)	Low	Low	High Impact: >20%	100	Yes	Top has died back
621	<i>Eucalyptus tereticornis</i>	1	18	12	360	Good	Fair	4.3	2.2	Long (>40 years)	Medium	Medium	High Impact: >20%	79	Yes	Minor basal wound
622	<i>Melia azedarach</i>	1	12	12	350	Good	Good	4.2	2.1	Long (>40 years)	Medium	Medium	High Impact: >20%	100	Yes	

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623	<i>Melia azedarach</i>	1	4	6	160	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	High Impact: >20%	100	Yes	Multi trunked
624	<i>Grevillea robusta</i>	1	14	5	280	Good	Good	3.4	1.9	Long (>40 years)	Low	Low	High Impact: >20%	100	Yes	
625	<i>Corymbia gummifera</i>	1	14	10	350	Fair	Fair	4.2	2.1	Long (>40 years)	Medium	Medium	High Impact: >20%	79	Yes	Hanging branch Lodged up
626	<i>Grevillea robusta</i>	1	12	8	300	Good	Good	3.6	2.0	Long (>40 years)	Medium	Medium	High Impact: >20%	100	Yes	
627	<i>Melia azedarach</i>	1	3	4	80	Good	Good	2.0	1.5	Short (5-15 years)	Low	Low	High Impact: >20%	100	Yes	
628	<i>Eucalyptus tereticornis</i>	1	16	8	340	Good	Fair	4.1	2.1	Long (>40 years)	Medium	Medium	High Impact: >20%	90	Yes	Borers, basal wound
629	<i>Grevillea robusta</i>	1	4	1	50	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	High Impact: >20%	100	Yes	
630	<i>Grevillea robusta</i>	1	12	5	260	Good	Good	3.1	1.9	Long (>40 years)	Medium	Medium	High Impact: >20%	100	Yes	
631	<i>Eucalyptus tereticornis</i>	1	17	5	250	Good	Fair	3.0	1.8	Long (>40 years)	Medium	Medium	High Impact: >20%	73	Yes	Basal wound
632	<i>Grevillea robusta</i>	1	8	4	180	Fair	Good	2.2	1.6	Medium (15-40 years)	Low	Low	High Impact: >20%	100	Yes	Sparse at top
633	<i>Grevillea robusta</i>	1	15	6	280	Fair	Good	3.4	1.9	Long (>40 years)	Medium	Medium	High Impact: >20%	100	Yes	
634	<i>Eucalyptus tereticornis</i>	1	16	7	340	Fair	Fair	4.1	2.1	Long (>40 years)	Medium	Medium	High Impact: >20%	82	Yes	Bifurcated stem
635	<i>Grevillea robusta</i>	1	14	8	329	Good	Good	3.9	2.1	Long (>40 years)	Medium	Medium	High Impact: >20%	96	Yes	
636	<i>Eucalyptus sideroxylon</i>	1	17	10	470	Good	Fair	5.6	2.4	Medium (15-40 years)	Medium	Medium	No Impact: 0%	0	No	Twin stems, wound at base
637	<i>Eucalyptus sideroxylon</i>	1	15	6	320	Poor	Fair	3.8	2.1	Remove (<5 years)	Low	Low	No Impact: 0%	0	No	Dead tree
638	<i>Eucalyptus sideroxylon</i>	1	18	8	400	Good	Good	4.8	2.3	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	
639	<i>Eucalyptus sideroxylon</i>	1	5	3	150	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	No Impact: 0%	0	No	
640	<i>Jacaranda mimosifolia</i>	1	7	6	200	Good	Fair	2.4	1.7	Long (>40 years)	Medium	Medium	High Impact: >20%	100	Yes	
641	<i>Jacaranda mimosifolia</i>	1	9	7	240	Good	Good	2.9	1.8	Long (>40 years)	Medium	Medium	High Impact: >20%	100	Yes	
642	<i>Grevillea robusta</i>	1	12	6	300	Good	Good	3.6	2.0	Long (>40 years)	Medium	Medium	High Impact: >20%	100	Yes	
643	<i>Grevillea robusta</i>	1	14	8	320	Good	Fair	3.8	2.1	Long (>40 years)	Medium	Medium	High Impact: >20%	100	Yes	Bifurcated stem

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644	<i>Lagerstroemia indica</i>	1	6	5	150	Good	Good	2.0	1.5	Medium (15-40 years)	Low	Low	High Impact: >20%	100	Yes	Multi trunked
645	<i>Lagerstroemia indica</i>	1	5	4	140	Poor	Fair	2.0	1.5	Short (5-15 years)	Low	Low	High Impact: >20%	100	Yes	
646	<i>Lagerstroemia indica</i>	1	8	6	220	Good	Good	2.6	1.8	Medium (15-40 years)	Medium	Medium	High Impact: >20%	100	Yes	Multi trunked
647	<i>Lagerstroemia indica</i>	1	6	5	170	Good	Good	2.0	1.6	Medium (15-40 years)	Low	Low	High Impact: >20%	100	Yes	Bifurcation of stem
648	<i>Lagerstroemia indica</i>	1	6	6	140	Good	Fair	2.0	1.5	Medium (15-40 years)	Low	Low	High Impact: >20%	100	Yes	Bifurcation of stem
649	<i>Eucalyptus sideroxylon</i>	1	17	7	320	Good	Good	3.8	2.1	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	
650	<i>Casuarina glauca</i>	1	7	1	70	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	No Impact: 0%	0	No	
651	<i>Casuarina glauca</i>	1	8	1	60	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	No Impact: 0%	0	No	
652	<i>Casuarina glauca</i>	1	8	1	60	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	No Impact: 0%	0	No	
653	<i>Grevillea robusta</i>	1	11	4	210	Good	Fair	2.5	1.7	Medium (15-40 years)	Medium	Medium	High Impact: >20%	100	Yes	Basal wound
654	<i>Eucalyptus sideroxylon</i>	1	12	6	340	Good	Fair	4.1	2.1	Long (>40 years)	Medium	Medium	High Impact: >20%	100	Yes	Mechanical damage
655	<i>Eucalyptus sideroxylon</i>	1	14	7	320	Fair	Good	3.8	2.1	Medium (15-40 years)	Medium	Medium	High Impact: >20%	100	Yes	Low branches dying back
656	<i>Eucalyptus tereticornis</i>	1	20	18	950	Fair	Fair	11.4	3.2	Medium (15-40 years)	High	High	High Impact: >20%	97	Yes	Basal wounds
657	<i>Eucalyptus tereticornis</i>	1	16	20	1000	Good	Fair	12.0	3.3	Medium (15-40 years)	High	High	High Impact: >20%	100	Yes	Some wounding at base and lower trunk
658	<i>Eucalyptus sideroxylon</i>	1	13	6	280	Good	Good	3.4	1.9	Long (>40 years)	Medium	Medium	High Impact: >20%	100	Yes	
659	<i>Eucalyptus tereticornis</i>	1	12	6	300	Good	Fair	3.6	2.0	Long (>40 years)	Medium	Medium	High Impact: >20%	30	Yes	Borers
660	<i>Eucalyptus moluccana</i>	1	10	3	140	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	No Impact: 0%	0	No	
661	<i>Eucalyptus tereticornis</i>	1	8	3	140	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	No Impact: 0%	0	No	
662	<i>Eucalyptus tereticornis</i>	1	6	1	100	Poor	Poor	2.0	1.5	Short (5-15 years)	Low	Low	No Impact: 0%	0	No	Dying back
663	<i>Eucalyptus tereticornis</i>	1	6	2	120	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	No Impact: 0%	0	No	Low branch torn out
664	<i>Eucalyptus sideroxylon</i>	1	20	10	630	Fair	Fair	7.6	2.7	Long (>40 years)	High	High	No Impact: 0%	0	No	Wounds on lower trunk

Tree	Botanical name	Trees in Group	Height (m)	Spread (m)	DBH (mm)	Health	Structure	TPZ (m)	SRZ (m)	SULE	Landscape significance	Retention value	Impact	TPZ% encroachment	SRZ encroached	Notes
665	<i>Casuarina glauca</i>	1	9	3	140	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	No Impact: 0%	0	No	
666	<i>Casuarina glauca</i>	1	7	2	50	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	No Impact: 0%	0	No	
667	<i>Casuarina glauca</i>	1	6	1	50	Poor	Fair	2.0	1.5	Short (5-15 years)	Low	Low	No Impact: 0%	0	No	
668	<i>Casuarina glauca</i>	1	10	4	140	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	No Impact: 0%	0	No	
669	<i>Casuarina glauca</i>	1	10	3	120	Fair	Fair	2.0	1.5	Long (>40 years)	Low	Low	No Impact: 0%	0	No	
670	<i>Casuarina glauca</i>	1	8	2	60	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	No Impact: 0%	0	No	
671	<i>Casuarina glauca</i>	1	4	1	50	Fair	Fair	2.0	1.5	Long (>40 years)	Low	Low	No Impact: 0%	0	No	
672	<i>Casuarina glauca</i>	1	4	1	50	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	No Impact: 0%	0	No	
673	<i>Casuarina glauca</i>	1	10	3	100	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	No Impact: 0%	0	No	Twin stemmed
674	<i>Casuarina glauca</i>	1	14	4	160	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	No Impact: 0%	0	No	
675	<i>Grevillea robusta</i>	1	12	10	340	Good	Good	4.1	2.1	Long (>40 years)	Medium	Medium	High Impact: >20%	92	Yes	
676	<i>Casuarina glauca</i>	1	10	3	150	Fair	Fair	2.0	1.5	Long (>40 years)	Low	Low	No Impact: 0%	0	No	
677	<i>Casuarina glauca</i>	1	10	2	80	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	No Impact: 0%	0	No	
678	<i>Casuarina glauca</i>	1	10	3	120	Poor	Poor	2.0	1.5	Remove (<5 years)	Low	Low	No Impact: 0%	0	No	
679	<i>Casuarina glauca</i>	1	12	3	150	Poor	Poor	2.0	1.5	Remove (<5 years)	Low	Low	No Impact: 0%	0	No	Dead tree
680	<i>Casuarina glauca</i>	1	8	4	150	Fair	Fair	2.0	1.5	Long (>40 years)	Low	Low	No Impact: 0%	0	No	Twin stems
681	<i>Casuarina glauca</i>	1	20	5	220	Good	Good	2.6	1.8	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	
682	<i>Casuarina glauca</i>	1	22	6	320	Good	Good	3.8	2.1	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	
683	<i>Casuarina glauca</i>	1	12	4	160	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	No Impact: 0%	0	No	
684	<i>Melia azedarach</i>	1	5	5	120	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	No Impact: 0%	0	No	
685	<i>Melia azedarach</i>	1	6	6	180	Good	Good	2.2	1.6	Long (>40 years)	Low	Low	No Impact: 0%	0	No	

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686	<i>Melia azedarach</i>	1	8	7	160	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	Low Impact: <10%	2	No	Twin stems
687	<i>Grevillea robusta</i>	1	9	2	80	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	High Impact: >20%	36	Yes	
688	<i>Olea africana</i>	1	5	5	80	Good	Good	2.0	1.5	Remove (<5 years)	Low	Low	High Impact: >20%	100	Yes	Multi stemmed, considered a weed
689	<i>Eucalyptus tereticornis</i>	1	16	20	770	Good	Fair	9.2	3.0	Long (>40 years)	High	High	High Impact: >20%	36	Yes	Multi stemmed, borers and wounds on stems. Exempt species, considered a weed.
690	<i>Eucalyptus tereticornis</i>	1	20	18	1000	Good	Fair	12.0	3.3	Long (>40 years)	High	High	Low Impact: <10%	6	No	Base of tree not accessed due to dense Lantana. Multi trunked
691	<i>Olea africana</i>	1	4	3	70	Good	Good	2.0	1.5	Remove (<5 years)	Low	Low	No Impact: 0%	0	No	No access to the base of the tree due to dense Lantana. Exempt species, considered a weed.
692	<i>Melia azedarach</i>	1	4	4	50	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	No Impact: 0%	0	No	No access to the base of the tree due to dense Lantana
693	<i>Eucalyptus tereticornis</i>	1	22	12	600	Good	Good	7.2	2.7	Long (>40 years)	High	High	High Impact: >20%	30	Yes	Twin stemmed. No access to the base of the tree due to dense Lantana
694	<i>Eucalyptus tereticornis</i>	1	26	12	700	Good	Good	8.4	2.8	Long (>40 years)	High	High	High Impact: >20%	43	Yes	No access to the base of the tree due to dense Lantana
695	<i>Eucalyptus tereticornis</i>	1	10	4	180	Fair	Fair	2.2	1.6	Short (5-15 years)	Low	Low	High Impact: >20%	52	Yes	No access to the base of the tree due to dense Lantana
696	<i>Eucalyptus tereticornis</i>	1	25	25	1000	Good	Good	12.0	3.3	Long (>40 years)	High	High	High Impact: >20%	66	Yes	No access to the base of the tree due to dense Lantana
697	<i>Melia azedarach</i>	1	4	4	50	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	High Impact: >20%	100	Yes	No access to the base of the tree due to dense Lantana
698	<i>Ligustrum lucidum</i>	1	7	4	150	Good	Good	2.0	1.5	Remove (<5 years)	Low	Low	High Impact: >20%	81	Yes	No access to the base of the tree due to dense Lantana. Exempt species, considered a weed.
699	<i>Olea africana</i>	1	6	3	80	Good	Good	2.0	1.5	Remove (<5 years)	Low	Low	No Impact: 0%	0	No	No access to the base of the tree due to dense Lantana. Exempt species, considered a weed.
700	<i>Acacia parramattensis</i>	1	12	8	140	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	No Impact: 0%	0	No	Borer in trunk
701	<i>Morus nigra</i>	1	10	10	300	Good	Good	3.6	2.0	Medium (15-40 years)	Medium	Medium	No Impact: 0%	0	No	
702	<i>Acacia parramattensis</i>	1	4	2	50	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	High Impact: >20%	100	Yes	No access to the base of the tree due to dense Lantana
703	<i>Melia azedarach</i>	1	4	5	100	Good	Good	2.0	1.5	Medium (15-40 years)	Low	Low	High Impact: >20%	100	Yes	No access to the base of the tree due to dense Lantana. Multi stemmed
704	<i>Eucalyptus tereticornis</i>	1	25	20	800	Good	Fair	9.6	3.0	Long (>40 years)	High	High	High Impact: >20%	100	Yes	No access to the base of the tree due to dense Lantana

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705	<i>Ligustrum lucidum</i>	1	6	6	150	Good	Good	2.0	1.5	Remove (<5 years)	Low	Low	High Impact: >20%	100	Yes	No access to the base of the tree due to dense Lantana. Exempt species, considered a weed.
706	<i>Ligustrum lucidum</i>	1	6	3	100	Fair	Fair	2.0	1.5	Remove (<5 years)	Low	Low	High Impact: >20%	48	Yes	By base of Tree 707. Exempt species, considered a weed.
707	<i>Eucalyptus tereticornis</i>	1	22	10	500	Good	Good	6.0	2.5	Medium (15-40 years)	Medium	Medium	High Impact: >20%	43	Yes	
708	<i>Eucalyptus tereticornis</i>	1	28	8	340	Good	Good	4.1	2.1	Long (>40 years)	Medium	Medium	High Impact: >20%	100	Yes	No access to the base of the tree due to dense Lantana
709	<i>Eucalyptus tereticornis</i>	1	28	10	400	Good	Good	4.8	2.3	Long (>40 years)	Medium	Medium	High Impact: >20%	100	Yes	No access to the base of the tree due to dense Lantana
710	<i>Eucalyptus tereticornis</i>	1	30	15	400	Good	Good	4.8	2.3	Long (>40 years)	Medium	Medium	High Impact: >20%	46	Yes	
711	<i>Melia azedarach</i>	1	5	4	70	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	High Impact: >20%	100	Yes	No access to the base of the tree due to dense Lantana.
712	<i>Eucalyptus tereticornis</i>	1	22	5	300	Good	Fair	3.6	2.0	Long (>40 years)	Medium	Medium	High Impact: >20%	100	Yes	No access to the base of the tree due to dense Lantana. Twin stems
713	<i>Eucalyptus tereticornis</i>	1	22	6	300	Good	Good	3.6	2.0	Long (>40 years)	Medium	Medium	High Impact: >20%	100	Yes	No access to the base of the tree due to dense Lantana
714	<i>Eucalyptus tereticornis</i>	1	26	6	350	Good	Good	4.2	2.1	Long (>40 years)	Medium	Medium	High Impact: >20%	71	Yes	
715	<i>Eucalyptus tereticornis</i>	1	25	8	300	Good	Good	3.6	2.0	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	
716	<i>Ligustrum lucidum</i>	1	6	4	100	Good	Good	2.0	1.5	Remove (<5 years)	Low	Low	High Impact: >20%	100	Yes	No access to the base of the tree due to dense Lantana. Exempt species, considered a weed.
717	<i>Eucalyptus tereticornis</i>	1	12	5	290	Fair	Fair	3.5	2.0	Medium (15-40 years)	Medium	Medium	No Impact: 0%	0	No	
718	Dead tree	1	30	15	980	Poor	Fair	11.8	3.3	Long (>40 years)	High	High	No Impact: 0%	0	No	Large dead tree. Consider retaining and pruning for habitat
719	<i>Eucalyptus saligna</i>	1	35	15	880	Poor	Fair	10.6	3.1	Long (>40 years)	High	High	No Impact: 0%	0	No	Very large tree appears to be dying. Consider pruning and retaining for habitat
720	<i>Eucalyptus saligna</i>	1	12	5	220	Fair	Fair	2.6	1.8	Medium (15-40 years)	Medium	Medium	No Impact: 0%	0	No	
721	<i>Eucalyptus saligna</i>	1	14	5	200	Fair	Fair	2.4	1.7	Medium (15-40 years)	Medium	Medium	No Impact: 0%	0	No	
722	<i>Eucalyptus microcorys</i>	1	30	15	730	Good	Good	8.8	2.9	Long (>40 years)	High	High	No Impact: 0%	0	No	
723	<i>Eucalyptus moluccana</i>	1	23	12	480	Good	Good	5.8	2.4	Long (>40 years)	Medium	Medium	High Impact: >20%	100	Yes	
724	<i>Eucalyptus saligna</i>	1	5	2	50	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	High Impact: >20%	100	Yes	

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725	<i>Eucalyptus saligna</i>	1	6	2	120	Fair	Fair	2.0	1.5	Medium (15-40 years)	Low	Low	High Impact: >20%	100	Yes	
726	<i>Eucalyptus saligna</i>	1	8	2	80	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	High Impact: >20%	100	Yes	
727	<i>Eucalyptus saligna</i>	1	7	2	80	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	High Impact: >20%	100	Yes	
728	<i>Eucalyptus saligna</i>	1	4	1	50	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	High Impact: >20%	100	Yes	
729	<i>Eucalyptus saligna</i>	1	10	4	150	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	High Impact: >20%	100	Yes	
730	<i>Eucalyptus saligna</i>	1	10	4	180	Fair	Fair	2.2	1.6	Long (>40 years)	Low	Low	High Impact: >20%	100	Yes	
731	<i>Eucalyptus microcorys</i>	1	12	4	150	Good	Fair	2.0	1.5	Medium (15-40 years)	Low	Low	High Impact: >20%	100	Yes	
732	<i>Eucalyptus saligna</i>	1	6	1	60	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	High Impact: >20%	100	Yes	
733	<i>Eucalyptus saligna</i>	1	20	8	400	Good	Good	4.8	2.3	Long (>40 years)	Medium	Medium	High Impact: >20%	100	Yes	
734	<i>Eucalyptus saligna</i>	1	10	3	110	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	High Impact: >20%	100	Yes	
735	<i>Eucalyptus saligna</i>	1	12	4	160	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	High Impact: >20%	100	Yes	
736	<i>Eucalyptus microcorys</i>	1	7	2	100	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	High Impact: >20%	100	Yes	
737	<i>Eucalyptus saligna</i>	1	12	4	180	Good	Good	2.2	1.6	Long (>40 years)	Low	Low	High Impact: >20%	100	Yes	
738	<i>Eucalyptus saligna</i>	1	8	3	120	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	High Impact: >20%	100	Yes	
739	<i>Eucalyptus saligna</i>	1	10	3	110	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	High Impact: >20%	100	Yes	
740	Dead tree	1	18	15	700	Poor	Poor	8.4	2.8	Long (>40 years)	High	High	High Impact: >20%	82	Yes	Dead tree, consider pruning and retaining for habitat
741	<i>Eucalyptus microcorys</i>	1	12	4	140	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	High Impact: >20%	100	Yes	
742	<i>Eucalyptus saligna</i>	1	25	10	650	Good	Good	7.8	2.8	Long (>40 years)	High	High	High Impact: >20%	42	Yes	
743	<i>Eucalyptus saligna</i>	1	4	2	50	Poor	Fair	2.0	1.5	Short (5-15 years)	Low	Low	High Impact: >20%	100	Yes	
744	<i>Eucalyptus microcorys</i>	1	22	10	350	Good	Fair	4.2	2.1	Long (>40 years)	Medium	Medium	Low Impact: <10%	0	No	Twin stemmed
745	<i>Eucalyptus moluccana</i>	1	18	15	550	Good	Good	6.6	2.6	Long (>40 years)	Medium	Medium	Low Impact: <10%	10	No	

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746	<i>Eucalyptus saligna</i>	1	20	5	320	Good	Good	3.8	2.1	Long (>40 years)	Medium	Medium	High Impact: >20%	100	Yes	
747	<i>Eucalyptus microcorys</i>	1	15	4	150	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	High Impact: >20%	100	Yes	
748	<i>Eucalyptus tereticornis</i>	1	5	1	50	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	High Impact: >20%	100	Yes	
749	<i>Eucalyptus microcorys</i>	1	5	3	80	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	High Impact: >20%	100	Yes	
750	<i>Eucalyptus tereticornis</i>	1	8	2	90	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	High Impact: >20%	100	Yes	
751	<i>Eucalyptus tereticornis</i>	1	15	5	160	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	High Impact: >20%	100	Yes	
752	<i>Eucalyptus tereticornis</i>	1	16	5	200	Good	Good	2.4	1.7	Long (>40 years)	Medium	Medium	High Impact: >20%	100	Yes	
753	<i>Eucalyptus tereticornis</i>	1	5	1	50	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	High Impact: >20%	100	Yes	
754	<i>Eucalyptus saligna</i>	1	16	5	30	Good	Good	2.0	1.5	Long (>40 years)	Medium	Medium	High Impact: >20%	100	Yes	
755	<i>Eucalyptus tereticornis</i>	1	15	5	180	Poor	Fair	2.2	1.6	Short (5-15 years)	Low	Low	High Impact: >20%	100	Yes	
756	<i>Eucalyptus tereticornis</i>	1	18	8	300	Good	Good	3.6	2.0	Long (>40 years)	Medium	Medium	High Impact: >20%	100	Yes	
757	<i>Eucalyptus saligna</i>	1	16	6	320	Good	Good	3.8	2.1	Long (>40 years)	Medium	Medium	High Impact: >20%	100	Yes	Growing very close to tree number 723. Twin stemmed
758	<i>Eucalyptus moluccana</i>	1	12	4	150	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	No Impact: 0%	0	No	
759	<i>Eucalyptus tereticornis</i>	1	12	6	240	Good	Good	2.9	1.8	Long (>40 years)	Medium	Medium	High Impact: >20%	100	Yes	
760	<i>Eucalyptus tereticornis</i>	1	10	4	140	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	High Impact: >20%	100	Yes	
761	<i>Eucalyptus tereticornis</i>	1	5	1	70	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	High Impact: >20%	100	Yes	
762	<i>Eucalyptus punctata</i>	1	7	2	100	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	High Impact: >20%	100	Yes	
763	<i>Eucalyptus microcorys</i>	1	20	8	380	Good	Good	4.6	2.2	Long (>40 years)	Medium	Medium	High Impact: >20%	100	Yes	
764	<i>Eucalyptus microcorys</i>	1	14	5	260	Fair	Good	3.1	1.9	Long (>40 years)	Medium	Medium	High Impact: >20%	100	Yes	
765	<i>Eucalyptus tereticornis</i>	1	28	12	800	Good	Fair	9.6	3.0	Long (>40 years)	High	High	High Impact: >20%	100	Yes	Not directly accessed due to dense Lantana
766	<i>Eucalyptus tereticornis</i>	1	5	3	80	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	High Impact: >20%	100	Yes	

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767	<i>Eucalyptus tereticornis</i>	1	8	3	120	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	High Impact: >20%	100	Yes	
768	<i>Eucalyptus punctata</i>	1	15	10	200	Good	Good	2.4	1.7	Long (>40 years)	Low	Low	High Impact: >20%	100	Yes	
769	<i>Eucalyptus tereticornis</i>	1	10	5	140	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	No Impact: 0%	0	No	
770	<i>Eucalyptus moluccana</i>	1	14	5	180	Good	Good	2.2	1.6	Long (>40 years)	Low	Low	High Impact: >20%	100	Yes	
771	<i>Eucalyptus punctata</i>	1	25	15	380	Good	Good	4.6	2.2	Long (>40 years)	Medium	Medium	High Impact: >20%	100	Yes	
772	<i>Ligustrum lucidum</i>	1	10	6	240	Good	Fair	2.9	1.8	Remove (<5 years)	Low	Low	High Impact: >20%	100	Yes	Exempt species, considered a weed.
773	<i>Eucalyptus moluccana</i>	1	14	5	140	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	High Impact: >20%	100	Yes	
774	<i>Eucalyptus punctata</i>	1	18	8	320	Good	Good	3.8	2.1	Long (>40 years)	Medium	Medium	High Impact: >20%	100	Yes	
775	<i>Eucalyptus microcorys</i>	1	28	15	500	Good	Good	6.0	2.5	Long (>40 years)	High	High	High Impact: >20%	100	Yes	
776	<i>Eucalyptus tereticornis</i>	1	20	8	300	Good	Good	3.6	2.0	Long (>40 years)	Medium	Medium	High Impact: >20%	42	Yes	
777	<i>Eucalyptus tereticornis</i>	1	20	6	300	Good	Good	3.6	2.0	Long (>40 years)	Medium	Medium	High Impact: >20%	52	Yes	
778	<i>Eucalyptus tereticornis</i>	1	22	6	400	Fair	Good	4.8	2.3	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	
779	<i>Eucalyptus moluccana</i>	1	26	15	940	Good	Good	11.3	3.2	Long (>40 years)	High	High	Low Impact: <10%	2	No	Bifurcation
780	<i>Eucalyptus tereticornis</i>	1	12	4	100	Fair	Fair	2.0	1.5	Long (>40 years)	Low	Low	High Impact: >20%	28	Yes	
781	<i>Eucalyptus moluccana</i>	1	8	2	80	Good	Good	2.0	1.5	Short (5-15 years)	Low	Low	High Impact: >20%	49	Yes	
782	<i>Eucalyptus microcorys</i>	1	25	15	560	Good	Good	6.7	2.6	Long (>40 years)	High	High	High Impact: >20%	95	Yes	
783	<i>Eucalyptus tereticornis</i>	1	16	8	320	Good	Good	3.8	2.1	Long (>40 years)	Medium	Medium	High Impact: >20%	100	Yes	
784	<i>Eucalyptus tereticornis</i>	1	14	5	280	Good	Good	3.4	1.9	Long (>40 years)	Medium	Medium	High Impact: >20%	100	Yes	
785	<i>Eucalyptus moluccana</i>	1	16	5	300	Good	Good	3.6	2.0	Long (>40 years)	Medium	Medium	High Impact: >20%	100	Yes	
786	<i>Eucalyptus tereticornis</i>	1	25	15	930	Good	Good	11.2	3.2	Long (>40 years)	High	High	High Impact: >20%	92	Yes	
787	<i>Acacia parramattensis</i>	1	8	3	100	Good	Good	2.0	1.5	Short (5-15 years)	Low	Low	High Impact: >20%	100	Yes	

Tree	Botanical name	Trees in Group	Height (m)	Spread (m)	DBH (mm)	Health	Structure	TPZ (m)	SRZ (m)	SULE	Landscape significance	Retention value	Impact	TPZ% encroachment	SRZ encroached	Notes
788	<i>Acacia parramattensis</i>	1	10	2	120	Good	Good	2.0	1.5	Short (5-15 years)	Low	Low	High Impact: >20%	100	Yes	
789	<i>Acacia parramattensis</i>	1	5	1	50	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	High Impact: >20%	100	Yes	No direct access due to dense Lantana
790	<i>Acacia parramattensis</i>	1	5	1	50	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	High Impact: >20%	100	Yes	No direct access due to dense Lantana
791	<i>Acacia parramattensis</i>	1	5	1	50	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	High Impact: >20%	100	Yes	No direct access due to dense Lantana
792	<i>Eucalyptus microcorys</i>	1	7	2	70	Fair	Fair	2.0	1.5	Short (5-15 years)	Low	Low	High Impact: >20%	100	Yes	
793	<i>Acacia parramattensis</i>	1	10	2	50	Good	Good	2.0	1.5	Short (5-15 years)	Low	Low	High Impact: >20%	100	Yes	
794	<i>Ligustrum sinense</i>	1	4	1	50	Good	Good	2.0	1.5	Remove (<5 years)	Low	Low	High Impact: >20%	100	Yes	Exempt species, considered a weed.
795	<i>Acacia parramattensis</i>	1	5	1	50	Good	Good	2.0	1.5	Short (5-15 years)	Low	Low	High Impact: >20%	100	Yes	
796	<i>Acacia parramattensis</i>	1	8	2	50	Good	Good	2.0	1.5	Short (5-15 years)	Low	Low	High Impact: >20%	100	Yes	
797	<i>Acacia parramattensis</i>	1	8	2	50	Poor	Fair	2.0	1.5	Short (5-15 years)	Low	Low	High Impact: >20%	100	Yes	Dying
798	<i>Melia azedarach</i>	1	14	5	160	Fair	Fair	2.0	1.5	Medium (15-40 years)	Low	Low	No Impact: 0%	0	No	
799	<i>Eucalyptus tereticornis</i>	1	15	5	270	Fair	Fair	3.2	1.9	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	
800	<i>Eucalyptus moluccana</i>	1	12	4	130	Good	Good	2.0	1.5	Short (5-15 years)	Low	Low	No Impact: 0%	0	No	
801	<i>Eucalyptus moluccana</i>	1	10	4	120	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	No Impact: 0%	0	No	
803	<i>Corymbia maculata</i>	1	18	10	380	Good	Fair	4.6	2.2	Long (>40 years)	Medium	Medium	No Impact: 0%	0	No	Bifurcation of stem at 10m
804	<i>Eucalyptus microcorys</i>	1	17	15	380	Good	Good	4.6	2.2	Long (>40 years)	Medium	Medium	High Impact: >20%	100	Yes	
805	<i>Eucalyptus tereticornis</i>	1	22	15	1120	Good	Good	13.4	3.5	Long (>40 years)	High	High	High Impact: >20%	100	Yes	Bifurcation
806	<i>Eucalyptus microcorys</i>	1	12	6	280	Good	Good	3.4	1.9	Long (>40 years)	Medium	Medium	High Impact: >20%	100	Yes	
807	<i>Eucalyptus saligna</i>	1	30	20	700	Good	Good	8.4	2.8	Long (>40 years)	High	High	High Impact: >20%	100	Yes	
808	<i>Eucalyptus saligna</i>	1	25	15	800	Good	Good	9.6	3.0	Long (>40 years)	High	High	High Impact: >20%	100	Yes	
809	<i>Melia azedarach</i>	1	10	10	300	Good	Good	3.6	2.0	Long (>40 years)	Medium	Medium	High Impact: >20%	100	Yes	

Tree	Botanical name	Trees in Group	Height (m)	Spread (m)	DBH (mm)	Health	Structure	TPZ (m)	SRZ (m)	SULE	Landscape significance	Retention value	Impact	TPZ% encroachment	SRZ encroached	Notes
810	<i>Angophora floribunda</i>	1	11	3	150	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	High Impact: >20%	100	Yes	
811	<i>Angophora floribunda</i>	1	16	10	450	Good	Good	5.4	2.4	Long (>40 years)	Medium	Medium	High Impact: >20%	100	Yes	No direct access due to dense Lantana
812	<i>Eucalyptus tereticornis</i>	1	7	2	80	Poor	Poor	2.0	1.5	Short (5-15 years)	Low	Low	High Impact: >20%	100	Yes	
813	<i>Eucalyptus tereticornis</i>	1	18	10	400	Good	Good	4.8	2.3	Long (>40 years)	Medium	Medium	High Impact: >20%	83	Yes	No direct access due to dense Lantana
814	<i>Eucalyptus tereticornis</i>	1	12	5	150	Fair	Good	2.0	1.5	Long (>40 years)	Low	Low	No Impact: 0%	0	No	
1500	<i>Casuarina glauca</i>	25	12	3	150	Good	Good	2.0	1.5	Long (>40 years)	Low	Low	No Impact: 0%	0	No	Group of approximately 25 trees.
1514	Mixed group	200	10	3	100	Fair	Fair	2.0	1.5	Remove (<5 years)	Low	Low	No Impact: 0%	0	No	Mixed weeds of <i>Ligustrum lucidum</i> and <i>Melia azedarach</i> . Dimensions provided show average

Appendix E Tree protection guidelines

The following tree protection guidelines must be implemented during the construction period if no tree-specific recommendations are detailed.

E1 Tree protection fencing

The TPZ is a restricted area delineated by protective fencing or the use of an existing structure (such as a wall or fence).

Trees that are to be retained must have protective fencing erected around the TPZ (or as specified in the body of the report) to protect and isolate it from the construction works. Fencing must comply with the Australian Standard, AS 4687-2007, Temporary fencing and hoardings.

Tree protection fencing must be installed prior to site establishment and remain intact until completion of works. Once erected, protective fencing must not be removed or altered without the approval of the project arborist.

If the protective fencing requires temporary removal, trunk, branch and ground protection must be installed and must comply with AS 4970-2009, Protection of Trees on Development Sites.

Tree protection fencing shall be:

- Enclosed to the full extent of the TPZ (or as specified in the Recommendations and Tree Protection Plan).
- Cyclone chain wire link fence or similar, with lockable access gates.
- Certified and Inspected by the Project Arborist.
- Installed prior to any machinery or material are brought to site and before the commencement of works.
- Prominently sign posted with 300 mm x 450 mm boards stating, "NO ACCESS - TREE PROTECTION ZONE".

E2 Crown protection

Tree crowns/canopy may be injured or damaged by machinery such as; excavators, drilling rigs, trucks, cranes, plant and vehicles. Where crown protection is required, it will usually be located at least one meter outside the perimeter of the crown.

Crown protection may include the installation of a physical barrier, pruning selected branches to establish clearance, or the tying/bracing of branches.

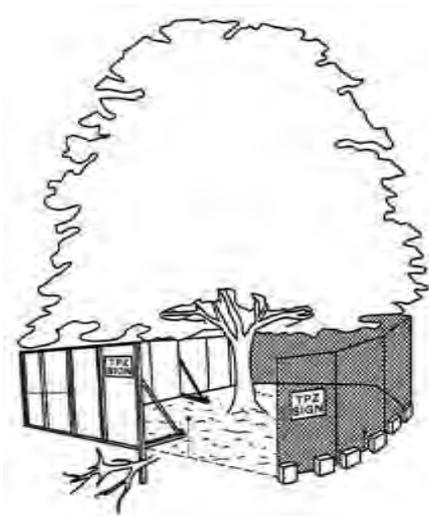
E3 Trunk protection

Where provision of tree protection fencing is impractical or must be temporarily removed, trunk protection shall be installed for the nominated trees to avoid accidental mechanical damage.

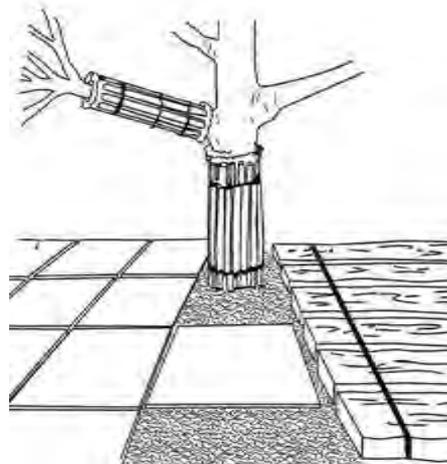
The removal of bark or branches allows the potential ingress of micro-organisms which may cause decay. Furthermore, the removal of bark restricts the trees' ability to distribute water, mineral ions (solutes), and glucose.

Trunk protection shall consist of a layer of either carpet underfelt, geotextile fabric or similar wrapped around the trunk, followed by 1.8 m lengths of softwood timbers aligned vertically and spaced evenly around the trunk (with an approx. 50 mm gap between the timbers).

The timbers must be secured using galvanised hoop strap (aluminium strapping). The timbers shall be wrapped around the trunk but not fixed to the tree, as this will cause injury/damage to the tree.



Tree protection fencing



Trunk protection fencing

E4 Ground protection

Tree roots are essential for the uptake/absorption of water, oxygen and mineral ions (solutes). It is essential to prevent the disturbance of the soil beneath the dripline and within the TPZ of trees that are to be retained. Soil compaction within the TPZ will adversely affect the ability of roots to function correctly.

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. Maintain a thick layer of mulch around all retained trees to a depth of 100 mm using coarse pine bark or wood chip material that complies with AS 4454. Where the existing landscape within the TPZ is to remain unaltered (e.g. garden beds or turf) mulch may not be required.

For heavy vehicle access within TPZ, ground protection may include a permeable membrane such as geotextile fabric beneath a layer of crushed rock or rumble boards.

If the grade is to be raised within the TPZ, the material should be coarser or more porous than the underlying material.

E5 Root protection and investigation

If incursions/excavation within the TPZ are unavoidable, root investigation may be needed to determine the extent and location of roots within the area of construction activity. The location and distribution of roots are found through non-destructive excavation (NDE) methods such as hydro-vacuum excavation (sucker truck), air spade and manual excavation. Root investigation does not guarantee the retention of the tree.

If the project arborist identifies conflicting roots that requiring pruning, they must be pruned with a sharp implement such as; secateurs, pruners, handsaws or a chainsaw back to undamaged tissue. The final cut must be a clean cut.

E6 Underground services

All underground services should be routed outside of the TPZ. If underground services need to be installed within the TPZ, they should be installed using horizontal directional drilling (HDD), non-destructive excavation (NDE) methods such as hydro-vacuum, Air Spade or manually excavated trenches. The horizontal drilling/boring must be at minimum depth of 600 mm below grade. Trenching for services is to be regarded as “excavation”. The project arborist should assess the likely impacts of boring and bore pits on retained trees.



