

arboricultural impact assessment report

AIA-01

Revision A, Issued for Development Application
13 June, 2018

DOCUMENT INCLUDES

- T-02 Tree Protection Specification
- T-03 Tree Protection & Removal Plan

PROJECT

Allambie Heights Village - Project 2

William Charlton Village
181 Allambie Road
Allambie Heights, NSW, 2100

CLIENT / PRINCIPAL

Allambie Heights Village Ltd

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i EXECUTIVE SUMMARY

In April 2018, Arterra was engaged by Allambie Heights Village Limited to undertake an arboricultural assessment of the trees located within and immediately surrounding the site currently known as William Charlton Village and prepare the relevant arboricultural reports and plans to help guide the proposed re-development.

A tree assessment and impact schedule was completed for those trees likely to be impacted by the proposed development (Refer to Appendix 4.1). The trees were photographed and given a unique identification number and plotted onto a scaled survey base plan for referencing and identification throughout the report and for future discussions and co-ordination with Council, contractors and stakeholders.

In summary, 107 trees were assessed for this report.

85 trees are recommended for removal as they are either:

- within, or immediately adjacent to, the construction footprint and unable to be retained due to impacts from construction, installation of services, bulk earthworks and re-grading;
- or are considered weeds or in poor, or very poor condition and unsuitable to be retained in the context of the development.

22 trees are to be retained and protected.

- 19 have nil or minimal foreseeable impact from construction related activity;
- 3 have minor encroachments as defined under AS 4970 – 2009;

The largest and most prominent tree on the site is a Sydney Blue Gum (*Eucalyptus saligna*) (**T55**). It is clearly visible from Allambie Road and other public areas. Tree **T55** is to be retained and protected with only a minor incursion to its south-west. Building placement and landscaping has been tailored to minimise impacts to this tree during construction. It is not 'naturally' occurring to this particular site but it will create a valuable landscape asset and will help screen and separate the new development from the existing William Charlton Village. At the time of this report it is in good health with minimal observable defects. A similar tree to its west (**T54**) is in poor health and condition and should be removed.

Summary of Trees Retained by Retention Values

Retention Value	Total Trees	Number Removed	Number Retained
High	10	1	9
Moderate	24	13	11
Low	52	50	2
V Low / Remove	21	21	nil
Total	107	85	22

As with all aspects in the development and construction process, the tree related constraints have to be weighed up against many other relevant development opportunities and constraints. The retention of the trees on the site must also consider economic, social, environmental, construction and practical realities.

This document has been prepared by Arterra Design Pty Ltd, using the expertise of our in-house consulting arborist (AQF Level 5), Robert Smart. Robert is a member of the International Society of Arboriculture - Australian Chapter and is also a Registered Consulting Arborist with Arboriculture Australia.



Robert Smart AAILA , ISA, AA

Director, Registered Landscape Architect (054), Registered Consulting Arborist (1804)

1.0 INTRODUCTION

1.1 Background

In April 2018, Arterra Design was engaged by Allambie Heights Village (AHV, the client) to undertake an arboricultural assessment of the site and prepare the relevant reports and plans to help guide the proposed development. This assessment was restricted to the trees within or immediately adjacent to the proposed development site that were likely to be impacted by the proposed construction works. The other trees surrounding or within the broader William Charlton Village complex, and unlikely to be impacted, are not specifically addressed as part of this report.

The client proposes to develop a new seniors living complex comprising 24 independent living apartments, car parking and a pool building including a gymnasium, lap pool and meeting space. The access for the development utilises the existing driveway that services the site.

The new development is proposed to be on a portion of the existing William Charlton Village site that is predominantly cleared grassland and bisected by an existing driveway running east – west that terminates at the western site boundary. The grassed portion of the site has a number of trees scattered throughout, being native and exotic, both planted and self-sown or remnant. The proposed development area is bordered by bushland, of various quality and significance to the north and west. It is likely that the proposed construction work will have a variety of impacts on the trees within and surrounding the development area.

Arterra completed a “Pre-development Assessment” of the existing trees that identified the trees and ranked their relative significance, health and retention values. This work was distributed to the client and the design team to help guide the development proposals and final building positions.

This impact assessment has been prepared to identify the trees to be retained and removed as part of the development and so that the client and the design team can take a proactive approach to the management of the trees to be retained and put in place appropriate measures to protect them during the construction.



Figure 1 – Typical site conditions illustrating predominantly cleared site area and some larger trees that have either been planted or retained from pre-existing trees as amenity trees. (Photo: Arterra)

1.2 Aims of This Report

The aim of this report is to assess the impact of the new development on the existing trees within the development area. Specifically the report aims to:-

- Assess the health and condition of the trees;
- Accurately record information relevant to the existing trees;
- Assess the significance, Safe Useful Life Expectancy (SULE) and retention values of the existing trees;

- Provide clear recommendations as to which trees should ideally be retained and protected;
- Identify the proposed Tree Protection Zones (TPZ) of the trees being retained and identify and assess the likely arboricultural impacts of the development on the trees and
- Provide preliminary advice on the tree protection measures that will be required during construction to ensure the trees are successfully retained.

The following limitations apply to this reports use: -

1. Plans: All plans are based on information provided to Arterra. They should only be used relating to tree issues and are not suitable for any other purpose.
2. Notification of proposed alterations to disturbance within TPZs: Arterra must be clearly notified of any proposed alterations to the plans or additional disturbance in TPZs, so that we can advise on the implications before any work is undertaken.

1.3 Relevant Controls or Legislation

The Council planning instruments that apply to the site's vegetation:-

Northern Beaches (Warringah) Council Documents:-

- Local Environment Plan 2011 (WLEP 2011)
- Development Control Plan 2011 (WDCP 2011)
 - WDCP Part E1- Private Property Tree Management

A tree for the purposes of this report is any woody perennial plant greater than 5m in height. Heights of palms are measured from ground level to top of the trunk.

The following species are listed as 'exempt' under the WDCP 2011, and can be removed without Council approval. There are a number of these species within the development area and most are proposed to be removed:-

- Cassia spp. (Cassia)
- Morus spp. (Mulberry)
- Erythrina spp. (Coral Tree)
- Ligustrum spp. (Privet)
- Olea spp. (Olive)
- All Palms (other than *Livistona australis*)
- Pinus spp. (Pines)
- Populus spp. (Poplars)
- Salix spp. (Willow)

Exemptions apply to a number of other species however they are not relevant to this site. It is our understanding the site is not currently listed as a heritage item in the LEP. The site does not contain any trees listed by Council as significant trees.

1.4 Conduct and Author Qualifications

Given the above stated aims of this report, as author of this report, Arterra Design confirms that Robert Smart is suitably qualified (AQF 5 Consulting Arborist) to provide comment and the required arboricultural advice pertaining to these matters.

Furthermore, Mr Smart confirms that he has read and agrees to be bound by the NSW Uniform Civil Procedure Rules 2005, Part 31 Division 2 Provisions, Schedule 7 - Expert witness code of conduct.

Arterra provides specialist consulting arborist services only and does not provide any physical tree work services such as climbing, pruning, removal, root investigations or root pruning. Our advice is based on impartial professional assessment only, as we do not derive any financial benefit from specifying pruning or other physical services. We will not specify any such activities unless we determine them to be essential to ongoing tree health or stability.

1.5 Key Definitions and Abbreviations

The following abbreviations are used throughout this report.

"TPZ" = Tree Protect Zone

This is the area as defined by AS 4970 – "Protection of Trees on Development Sites" and means the typical minimum area above and below ground at a given distance from the trunk to provide for protection of the tree. Most importantly it represents the root zone required to be left undisturbed to maintain a healthy and viable tree. Please note, that roots will usually extend well beyond this zone, so this represents the minimum remaining

root zone required, assuming all others are lost or damaged due to construction. It is typically calculated as a circle centred on the trunk unless existing site conditions can be assessed and indicate otherwise.

"SRZ" = Structural Root Zone

This is the area as defined by AS 4970 – "Protection of Trees on Development Sites" and means the area immediately around the base of the tree at a given distance from the trunk within which the woody roots and soil cohesion are considered vital to the structural stability of the tree. Disturbance, damage or removal of soil and roots within this area will typically render the tree unstable and require its removal. It is typically calculated as a circle, centred on the trunk, unless existing site conditions can be assessed and indicate otherwise.

DBH = Diameter at Breast Height

This is the diameter of the trunk measured at 1.4m above ground level.

DGL = Diameter at Ground Level

This is the diameter of the trunk measured at ground level, but just above any root flare.

1.6 Documents Reviewed

Plans and documents referenced and reviewed as part of this tree impact assessment were:-

Jackson Teece Architects Architectural Drawings issued for Authority Approval - Dated 05 June 2018

- DA-000 Cover Sheet – Rev A
- DA-010 Site Analysis – Rev A
- DA-011 Site Plan – Rev A
- DA-013 Demolition – Rev A
- DA-100 Floor Plan - Lower Ground Floor – Rev A
- DA-101 Floor Plan - Ground Floor – Rev A
- DA-102 Floor Plan - Level 1 – Rev A
- DA-103 Roof Plan – Rev A
- DA-104 Community Building - Lower Ground Floor Plan – Rev A
- DA-105 Community Building - Roof Plan – Rev A
- DA-200 Elevations - Building A & B – Rev A
- DA-201 Elevations - Community Building – Rev A
- DA-300 Sections - Building A & B – Rev A
- DA-302 Sections - Community Building – Rev A
- DA-600 Area Plans - GFA / Deep Soil / Compliance Table / Calculations – Rev A
- DA-700 Solar Access & Cross Ventilation Diagrams – Rev A
- DA-800 Shadow Diagrams – Rev A

Arterra Design – Landscape Architects:-

- L-SD-01 Landscape Concept Plan – Rev A.
- L-SD-02 Landscape Planting Plan – Rev A.
- L-SD-03 Landscape Planting Plan – Rev A.
- L-SD-04 Plant Schedule & Indicative Perspective Imagery – Rev A.
- L-SD-05 Indicative Perspective Imagery – Rev A.
- L-SD-06 Landscape Section and Character Images – Rev A.
- L-SD-07 Landscape Section and Character Images – Rev A.

CMS Surveyors Pty Ltd:-

- Detail and levels survey of Lot 2615, DP752038,
Drawing Name: 15090Adetail, issue 2.

Total Earth Care Pty Ltd:-

- Bushfire Assessment Report – October 2017

At present we have not reviewed any of the proposed detailed servicing plans for the development but have been advised by Jackson Teece Architects and other relevant engineering consultants that no new services are proposed to be extended into the proposed TPZs existing trees to be retained and that any existing services that are no longer required will be capped off and left in situ.

1.7 Site Location, History and Context

The site is located approximately 13km north from the Sydney CBD and approximately 5km west from Freshwater Beach on the coast. It is located on the western side of Allambie road, in Allambie Heights with a southerly aspect that affords views to the south, across Manly Warringah War Memorial Park (Manly Dam) to forested hillsides and the Sydney CBD skyline beyond.

The Benevolent Society of NSW established the site as their first aged care village in 1964. It has been used as aged care housing since that time. The entire site was subsequently acquired by AHV in 2016. They intend to retain the William Charlton Village component and develop the currently unused portion of the site to the west.

The surrounding area consists of low-density residential development to the east of Allambie Road, together with aged care and assisted living community developments to the north and south of the site. The proposed development site is bordered by the existing William Charlton Village buildings to the east, AHV and Manly Warringah War Memorial Park (Manly Dam) to the south and bushland to the west. A Sydney Water supply line and accompanying 20m wide easement, which is currently, weed impacted bushland, runs adjacent to the northern site boundary.



Figure 2 – The site and broad overview of trees subject of this assessment. (Image: Nearmap 2018)



Figure 3 – The site and bushland areas to the west of the proposed development. The trees in this portion of the site are not addressed in this report but are covered in the ecological assessments. (Photo: Arterra 21/4/18)

1.8 Site Ownership and Zoning

The site identified as Lot 2615 of DP 752038 is controlled and managed by Allambie Heights Village Limited and has an approximate area of 3.70 ha. The site is currently zoned R2 (Low Density Residential) under Northern Beaches (Warringah) Council LEP 2011 Land Zoning Map (<https://services.northernbeaches.nsw.gov.au/icongis/index.html> accessed 24/4/18).

1.9 Assessment Methodology

On the 21 April 2018, Robert Smart of Arterra completed a detailed assessment of the trees located within the proposed development area and those immediately adjacent that are likely to be impacted by the proposed development. The trees within the bushland areas to the west of the development area are not addressed. These are covered by other ecological reports. The trees' health and condition were assessed via a visual inspection of the trees from the ground only. Requisite tree data (including DBH, DGL, height, condition & proximity to services) were recorded using an Apple iPad and Filemaker Pro database.

The basic health and condition criteria that were inspected for each tree can be summarised as follows: -

- Tree size, broad age-class and general balance of the tree;
- Above ground obstructions;
- Evidence of recent site disturbance;
- Canopy foliage size, colour and density;
- Dieback and epicormic growth;
- Trunk or branch wounding, branch tear outs and pruning history;
- Structural defects such as any co-dominant stems, cracks, splits, included bark, decay and
- Pests and disease evidence or occurrence.

All of the trees were photographed, given a unique identification number and plotted onto a scaled base plan for referencing and identification throughout the report and for future discussions and co-ordination. (Refer Appendix 4.1– Tree Impact Assessment Schedule and Appendix 4.2 – T-03 Tree Protection & Removal Plan). The photographic record of trees and general site context was taken using the inbuilt Apple iPad camera and a Nikon Coolpix AW120 digital camera with GPS recording. Files have been resized, dated, named and filed in accordance with normal office procedures and protocols. No other image manipulation has been undertaken.

Tree trunk diameters were measured using a metric diameter tape measure. Tree heights were measured using the two point clinometer function of a Nikon Forestry Pro laser range finder. Canopy spreads were estimated by pacing out distances along the cardinal axis of the canopy and cross-referencing to survey information and aerial photos. Canopy positions and extents were then altered on the plans to provide a more accurate portrayal.

A representative soil sample was taken in the vicinity of the trees and tested for pH, structure, colour and soil texture class to gain a basic understanding of likely soil conditions and topsoil depths surrounding the trees. The sample was taken using a Dormer 50mm Ø hand soil auger.

Tests for pH were done using a Manutec field pH test kit. Soil structure was assessed by observation of soil pedality and soil texture assessment was done using procedures outlined for the field-testing of a moist bolus by McDonald et al, 1998 and Roberts, et al, 2006.

No exploratory excavations were done to determine location and condition of roots and no detailed soil laboratory testing was undertaken. No specialised equipment or methods were employed to test for the extent of decay in any of the trees, apart from a nylon 'sounding' mallet. No plant samples were analysed or independently tested to verify or formally identify any pests or diseases.

Desktop Review and Research

Digital AutoCAD files of the proposed works were imported into Arterra's standard CAD software (ArchiCAD v21) and superimposed over the tree and site survey information. The extent of site disturbance was analysed for the proposed building works, landscaping, services and other site grading. An assessment was made of the likely extent of impacts on the TPZs, taking into account the likely construction impacts depending on the type of work being undertaken (ie: cut or fill, suspended slabs, decks, service trenches). Various area calculations and measurements were made in the CAD software of the likely incursions into the TPZs or SRZs.

Recent aerial photography data was obtained from the Nearmap website with aerial photos of the site dating from January 2018 imported into the above software for cross checking and assessment. (<http://www.nearmap.com/> accessed 24 04 2018)

Climatic data was obtained from the Bureau of Meteorology using statistics from Observatory Hill which is located approximately 13.0km to the south of the site. (<http://www.bom.gov.au/climate/data/> accessed 24 04 2018)

1.10 Pre-Development Tree Assessment – Tree Retention Values & Risk Assessment

The information gathered in the field was tabulated and the retention value assessed using a combination of techniques commonly used and recognised in the arboricultural industry. The tree life expectancy was established using the Safe Useful Life Expectance (SULE) system. A brief summary of the system is provided below.

SULE

This is a system developed by Jeremy Barrell in 1993 that determines the time a tree may be expected to be retained based on its age, health, condition, safety and location. This is then moderated by the economics of maintenance or other costs of retaining the tree. A long SULE means the tree is presently expected to live longer than 40 years with minimal intervention and cost. A short SULE indicates a tree that is not expected to live longer than 5 years or may require substantial intervention or costs to retain it.

RETENTION VALUE

The proposed retention value of the trees was determined based on a considered combination of the size, age, condition and suitability of the tree. Each tree was then ranked according to one of 4 retention categories.

1. **"High" Retention Value** – these are trees that are typically in good or very good condition, large and visually prominent, historically or environmentally important. They may also be lesser quality trees, but part of an important grouping of trees. They should represent a serious physical constraint to the development and their removal avoided where possible and feasible.
2. **"Moderate" Retention Value** – these are trees that are in good to reasonable condition and should be retained where possible and feasible to do so. They may also be lesser trees, but part of an important grouping of trees and therefore warrant retention based on the group's value.
3. **"Low" Retention Value** – these are trees that are in poor condition or have structural defects, are particularly small or commonplace, are not historically, environmentally or socially significant and should not be considered as a constraint to the development. They could be retained only if they are not likely to be impacted by, or constrain potential desirable, development outcomes.
4. **"Should Remove" / No Retention Value** – these are trees that are in very poor health, exhibit poor form, or have serious structural defects, are considered weeds or combination of all these, and therefore should be considered for removal regardless of any development.

Consideration has also been given to the relationship of the trees to one and other and their proximity to the likely development areas on the site. For example, trees that are part of a closely spaced group, or are likely to be significantly misshapen or unstable due to the removal of surrounding trees and structures are considered with these factors in mind.

1.11 Tree Assessment – Tree Protection Zones

In order to ensure the long-term survival and growth of any tree to be retained on the development site, a suitable area is required to be protected around the tree. This area should typically be as large as possible. It should also take into consideration: -

- The size and age of the tree;
- Above and below ground properties;
- The health and condition of the tree;
- The species of tree and its tolerance to disturbance;
- Soil conditions, type, depth and site hydrology and
- Site specific conditions and any existing obstructions to root development

The Tree Protection Zones (TPZs) have been calculated using the formula and criteria outlined in AS 4970-2009 Protection of Trees on Development Sites. In summary the standard applies the calculation for the radius of the TPZ as $12 \times$ (the tree trunk diameter (in metres) calculated at breast height (DBH)). DBH is taken at 1.4m above ground level.

A maximum TPZ radius will be 15m (unless crown protection is required) while the minimum TPZ radius shall be 2m.

The TPZ is typically assumed to be radial and centred on the centre of the tree's trunk unless other site factors or tree canopy size and location dictate an adjustment. Encroachments of up to 10% of the area may be accepted within the TPZ as long as it is outside of the Structural Root Zone (SRZ). This is known as a "minor encroachment". Encroachments greater than this, known as "major encroachments" will only be accepted with additional specific evidence that the tree will not be unduly impacted.

Whenever an encroachment is made into a TPZ, a suitable compensation should be made elsewhere and physically contiguous to the remaining TPZ.

The Structural Root Zone (SRZ) is the area defined as the minimum area required to retain the structural stability of the tree. The formula for calculating the SRZ is outlined in AS 4970 Section 3.3.5. No encroachment into the SRZ shall typically be allowed.

2.0 KEY FINDINGS & OBSERVATIONS

2.1 The Proposed Development

The proposed building and development will result in a major site disturbance. This will potentially have a significant impact on the trees within and adjacent to the site.

Specifically the proposed development will involve:-

- Major demolition works;
- Use of large scale civil and earthmoving equipment;
- Access to and from the site with large trucks and construction plant;
- Major excavations;
- Large stockpiles of excavated material and demolition waste;
- Stockpiles/ storage of building materials;
- Regrading and filling of the surface levels;
- Trenching for services;
- Major building works involving concreting, block-work, painting and general construction;
- Use of large cranes;
- Parking for site personnel and deliveries;
- Paving and retaining walls and
- Landscaping.

Key Assumptions:-

- The soil depths are likely to be shallow and overlying sandstone geology. It is assumed piling and other retaining will not be required to support excavations. It is assumed a small and steep batter will be required for loose material above the rock foundation.
- Despite the above, the line of disturbance outside of the building line has been typically estimated at 1.5m from the face of the building to allow for provision of water proofing, services, access and scaffolding around the building during construction.
- All services for the buildings will be clear of any retained trees' TPZs.
- All construction access and deliveries are to be made from Martin Luther Place via the existing central site access road. Concrete will typically be pumped and will not require any truck movements through TPZs.
- Where no spot levels are indicated it is assumed that the existing surface levels are retained.
- It is assumed that any new landscape grading within identified TPZs will be minimal.
- That traditional cantilevered retaining wall footings will be used, (ie: footings extending to the rear of the face of the wall, typically equalling the height of the wall), but that when such walls abut a Tree Protection area the footing will be extended to the front of the wall, away from the tree.

2.2 Climate and Microclimate

Allambie Heights is located on Sydney's northern beaches suburbs, and therefore would share the general climate of this region with moderate temperatures, good rainfall and minimal climatic and weather extremes. It is typically described as a temperate climate with hot to warm summers and cool winters, with relatively uniform rainfalls greater than 800mm / year. There is no distinct dry season.

Allambie Heights is located approximately 5km from the ocean and the coastal beaches of Freshwater. It has an average annual rainfall of 1215.7mm, fairly evenly spread across the year but with a slightly drier period during the late winter and early spring months. The highest rainfall period is usually June with an average of 133.2mm and the driest month being September with an average of 67.9mm.

Maximum average daily temperatures range from 26.0°C in January and to 16.4°C in July. The minimum average daily temperatures range from a high of 18.8°C in January and February down to lows of 8.1°C in July.

The site has a south westerly aspect. Due to the location on the ridgeline, it may typically be defined as a moderately exposed location with defined coastal influences.

The primary wind direction is from the south-east to the north-east in the afternoons while it is predominantly from the west and south-west in the mornings. This is common of coastal areas dominated by "sea breeze" affects. Sea breezes are caused by unequal heating and cooling of adjacent land and sea surfaces. A sea breeze is one that blows from the sea to the land in consequence of this differential heating. With a weak general wind circulation, a sea breeze will commence over the coastline soon after the land temperature begins to exceed the

sea temperature (late morning to early afternoon). As the difference increases, so the sea breeze will become stronger and will extend farther inland. (Source: Australian Bureau of Meteorology)

The strongest winds (>40km/h) are normally experienced from the westerly directions and later in the day. There are no prominent microclimatic influences apparent on the site.

2.3 Soils and Landform

The site has an undulating landform sloping generally downwards towards the southwest. Elevation ranges from an level of approximately 130m AHD in the northeast to down to an approximate 120m AHD at the low point in the south western corner. On the proposed development site the slopes are typically gentle with grades around 1 in 12 (approximately 8% slopes). There is a steep batter at the southern edge of the site where it fronts the roadways servicing the carpark for Allambie Heights Village.

Soil landscape mapping of the area describes the site soils as a mixture of Hawkesbury and Lambert groups, overlying Hawkesbury Sandstone. The topsoil is expected to be a loose, black sand to sandy loam (Hawkesbury) to stony brown loamy sand to sandy loam (Lambert). The topsoil usually overlies a yellowish brown sandy clay (Hawkesbury) or light clay loam (Lambert). The soil is expected to be apedal, non-cohesive with low fertility and low water holding capacity with extremely high permeability. (Chapman 1989). Topsoils may be highly susceptible to erosion from concentrated water flows.

A site soil sample was taken from the cleared, grassed area in the north eastern portion of the site, approximately 25m southwest from the base of the significant mature *Eucalyptus saligna* (Sydney Blue Gum) T55. Multiple attempts were made to take soil samples and rock refusal was encountered at less than 300mm depth. The soil profiles appear to be quite shallow and over sandstone as described above. In the final sample the sampling auger was rejected at a depth of approximately 600-700mm. This deeper soil sample is described as follows:

Topsoil

Depth – approximately 300-350mm

Structure - Weakly to moderately pedal, medium sized subangular blocky peds

pH - 6.0 – moderately acidic

Texture - Sandy clay loam. Soil texture indicates that some care will be required to avoid soil compaction when undertaking work or trafficking through TPZs, particularly following periods of rain or when soil is moist.

Subsoil

Depth – approximately 350-700mm (rock encountered below this depth)

Structure - Weakly pedal, small to medium sized subangular blocky peds

pH - 6.0 – moderately acidic

Texture - Sandy loam with a high percentage of sand.



Figure 4 – Typical Soil Profile to a depth of 700mm – the auger was rejected at this depth. (Photo: Arterra)

2.4 Tree Assessment - Generally

A total of 107 trees were assessed for this report and were found to be a variety of locally endemic, native, exotic and invasive/ weed species. The majority of trees are located around the perimeter of the site. Some bushland occurs along the northern and western boundaries and a row planting of Pines along the southern site boundary. There is also a row planting of mature Eucalypts along the northern side of the central road and scattered plantings in the lawns and garden beds across the site. Detailed information on each tree including; height, trunk diameter, canopy spread, age class and condition are all provided in Appendix 4.1 - Tree Impact Assessment Schedule. The tables below provide a brief overview of the tree population within the study area.

Table 1 - Summary of Tree Retention Values

Retention Value	No.	% total population.
High	10	9%
Moderate	24	22%
Low	52	49%
V Low / Remove	21	20%

Table 2 - Summary of Tree Origins

Tree Origin	No.	% total population.
Endemic To Site	43	40%
Australian Native	27	25%
Exotic	20	19%
Weed or Invasive Species	17	16%



Figure 5 – View to south-west across the southern portion of the site. (Photo: Arterra 21/4/18).

The following is a summary of the trees found on the site. There are currently 107 trees recorded and assessed on, or immediately adjacent to, the development area of the site. These are the trees that would be potentially considered 'trees' under the above Council criteria. Very small trees and shrubs (<4m) or small but obviously known weeds have typically not been included in the assessment.

There are numerous relatively short-lived Wattles (*Acacia parramattensis*), particularly along the northern boundary. Although some are in reasonable health, many are showing significant signs of decline due to borer and other insect attack. Some are very poor forms with significant leans. We believe these should not form an impediment to development and should be removed with suitable longer term replacement planting undertaken in their place.

Table 3 - Summary of Trees Recorded on Site (In Order of Abundance)

Species	Common Name	No.	% total pop.
<i>Acacia parramattensis</i>	Parramatta Wattle	15	14.02%
<i>Pinus canariensis</i> (E)	Canary Pine	12	11.21%
<i>Eucalyptus saligna</i>	Sydney Blue Gum	9	8.41%
<i>Pinus radiata</i> (E)	Monterey Pine	9	8.41%
<i>Corymbia gummifera</i>	Red Bloodwood	6	5.61%
<i>Eucalyptus botryoides</i>	Bangalay	6	5.61%
<i>Eucalyptus robusta</i>	Swamp Gum	5	4.67%
<i>Pittosporum undulatum</i>	Sweet Pittosporum	5	4.67%
<i>Erythrina x sykesii</i> (E)	Coral Tree	4	3.74%
<i>Banksia ericifolia</i>	Heath banksia	3	2.80%
<i>Eucalyptus punctata</i>	Grey Gum	3	2.80%
<i>Populus nigra</i> 'Italica'	Lombardy Poplar	3	2.80%
<i>Allocasuarina littoralis</i>	Black She-oak	2	1.87%
<i>Angophora costata</i>	Smooth-barked Apple	2	1.87%
<i>Callistemon viminalis</i> cv.	Bottlebrush	2	1.87%
<i>Eucalyptus haemastoma</i>	Scribbly Gum	2	1.87%
<i>Glochidion ferdinandi</i>	Cheese Tree	2	1.87%
<i>Leptospermum petersonii</i>	Lemon-scented Tea Tree	2	1.87%
<i>Araucaria heterophylla</i>	Norfolk Island Pine	1	0.93%
<i>Banksia serrata</i>	Old man Banksia	1	0.93%
<i>Callistemon salignus</i> cv.	Willow Bottlebrush	1	0.93%
<i>Callistemon</i> sp.	Bottlebrush	1	0.93%
<i>Leptospermum polygalifolium</i>	Tea Tree	1	0.93%
<i>Ligustrum lucidum</i> (E)	Broad-leaf Privet	1	0.93%
<i>Ligustrum sinense</i> (E)	Small-leaf Privet	1	0.93%
<i>Ligustrum vulgare</i> ? (E)	European Privet?	1	0.93%
<i>Lophostemon confertus</i>	Brush Box	1	0.93%
<i>Michelia champaca</i>	Michelia	1	0.93%
<i>Morus nigra</i> (E)	Mulberry	1	0.93%
<i>Olea europaea</i> subsp. <i>europaea</i> (E)	African Olive	1	0.93%
<i>Persoonia levis</i>	Geebung	1	0.93%
<i>Populus deltoids</i> (E)	American Cotton-wood	1	0.93%
<i>Salix</i> sp. (E)	Willow	1	0.93%
TOTAL		107	100.00%

** (E) Exempt species / weeds

2.5 Tree Biology and Tree Care Basics

Trees are dynamic living organisms. Trees can be very susceptible to damage, stress and declining rapidly if overly impacted by construction. Trees take decades to grow but can be injured and killed in a very short time frame. This is particularly due to the irreparable damage to the often shallow, extensive and unseen root systems. It is rarely possible to repair a stressed or damaged tree, after the damage has occurred. Proper protection is the key. Severing of roots within the Structural Root Zone (SRZ) can also lead to potentially unsafe instability of the tree as a structure.

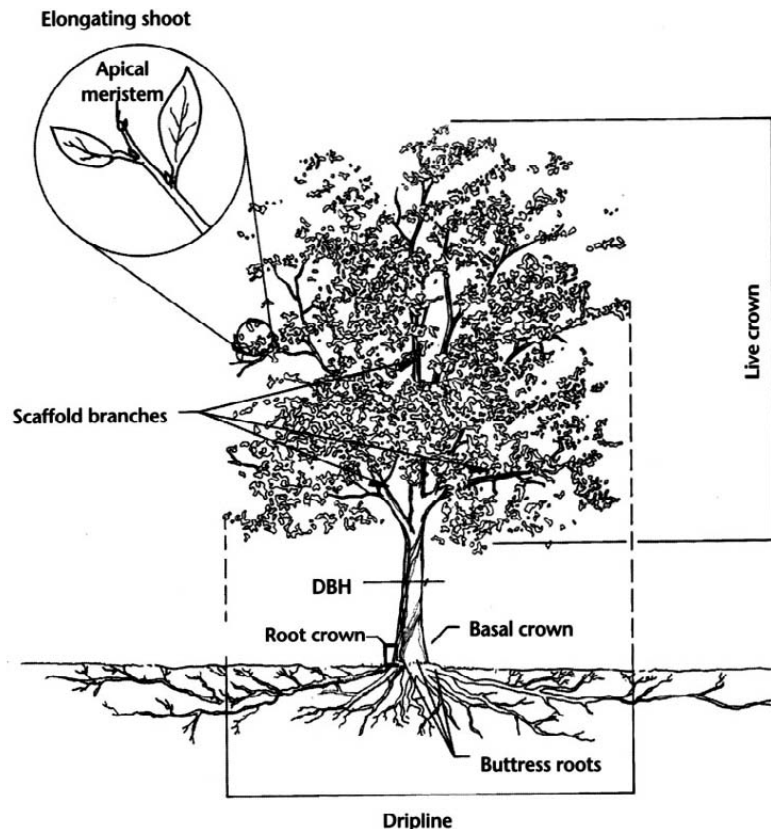


Figure 6 – Typical form and structure of a tree illustrating the typical form, location and extent of root growth (Source: Matheny and Clark, 1998)

Basic Tree Needs

As a living organism a tree remains alive by completing the following chemical reaction - Carbon Dioxide and water in combination with chlorophyll and light is converted to Glucose and Oxygen [$\text{CO}_2 + \text{H}_2\text{O} + \text{light} = \text{sugar (CH}_2\text{O [Glucose])} + \text{O}_2$]

The process ultimately leads to the plant cells 'respiring' and producing energy for survival, a natural requirement for all living cells. Anything that affects a plant's photosynthesis and then cellular respiration will affect the overall plant health. The limiting factors of photosynthesis and respiration will typically be the availability of oxygen, water and nutrients that make up the important chemical molecules and reactions.

Trees therefore have five basic requirements to survive and successfully grow:-

1. Oxygen (and particularly oxygen within the soil);
2. Water (a cellular necessity and primarily taken up by the tree roots);
3. Light & Sufficient Foliage (in order to photosynthesise and create the resources needed for cellular survival);
4. Soil (for physical anchorage and critical chemical nutrients) and
5. Physical Space (both above and below ground to grow).

Importantly, a minimum of 15% soil oxygen is required for active root growth and nutrient uptake. Less than 10% available soil oxygen starts to restrict root extension and growth and a minimum of 3% soil oxygen is required to just maintain root existence. Less than this will result in root death (Harris 1999).

One of the most insidious affects of construction on trees is often that of soil compaction or covering of root zones with impervious surfaces, as it:-

- Reduces infiltration rates of surface water;
- Reduces the availability of water to the roots as they can't naturally extract remaining moisture when soil becomes too dry;
- Reduces air to roots (roots cease to function properly and die without oxygen);
- Increased soil strength caused by compaction mean that roots need more energy to growth through it or can't even physically penetrate the soil;
- Roots are physically broken or crushed and there is increased potential for fungal and pathogen attack. (Harris 1999).

Tree Tolerance

Typically older and larger trees are less tolerant of construction impacts. Different species also have different tolerance of injury and disturbance. Importantly it needs to be stressed, that a tree does not “heal” from injury as animals do. Typically any injury made to a tree results in the tree expending considerable energy reserves to create new growth that “seals” and surrounds a wound and then attempting to compensate structurally and physically for any losses. Impacts to trees are therefore cumulative and a series of otherwise small and unrelated impacts can easily result in the death of a tree.

A tree that is already compromised or showing signs of stress is far less likely to tolerate construction impacts due to its lower levels of energy reserves and already weakened state. Therefore a tree that is only in a fair condition or poor condition is less likely to tolerate construction impacts than a young tree in good or excellent condition.

Weakened or stressed trees are also far less able to combat the myriad of normal environmental stresses and pathogens that are naturally imposed against them such as drought, decay, fungi, bacteria and insect pests.

2.6 Tree Impact Assessment

The intention of this assessment is to clearly illustrate the trees to be retained and removed as part of the development. It is also to determine any incursions into the retained trees’ root zones and canopies by the proposed development and evaluate the likely impact of the proposed works on the trees. A detailed summary of the incursions and likely impacts of the proposed development on each tree is shown in Appendix 4.1 – Tree Impact Assessment Schedule.

107 trees were assessed and 85 are recommended for removal as they are either:

- within or immediately adjacent to the construction footprint and significantly impacted as a result of the construction, installation of services, bulk earthworks and regrading
- or are considered weeds or in poor, or very poor, condition and unsuitable to be retained in the context of the development.

Trees recommended for removal are listed in Appendix 4.1 and shown on the tree plans in Appendix 4.2 – T-03 Tree Protection & Removal Plan, however they are not discussed further in the report.

22 are trees to be retained:-

- 19 have nil or minimal foreseeable impacts from construction related activity;
- 3 have minor encroachments as defined under AS 4970 – 2009;

The encroachments and minor works within the TPZs are discussed below and outlined graphically in Appendix 4.2 – T-03 Tree Protection & Removal Plan.

Tree T23- *Eucalyptus punctata* (Grey Gum)

This tree has a TPZ radius of 8.2m and is located adjacent to a prominent sandstone outcrop on the edge of the bushland, adjacent to the intermittent creek line in the south western corner of the development area. **T23** is one of four trees (**T22-T25**) that are in a stand growing around this sandstone outcrop. **T23** is only in fair condition overall, displaying a variety of structural defects including co-dominant stems, major decay, minor deadwood, branch tear-outs and a major lean. This stand of trees however forms a prominent landscape feature in this portion of the site and provides screening to the proposed new building when viewed from the south west. This is also an endemic species and will provide important habitat services.

T23 will experience a minor incursion as defined by AS 4970, of approximately 10.0%, as a result of excavations required for the construction of the pool building and a pedestrian access pathway through the north-eastern portion of its nominal TPZ. The other trees within the stand are unlikely to experience any impact as a result of the proposed works. Based on the minor nature of the likely incursion it is the author’s opinion that **T23** may be successfully retained and protected throughout the course of the project.



Figure 7 – T22 in foreground, T23 immediately behind with the nest box installed. Note the sandstone outcrop at right. (Photo: Arterra 21/4/18)

Tree T55- *Eucalyptus saligna* (Sydney Blue Gum)

The largest and most prominent tree on the site is a large Sydney Blue Gum (*Eucalyptus saligna*) (T55). It is clearly visible from Allambie Road and other public areas. A similar tree to its west is in poor health and condition and should be removed. Tree T55 should be the focus of efforts to retain. It is not 'naturally' occurring in this particular site but it will create a valuable landscape asset and will help screen and separate the new development from the existing William Charlton Village. It is visually prominent and in good health.



Figure 8 – T55 a tree native to the Sydney basin, is large and very visually prominent with no notable defects. The retention of this tree should form a priority. (Photo: Arterra 21/4/18)

This tree has a TPZ radius of 13.56m and is located in a garden bed in a steep bank between the access road and utilities area to the rear of William Charlton Village and the cleared, grassed area in the north-eastern corner of the project site. There will be what we consider a minor incursion, as defined by AS 4970, of approximately 10.6% in the south-western portion of this tree's nominal TPZ. The incursion will result from the excavations for the adjacent building's basement floor level, which will sit approximately 400 – 500mm below the current ground level. The existing ground levels and surface conditions around this tree, within the TPZ and beyond, (with the exception of the noted incursion), will be maintained at existing levels. A low retaining wall/ kerb will be constructed along the eastern side of the basement to prevent the need for any further battering. A new pedestrian pathway proposed to run through the south-eastern portion of the TPZ shall be installed as a suspended structure above the existing ground levels requiring no significant excavation, and minimising any likely root impacts in this area.

Given that the incursion occurs to a relatively small south-western portion of the TPZ and the remainder of the TPZ will experience no significant disturbance including the areas contiguous and beyond the TPZ to the north, east and south it is the author's opinion that this impact is acceptable and is likely to have little impact to the overall condition of the tree. It will be vital however to protect the remaining TPZ thoroughly, during construction. The implementation of temporary irrigation during the construction phase will be extremely beneficial and help maintain the health and vitality of the tree and is recommended.

Located immediately to the west of **T55**, is **T54** which is a similar tree, however, it is in much poorer health and condition with significant borer blazes to the north and south sides of trunk. **T56-T60** are smaller trees in poor condition and weeds that are growing around the base of **T55**. It is recommended that **T54** & **T56-T60** be removed for the betterment of **T55**.



Figure 9 – T55- view north west from rear of William Charlton Village towards tree. (Photo: Arterra 21/4/18)

Tree T76 - *Eucalyptus saligna* (Sydney Blue Gum)

T76 is a young and healthy tree located adjacent to the northern site boundary just north of the proposed extent of works. The existing carpark is to be extended north and a garbage bin storage area is proposed adjacent to this tree. The carpark has been designed around the tree to minimise construction impacts to the tree and allow its retention. The potential disturbance caused by the construction of the bin storage facility results in a minor incursion to the southern portion of the TPZ of 10%. Any other root impacts are expected to be minimal and it is the author's opinion that this incursion is acceptable and likely to have little impact to the condition of this young tree.



Figure 10 – T76 view to the north from the northern edge of the existing carpark (Photo: Arterra 21/4/18)

Other Trees - Surface Impacts to be Managed During Pedestrian Pathways Construction

T01, T26, T41, T55 and T96 have landscape pedestrian paths to be constructed within their respective nominal TPZs. It is proposed that each of the pathways be constructed at or above the existing ground level and that surface impacts shall be carefully managed to minimise soil compaction and possible surface root damage. Root impacts, if any, are expected to be minimal with no long term impacts expected to the condition of the trees. On this basis none of these proposed pathway works are considered to be material incursions within the nominal TPZs. Refer to Appendix 4.2 – T-03 Tree Protection & Removal Plan for further details of these minor works.

Removal of T02, T03-T12 – *Pinus canariensis* (Canary Pine)

There are several Pine trees (believed to be *Pinus canariensis*) located on the boundary embankment along the southern edge of the development site. Pinus are an exempt species and may be removed without approval. These are a potentially invasive species and are growing on the edge of a steep drop-off. Given the above exemption and the likely shallow soils and limited root development to the southern side of these trees we believe it is prudent to remove them. Suitable replacement planting is proposed within the new landscaping of the site, which will continue to provide suitable low level screening between the new development and Allambie Heights Village to the south.



Figure 10 – T03-T12- view south-west from rear of William Charlton Village. (Photo: Arterra 21/4/18)

2.7 Potential Tree Related Impacts to be Managed During Construction

The main potential impacts from the proposed construction activity can be summarised as tree damage and 'reduced life expectancy' caused by:-

- Root loss and disturbance due to excavations and bulk earthworks;
- Compaction of the root zone from general trafficking, storage and stockpiling of materials;
- Contamination of the soil from; the preparation of chemicals, wash down/ cleaning of equipment, refuelling of vehicles and dumping of waste;
- Compaction of the root zone from haul roads and the parking of vehicles/ plant equipment;
- Root disturbance from cut and fill and soil level changes;
- Physical damage to the tree trunks and branches from passing machinery;
- Damage to the tree roots from landscaping and pedestrian pathway construction.

The following Section provides recommendations and proposed measures that aim to minimise and avoid these impacts as much as realistically possible.

3.0 TREE MANAGEMENT RECOMMENDATIONS

3.1 Potential Amendments to Site Layout and Design

The landscape concept design and proposed building layouts have been developed in consultation with the Client and Architects. Arterra, as both the Consulting Arborists and Landscape Architects for the project have aimed to minimise the impact on the existing site trees to be retained and the design has been modified to this effect wherever possible. The trees noted for removal, as well as those to be retained, have been given careful consideration and recommendation for removal has not been given lightly.

As the current design has been developed in consultation with the Consulting Arborist, appropriate changes have been implemented throughout the design development process to accommodate existing trees wherever possible. On this basis there are no recommendations to alter the design at this time.

3.2 Key Recommendations to Reduce Tree Impacts

The following recommendations are made to potentially reduce the negative construction impacts on the trees.

- Ensure that an appropriately qualified Arborist (AQF5) is on site and supervises all demolition work within the identified TPZ areas.
- Demolition works within the TPZ of **T55, T96, T97, & T98** are to be undertaken with particular care. Paving is to be carefully lifted by hand or small tracked machine where appropriate, to avoid root damage and soil compaction. There is to be no excavation below the existing ground level within the TPZ.
- Appropriately fence all TPZs beyond the noted incursions for the duration of all major site construction work. See Appendix 4.2 – T-03 Tree Protection & Removal Plan for locations.
- Carefully control and fence access to and from the construction area so that movement does not occur through any TPZ other than for the noted building incursions.
- Ensure all the above and below ground services are excluded from running through any TPZs beyond the incursions already noted and assessed.
- Where pedestrian pathways are to be constructed within the TPZs, care shall be taken to minimise surface impacts and root disturbance. Paths shall be constructed at or above the existing ground surface level as shown in Appendix 4.2 – T-03 Tree Protection & Removal Plan.
- Minimise the re-grading of the ground surface within the TPZ, beyond the noted building incursions, to meet and match proposed pathways and building levels. Where it is required, limit it to a maximum depth of 300mm above existing ground levels and ensure only quality sandy manufactured organic garden mix is used.
- Mulching of the entire TPZs (where it is grassed), beyond the noted building incursion, for all retained trees. This will aid tree health with moisture retention, remove competition from grasses, and improve soil conditions within the TPZs during construction. Mulch generated during site clearing can be used except where it is from weed material, which should be disposed off site.
- Avoid digging into existing root zones for the installation of the proposed landscaping around the trees and installation sizes of new plants to be 5L or less to ensure that excavations are less than 200mm in depth. Build up soil levels when planting to a maximum of 200mm to enable the planting to occur without disturbing roots.
- Do not allow storage or stockpiling of any materials or site sheds within established TPZs unless it can be demonstrated that this will not impact on the tree retention and is approved in writing by the Consulting Arborist.

Refer to T02 - Tree Protection Specification & Schedule in Appendix 4.2 for detail of the tree protection specifications to be implemented during construction.

3.3 Proposed Tree Protection & Construction Activity Sequencing

The following sequence of activities should be followed for this project: -

1. A Tree Protection Specification & Plan shall be prepared and issued as part of the construction contract prior to any construction work.
2. Project Consulting Arborist, Landscape Architect, Civil and Structural Engineers, Client and Contractor Site Foreman are to meet prior to beginning any work on the site to discuss and review all work procedures, construction access routes, stockpiling and tree protection measures (ie: fence types and locations, access, craneage points, piling methods etc.).
3. Contractors to discuss locations and type of any sediment and erosion controls (if any) and install them with minimal tree impact when within or passing through the TPZ.
4. Existing pathways, fences, driveways, furniture and shrubs are to be carefully removed from within the TPZ.

5. Existing surrounding trees are to be removed. Stumps are to be ground to avoid the use of excavators and the like from grubbing out stumps, which may lead to damage of any intertwined roots.
6. Designated TPZs are to be mulched with 75mm of recovered site mulch or recycled hardwood woodchip mulch to improve soil conditions around tree and remain in place until future landscaping.
7. Trunk protection is to be placed on trees to be retained, as identified in plans.
8. The Construction Phase TPZ is to be defined and fenced off with a 1.8m high metal or plywood temporary fence prior to any further work within the vicinity of the trees. Any required rumble boards installed to protect TPZ areas if and where access is required through a TPZ.
9. Install temporary irrigation system to TPZs of **T55, T28 and T01**.
10. A utility Arborist is to undertake selective pruning of canopy or branches to facilitate construction of the building and the use of any large scale piling equipment without accidental damage to the tree canopy. Pruning to be done in accordance with AS4373 - Pruning of Amenity Trees and performed by staff with minimum AQF 3 qualification.
11. Plywood is to be placed under any scaffolds or works paths when running through TPZs
12. Building works to be completed (external).
13. Contractor to remove the TPZ fencing and then install final pathways and landscaping within the TPZ under the trees, after construction of the building exterior is largely completed.

3.4 Final Building and Pedestrian Clearance Pruning

Once the final levels and finishes are in place the Project Consulting Arborist shall supervise the selective pruning of any lower peripheral branches to retained trees to achieve any clearances for final pedestrian access. This shall be minimised as much as possible. It is anticipated that the final pruning of any of the retained trees will be less than 5% of the existing canopy and will not have any serious impact to the trees health or habit.

The branches of the trees shall only be pruned as specifically needed and directed by the Project Consulting Arborist. Work is to be in strictly accordance with to AS4373 - Pruning of Amenity Trees. Do not treat wounds. Only clean, sharp pruning implements shall be used for all pruning work, ensuring that cuts are made without damage, tearing or bruising of the vascular tissue.

3.5 Other Tree Protection Measures to be Implemented

The following is a summary of the main measures that will be required during construction. These should be adopted for the Construction Contract and conditioned by Council.

Controlled Construction Access & Parking

Construction access points and stockpiling and storage areas shall be clearly identified and fenced where appropriate. Uncontrolled access points and parking of vehicles outside of designated areas is to be avoided. If temporary access is required through a tree protection zone, ground protection shall be employed to limit soil compaction and root damage and disturbance.

Clearing and Removal of Trees to be Removed

Removal and clearing of existing trees should be done by qualified arboricultural staff with care not to impact or damage other surrounding trees throughout the process. Existing stumps should be grubbed out or ground in a controlled fashion to remove wood that may decay and promote unwanted pathogens.

Communication - Tool Box Meetings and Construction Inductions

All contractors and subcontractors shall be inducted prior to working on the site. All inductions shall include description and identification of the Tree Protection Zones and the restriction on work and activities with regard to trees. The site foreman shall ensure that all new staff and contractors are appropriately inducted and that brief "tool box" meetings are conducted regularly to ensure Tree Protection is maintained at the forefront of all construction workers minds.

3.6 References

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- End of report.

4.0 APPENDICES

4.1 Tree Impact Assessment Schedule

Allambie Heights Village Project 2 - Tree Impact Assessment Schedule

Tree ID	Tree Species	Common Name	Height (m)	Trunk Diameter Breast Height (dbh) (m)	Trunk Diameter at base (dgl) (m)	Nominal TPZ radius (m) 12xdbh (AS 4970)	Nominal SRZ radius (m) (AS 4970)	Age Class	Current Vigour	Current Form	Tree Origin	Noted Defects	SULE Rating	Retention Value	General Comments and Notes	Incursion and Impact	Recommendation
1	<i>Pinus canariensis</i>	Canary Pine	14.0	0.58	0.77	6.96	2.97	Mature	Good	Good	Exotic		Long (>40 years)	Moderate		Surface impacts to be managed during landscape construction. Nil impact expected.	Retain and Protect
2	<i>Pinus canariensis</i>	Canary Pine	6.5	0.17	0.27	2.04	1.91	Young	Good	Good	Exotic		Long (>40 years)	Low		Exempt species to be removed	Remove
3	<i>Pinus canariensis</i>	Canary Pine	8.5	0.22	0.31	2.64	2.02	Semi-mature	Fair	Average	Exotic		Long (>40 years)	Low	Planted as a row and very close to edge of embankment. Moderate retention only if retained as a group. Individually low.	Exempt species growing close to edge of bank adjacent to carpark - to be removed	Remove
4	<i>Pinus canariensis</i>	Canary Pine	8.0	0.15	0.22	2.00	1.75	Semi-mature	Fair	Average	Exotic		Long (>40 years)	Low	Planted as a row and very close to edge of embankment. Moderate retention only if retained as a group. Individually low.	Exempt species growing close to edge of bank adjacent to carpark - to be removed	Remove
5	<i>Pinus canariensis</i>	Canary Pine	11.0	0.27	0.37	3.24	2.18	Semi-mature	Fair	Average	Exotic		Long (>40 years)	Low	Planted as a row and very close to edge of embankment. Moderate retention only if retained as a group. Individually low.	Exempt species growing close to edge of bank adjacent to carpark - to be removed	Remove
6	<i>Pinus canariensis</i>	Canary Pine	11.0	0.35	0.43	4.20	2.32	Semi-mature	Fair	Average	Exotic		Long (>40 years)	Low	Planted as a row and very close to edge of embankment. Moderate retention only if retained as a group. Individually low.	Exempt species growing close to edge of bank adjacent to carpark - to be removed	Remove
7	<i>Pinus canariensis</i>	Canary Pine	10.5	0.25	0.30	3.00	2.00	Semi-mature	Fair	Suppressed	Exotic		Long (>40 years)	Low	Planted as a row and very close to edge of embankment. Moderate retention only if retained as a group. Individually low.	Exempt species growing close to edge of bank adjacent to carpark - to be removed	Remove
8	<i>Pinus canariensis</i>	Canary Pine	13.5	0.39	0.50	4.68	2.47	Mature	Good	Good	Exotic		Long (>40 years)	Low	Planted as a row and very close to edge of embankment. Moderate retention only if retained as a group. Individually low.	Exempt species growing close to edge of bank adjacent to carpark - to be removed	Remove
9	<i>Pinus canariensis</i>	Canary Pine	4.5	0.18	0.23	2.16	1.79	Young	Fair	Suppressed	Exotic		Long (>40 years)	Low	Planted as a row and very close to edge of embankment. Moderate retention only if retained as a group. Individually low.	Exempt species growing close to edge of bank adjacent to carpark - to be removed	Remove
10	<i>Pinus canariensis</i>	Canary Pine	13.0	0.39	0.50	4.68	2.47	Mature	Good	Good	Exotic		Long (>40 years)	Low	Planted as a row and very close to edge of embankment. Moderate retention only if retained as a group. Individually low.	Exempt species growing close to edge of bank adjacent to carpark - to be removed	Remove
11	<i>Pinus canariensis</i>	Canary Pine	13.0	0.40	0.59	4.80	2.65	Mature	Good	Good	Exotic		Long (>40 years)	Low	Planted as a row and very close to edge of embankment. Moderate retention only if retained as a group. Individually low.	Exempt species growing close to edge of bank adjacent to carpark - to be removed	Remove
12	<i>Pinus canariensis</i>	Canary Pine	11.5	0.31	0.39	3.72	2.23	Semi-mature	Good	Good	Exotic		Long (>40 years)	Low	Planted as a row and very close to edge of embankment. Moderate retention only if retained as a group. Individually low.	Exempt species growing close to edge of bank adjacent to carpark - to be removed	Remove
13	<i>Callistemon viminalis</i> cv.	Weeping Bottlebrush	5.0	0.22	0.25	2.64	1.85	Mature	Good	Good	Native		Medium (15-40 years)	Moderate	Good lower level screen to adjoining property. Good form and condition.	Nil	Retain and Protect
14	<i>Erythrina x sykesii</i>	Coral Tree	6.5	0.37	1.20	4.44	3.57	Mature	Good	Poor	Invasive	Co-dominant Stems, Epicormic Growth	Medium (15-40 years)	V Low / Remove	Previously cut to ground. Resultant coppiced growth from stump.	Exempt species to be removed	Remove
15	<i>Erythrina x sykesii</i>	Coral Tree	6.5	0.49	5.00	5.88	6.51	Mature	Good	Poor	Invasive	Co-dominant Stems, Epicormic Growth	Medium (15-40 years)	V Low / Remove	Previously cut to ground. Resultant coppiced growth. Most of stump decayed. Very poor tree. Privet intergrown at its base.	Exempt species to be removed	Remove
16	<i>Ligustrum sinense</i>	Narrow-leaf Privet	6.0	0.22	0.50	2.64	2.47	Mature	Good	Poor	Weed	Co-dominant Stems, Epicormic Growth	Medium (15-40 years)	V Low / Remove	Weed, with Erythrina saplings intergrown at its base.	Exempt species to be removed	Remove
17	<i>Erythrina x sykesii</i>	Coral Tree	13.0	0.92	1.15	11.04	3.51	Mature	Good	Average	Invasive	Epicormic Growth, Decay-Minor, Branch Tearouts	Medium (15-40 years)	V Low / Remove	Previous large lower branches pruned. Minor decay noted at wounds.	Exempt species to be removed	Remove
18	<i>Erythrina x sykesii</i>	Coral Tree	13.5	0.88	1.55	10.56	3.98	Mature	Good	Average	Invasive	Epicormic Growth, Decay-Minor, Branch Tearouts, Asymmetric Canopy, Co-dominant Stems	Medium (15-40 years)	V Low / Remove		Exempt species to be removed	Remove
19	<i>Banksia ericifolia</i>	Heath Banksia	4.0	0.25	0.25	3.00	1.85	Mature	Fair	Average	Endemic	Inclusions	Short (5-15 years)	Low	Some dysfunction noted at primary branch unions.	Tree within footprint of building / other significant siteworks	Remove
20	<i>Salix</i> sp.	Willow	12.5	0.65	0.65	7.80	2.76	Over-mature	Poor	Average	Invasive	Tip Dieback, Co-dominant Stems, Inclusions	Short (5-15 years)	V Low / Remove	Dead willow to its south west. Cassia sp. growing in and amongst tree. Invasive and should be removed to prevent spread into bushland.	Exempt species to be removed	Remove
21	<i>Allocasuarina littoralis</i>	Black She-Oak	9.0	0.25	0.35	3.00	2.13	Mature	Good	Average	Endemic	Branch Tearouts	Medium (15-40 years)	Low	Historical flush cuts made to trunk. Previously growing in and amongst a now fallen Erythrina. Two trunks close together, tagged as one tree.	Tree within footprint of building / other significant siteworks	Remove
22	<i>Angophora costata</i>	Smooth-barked Apple	9.0	0.29	0.35	3.48	2.13	Mature	Good	Poor	Endemic	Lean-Major, Asymmetric Canopy	Long (>40 years)	High	Growing on top of prominent rock outcrop with distinct lean to west.	Nil	Retain and Protect
23	<i>Eucalyptus punctata</i>	Grey Gum	12.5	0.68	0.80	8.16	3.01	Mature	Good	Poor	Endemic	Lean-Major, Branch Tearouts, Deadwood-Minor, Decay-Major, Co-dominant Stems	Long (>40 years)	Moderate	Growing on top of prominent rock outcrop. Nest box attached. Major roots observed to north -east. Only given moderate rating due to being endemic and related to adjacent bushland.	Minor incursion from regrading for pedestrian pathway on northeast portion of TPZ. Minimal impact expected.	Retain and Protect
24	<i>Angophora costata</i>	Smooth-barked Apple	12.0	0.27	0.29	3.24	1.97	Mature	Good	Average	Endemic	Asymmetric Canopy	Long (>40 years)	High	Small Glochidian sapling growing at its base to eastern side.	Nil	Retain and Protect
25	<i>Eucalyptus punctata</i>	Grey Gum	8.5	0.24	0.35	2.88	2.13	Semi-mature	Good	Average	Endemic	Asymmetric Canopy	Long (>40 years)	Moderate	Growing at base of adjacent rock outcrop.	Nil	Retain and Protect
26	<i>Eucalyptus punctata</i>	Grey Gum	10.5	0.32	0.40	3.84	2.25	Mature	Good	Average	Endemic	Asymmetric Canopy, Pest/Disease	Long (>40 years)	High	Prominent butt sweep from south to north. Minor borer activity in lower trunk.	Nil	Retain and Protect
27	<i>Persoonia levis</i>	Broad-leaved Geebung	4.5	0.24	0.24	2.88	1.82	Mature	Good	Good	Endemic		Long (>40 years)	High	Large and very mature specimen in good condition. Endemic to bushland.	Nil	Retain and Protect
28	<i>Eucalyptus saligna</i>	Sydney Blue Gum	14.0	0.43	0.63	5.16	2.73	Mature	Good	Good	Native	Deadwood-Minor	Long (>40 years)	High		Surface impacts to be managed during landscape construction. Nil impact expected.	Retain and Protect
29	<i>Eucalyptus robusta</i>	Swamp Mahogany	12.5	0.40	0.47	4.80	2.41	Mature	Fair	Average	Native		Long (>40 years)	Moderate		Tree within footprint of building / other significant siteworks	Remove
30	<i>Eucalyptus botryoides</i>	Bangalay	10.0	0.29	0.37	3.48	2.18	Semi-mature	Good	Good	Native		Long (>40 years)	Moderate		Tree within footprint of building / other significant siteworks	Remove
31	<i>Eucalyptus botryoides</i>	Bangalay	11.0	0.36	0.47	4.32	2.41	Semi-mature	Good	Good	Native		Long (>40 years)	Moderate		Tree within footprint of building / other significant siteworks	Remove
32	<i>Eucalyptus robusta</i>	Swamp Mahogany	10.0	0.19	0.24	2.28	1.82	Semi-mature	Fair	Average	Native		Long (>40 years)	Low	Poor specimen with sparse canopy.	Tree within footprint of building / other significant siteworks	Remove
33	<i>Eucalyptus botryoides</i>	Bangalay	11.0	0.29	0.35	3.48	2.13	Semi-mature	Good	Good	Native		Long (>40 years)	Moderate		Tree within footprint of building / other significant siteworks	Remove
34	<i>Eucalyptus robusta</i>	Swamp Mahogany	15.0	0.38	0.46	4.56	2.39	Mature	Fair	Average	Native		Long (>40 years)	Moderate		Tree within footprint of building / other significant siteworks	Remove
35	<i>Eucalyptus botryoides</i>	Bangalay	12.0	0.42	0.50	5.04	2.47	Mature	Good	Average	Native		Long (>40 years)	Moderate	Very low but large branch to south-east.	Tree within footprint of building / other significant siteworks	Remove
36	<i>Eucalyptus botryoides</i>	Bangalay	11.5	0.40	0.46	4.80	2.39	Mature	Good	Average	Native		Long (>40 years)	Moderate	Low branching habit.	Tree within footprint of building / other significant siteworks	Remove
37	<i>Eucalyptus robusta</i>	Swamp Mahogany	16.5	0.51	0.64	6.12	2.74	Mature	Fair	Average	Native		Long (>40 years)	Moderate	Low branch over road to south.	Tree within footprint of building / other significant siteworks	Remove
38	<i>Eucalyptus botryoides</i>	Bangalay	16.0	0.50	0.62	6.00	2.71	Mature	Good	Good	Native		Long (>40 years)	Moderate		Tree within footprint of building / other significant siteworks	Remove
39	<i>Eucalyptus robusta</i>	Swamp Mahogany	16.5	0.84	0.96	10.08	3.25	Mature	Good	Good	Native		Long (>40 years)	High	Large and low branching to north and north-east. Best specimen of row planting along driveway.	Tree within footprint of building / other significant siteworks	Remove
40	<i>Michelia champaca</i>	Champaca	6.5	0.17	0.20	2.04	1.68	Semi-mature	Moribund	Average	Exotic		Remove (<5 years)	V Low / Remove	Extensive dieback	Tree within footprint of building / other significant siteworks	Remove
41	<i>Corymbia gummifera</i>	Red Bloodwood	9.5	0.41	0.44	4.92	2.34	Mature	Good	Average	Endemic		Long (>40 years)	Moderate		Surface impacts to be managed during landscape construction. Nil impact expected.	Retain and Protect
42	<i>Eucalyptus saligna</i>	Sydney Blue Gum	8.0	0.14	0.20	2.00	1.68	Young	Good	Good	Native		Long (>40 years)	Moderate		Nil	Retain and Protect
43	<i>Eucalyptus saligna</i>	Sydney Blue Gum	11.0	0.52	0.66	6.24	2.78	Semi-mature	Fair	Poor	Native	Pest/Disease, Co-dominant Stems	Long (>40 years)	Low	Tri-trunked from base with minor borer activity noted.	Nil	Retain and Protect
44	<i>Corymbia gummifera</i>	Red Bloodwood	9.5	0.35	0.39	4.20	2.23	Mature	Poor	Average	Endemic	Tip Dieback, Asymmetric Canopy	Medium (15-40 years)	Low	Generally poor condition with very sparse canopy.	Poor tree, removed for APZ and landscape amenity.	Remove
45	<i>Corymbia gummifera</i>	Red Bloodwood	9.5	0.42	1.00	5.04	3.31	Mature	Fair	Average	Endemic	Deadwood-Minor	Long (>40 years)	Moderate	Twin trunked from underground base.	Poor tree, remove due to impact from new driveway construction.	Remove
46	<i>Eucalyptus haemastoma</i>	Scribbly Gum	9.5	0.80	0.80	9.60	3.01	Mature	Fair	Average	Endemic	Epicormic Growth, Deadwood-Minor	Long (>40 years)	Low	Significant wound at base to south-east.	Tree within footprint of building / other significant siteworks	Remove
47	<i>Pinus radiata</i>	Monterey Pine	13.5	0.62	0.72	7.44	2.88	Senescent	Poor	Average	Invasive	Asymmetric Canopy	Short (5-15 years)	V Low / Remove		Exempt Species, Tree within footprint of building / other significant siteworks	Remove
48	<i>Pinus radiata</i>	Monterey Pine	14.5	0.68	0.83	8.16	3.06	Senescent	Moribund	Average	Invasive	Tip Dieback	Short (5-15 years)	V Low / Remove	Significant dieback.	Exempt Species, Tree within footprint of building / other significant siteworks	Remove
49	<i>Pinus radiata</i>	Monterey Pine	14.5	0.63	0.70	7.56	2.85	Senescent	Moribund	Average	Invasive	Tip Dieback	Remove (<5 years)	V Low / Remove	Significant dieback.	Exempt Species, Tree within footprint of building / other significant siteworks	Remove
50	<i>Pinus radiata</i>	Monterey Pine	13.0	0.95	1.08	11.40	3.42	Mature	Good	Average	Invasive	Asymmetric Canopy, Deadwood-Major	Medium (15-40 years)	Low		Exempt Species, Tree within footprint of building / other significant siteworks	Remove
51	<i>Pittosporum undulatum</i>	Sweet Pittosporum	7.5	0.28	0.47	3.36	2.41	Mature	Fair	Suppressed	Endemic	Tip Dieback, Decay-Major, Deadwood-Minor	Short (5-15 years)	Low	Extensive canopy dieback and decay in base.	Tree within footprint of building / other significant siteworks	Remove
52	<i>Morus nigra</i>	Mulberry	3.5	0.20	0.40	2.40	2.25	Mature	Poor	Poor	Exotic	Tip Dieback, Deadwood-Minor, Epicormic Growth	Short (5-15 years)	V Low / Remove	Extensive dieback.	Exempt Species, Tree within footprint of building / other significant siteworks	Remove
53	<i>Populus deltoides</i>	American Cottonwood	19.0	0.95	1.18	11.40	3.55	Mature	Good	Good	Exotic	Epicormic Growth	Medium (15-40 years)	Low	Large pruning wounds to west and south at 4.0m. Long stubs frequently left in canopy from historical pruning.	Exempt Species, Tree within footprint of building / other significant siteworks	Remove
54	<i>Eucalyptus saligna</i>	Sydney Blue Gum	22.5	1.25	1.25	15.00	3.63	Mature	Fair	Poor	Native	Pest/Disease, Epicormic Growth, Tip Dieback, Deadwood-Major	Long (>40 years)	Low	Major borer blazes to north and south sides of trunk. Significant historical pruning to east at 1.8m	Poor tree, remove due to construction impacts and for betterment of T55 to be retained.	Remove
55	<i>Eucalyptus saligna</i>	Sydney Blue Gum	24.0	1.13	1.24	13.56	3.62	Mature	Good	Good	Native	Deadwood-Minor	Long (>40 years)	High	Good condition and visually prominent.	Minor incursion (10.6%) to southwestern portion of TPZ, surface impacts to be managed during demolition and construction.	Retain and Protect
56	<i>Pittosporum undulatum</i>	Sweet Pittosporum	7.5	0.18	0.19	2.16	1.65	Mature	Poor	Poor	Endemic	Tip Dieback, Deadwood-Minor, Asymmetric Canopy	Short (5-15 years)	Low	Extensive dieback.	Poor tree, remove to betterment of T55.	Remove

Tree ID	Tree Species	Common Name	Height (m)	Trunk Diameter Breast Height (dbh) (m)	Trunk Diameter at base (dgl) (m)	Nominal TPZ radius (m) 12xdbh (AS 4970)	Nominal SRZ radius (m) (AS 4970)	Age Class	Current Vigour	Current Form	Tree Origin	Noted Defects	SULE Rating	Retention Value	General Comments and Notes	Incursion and Impact	Recommendation
57	<i>Pittosporum undulatum</i>	Sweet Pittosporum	7.5	0.12	0.18	2.00	1.61	Mature	Poor	Poor	Endemic	Deadwood-Minor, Asymmetric Canopy, Tip Dieback	Short (5-15 years)	Low	Extensive dieback.	Poor tree, remove to betterment of T55.	Remove
58	<i>Ligustrum vulgare?</i>	Privet	4.0	0.26	1.00	3.12	3.31	Mature	Fair	Poor	Invasive		Remove (<5 years)	V Low / Remove	Invasive species, should be removed.	Exempt species to be removed	Remove
59	<i>Ligustrum lucidum</i>	Broadleaf Privet	7.5	0.21	0.37	2.52	2.18	Mature	Fair	Poor	Weed	Asymmetric Canopy	Remove (<5 years)	V Low / Remove	Weed, should be removed.	Exempt species to be removed	Remove
60	<i>Acacia parramattensis</i>	Parramatta Wattle	9.5	0.23	0.27	2.76	1.91	Mature	Fair	Poor	Endemic	Tip Dieback, Pest/Disease, Lean-Major, Asymmetric Canopy	Short (5-15 years)	Low	Borer.	Poor tree, remove due to construction impacts and for betterment of T55 to be retained.	Remove
61	<i>Eucalyptus saligna</i>	Sydney Blue Gum	13.0	0.22	0.28	2.64	1.94	Semi-mature	Good	Average	Native	Asymmetric Canopy	Long (>40 years)	Low		Poor tree, remove due to construction impacts.	Remove
62	<i>Pittosporum undulatum</i>	Sweet Pittosporum	6.0	0.17	0.32	2.04	2.05	Senescent	Poor	Poor	Endemic	Deadwood-Minor, Asymmetric Canopy, Tip Dieback, Epicormic Growth	Remove (<5 years)	V Low / Remove	Extensive dieback, very poor condition.	Very poor tree, remove due to construction impacts.	Remove
63	<i>Acacia parramattensis</i>	Parramatta Wattle	14.0	0.22	0.30	2.64	2.00	Mature	Good	Good	Endemic		Medium (15-40 years)	Low		Tree within footprint of building / other significant siteworks	Remove
64	<i>Acacia parramattensis</i>	Parramatta Wattle	12.0	0.25	0.37	3.00	2.18	Mature	Good	Average	Endemic	Lean-Minor	Medium (15-40 years)	Low		Tree within footprint of building / other significant siteworks	Remove
65	<i>Pinus radiata</i>	Monterey Pine	11.5	0.45	0.54	5.40	2.55	Mature	Good	Average	Invasive		Long (>40 years)	Low		Tree within footprint of building / other significant siteworks	Remove
66	<i>Pinus radiata</i>	Monterey Pine	10.5	0.43	0.47	5.16	2.41	Mature	Fair	Poor	Invasive	Asymmetric Canopy	Medium (15-40 years)	Low		Tree within footprint of building / other significant siteworks	Remove
67	<i>Pinus radiata</i>	Monterey Pine	10.5	0.55	0.59	6.60	2.65	Mature	Good	Poor	Invasive	Lean-Minor, Asymmetric Canopy	Medium (15-40 years)	V Low / Remove	Previously failed tree now regrown and corrected from the remnant growth. Numerous Pittosporum saplings growing around base.	Tree within footprint of building / other significant siteworks	Remove
68	<i>Lophostemon confertus</i>	Brush Box	7.5	0.27	0.33	3.24	2.08	Semi-mature	Good	Average	Native		Long (>40 years)	Low		Tree within footprint of building / other significant siteworks	Remove
69	<i>Eucalyptus haemastoma</i>	Scribbly Gum	9.0	0.48	1.20	5.76	3.57	Mature	Fair	Average	Endemic	Co-dominant Stems	Long (>40 years)	Moderate	Multiple trunks from base.	Tree within footprint of building / other significant siteworks	Remove
70	<i>Corymbia gummifera</i>	Red Bloodwood	9.5	0.24	0.35	2.88	2.13	Mature	Fair	Poor	Endemic	Deadwood-Minor, Epicormic Growth	Medium (15-40 years)	Low		Tree within footprint of building / other significant siteworks	Remove
71	<i>Glochidion ferdinandi</i>	Cheese Tree	9.5	0.50	0.50	6.00	2.47	Mature	Good	Good	Endemic	Asymmetric Canopy	Long (>40 years)	High	Visually prominent screen to major road.	Nil	Retain and Protect
72	<i>Eucalyptus saligna</i>	Sydney Blue Gum	16.0	0.37	0.44	4.44	2.34	Mature	Good	Good	Native		Long (>40 years)	Moderate		Nil	Retain and Protect
73	<i>Eucalyptus saligna</i>	Sydney Blue Gum	19.5	0.86	1.08	10.32	3.42	Mature	Good	Average	Native		Long (>40 years)	Moderate	Extensive clearance pruning to eastern side.	Nil	Retain and Protect
74	<i>Pinus radiata</i>	Monterey Pine	12.5	0.37	0.44	4.44	2.34	Semi-mature	Fair	Average	Invasive		Medium (15-40 years)	V Low / Remove		Exempt species to be removed	Remove
75	<i>Pinus radiata</i>	Monterey Pine	10.5	0.25	0.31	3.00	2.02	Semi-mature	Fair	Average	Invasive		Long (>40 years)	V Low / Remove		Exempt species to be removed	Remove
76	<i>Eucalyptus saligna</i>	Sydney Blue Gum	16.0	0.27	0.33	3.24	2.08	Semi-mature	Good	Good	Native		Long (>40 years)	Moderate		Minor incursion 10% to northern portion TPZ for construction of bin storage area.	Retain and Protect
77	<i>Leptospermum polygalifolium</i>	Tea Tree	6.5	0.26	0.42	3.12	2.30	Over-mature	Fair	Poor	Endemic		Short (5-15 years)	Low		Tree within footprint of building / other significant siteworks	Remove
78	<i>Corymbia gummifera</i>	Red Bloodwood	8.5	0.22	0.28	2.64	1.94	Mature	Fair	Poor	Endemic	Deadwood-Minor	Medium (15-40 years)	Low		Tree within footprint of building / other significant siteworks	Remove
79	<i>Acacia parramattensis</i>	Parramatta Wattle	10.5	0.17	0.23	2.04	1.79	Mature	Good	Average	Endemic		Medium (15-40 years)	Low		Tree within footprint of building / other significant siteworks	Remove
80	<i>Acacia parramattensis</i>	Parramatta Wattle	9.5	0.80	0.27	9.60	1.91	Over-mature	Fair	Poor	Endemic	Lean-Minor, Asymmetric Canopy	Medium (15-40 years)	Low		Tree within footprint of building / other significant siteworks	Remove
81	<i>Acacia parramattensis</i>	Parramatta Wattle	9.5	0.27	0.37	3.24	2.18	Over-mature	Fair	Poor	Endemic	Lean-Minor, Asymmetric Canopy	Medium (15-40 years)	Low		Tree within footprint of building / other significant siteworks	Remove
82	<i>Acacia parramattensis</i>	Parramatta Wattle	9.5	0.23	0.29	2.76	1.97	Over-mature	Fair	Poor	Endemic	Lean-Minor, Asymmetric Canopy, Pest/Disease	Short (5-15 years)	V Low / Remove		Tree within footprint of building / other significant siteworks	Remove
83	<i>Acacia parramattensis</i>	Parramatta Wattle	10.5	0.35	0.37	4.20	2.18	Mature	Good	Average	Endemic	Lean-Minor	Medium (15-40 years)	Low		Tree within footprint of building / other significant siteworks	Remove
84	<i>Corymbia gummifera</i>	Red Bloodwood	10.0	0.31	0.40	3.72	2.25	Mature	Fair	Poor	Endemic	Deadwood-Minor, Epicormic Growth	Medium (15-40 years)	Low		Tree within footprint of building / other significant siteworks	Remove
85	<i>Acacia parramattensis</i>	Parramatta Wattle	9.5	0.31	0.37	3.72	2.18	Senescent	Fair	Poor	Endemic	Lean-Minor, Asymmetric Canopy, Pest/Disease	Remove (<5 years)	V Low / Remove	Extensive borer.	Tree within footprint of building / other significant siteworks	Remove
86	<i>Acacia parramattensis</i>	Parramatta Wattle	9.5	0.00	0.00	2.00	0.00	Dead	Dead	Poor	Endemic	Asymmetric Canopy, Pest/Disease Lean-Major	Remove (<5 years)	V Low / Remove	Dead tree	Tree within footprint of building / other significant siteworks	Remove
87	<i>Acacia parramattensis</i>	Parramatta Wattle	10.5	0.17	0.22	2.04	1.75	Mature	Fair	Average	Endemic	Asymmetric Canopy	Short (5-15 years)	Low		Tree within footprint of building / other significant siteworks	Remove
88	<i>Acacia parramattensis</i>	Parramatta Wattle	10.5	0.25	0.32	3.00	2.05	Mature	Good	Average	Endemic	Asymmetric Canopy	Medium (15-40 years)	Low		Tree within footprint of building / other significant siteworks	Remove
89	<i>Acacia parramattensis</i>	Parramatta Wattle	10.5	0.26	0.34	3.12	2.10	Mature	Good	Average	Endemic	Asymmetric Canopy	Medium (15-40 years)	Low		Tree within footprint of building / other significant siteworks	Remove
90	<i>Acacia parramattensis</i>	Parramatta Wattle	9.0	0.24	0.34	2.88	2.10	Mature	Good	Average	Endemic	Asymmetric Canopy, Lean-Minor	Medium (15-40 years)	Low		Tree within footprint of building / other significant siteworks	Remove
91	<i>Acacia parramattensis</i>	Parramatta Wattle	9.0	0.17	0.26	2.04	1.88	Mature	Fair	Average	Endemic	Asymmetric Canopy, Lean-Minor	Short (5-15 years)	Low		Tree within footprint of building / other significant siteworks	Remove
92	<i>Banksia serrata</i>	Old Man Banksia	8.0	0.23	0.29	2.76	1.97	Mature	Good	Poor	Endemic	Asymmetric Canopy, Lean-Major	Medium (15-40 years)	Moderate		Tree within footprint of building / other significant siteworks	Remove
93	<i>Banksia ericifolia</i>	Heath Banksia	6.5	0.18	0.38	2.16	2.20	Mature	Good	Average	Endemic	Asymmetric Canopy, Lean-Major	Medium (15-40 years)	Moderate		Nil	Retain and Protect
94	<i>Allocasuarina littoralis</i>	Black She-Oak	8.0	0.23	0.31	2.76	2.02	Mature	Good	Good	Endemic		Medium (15-40 years)	Moderate		Nil	Retain and Protect
95	<i>Banksia ericifolia</i>	Heath Banksia	7.0	0.20	0.25	2.40	1.85	Mature	Good	Average	Endemic		Medium (15-40 years)	Moderate		Poor tree, removed for APZ and landscape amenity.	Remove
96	<i>Araucaria heterophylla</i>	Norfolk Island Pine	17.0	0.44	0.56	5.28	2.59	Mature	Good	Good	Exotic		Long (>40 years)	High	Growing at edge of driveway, otherwise good tree.	Minor pathway work. Minor impacts only	Retain and Protect
97	<i>Glochidion ferdinandi</i>	Cheese Tree	9.0	0.60	0.60	7.20	2.67	Mature	Good	Good	Endemic		Long (>40 years)	High		Minor pathway work. Minor impacts only	Retain and Protect
98	<i>Callistemon salignus cv.</i>	Willow Bottlebrush	8.0	0.36	0.72	4.32	2.88	Mature	Fair	Average	Native	Co-dominant Stems	Long (>40 years)	Low	Multi-trunked from base.	Minor pathway work. Minor impacts only	Retain and Protect
99	<i>Populus nigra 'Italica'</i>	Lombardy Poplar	20.0	1.00	1.10	12.00	3.44	Mature	Good	Average	Exotic		Medium (15-40 years)	Low	Prominent tree. Disturbance to base could cause suckering.	Exempt species to be removed	Remove
100	<i>Populus nigra 'Italica'</i>	Lombardy Poplar	18.0	0.44	0.52	5.28	2.51	Mature	Good	Average	Exotic		Medium (15-40 years)	Low	Could be sucker from larger specimen nearby.	Exempt species to be removed	Remove
101	<i>Populus nigra 'Italica'</i>	Lombardy Poplar	12.0	0.19	0.25	2.28	1.85	Mature	Good	Average	Exotic		Long (>40 years)	Low	Could be sucker from larger specimen nearby.	Exempt species to be removed	Remove
102	<i>Pittosporum undulatum</i>	Sweet Pittosporum	7.0	0.12	0.16	2.00	1.53	Mature	Poor	Poor	Endemic		Medium (15-40 years)	Low	Poor quality tree.	Tree within footprint of building / other significant siteworks	Remove
103	<i>Olea europaea subsp. europea</i>	European Olive	6.0	0.24	0.29	2.88	1.97	Mature	Good	Average	Exotic		Long (>40 years)	Low		Tree within footprint of building / other significant siteworks	Remove
104	<i>Leptospermum petersonii</i>	Lemon Scented Tea Tree	4.0	0.09	0.11	2.00	1.31	Mature	Poor	Average	Native		Short (5-15 years)	Low		Tree within footprint of building / other significant siteworks	Remove
105	<i>Callistemon sp.</i>	Bottlebrush	4.0	0.08	0.18	2.00	1.61	Senescent	Poor	Poor	Native	Cracks/Splits, Tip Dieback	Long (>40 years)	V Low / Remove	Poor condition.	Tree within footprint of building / other significant siteworks	Remove
106	<i>Leptospermum petersonii</i>	Lemon Scented Tea Tree	5.0	0.13	0.22	2.00	1.75	Mature	Poor	Average	Native		Long (>40 years)	Low		Tree within footprint of building / other significant siteworks	Remove
107	<i>Callistemon viminalis cv.</i>	Weeping Bottlebrush	5.5	0.15	0.22	2.00	1.75	Mature	Good	Average	Native		Medium (15-40 years)	Low		Tree within footprint of building / other significant siteworks	Remove

4.2 T-02 & T-03 - Tree Protection and Removal Plans

TREE PROTECTION SPECIFICATIONS

1. Tree Protection Measures and Protocols.

All work around existing trees to be retained shall be in accordance with AS 4970-2009 Protection of trees on development sites with the clear establishment of the required Tree Protection Zones (TPZ's). If the scope of work allowed within or the extent of the Tree Protection Zones of existing trees is not clear, please refer to the Contract Manager or Project Consulting Arborist for clarification.

Before any site works commence tree protection zones and other measures must be established and conveyed to those all working on the site. The Contractor shall ensure all subcontractors are inducted prior to working on the site. All inductions shall include description and identification of the Tree Protection Zones and the restriction on work and activities with regard to trees.

Damage to roots or degradation of the soil through compaction and/or excavation within TPZ's is likely to cause serious damage to the tree. Any work operations required within TPZ's must be carried out with extreme care. All trees, palms and other shrubs within TPZ's are to be retained unless shown otherwise on the Tree Protection Plan(s). Trees marked for retention shall not be used to display signage, or as fence or cable supports for any reason. No materials stockpiling, chemicals or washout areas are permitted immediately upslope of or within the Tree Protection Zone. The washing down of wheel barrows, paint cans/brushes, acids and the like shall not be done near existing trees as the runoff is very harmful to tree roots.

No fuel powered pumps or generators or air compressors are to be placed within TPZ's. No fuel or chemicals shall be stored and no equipment or vehicles shall be serviced or re-fuelled within a TPZ.

2. Controlled Construction Access

Construction access points, stockpiling and storage areas shall be clearly identified on site and fenced off where appropriate. Uncontrolled access and parking of vehicles inside TPZ's shall be avoided. If access is required through a tree protection zone, the access way shall be treated with ground protection.

3. Tree Protection Fencing & Signage

The Tree Protection Plan(s) shows the extent of areas to be fenced and protected. Protection measures shall be certified as adequate by the Project Consulting Arborist. This fencing may form part of the general construction site fencing, where practical. It shall remain in place as long as possible and typically not be removed until the final landscape installation in those areas begins.

All tree protection fencing shall be 1800mm high galvanised chain wire or welded steel mesh. Fencing must be bolted together and secured with the necessary back stays and bracing.

Star pickets with bunting or danger tape shall not constitute acceptable tree protection fencing.

Suitable signage as defined by AS 4970-2009 Appendix C shall be affixed to the external side of the fencing at a spacing of not less than 1 sign per 20 lineal metres of fence.

If fence locations conflict with the proposed works, contact the Project Consulting Arborist and Contract Manager for resolution. No new services (unless under-bored) shall be located within or through the Tree Protection Zone.

4. Trunk and Lower Branch Protection

A trunk barrier is to be erected around the circumference of the tree trunk and root buttress where shown. This barrier will consist of a double layer of used carpet or carpet underfelt placed around the trunk. A layer of battens is to be placed over the underfelt. The battens are to have a maximum spacing of 50mm. The height of the battens is to be 2 metres or to the height of the first branches. Lower large branches may require the same protection if likely to be damaged by passing vehicles or equipment. Secure in place with galvanised steel bracing straps. Do not nail into or otherwise injury the trunk or bark. Battens may be made from any suitable waste timber of similar sizes and depths. All sharp or protruding edges are to be properly covered with tape or similar padding.



Example image of acceptable ground protection rumble boards

5. Works within the TPZ

All work within the root zone of existing trees shall be undertaken with the utmost care. If by necessity a tree requires removal of branches for building or access, pruning shall be done in strict accordance with accepted arboriculture techniques and AS 4373-2007. No rubbish, spoil or new materials shall be placed on the root zone of any existing tree or against their trunks.

6. Ground Protection

If it is proposed to create any access route, or similar, within the TPZ of a retained tree, the Contractor shall install rumble boards over the TPZ ground surface. No excavation shall be allowed. Contractor shall first place a suitable permeable geotextile to the extent required and then a 100mm thick layer of wood chip mulch or coarse no-fines gravel over the extent to be covered. Then place hardwood boards (minimum 3600 x 200 x 75mm) on their flat edge, side by side, with a 30 - 50mm gap to form a rumble strip. These boards are to be held together with three galvanised metal bracing straps nailed to each board. The two outer straps are to be approximately 200mm in from the ends of the boards. The third strap is to be along the centre line of the boards.

7. Provision of Temporary Irrigation

A temporary and automated (battery powered timer is sufficient) watering system to be placed within the TPZs of all trees to maintain adequate water to the retained trees and help maintain their healthy condition. This shall be a surface mounted 'residential-style' soaker hose and/or similar surface sprinkler systems. It is to be surface visible and spray delivered so that is operation can be easily visible and verified. It should be on a designated supply line, separate from other construction related water supplies to minimise its likelihood of being disconnected.

Typically, during spring and summer months it should be set to run for a minimum of 30 minutes every day, in the early morning. During, autumn and winter months it should be set to run for 1 hour once every week. The operation can be suspended temporarily in periods of extensive and prolonged rain.

The system is to remain in place for the duration of construction, or until the project consulting arborist approves it's removal. It may be removed to allow final landscape treatments to proceed. If accidentally disturbed or damaged by construction activities, it is to be reinstated as soon as practicable.

8. Structural Demolition Within TPZ's

Project Consulting Arborist shall be on site during all demolition work within the TPZ's to monitor and advise on tree protection. Secateurs and a handsaw shall be available to deal with and cleanly cut any exposed roots that have to be cut. Machines with a long reach may be used if they can work from outside TPZ's or from protected areas within TPZ's. They shall not encroach onto unprotected soil in TPZ's.

Debris to be removed from TPZ's must be moved across existing hard surfacing or temporary ground protection in a way that prevents compaction and disturbance of soil. Alternatively, it can be lifted out by machines provided this does not disturb TPZ's or damage the canopy. If appropriate, leave below ground structures such as footings and disused pipes in place if their removal will cause excessive root disturbance.

When pulling up existing paving the Contractor shall work backwards, lifting demolished paving back onto the existing paving. Roots may be found growing under the pavement and should not be trafficked. Roots growing into existing sub-base should be left and new surface finishes placed over the top without disturbance.

9. Excavations or Trenching within TPZ's

Excavation within TPZ's shall not be allowed using mechanical equipment such as excavators or backhoes. Excavation within TPZ's shall only be carried out carefully by hand taking care not to damage the bark and wood of any roots. Specialist tools for removing soil around roots using compressed air (air spade), or water vacuum extraction shall be an appropriate alternative to hand digging and is the preferred method.



Example image of acceptable tree protection tree protection battens

Exposed roots to be removed shall be cut cleanly with a sharp saw or secateurs at the face of the excavation. Roots temporarily exposed must be protected by appropriate covering with damp hessian or sand. Roots greater than 50mm in diameter are to be retained and shall only be cut in exceptional circumstances and only after consultation with the Project Consulting Arborist. Roots greater than 100mm in diameter shall typically not be allowed to be cut and must be worked around.

10. Soft Landscaping Installation

Final trimming and planting shall be judiciously undertaken around trees. All soft landscaping within the tree protection zones will be installed with care to avoid root disturbance from irrigation trenching, lighting installation and the planting of larger plants. Permanent irrigation (if used) shall be installed as spray heads located outside of TPZ's and spraying inwards. All other services such as small-scale electrical services shall also be designed and installed to avoid any excavation or trenching around the trees.

No significant excavation or cultivation, especially by rotary hoes or excavators, shall occur within TPZs. Where new designs require the levels to be increased, good quality and permeable top soil shall be used. It should be firmed into place but not over compacted. All areas close to tree trunks shall be kept at the original ground level. Where turf is to be installed tree trunks shall have mulched rings applied rather than grass laid up to the trunk.

The size of the installed plants shall typically be less than 5L pots so that the maximum depth of the new root balls is less than 200mm. Any planting proposed that is larger than this shall be only installed outside of the SRZ and with care to not injure roots while digging planting holes.

11. Canopy Pruning

The Contractor shall prune branches of protected trees only as directed by the Project Consulting Arborist. Pruning is only to be undertaken by a qualified arborist (under the supervision of a person with AQF Level 4 or above). The Project Consulting Arborist is to be at present at all times during the pruning work. Work is to be in strict accordance with to AS4373 Pruning of Amenity Trees. Do not treat wounds.

12. Root Pruning

Pruning of roots of protected trees shall only be as directed the Project Consulting Arborist. The Tree Contractor shall use only a qualified arborist (AQF Level 4 or above). The Project Consulting Arborist is to be present at all times during the root pruning.

Roots are not to be cut using normal excavation machinery of any sort. This usually results in splitting and massive disturbance well past the intended line of cut. When required to cut roots, use hand methods and sharp hand tools (e.g. secateurs, hand saw) such that the remaining root systems are preserved intact and undamaged. Roots are to be cut back by hand square to the direction of the root travel (or edge of the excavation). Do not cut any tree roots exceeding 40mm diameter unless permitted. Excavations within root zones should be kept open for as short a period as possible. Any excavated face containing roots is to be temporarily supported, where necessary, to prevent soil loss from around the other retained roots.

13. Accidental Tree Damage

Should a tree be accidentally damaged, the Contractor shall immediately notify the Project Consulting Arborist. Timing can be of the essence, particularly with bark injuries, trunk damage or chemical contaminations.

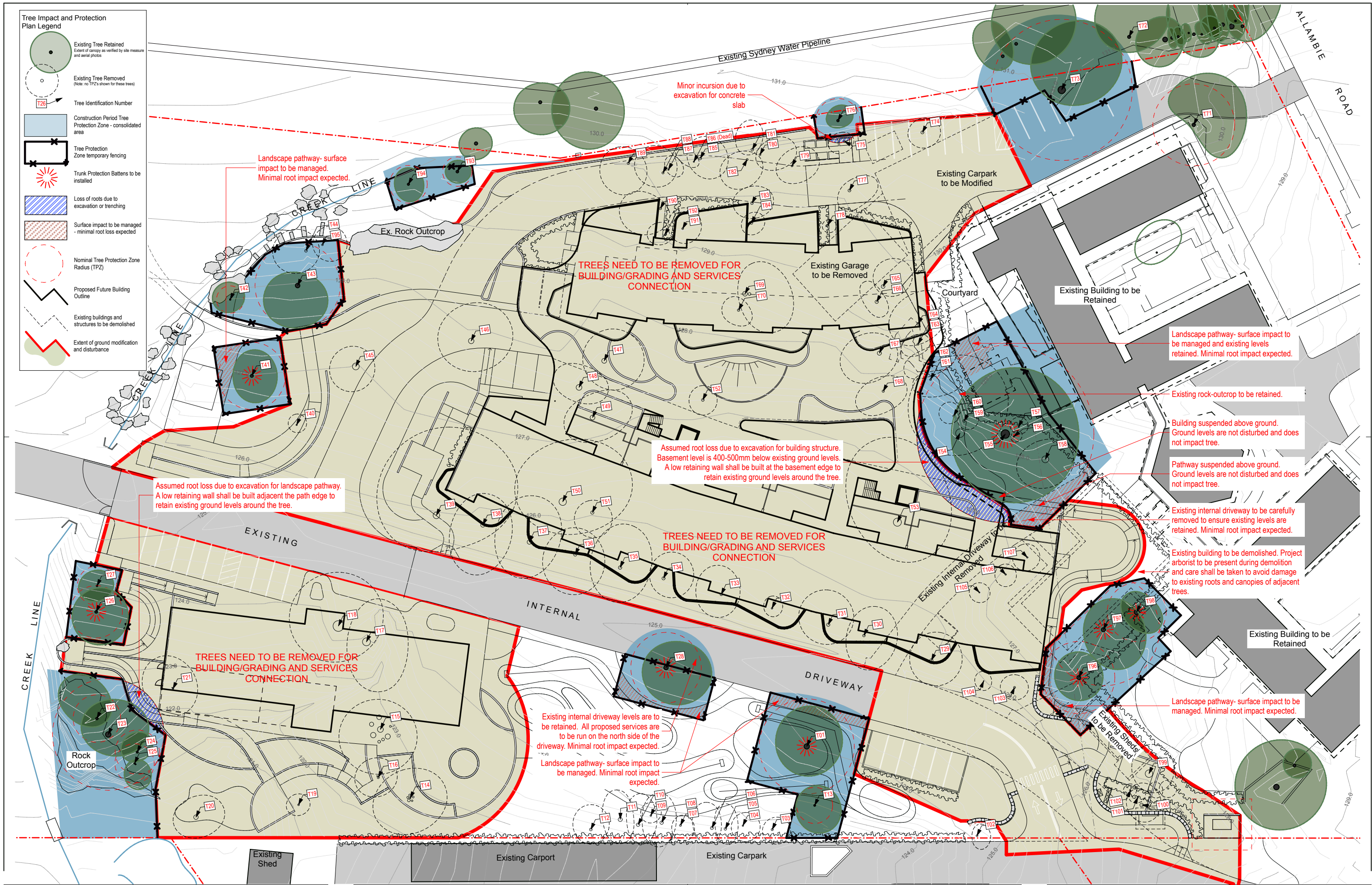
If a branch has been broken, it shall be removed and the damaged end pruned to a suitable branch collar. If the branch has been torn out of the trunk, assessment shall be made and the damage cleaned up by as much as possible without further damage to the tree.

If roots are accidentally disturbed or excavated, any broken, crushed and torn sections shall be exposed and pruned leaving clean cuts to minimise risk of infection by fungal pathogens and promote good conditions for new root growth.



Example image of acceptable tree protection fencing measures to be applied. (1.8m high rigid metal fencing with appropriate lateral bracing)

Allambie Heights Village Project 2 - Tree Impact Assessment Schedule									
Tree ID	Tree Species	Common Name	Trunk Diameter at Breast Height (dbh) (m)	Trunk Diameter at base (dgb) (m)	Nominal TPZ radius (m) 12dbh (AS 4970)	Nominal SRZ radius (m) (AS 4970)	Retention Value	Recommendation	
1	Pinus canariensis	Canary Pine	0.58	0.77	6.96	2.97	Moderate	Retain and Protect	
2	Pinus canariensis	Canary Pine	0.17	0.27	2.04	1.91	Low		Remove
3	Pinus canariensis	Canary Pine	0.22	0.31	2.64	2.02	Low	Remove	
4	Pinus canariensis	Canary Pine	0.15	0.22	2.00	1.75	Low	Remove	
5	Pinus canariensis	Canary Pine	0.27	0.37	3.24	2.18	Low	Remove	
6	Pinus canariensis	Canary Pine	0.35	0.43	4.20	2.32	Low	Remove	
7	Pinus canariensis	Canary Pine	0.25	0.30	3.00	2.00	Low	Remove	
8	Pinus canariensis	Canary Pine	0.39	0.50	4.68	2.47	Low	Remove	
9	Pinus canariensis	Canary Pine	0.18	0.23	2.16	1.79	Low	Remove	
10	Pinus canariensis	Canary Pine	0.39	0.50	4.68	2.47	Low	Remove	
11	Pinus canariensis	Canary Pine	0.40	0.59	4.80	2.65	Low	Remove	
12	Pinus canariensis	Canary Pine	0.31	0.39	3.72	2.23	Low	Remove	
13	Callistemon viminalis cv.	Weeping Bottlebrush	0.22	0.25	2.64	1.85	Moderate	Retain and Protect	
14	Erythrina x sykesii	Coral Tree	0.37	1.20	4.44	3.57	V Low / Remove		Remove
15	Erythrina x sykesii	Coral Tree	0.49	5.00	5.88	6.51	V Low / Remove	Remove	
16	Ligustrum sinense	Narrow-leaf Privet	0.22	0.50	2.64	2.47	V Low / Remove	Remove	
17	Erythrina x sykesii	Coral Tree	0.92	1.15	11.04	3.51	V Low / Remove	Remove	
18	Erythrina x sykesii	Coral Tree	0.88	1.55	10.56	3.98	V Low / Remove	Remove	
19	Banksia ericifolia	Heath Banksia	0.25	0.25	3.00	1.85	Low	Remove	
20	Salix sp.	Willow	0.65	0.65	7.80	2.76	V Low / Remove	Remove	
21	Allocasuarina littoralis	Black She-Oak	0.25	0.35	3.00	2.13	Low	Remove	
22	Angophora costata	Smooth-barked Apple	0.29	0.35	3.48	2.13	High	Retain and Protect	
23	Eucahyptus punctata	Grey Gum	0.68	0.80	8.16	3.01	Moderate		Retain and Protect
24	Angophora costata	Smooth-barked Apple	0.27	0.29	3.24	1.97	High	Retain and Protect	
25	Eucahyptus punctata	Grey Gum	0.24	0.35	2.88	2.13	Moderate		Retain and Protect
26	Eucahyptus punctata	Grey Gum	0.32	0.40	3.84	2.25	High	Retain and Protect	
27	Persea levei	Broad-leaved Gueezung	0.24	0.24	2.88	1.62	High		Retain and Protect
28	Eucahyptus saligna	Sydney Blue Gum	0.43	0.63	5.16	2.73	High	Retain and Protect	
29	Eucahyptus robusta	Swamp Mahogany	0.40	0.47	4.80	2.41	Moderate		Remove
30	Eucahyptus botryoides	Bangalay	0.29	0.37	3.48	2.18	Moderate	Remove	
31	Eucahyptus botryoides	Bangalay	0.36	0.47	4.32	2.41	Moderate	Remove	
32	Eucahyptus robusta	Swamp Mahogany	0.19	0.24	2.28	1.82	Low	Remove	
33	Eucahyptus botryoides	Bangalay	0.29	0.35	3.48	2.13	Moderate	Remove	
34	Eucahyptus botryoides	Swamp Mahogany	0.38	0.46	4.56	2.39	Moderate	Remove	
35	Eucahyptus botryoides	Bangalay	0.42	0.50	5.04	2.47	Moderate	Remove	
36	Eucahyptus botryoides	Bangalay	0.40	0.46	4.80	2.39	Moderate	Remove	
37	Eucahyptus robusta	Swamp Mahogany	0.51	0.64	6.12	2.74	Moderate	Remove	
38	Eucahyptus botryoides	Bangalay	0.50	0.62	6.00	2.71	Moderate	Remove	
39	Eucahyptus robusta	Swamp Mahogany	0.84	0.96	10.08	3.25	High	Remove	
40	Michelia champaca	Champaca	0.17	0.20	2.04	1.68	V Low / Remove	Remove	
41	Corymbia gummifera	Red Bloodwood	0.41	0.44	4.92	2.34	Moderate	Retain and Protect	
42	Eucahyptus saligna	Sydney Blue Gum	0.14	0.20	2.00	1.68	Moderate		Retain and Protect
43	Eucahyptus saligna	Sydney Blue Gum	0.52	0.66	6.24	2.78	Low	Retain and Protect	
44	Corymbia gummifera	Red Bloodwood	0.35	0.39	4.20	2.23	Low		Remove
45	Corymbia gummifera	Red Bloodwood	0.42	1.00	5.04	3.31	Moderate	Remove	
46	Eucahyptus haemastoma	Scribbly Gum	0.80	0.80	9.60	3.01	Low	Remove	
47	Pinus radiata	Monterey Pine	0.62	0.72	7.44	2.88	V Low / Remove	Remove	
48	Pinus radiata	Monterey Pine	0.68	0.83	8.16	3.06	V Low / Remove	Remove	
49	Pinus radiata	Monterey Pine	0.63	0.70	7.56	2.85	V Low / Remove	Remove	
50	Pinus radiata	Monterey Pine	0.95	1.08	11.40	3.42	Low	Remove	
51	Pittosporum undulatum	Sweet Pittosporum	0.28	0.47	3.36	2.41	Low	Remove	
52	Morus nigra	Mulberry	0.20	0.40	2.40	2.25	V Low / Remove	Remove	
53	Populus deltoides	American Cottonwood	0.95	1.18	11.40	3.55	Low	Remove	
54	Eucahyptus saligna	Sydney Blue Gum	1.25	1.25	15.00	3.63	Low	Remove	
55	Eucahyptus saligna	Sydney Blue Gum	1.13	1.24	13.56	3.62	High	Retain and Protect	
56	Pittosporum undulatum	Sweet Pittosporum	0.18	0.19	2.16	1.65	Low		Remove
57	Pittosporum undulatum	Sweet Pittosporum	0.12	0.18	2.00	1.61	Low	Remove	
58	Ligustrum vulgare?	Privet	0.26	1.00	3.12	3.31	V Low / Remove	Remove	
59	Ligustrum lucidum	Broadleaf Privet	0.31	0.37	2.52	1.98	V Low / Remove	Remove	
60	Acacia paramattensis	Parramatta Wattle	0.23	0.27	2.76	1.91	Low	Remove	
61	Eucahyptus saligna	Sydney Blue Gum	0.22	0.28	2.64	1.94	Low	Remove	
62	Pittosporum undulatum	Sweet Pittosporum	0.17	0.32	2.04	2.05	V Low / Remove	Remove	
63	Acacia paramattensis	Parramatta Wattle	0.22	0.30	2.64	2.00	Low	Remove	
64	Acacia paramattensis	Parramatta Wattle	0.25	0.37	3.00	2.18	Low	Remove	
65	Pinus radiata	Monterey Pine	0.45	0.54	5.40	2.55	Low	Remove	
66	Pinus radiata	Monterey Pine	0.43	0.47	5.16	2.41	Low	Remove	
67	Pinus radiata	Monterey Pine	0.55	0.59	6.60	2.65	V Low / Remove	Remove	
68	Lophosolen confertus	Brush Box	0.27	0.33	3.24	2.08	Low	Remove	
69	Eucahyptus haemastoma	Scribbly Gum	0.48	1.20	5.76	3.57	Moderate	Remove	
70	Corymbia gummifera	Red Bloodwood	0.24	0.35	2.88	2.13	Low	Remove	
71	Glochidion ferdinandi	Cheese Tree	0.50	0.50	6.00	2.47	High	Retain and Protect	
72	Eucahyptus saligna	Sydney Blue Gum	0.37	0.44	4.44	2.34	Moderate		Retain and Protect
73	Eucahyptus saligna	Sydney Blue Gum	0.86	1.08	10.32	3.42	Moderate	Retain and Protect	
74	Pinus radiata	Monterey Pine	0.37	0.44	4.44	2.34	V Low / Remove		Remove
75	Pinus radiata	Monterey Pine	0.25	0.31	3.00	2.02	V Low / Remove	Remove	
76	Eucahyptus saligna	Sydney Blue Gum	0.27	0.33	3.24	2.08	Moderate	Retain and Protect	
77	Leptospermum polygalifolium	Tea Tree	0.26	0.42	3.12	2.30	Low		Remove
78	Corymbia gummifera	Red Bloodwood	0.22	0.28	2.64	1.94	Low	Remove	
79	Acacia paramattensis	Parramatta Wattle	0.17	0.23	2.04	1.79	Low	Remove	
80	Acacia paramattensis	Parramatta Wattle	0.80	0.27	9.60	1.91	Low	Remove	
81	Acacia paramattensis	Parramatta Wattle	0.27	0.37	3.24	2.18	Low	Remove	
82	Acacia paramattensis	Parramatta Wattle	0.23	0.29	2.76	1.97	V Low / Remove	Remove	
83	Acacia paramattensis	Parramatta Wattle	0.35	0.37	4.20	2.18	Low	Remove	
84	Corymbia gummifera	Red Bloodwood	0.31	0.40	3.72	2.25	Low	Remove	
85	Acacia paramattensis	Parramatta Wattle	0.31	0.37	3.72	2.18	V Low / Remove	Remove	
86	Acacia paramattensis	Parramatta Wattle	0.00	0.00	2.00	0.00	V Low / Remove	Remove	
87	Acacia paramattensis	Parramatta Wattle	0.17	0.22	2.04	1.75	Low	Remove	
88	Acacia paramattensis	Parramatta Wattle	0.25	0.32	3.00	2.05	Low	Remove	
89	Acacia paramattensis	Parramatta Wattle	0.26	0.34	3.12	2.10	Low	Remove	
90	Acacia paramattensis	Parramatta Wattle	0.24	0.34	2.88	2.10	Low	Remove	
91	Acacia paramattensis	Parramatta Wattle	0.17	0.26	2.04	1.88	Low	Remove	
92	Banksia serrata	Old Man Banksia	0.23	0.29	2.76	1.97	Moderate	Remove	
93	Banksia ericifolia	Heath Banksia	0.18	0.38	2.16	2.20	Moderate	Retain and Protect	
94	Allocasuarina littoralis	Black She-Oak	0.23	0.31	2.76	2.02	Moderate		Retain and Protect
95	Banksia ericifolia	Heath Banksia	0.20	0.25	2.40	1.85	Moderate	Remove	
96	Arctostaphylos heterophylla	Norfolk Island Pine	0.44	0.56	5.28	2.59	High	Retain and Protect	
97	Glochidion ferdinandi	Cheese Tree	0.60	0.60	7.20	2.67	High		Retain and Protect
98	Callistemon salignus cv.	Willow Bottlebrush	0.36	0.72	4.32	2.88	Low	Retain and Protect	
99	Populus nigra 'Italica'	Lombardy Poplar	1.00	1.10	12.00	3.44	Low		Remove
100	Populus nigra 'Italica'	Lombardy Poplar	0.44	0.52	2.58	2.51	Low	Remove	
101	Populus nigra 'Italica'	Lombardy Poplar	0.19	0.25	2.28	1.85	Low	Remove	
102	Pittosporum undulatum	Sweet Pittosporum	0.12	0.16	2.00	1.53	Low	Remove	
103	Olea europaea subsp. europaea	European Olive	0.24	0.29	2.88	1.97	Low	Remove	
104	Leptospermum petersoni	Lemon Scented Tea Tree	0.09	0.11	2.00	1.31	Low	Remove	
105	Callistemon sp.	Bottlebrush	0.08	0.18	2.00	1.61	V Low / Remove	Remove	
106	Leptospermum petersoni	Lemon Scented Tea Tree	0.13	0.22	2.00	1.75	Low	Remove	
107	Callistemon viminalis cv.	Weeping Bottlebrush	0.15	0.22	2.00	1.75	Low	Remove	



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NOTE
Refer to the accompanying Arboricultural Impact Assessment Report for full description of trees, measurements and methods used to assess the trees, and proposed tree protection measures. Refer to T-02 for tree protection specifications and schedule.

A For Authority Approval / DA
REVISION DESCRIPTION
RWVS 13/06/18
CHKD DATE

PROJECT & CLIENT
Allambie Heights Village - Project 2

Allambie Heights Village Ltd.
DRAWING NUMBER
Tree Protection & Removal Plan

Project No : 18.11
Designed : CLB
Drawn : CLB
Scale : 1:250@A1/1:500@A3
DRAWING NUMBER
T-03
REVISION
A
Plotted at : 3:38 pm 12/6/18