EARTHSCAPE HORTICULTURAL SERVICES
Arboricultural, Horticultural and Landscape Consultants

ABN 36 082 126 027

ARBORICULTURAL ASSESSMENT REPORT

PROPOSED STAGE 1 WORKS

LORETO NORMANHURST
91-93 PENNANT HILLS ROAD, NORMANHURST

January 2019

Prepared for: Loreto Normanhurst
c/- Allen Jack + Cottier
79 Myrtle Street
CHIPPENDALE NSW 2008

Ph:- 02 9311 8222

Prepared by: Andrew Morton
Dip. (Arboriculture) [AQF Level 5]
B. App. Sci. (Horticulture)
A. Dip. App. Sci. (Landscape)

EARTHSCAPE HORTICULTURAL SERVICES
Ph: - 0402 947 296

Member of Arboriculture Australia
Member International Society of Arboriculture - Australian Chapter (ISAAC)
Member Local Government Tree Resources Association (LGTRA)

PO Box 364, BEROWRA NSW 2081
Ph: (02) 9456 4787 Mobile: 0402 947 296 Fax: (02) 9456 5757
Email: earthscape@iinet.net.au

TABLE OF CONTENTS

1 INTRODUCTION

1.1.1 This report was commissioned by Allen Jack + Cottier (AJ+C) on behalf of Loreto Normanhurst to assess the health and condition of approximately one-hundred and twenty-seven (127) trees within Loreto Normanhurst School (91-93 Pennant Hills Road, Normanhurst) located in the vicinity of the proposed 'Detailed Stage 1 Works' forming part of a State Significant Development Application (SSDA). The extent of the Stage 1 Area is indicated in **Figure 1**.

1.1.2 This report follows a previous Arboricultural Assessment Report for the whole of the site prepared by Earthscape [Version 2] dated 15th December 2018.

1.1.3 This report supports a SSDA submitted to the Department of Planning and Environment (DPE) pursuant to Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). This application is SSD by way of clause 8 and schedule 1 under *State Environmental Planning Policy (State and Regional Development) 2011* on the basis that the development is for the purpose of an existing school and has a Capital Investment Value of more than $20 million.

1.1.4 Specifically, this application relates to a staged SSDA within the meaning of Section 4.12 of the EP&A Act, with this application being the Concept Proposal for a new site wide masterplan for the existing Loreto Normanhurst School. In addition, consent is also sought for the Stage 1 detailed design works for a new on campus student boarding facility, landscaping works, and some demolition works to the buildings between Mary Ward and existing dining room building and associated works to make good existing. This report has been prepared having regard to the Secretary's Environmental Assessment Requirements issued for the project by DPE, ref no SEAR 8996 issued on 12 January 2018.

1.1.5 The 'Detailed Stage 1 Works', include:

- Construction of a new 3 to 6-storey boarding house to accommodate up to 216 boarders;
- Excavation works to accommodate partially underground carpark and dock facilities within the proposed footprint of the new boarding house facility;
- Demolition works to buildings between Mary Ward and existing dining room building and associated works to make good existing;
- Landscaping works and removal and replacement of approximately 50 trees of varying significance; and
- Augmentation of connection of services and utilities infrastructure.

1.1.6 The purpose of this report is to assess the potential impact of the proposed Detailed Stage 1 Works on the subject trees, together with recommendations for amendments to the design or construction methodology where necessary to minimise any adverse impact. The report also provides recommended tree protection measures to ensure the long-term preservation of the trees to be retained where appropriate.

1.1.7 This report has been prepared in accordance with Hornsby Council's *Arboricultural (Tree) Report Guidelines* (March 2016), Section 11 of Councils *Development Application Submission Guideline 2013* and Sections 2.3.2-2.3.5 of the Australian Standard for *Protection of Trees on Development Sites* (AS 4970:2009).

Figure 1 – Showing the Stage 1 Area relative to the site

2 THE SITE

2.1.1 The subject property is comprised of a number of allotments as outlined in the following table:-

Address	Lot	Plan
16 Mount Pleasant Avenue	Lot 5	DP 1218765
	Lot 16	DP 6612
30 – 62 Mount Pleasant Avenue	Lots 20 – 23 and 25 – 36	DP 6612
	Lot 1	DP 34834
91 – 93 Pennant Hills Road	Lot 1	DP 114580
	Lot 3	DP 1217496
	Lot 1 – Lot 3	DP 1218765
	Lot B	DP327538
24 – 28 Mount Pleasant Avenue	Lot 1	DP 809066
6 Mount Pleasant Avenue	Lot C	DP 366271
14 Mount Pleasant Avenue	Lot 4	DP1218765
89 Pennant Hills Road	Lot 1	DP136156

2.1.2 For the purposes of this report, the subject allotments will be referred to as 'the site'. The total area of the site is approximately 13.02 hectares. The site is zoned Low Density Residential [R2] under the *Hornsby Local Environmental Plan 2013* (HLEP). The site contains a number of buildings and facilities, on-grade car parking areas, extensive lawns and gardens, hard courts and playing fields comprising the School, together with a large bushland area in the southern portion of the site (not included in this assessment). The site has a moderate south-westerly gradient with a number of terraced areas. The site contains a large number of mature and semi-mature trees. These include a variety of locally-indigenous, non-local native and exotic (introduced) species.

2.1.3 The proposed Boarding House is primarily located within Lot 1 in DP 809066 (24-28 Mount Pleasant Street, Normanhurst) and the adjoining allotments to the south (Lots 20, 21 & 22 in DP 6612), all forming part of the School grounds (91-93 Pennant Hills Road). 24-28 Mount Pleasant Street contains two existing single storey dwellings, the School Uniform Shop and a portion of the Aquatic Centre. The adjoining allotments (to the south) contain a level grassed playing field, with a steep embankment to the east of the field adjoining the eastern site boundary. The areas surrounding the dwellings contain established lawns and gardens, typical of the surrounding residential properties, with a variety of exotic, non-local native tree species. The embankment along the eastern boundary within Lots 20, 21 & 22 contains a variety of predominantly non-local native tree species and some locally indigenous species, all of which appear to have been planted within the site.

2.1.4 The soils of this area are typical of the Glenorie Soil Landscape Group (as classified in the *Soil Landscapes of the Sydney 1:100,000 Sheet*), consisting of "shallow to moderately deep (less than 1000mm) *Red Podzolic Soils* on crests, moderately deep (700 – 1500 mm) *Red & Brown Podzolic Soils* on upper slopes and deep (greater than 2000mm) *Yellow Podzolic Soils* on lower slopes*".* Soil materials are derived from Wianamatta shales. The landscape of the area generally consists of undulating to rolling low hills with slopes of 5-20%.[1]

2.1.5 The original vegetation of this area consisted of tall open forest (Blue Gum High Forest) which was progressively logged for timber-getting from early in the nineteenth century then cleared for

agricultural use (mainly orchards and market gardens) and later for residential development.[2] The dominant locally-indigenous tree species found in this area include *Eucalyptus saligna* (Sydney Blue Gum) and *Eucalyptus pilularis* (Blackbutt). Other species occurring in this vegetation community may include *Syncarpia glomulifera* (Turpentine), *Eucalyptus paniculata* (Grey Ironbark), *Angophora floribunda* (Rough Barked Apple), *Eucalyptus acmenoides* (White Mahogany), *Angophora costata* (Sydney Red Gum), *Eucalyptus resinifera* (Red Mahogany) and *Allocasuarina torulosa* (Forest Oak).

3 SUBJECT TREES

3.1.1 The subject trees were inspected by Earthscape Horticultural Services (EHS) on the 10th July 2018. Each tree has been provided with an identification number for reference purposes denoted on the attached Tree Location Plan (**Appendix 5**), based on the survey prepared by Lockley Land Title Solutions, Dwg. Ref No. 44200DT [B] dated 18/06/2018. The numbers used on this plan correlate with the Tree Assessment Schedule (**Appendix 3**). Tree No.s T148a, T148b, T151a, T154a, T190a, T190b, T195a, T195b, T196a, T196b, T196d, T203a, T206a and T600-T606 were not shown on the original survey and have been plotted on the drawing in their approximate positions.

4 HEALTH AND CONDITION ASSESSMENT

4.1 Methodology

4.1.1 An assessment of each tree was made using the Visual Tree Assessment (VTA) procedure.[3] All of the trees were assessed in view from the ground. No aerial inspection or diagnostic testing has been undertaken as part of this assessment.

4.1.2 The following information was collected for each tree:-

- Tree Species (Botanical & Common Name);
- Approximate height;
- Canopy spread; measured using a metric tape and an average taken.
- Trunk diameter (measured at 1.4 metres from ground level);
- Live Crown Size; (measured by subtracting the total height of the tree from the lowest point of the crown and multiplying by the average crown spread to give a value in square metres).
- Health & vigour; using foliage size, colour, extension growth, presence of disease or pest infestation, canopy density, presence of deadwood, dieback and epicormic growth as indicators,
- Condition; using visible evidence of structural defects, instability, evidence of previous pruning and physical damage as indicators.
- Suitability of the tree to the site and its existing location; in consideration of damage or potential damage to services or structures, available space for future development and nuisance issues.

4.1.3 This information is presented in a tabulated form in **Appendix 3**.

4.2 Safe Useful Life Expectancy (SULE)

4.2.1 The remaining Safe Useful Life Expectancy[4] of the tree is an estimate of the sustainability of the tree in the landscape, calculated based on an estimate of the average age of the species in an urban area, less its estimated current age. The life expectancy of the tree has been further modified where necessary in consideration of its current health and vigour, condition and suitability to the site. The estimated SULE of each tree is shown in **Appendix 3.**

4.2.2 The following ranges have been allocated to each tree:-

- Greater than 40 years (Long)

- Between 15 and 40 years (Medium)
- Between 5 and 15 years (Short)
- Less than 5 years (Transient)
- Dead or immediately hazardous (defective or unstable)

4.2.1 SULE ratings are intended to provide a general overview of the long term sustainability of the trees within the site in consideration of these factors. The allocated ranges are not intended to be absolute. This information is useful in guiding future planning by highlighting the probable lifespan of individual trees, for which a clear pattern may emerge. This information may be helpful in forecasting likely tree senescence and planning for replacement planting to ensure continuity in tree canopy across the site. It should be noted that SULEs *may* be extended or reduced depending on the way trees are managed. Intervention and remedial works may extend the SULE of some trees.

5 LANDSCAPE SIGNIFICANCE

5.1 Methodology for Determining Landscape Significance

5.1.1 The significance of a tree in the landscape is a combination of its environmental, heritage and amenity values. Whilst these values may be fairly subjective and difficult to assess consistently, some measure is necessary to assist in determining the retention value of each tree. To ensure a consistent approach, the assessment criteria shown in **Appendix 1** have been used in this assessment.

5.1.2 A rating has been applied to each tree to give an understanding of the relative significance of each tree in the landscape and to assist in determining priorities for retention, in accordance with the following categories:-

1. **Significant**
2. **Very High**
3. **High**
4. **Moderate**
5. **Low**
6. **Very Low**
7. **Insignificant**

5.2 Environmental Significance

5.2.1 Tree Management Controls

Prescribed Trees within the Hornsby Local Government Area (LGA) are protected under the provisions of Part 1, Section B.6 (Tree and Vegetation Preservation) of the *Hornsby Development Control Plan 2013* (HDCP) [revised March 2018] made pursuant to Clause 9 of the *State Environmental Planning Policy (Vegetation in Non-rural Areas) 2017* (SEPP VNRA). The HDCP generally protects all tree species with the potential to grow to a height of more than three (3) metres, all trees growing within a Heritage Conservation Area (regardless of their species) and all trees growing within land listed as a Heritage Item under the HLEP. Some exemptions apply. The following trees are exempt (not protected) under the provisions of the HDCP:-

Tree No.	Species	Exemption
T203a, T204	*Cinnamomum camphora* (Camphor Laurel)	Noxious Weed, Environmental Weed Species
T189, T207	*Acer negundo* (Box Elder)	Environmental Weed Species

T205, T206	*Malus sp* (Apple)	Fruit tree
T200	*Erythrina sp.* (Coral Tree)	Environmental Weed Species
T183	*Gleditsia triacanthos* (Honey Locust)	Located within 3 metres of an existing building

The remainder of the trees are protected under the HDCP 2013.

5.2.2 Wildlife Habitat

Allocasuarina torulosa (Forest Oak) [T195a & T304], *Eucalyptus acmenioides* (White Mahogany) [T325, T326 & T343], *Eucalyptus paniculata* (Grey Ironbark) [T349], *Syncarpia glomulifera* (Turpentine) [T329, T334, T339 & T344], *Angophora costata* (Sydney Red Gum) [T321] *Eucalyptus pilularis* (Blackbutt) [T230, T317, T319, T333, T338 & T348] and *Eucalyptus saligna* (Sydney Blue Gum) [T324 & T327] are all locally-indigenous species, representative of the original vegetation of the area and would be of benefit to native wildlife. However, none of the trees contain cavities that would be suitable as nesting hollows for arboreal mammals or birds. There were no other visible signs of wildlife habitation. It should be noted that all of these trees have been planted within the site.

5.2.3 Noxious Plants & Environmental Weeds

Cinnamomum camphora (Camphor Laurel) [T203a & T204] and *Olea europaea var africana* (African Olive) [T196c] are scheduled as a potential 'Biosecurity Risk' ('Priority Weed' – formerly 'Noxious Weed') within NSW under the provisions of the *Biosecurity Act 2015*. The growth of these plant species must be managed in a manner that continuously inhibits the ability of the plant to spread (so far as is reasonably practicable) and the plant must not be sold, propagated or knowingly distributed.

Liquidambar styracflua (Liquidambar) [T201 & T202], are considered to be a nuisance species in some Local Government Areas (LGAs) within the Sydney Metropolitan Area. Both of these species are protected under Hornsby Council's Tree Management Controls.

5.2.4 Threatened Species & Ecological Communities

None of the subject trees are listed as Threatened or Vulnerable Species or form part of Endangered Ecological Communities (EECs) under the provisions of the *Biodiversity Conservation Act 2016* (NSW) or the *Environment Protection and Biodiversity Conservation Act 1999*. All of the locally indigenous species within the Stage 1 Area have been planted within the site. The 1943 Aerial Photo of Sydney (SIX Maps) indicates that the whole of the Stage 1 Area was cleared of vegetation at this time.

5.2.1 Biodiversity, Bushfire & Riparian Lands

The Stage 1 Area does *not* contain any ecologically significant 'Terrestrial Biodiversity' as indicated on Council's Natural Resources Biodiversity Map forming part of the HLEP 2013.

5.3 Heritage Significance

5.3.1 Heritage Items

The site (including 91-93 Pennant Hills Road and 16-22 Mount Pleasant Avenue) is listed as an item of Environmental Heritage [Item 607] under Schedule 5, Part 1 of the *Hornsby Local Environmental Plan* (HLEP) 2013. This item is described as a school and former convent displaying characteristic elements from the late Victorian and Federation Era. Loreto Normanhurst was established as boarding school in 1897. The original convent building was designed by Sheerin and Hennessy and constructed by W. E. Graham. The Item includes a sandstone and cast iron gate way and fence (Pennant Hills Road frontage) and notable trees typical of this era

(including Brushbox [T17, T28 & T95], Canary Island Palms [T18, T21, T22 & T25], Hoop Pine [T39, T61, T62 & T64], Bunya Pine (now removed), Norfolk Island Pine [T13]) and other plantings typical of the Inter-War Period (1919-1939) including Butia (Jelly) Palm [T75] and Camphor Laurels [T139, T141 & T144].[5] It should be noted that the Stage 1 Area does *not* form part of this listing.

The Loreto Convent Group, including the grounds, gates and cemetery area also listed as an item of Environmental Heritage (Archaeological Site) [Item A60] under Schedule 5, Part 3 of the *Hornsby Local Environmental Plan* (HLEP) 2013.

5.3.2 Heritage Conservation Area
The site is *not* located within a Heritage Conservation Area under Schedule 5, Part 2 of the HLEP 2013.

5.3.3 Significant Tree Register
Hornsby Council does *not* currently maintain a Register of Significant Trees.

5.3.4 General
None of the trees within the Stage 1 Area have any known or suspected Heritage Significance.

5.4 Amenity Value

5.4.1 Criteria for the assessment of amenity values are incorporated into **Appendix 1**. The amenity value of a tree is a measure of its live crown size, visual appearance (form, habit, crown density), visibility and position in the landscape and contribution to the visual character of an area. Generally the larger and more prominently located the tree, and the better its form and habit, the higher its amenity value.

6 TREE RETENTION VALUES

6.1.1 The Retention Values shown in **Appendix 3** and **Appendix 5** have been determined on the basis of the estimated longevity of the trees and their landscape significance rating, in accordance with **Table One**. Together with guidelines contained in **Section 7** (Tree Protection Zones) this information should be used to determine the most appropriate position of building footprints and other infrastructure within the site, with due consideration to other site constraints, to minimise the impact on trees considered worthy of preservation.

TABLE 1 – TREE RETENTION VALUES – ASSESSMENT METHODOLOGY

	Landscape Significance Rating						
Estimated Life Expectancy	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Long - Greater than 40 Years	High Retention Value						
Medium- 15 to 40 Years			Moderate Retention Value				
Short - 5 to 15 years				Low Ret. Value			
Transient - Less than 5 Years				Very Low Retention Value			
Dead or Potentially Hazardous							

TABLE 2 – TREE RETENTION PRIORITES.

6.1.2 The following table describes the implications of the retention values on site layout and design.

RETENTION VALUE	RECOMMENDED ACTION
"High"	• These trees considered worthy of preservation; as such careful consideration should be given to their retention as a priority. • Proposed site design and placement of buildings and infrastructure should consider the recommended setbacks as discussed in the following section (refer also **Appendix 2**) to avoid any adverse impact on these trees. • In addition to Tree Protection Zones, the extent of the canopy (canopy drip-line) should also be considered, particularly in relation to high rise developments. Significant pruning of the trees to accommodate the building envelope or temporary scaffolding is generally not acceptable.
"Moderate"	• The retention of these trees is desirable, but not essential. • These trees should be retained as part of any proposed development if possible. However, these trees are considered less critical for retention. • If these trees must be removed, replacement planting should be considered in accordance with Council's Tree Replenishment Policy to compensate for loss of amenity (refer also **Section 9**).
"Low"	• These trees are not considered to worthy of any special measures to ensure their preservation, due to current health, condition or suitability. They do not have any special ecological, heritage or amenity value, or these values are substantially diminished due to their SULE. • These trees should not be considered as a constraint to the future development of the site.
"Very Low"	• These trees are considered potentially hazardous or very poor specimens, or may be environmental or noxious weeds. • The removal of these trees is therefore recommended regardless of the implications of any proposed development.

7 TREE PROTECTION ZONES

7.1.1 The Tree Protection Zone (TPZ) is a radial distance measured from the centre of the trunk of the tree as specified in **Appendix 4**. These have been calculated in accordance with AS 4970-2009 (Protection of Trees on Development Sites).[6]

7.1.2 The intention of the TPZ is to ensure protection of the root system and canopy from the potential damage from construction works and ensure the long-term health and stability of each tree to be retained. Incursions to the root zone may occur due to excavations, changes in ground levels, (either lowering or raising the grade), trenching or other forms or soil disturbance such as ripping, grading or inverting the soil profile. Such works may cause damage or loss of part of the root system, leading to an adverse impact on the tree.

7.2 Structural Root Zone (SRZ)

7.2.1 The Structural Root Zone (SRZ) provides the bulk of mechanical support and anchorage for a tree. This is also a radial distance measured from the centre of the trunk as specified in **Appendix 4**. The SRZ has been calculated in accordance with AS 4970-2009 (Protection of Trees on Development Sites).

7.2.2 Incursions within the SRZ are not recommended as they are likely to result in the severance of woody roots which may compromise the stability of the tree or lead to its decline and demise.

7.3 Acceptable Encroachments to the Tree Protection Zone.

7.3.1 Where encroachment to the TPZ is unavoidable, an incursion to the TPZ of not exceeding 10% of the area of the TPZ and outside the SRZ may be acceptable. Examples of acceptable incursions are shown in **Appendix 2**. Greater incursions to the TPZ may result in an adverse impact on the tree.

7.3.2 Where incursions greater than 10% of the TPZ are unavoidable, exploratory excavation using non-destructive methods may be required to evaluate the extent of the root system affected and determine whether or not the tree can remain viable

7.4 Acceptable Encroachments to the Canopy

7.4.1 The removal of a small portion of the crown (foliage and branches) is generally tolerable provided that the extent of pruning required is less than 10% of the total foliage volume of the tree and the removal of branches does not create large wounds or disfigure the natural form and habit of the tree. All pruning cuts must be undertaken in accordance with AS 4373:2007. This generally involves reduction of the affected branches back to the nearest branch collar at the junction with the parent branch, rather than at an intermediate point. The latter is referred to as "lopping" and is no longer an acceptable arboricultural practice. Generally speaking, the minimum pruning as required to accommodate any proposed works is desirable. Extensive pruning can result in a detrimental impact on tree health and may lead to exposure of remaining branches to wind forces that they were previously sheltered from, leading to a greater risk of branch failure.

7.4.2 Clearance to between the building line and canopy should take into account any projecting structures, such as balconies, awnings and the roofline and any requirement for temporary scaffolding to be erected during construction (typically 1-1.5 metres wide). High structures should preferably be located outside the canopy dripline (as shown indicatively on the attached plans) in order to avoid or minimise canopy pruning.

7.5 Legal Protection

7.5.1 Notwithstanding the above recommendations, Council may require a greater setback from certain types of structures to ensure the on-going legal protection of the tree (i.e. its legal status under Council's Tree Management Controls). In Hornsby Shire, a tree located within three (3) metres of the foundation of an approved building (excluding detaches garages, carports and other ancillary buildings) is *not* protected under the HDCP. The measurement is taken from the trunk of the tree at ground level to the foundation of the building. As such, if a tree is considered worthy of preservation, Council is unlikely to approve the construction of a dwelling or building within three (3) metres of the tree (regardless of whether this can be undertaken without having an adverse impact on its health or longevity).

8 PROPOSED DEVELOPMENT

8.1.1 The 'Detailed Stage 1 Works', include:

- Construction of a new 3 to 6-storey boarding house to accommodate up to 216 boarders;
- Excavation works to accommodate partially underground carpark and dock facilities within the proposed footprint of the new boarding house facility;
- Demolition works to buildings between Mary Ward and existing dining room building and associated works to make good existing;
- Landscaping works and removal and replacement of approximately 50 trees of varying significance; and
- Augmentation of connection of services and utilities infrastructure.

9 IMPACT ASSESSMENT

9.1.1 The intention of this assessment is to determine the incursions to the root zones and canopies created by the proposed development and evaluate the likely impact of the proposed works on the subject trees. Details shown on the following plans were used in this assessment:-

Title	Author	Dwg No.	Date
Stage 1 Works (area)	AJ+C	18008 A0003 [1]	10/12/2018
Demolition Plan	AJ+C	18009 DA1101 [0]	12/2018
Basement 2	AJ+C	18009 DA2001 [2]	10/12/2018
Basement 1	AJ+C	18009 DA2002 [2]	10/12/2018
Level 01 (Lower Ground)	AJ+C	18009 DA2003 [2]	10/12/2018
Level 02 (Ground Floor)	AJ+C	18009 DA2004 [2]	10/12/2018
Level 03	AJ+C	18009 DA2005 [2]	10/12/2018
Level 04	AJ+C	18009 DA2006 [2]	10/12/2018
Level 05	AJ+C	18009 DA2007 [2]	10/12/2018
Roof Plan	AJ+C	18009 DA2008 [2]	10/12/2018
Elevations	AJ+C	18009 DA3101-3102 [2]	10/12/2018
Sections S1	AJ+C	18011 DA3201 [0]	10/12/2018
Sections S2	AJ+C	18011 DA3202 [0]	10/12/2018
Landscape Detail Plans	Oculus	S18-031 L-200 – L-205 [B]	07/01/2018
Site Works Plans (incl. Stormwater Concept Design)	Taylor Thomson Whitting	181202 SKC104 – SKC105 [P1]	20/12/2018

9.1.2 A summary of the impact of the proposed development on each tree within the site is shown in **Appendix 5**. The following criteria have been examined as part of this assessment:-

- Existing Relative Levels (R.L.);
- Tree Protection Zone (TPZ);
- Structural Root Zone (SRZ);
- Footprint and envelope of the proposed development and temporary structures (scaffolding, hoardings etc);
- Incursions to the TPZ & SRZ, including estimated cut & fill beyond the building footprint;
- Incursions to the tree canopy from the building envelope and temporary structures; and
- Assessment of the likely impact of the works on existing trees.

9.1.3 The proposed development will necessitate the removal of thirty-five (35) trees of low and very low retention value. These include Tree No.s T302, T303, T605 & T606 (Black Wattle), T207 (Box Elder), T304 (Forest Oak), T323 (River Oak), T203a & T204 (Camphor Laurel), T604 (Spotted Gum), T167 (Rough Tree Fern), T200 (Cockscomb Coral tree), T309 & T337 (Tasmanian Blue Gum), T317 (Blackbutt), T310 (Willow Gum), T306 & T327 (Eucalypt), T316 & T330 (Scribbly Gum), T148a & T148b (Kentia Palm), T196 (Crepe Myrtle), T205 & T206 (Apple tree), T227 & T228 (Broad-leaved Paperbark), T305 (Prickly Paperbark), T196c (African Olive), T203 (Canary Island Palm), T172, T173 & T174 (Lombardy Poplar), T197 (Lasiandra) and

T196b (Sweet Pittosporum). None of these trees are considered significant or worthy of special measures to ensure their preservation. The removal of these trees is therefore considered warranted in this instance. It should be noted that trees T200, T203a, T204, T205, T206 & T207 are exempt from Council's Tree Management Controls.

9.1.4 The proposed development will also necessitate the removal of thirty-three (33) trees of moderate retention value. These include Tree No.s T195a (row of 8 x Forest Oak), T195b (row of 5 x Lillypilly), T196a (Lillypilly), T603 (Yellow Bloodwood), T313, T320 & T336 (Spotted Gum), T325 & T326 (White Mahogany), T226 (Bangalay), T312 & T332 (Narrow-leaved Ironbark), T319, T333 & T338 (Blackbutt), T322 (Scribbly Gum), T201 & T202 (Liquidambar), T180 (Bullbay Magnolia), T206a & T301 (Prickly Paperbark) and T329 (Turpentine). These trees are not considered significant, but are in good health and condition and make a fair contribution to the amenity of the site and surrounding properties. In order to compensate for loss of amenity resulting from the removal of these trees to accommodate the proposed development, consideration should be given to replacement planting with new trees elsewhere within the site in accordance with **Section 11**.

9.1.5 The proposed development will also necessitate the removal of ten (10) trees of high retention value. These include Tree No.s T307, T308, T314, T315 & T318 (Spotted Gum), T311 (Forest Red Gum), T321 (Sydney Red Gum), T328 (Yellow Bloodwood), T324 (Sydney Blue Gum) and T602 (Flooded Gum). These trees have no special ecological or heritage significance, but are in good health and condition and make a positive contribution to the amenity of the site and streetscape. It is understood that the building has been placed as best as possible to minimise loss of trees. There are no feasible options that can be recommended to preserve these trees in this instance given the extent of site development and the position of these trees within the site. In order to compensate for loss of amenity resulting from the removal of these trees to accommodate the proposed development, consideration should be given to replacement planting with new trees elsewhere within the site in accordance with **Section 11**.

9.1.6 The proposed boarding house is located within the TPZs of Trees T209 (Spotted Gum). However, the extent of the encroachment to the root zone is less than 10% of the TPZ, which is considered within acceptable limits under AS 4970:2009. As such, the proposed works will not result in any adverse impact on this tree, assuming the existing ground levels within the TPZ are maintained intact. In order to avoid any adverse impact on this tree, Tree Protection Fencing should be installed in accordance with **Section 10.3** and all excavations for the building and basement foundations and associated retaining walls within the TPZ should be undertaken in accordance with **Section 10.6.**

9.1.7 Proposed new driveways, to provide vehicular access to the basement 2 level car park and loading dock area, are located within the TPZs of Trees T341 & T342 (Spotted Gum), T334 & T339, (Turpentine), T229 & T340 (Grey Gum). In the case of Trees T339, T340, T341 & T342, the extent of the encroachment to the root zone is less than 10% of the TPZ, which is considered within acceptable limits under AS 4970:2009. As such, the proposed works will not result in any adverse impact on these trees (subject to review of the civil drawings showing extent of any cut or fill batters). In the case of trees T229 & T334, the extent of encroachment to the TPZ is 23% and 14% respectively, which exceeds acceptable limits under AS 4970:2009. Cut and fill for the pavement subgrade and excavations for the associated retaining walls are likely to result in an adverse impact on these trees. In order to minimise any adverse impact, all excavations for the pavement sub-grade and associated retaining wall foundations within the TPZs should be undertaken in accordance with **Section 10.6** and pavements should be constructed in accordance with **Section 10.8 & 10.9** wherever possible (i.e. in instances where the proposed pavement is substantially above existing grade). It should be noted that consideration has been given to increasing the setback distance between the driveway and these trees, but this is not considered feasible in this instance.

9.1.8 Proposed new elevated pavements and stairs are located within the TPZs of trees T177, T178 & T179 (Tropical Birch). These pavements are proposed to be constructed as elevated concrete slabs supported by Bondek and isolated pier footings. Excavations for the pier footings are located outside the SRZs. The proposed works will not result in any adverse impact on these trees, provided that all excavations for the pier footings within the TPZs are undertaken in accordance with **Section 10.6**. A portion of the proposed pavement is located below existing grade within the TPZ of T179. Whilst the potential encroachment exceeds acceptable limits under AS 4970:2009, the encroachment is substantially within the footprint of existing pavements and therefore the new encroachment will not be substantially different from the present situation. The proposed work will not result in any adverse impact on these trees, provided that all excavations for the new pavement sub-grade and associated retaining wall foundations within the TPZ are undertaken in accordance with **Section 10.6.** Trunk Protection should be installed in accordance with **Section 10.15** and Ground Protection in accordance with **Section 10.14**. All demolition works within the TPZs will be carried out in accordance with **Section 10.5.**

9.1.9 Proposed new pathways are located within the TPZs of T210 (Queensland Kauri) & T600 (Grey Gum). Excavations for the pavement sub-grade will result in an encroachment to the TPZs of 15% and 7% respectively. In the case of T600, the extent of the encroachment is within acceptable limits under AS 4970:2009. Therefore, the proposed works will not result in any adverse impact on this tree. In the case of T210, the encroachment exceeds acceptable limits under AS 4970:2009. However, this tree will tolerate the extent of the encroachment proposed, provided that all works within the TPZ are undertaken as recommended. In order to minimise any adverse impact on these trees, all excavations for the pavement sub-grade and any associated retaining wall foundations within the TPZs should be undertaken in accordance with **Section 10.6** and pavements should be constructed in accordance with **Section 10.8 & 10.9** wherever possible.

9.1.10 A proposed new lawn terrace and associated retaining wall is located within the TPZ of T169 (Japanese Maple). Excavations for the new wall footings and placement of non-engineered fill to a depth of 600-800mm depth will result in an encroachment to the TPZ of approximately 40%, which exceeds acceptable limits under AS 4970:2009. This work has the potential to result in some adverse impact on this tree. In order to minimise adverse impact, all excavations for the retaining wall foundations within the TPZ should be undertaken in accordance with **Section 10.6**. Pier and beam footings should be used where necessary to bridge over any woody roots encountered as specified. Fill material placed within the TPZ for the lawn terrace should be supplied and placed in accordance with **Section 10.10.**

9.1.11 No other trees will be adversely affected by the proposed development.

10 RECOMMENDED TREE PROTECTION MEASURES

10.1 Tree Protection Plan

10.1.1 The following Tree Protection Measures should be read in accordance with the Tree Protection Plan (**Appendix 6**). The Tree Protection Plan (TPP) indicates the position of tree protection devices and other recommended measures to ensure the protection of trees within the site to be retained as part of the proposed development.

10.2 Prohibited Activities

10.2.1 The following activities should be avoided within specified Tree Protection Zones (refer **Appendix 4 & 6** for extent of the TPZ for each tree):-

- Excavations and trenching (with exception of the approved remediation works, underground services, building foundations or pavement sub-grade);
- Soil disturbance, surface grading, compaction, tyning, ripping or cultivation of soil;

- Mechanical removal of vegetation, including extraction of tree stumps;
- Soil level changes including the placement of fill material (excluding imported validated fill for remediation works or placement of fill for approved works)
- Movement and storage of plant, equipment & vehicles (except within defined temporary haul roads, where ground protection has been installed, or within the footprint of existing floor slabs or paved areas);
- Erection of site sheds (except where approved by the site arborist);
- Affixing of signage, barricades or hoardings to trees;
- Storage of building materials, waste and waste receptacles;
- Stockpiling of spoil or fill;
- Stockpiling of bulk materials, such as soil, sand, gravel, roadbase or the like;
- Stockpiling of demolition waste;
- Disposal of waste materials and chemicals including paint, solvents, cement slurry, fuel, oil and other toxic liquids;
- Other physical damage to the trunk or root system; and
- Any other activity likely to cause damage to the tree.

10.3 Tree Protection Fencing

10.3.1 Trees [**T165, T169, T195, T209, T210, T211-T214, T229, T334, T339, T340-T350, T600 & T601**] shall be protected prior to and during construction from all activities that may result in detrimental impact by erecting a suitable protective fence beneath the canopy to the full extent of the Tree Protection Zone, excluding the footprint of the proposed works and areas within adjoining properties, as indicated on the Tree Protection Plan. As a minimum, the fence should consist of temporary chain wire panels of 1.8 metres in height, supported by steel stakes as required and fastened together and supported to prevent sideways movement using corner braces where required (as shown in **Figure 2**). The fence shall be erected prior to the commencement of any work on-site and shall be maintained in good condition for the duration of construction. Where tree protection zones merge together a single fence encompassing the area is deemed to be adequate. Existing site boundary fences may form part of the enclosure.

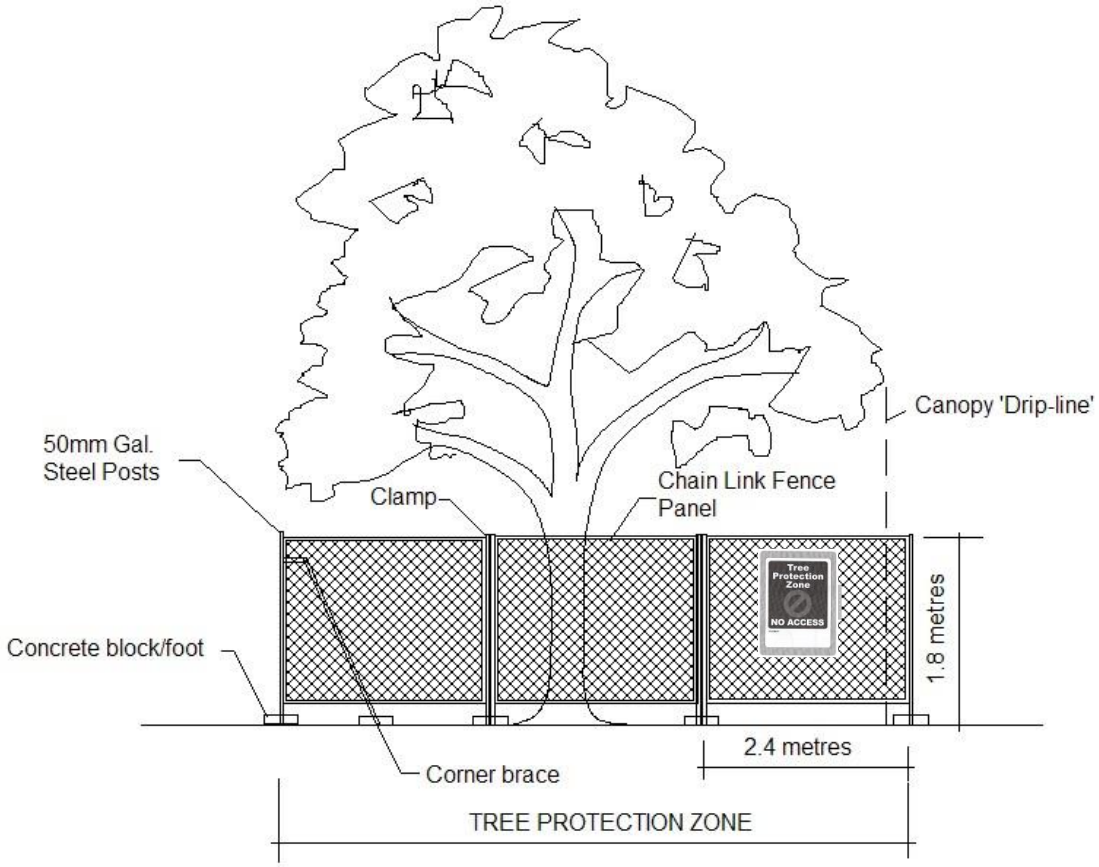


Figure 2 – Detail of Tree Protection Fence

10.4 Tree Protection Signs

10.4.1 Signs shall be installed on the Tree Protection Fence to prevent unauthorised movement of plant and equipment or entry to the Tree Protection Zone. The signs shall be securely attached to the fence using cable ties or equivalent. Signs shall be placed at minimum 10 metre intervals. The wording and layout of the sign shall comply with AS 4970-2009 as shown in **Figure 3**.

.

Figure 3 – Detail of Tree Protection Sign

10.5 Demolition Works within Tree Protection Zones

10.5.1 Demolition of paved areas within the Tree Protection Zones (TPZs) of trees [**T177, T178, T179 & T195**] shall be undertaken under the supervision of a qualified Arborist [Australian Qualification Framework (AQF) Level 5].

10.5.1 Concrete pavements shall be demolished by breaking the slab into manageable sections (using a rock hammer or similar) and asphalt pavements shall be removed by breaking the topcoat into manageable pieces. The broken sections shall be carefully lifted and folded over the remaining paved surface to minimise disturbance and compaction of the underlying soil profile. Special care shall be taken where underlying woody roots have lifted or displaced the pavement. Any plant or equipment used in demolition work shall operate within the footprint of existing paved areas and

avoid traversing soft landscape areas. Where this is unavoidable, suitable ground protection shall first be installed in accordance with **Section 10.14.**

10.5.2 The pavement sub-base within the TPZ shall be gradually removed (where required) in layers of no greater than 50mm thick using a small rubber tracked excavator or alternative approved method to avoid excessive disturbance and compaction of the underlying soil profile and damage to underlying roots and minimise. The machine shall work within the footprint of the existing path footprint to avoid compaction of the underlying soil. The final layer of sub-base material shall be removed using hand tools were required to avoid compaction of the underlying soil profile and avoid damage to any underlying woody roots.

10.5.3 Following removal of the pavement surface and sub-base, clean, friable topsoil shall be used to fill in the excavated area and bring flush with surrounding levels within new landscape areas. Soil shall only be imported and spread when the underlying soil conditions are dry to avoid compaction of the soil profile. Where there is insufficient recovered site topsoil for this purpose, any imported material shall be free of rocks, vegetation, heavy clay or other extraneous matter and supplied and spread in accordance with **Section 10.10**. Any imported soil material should be similar in texture to the existing site topsoil.

10.5.4 Demolition of existing walls, kerbs and other structures (including existing timber retaining walls) within the TPZ of trees [**T169, T177, T178, T179, T195, T209 & T210**] shall be undertaken under the supervision of a qualified Arborist [AQF level 5]. The structures shall be demolished using equipment on stationed outside the TPZ where possible or within the footprint of existing hardstand areas.

10.5.5 Care shall be taken to avoid the root systems, trunks and lower branches of trees in the vicinity of the structures during demolition works, with special attention required during demolition of the footings and other sub-surface members to avoid damage to woody roots. An observer ('spotter') shall be employed to assist the plant operator in order to detect and avoid damage to underlying woody roots during demolition. Trunk and/or branch protection shall be installed where there is a potential risk of damage to trees in proximity or overhead of the work.

10.6 Excavations within Tree Protection Zones

10.6.1 Prior to any mechanical excavations for building or wall foundations or pavement sub-grade within the TPZs of Trees [**T165, T169, T195, T209, T210, T600, T601, T229, T334, T339, T341 & T342]** exploratory excavation using non-destructive techniques shall be taken along the perimeter of the structure or pavement within the TPZ. Non-destructive excavation techniques may include the use of hand-held implements, air pressure (using an Air-spade® device) or water pressure. The exploratory excavation shall be undertaken along the perimeter of the foundation or pavement (within the TPZ) to the depth of the foundation or to a maximum of 800mm from surface levels, to locate and expose any woody roots prior to any mechanical excavation.

10.6.2 All care shall be undertaken to preserve woody roots intact and undamaged during exploratory excavation. Any roots encountered of less than 40mm in diameter may be cleanly severed with clean sharp pruning implements at the face of the excavation. The root zone in the vicinity of the excavation shall be kept moist following excavation for the duration of construction to minimise moisture stress on the tree. Where large woody roots (greater than 40mm diameter) are encountered during exploratory excavations, further advice from a qualified arborist shall be sought prior to severance.

10.6.3 Proposed Sandstone 'Slab' Retaining walls shall be constructed forward of the position of former timber retaining walls with minimal excavation to bed and level the stone. Excavation shall not exceed 200mm in depth. Stone slabs shall be lifted and placed into position using plant and

equipment stationed in the lower terrace area or upper existing roadway to avoid compaction and disturbance within TPZs during construction.

10.6.4 Where necessary, (to avoid severing large woody roots) consideration should be given to the installation of an elevated structure (e.g. pier and beam footing, suspended slab or floor supported on piers, cantilevered slab, up-turned edge beam etc) in preference to structures requiring a deep edge beam or continuous perimeter strip footing. The beam section of any pier and beam footing should be placed **above** grade to avoid excavation within the SRZ. Pier footings intersecting large woody roots should be slightly offset where necessary to avoid root severance.

10.6.5 For masonry walls or fences it may be acceptable to delete continuous concrete strip footings and replace with suspended in-fill panels (e.g. steel or timber pickets, lattice etc) fixed to pillars. For paved areas, consideration should be given to raising the proposed pavement level and using a porous fill material in preference to excavation where large woody roots are found within the sub-base

10.6.6 Over-excavations for the proposed retaining wall (to facilitate construction, drainage, waterproofing etc, where required) within the TPZ of trees [**T179, T341 & T342**] shall not exceed 500mm from the external face of the wall.

10.7 Underground Services

10.7.1 All proposed stormwater lines and other underground services should be located outside TPZs of trees [**any tree to be retained as indicated on the TPP**] wherever possible or installed by alternative measures. Alternative measures include suspending pipelines beneath the floor of a building or structure (to avoid excavation with the TPZ), non-destructive excavation methods or Horizontal Directional Drilling (HDD). Where the installation of service lines within TPZs is unavoidable, the pipelines or conduits should be installed as follows.

10.7.2 Trenching for underground services and stormwater pipes within the TPZs of Trees [**any tree to be retained as indicated on the TPP** shall be undertaken using non-destructive excavation methods in accordance with **Section 10.6**. Where large woody roots are encountered during excavation or trenching (root diameter greater than 40mm), these shall be retained intact wherever possible (e.g. by tunnelling beneath roots and inserting the pipeline or conduit beneath or re-routing the service etc). Where this is not practical and root pruning is the only alternative, proposed root pruning should be assessed by a qualified arborist [AQF 5] to evaluate the potential impact on the health and stability of the subject tree.

10.7.3 Installation of underground services and stormwater pipes within the SRZ of Trees [**any tree to be retained as indicated on the TPP**], shall only be undertaken by Horizontal Directional Drilling (HDD) (also referred to as sub-surface boring or Micro-tunnelling for large diameter pipes). The Invert Level of the pipe, plus the pipe diameter, must be lower than the estimated root zone depth as specified. At this site a minimum depth of 1 metre to the invert level of the pipe is specified.

10.8 Pavements

10.8.1 Proposed paved areas within the TPZs of Trees [**T177, T178, T179, T195, T210, T229, T334, T339, T341, T342 & T600**] shall be placed at or slightly above grade where possible to minimise excavations within the root zone and avoid severance and damage of woody roots. The pavement sub-base material should be supplied and installed in accordance with **Section 10.9**.

10.9 Pavement Sub-base

10.9.1 Pavement sub-base material within TPZs of trees [**T177, T178, T179, T210, T229, T334, T339, T341, T342 & T600]** shall be a coarse, gap-graded material such as 20 – 50mm crushed basalt (Blue Metal) or equivalent no-fines gravel material to provide some aeration and moisture permeation to the root zone. Note that road base or crushed sandstone or other similar material containing a high percentage of fines is unacceptable for this purpose. The fill material should be consolidated using a non-vibrating roller or similar to minimise compaction of the underlying soil. A permeable geotextile may be used beneath the sub-base to prevent migration of the stone into the sub-grade and provide greater load capacity.

10.10 Placement of Fill Material

10.10.1 Placement of fill material within the TPZs of Trees [**and any other trees to be retained as indicated on the TPP**] to be retained should be avoided wherever possible. Placement of fill material within the TPZs of Trees [**T165, T169**] shall be a well-drained friable material, equivalent in texture to the existing site topsoil material. The fill should be free from rocks, vegetation and other extraneous material complying with AS 4419:2003 (*Soils for Landscaping and Garden Use*).

10.10.2 The fill may be lightly consolidated, but shall not be compacted to engineering standards. No fill material should be placed in direct contact with the trunk.

10.10.3 Plant and equipment used to place and spread fill material should be stationed outside the TPZ where possible. Where not possible, suitable ground protection should be installed in accordance with **Section 10.14** to avoid compaction of the underlying soil profile and root zone.

10.11 Canopy & Root Pruning

10.11.1 Canopy pruning of Trees [**any tree nominated for pruning as indicated on the TPP**] (where necessary to clear the building envelope or temporary scaffolding) shall be carried out in accordance with Australian Standard 4373-2007 – *Pruning of Amenity Trees*. All pruning work shall be carried out by a qualified and experienced arborist or tree surgeon [Australian Qualification Framework Level 3] in accordance with the NSW WorkCover Code of Practice for the Amenity Tree Industry (1998). No branches of greater than 70mm in diameter should be removed or pruned without further advice from a Consulting Arborist [Australian Qualification Framework Level 5].

10.11.2 Where root pruning of trees [**any tree nominated for pruning as indicated on the TPP**] is required, roots shall be severed with clean, sharp pruning implements and retained in a moist condition during the construction phase using Hessian material or mulch where practical. Severed roots shall be treated with a suitable root growth hormone containing the active constituents Indol-3-yl-Butric Acid (IBA) and 1-Naphthylacetic Acid (NAA) to stimulate rapid regeneration of the root system.

10.12 Tree Damage

10.12.1 Care shall be taken when operating cranes, drilling rigs and similar equipment near trees to avoid damage to tree canopies (foliage and branches). Under no circumstances shall branches be torn-off by construction equipment. Where there is potential conflict between tree canopy and construction activities, the advice of the Site Arborist must be sought.

10.12.2 In the event of any tree becoming damaged for any reason during the construction period a consulting arborist [Australian Qualification Framework Level 5] shall be engaged to inspect and

provide advice on any remedial action to minimise any adverse impact. Such remedial action shall be implemented as soon as practicable and certified by the arborist.

10.13 Tree Removal

10.13.1 The removal of Trees [**all trees nominated for removal as indicated on the TPP**] shall be carried out by an experienced tree surgeon in accordance with the NSW WorkCover Code of Practice for the Amenity Tree Industry (1998). Care shall be taken to avoid damage to other trees during the felling operation.

10.13.2 Stumps located within the TPZs of trees to be retained shall be grubbed-out where required using a mechanical stump grinder (or by hand where less than 150mm in diameter) without damage to the root system of other trees. Where trees to be removed are within the SRZ of any trees to be retained, consideration should be given to cutting the stump close to ground level and retaining the root crown intact. Stumps within the Tree Protection Zone of other trees to be retained shall **not** be pulled out using excavation equipment or similar.

10.14 Ground Protection

10.14.1 A 100mm layer of woodchip mulch shall be installed within the areas encompassed by tree protection fences and surrounding Trees [**T177, T178 & T179**] as indicated on the Tree Protection Plan (**Appendix 6**) to minimise moisture stress during construction.

10.14.2 Construction haul routes shall be confined to existing paved areas wherever possible. Where this is not feasible and construction haul routes or access for plant and equipment must traverse soft landscape areas within TPZs of [**any tree nominated for retention**], 20mm thick marine ply sheets or truck mats (such as Envirex Versadeck® access mats) (refer **Figure 4** shall be placed over the top of the ground surface to minimise compaction and disturbance of the underlying soil profile and root zone.

Figure 4 – Showing typical detail for truck mats.

10.14.3 Ground protection shall be installed prior to any site works and maintained in good condition for the duration of the construction period. On completion of the works, ground protection shall be removed without damage or disturbance to the underlying soil profile.

10.15 Trunk Protection

10.15.1 Trunk protection boarding shall be erected around Trees [**T177, T178 & T179**] to avoid accidental damage, as indicated on the Tree Protection Plan (**Appendix 6**). The trunk protection shall consist of a layer of carpet underfelt (or similar) wrapped around the trunk, followed by 1.8 metre lengths of softwood timbers (90 x 45mm in section) aligned vertically and spaced evenly around the trunk at 150mm centres (i.e. with a 50mm gap) and secured together with 2mm galvanised wire or galvanised hoop strap as shown in **Figure 5**. Recycled timber (such as demolition waste) may be suitable for this purpose, subject to the approval of the Project Arborist. The timbers shall be wrapped around the trunk (over the carpet underfelt), but not fixed to the tree to avoid mechanical injury or damage to the trunk. Trunk protection should be installed prior to any site works and maintained in good condition for the duration of the construction period. Carpet underfelt (alone) is sufficient for trees with a trunk diameter of less than 200mm. This shall be wrapped around the trunk in a double layer and held in place with heavy-duty fibre reinforced adhesive tape (e.g. Gaffer Tape).

Figure 5 – Detail of Trunk Protection

11 REPLACEMENT PLANTING

11.1.1 In order to compensate for loss of amenity resulting from the removal of trees to accommodate the proposed development, an equivalent number of new trees capable of attaining a height of at least twelve (12) metres at maturity should be planted within the site.

11.1.2 Replacement trees should preferably include some locally indigenous species. These will be most appropriate to the site conditions and be most valuable in terms of preserving the landscape character and wildlife habitat of the area. The following species are appropriate to the site conditions and could be considered for replacement planting:-

Local native Species:-

- *Eucalyptus saligna* (Sydney Blue Gum) and
- *Eucalyptus pilularis* (Blackbutt).
- *Syncarpia glomulifera* (Turpentine)
- *Eucalyptus paniculata* (Grey Ironbark)
- *Angophora floribunda* (Rough Barked Apple)
- *Eucalyptus acmenoides* (White Mahogany)

- *Angophora costata* (Sydney Red Gum)
- *Eucalyptus resinifera* (Red Mahogany)
- *Allocasuarina torulosa* (Forest Oak)
- *Acmena smithii* (Lillypilly)
- *Elaeocarpus reticulatus* (Blueberry Ash)

Suitable Non-local Native Species:-

- *Lophostemon confertus* (Brushbox)#
- *Syzygium paniculatum* (Magenta Cherry)#
- *Waterhousea floribunda* (Weeping Lilly Pilly)#.
- *Corymbia maculata* (Spotted Gum)

Andrew Morton
EARTHSCAPE HORTICULTURAL SERVICES
11th January 2019

REFERENCES:-

[1] Chapman GA & Murphy CL (1989)
Soil Landscapes of the Sydney 1:100,000 Sheet
Soil Conservation Service of NSW. Sydney

[2] Benson, Doug & Howell, Jocelyn (1990)
Taken for Granted: the Bushland of Sydney and its Suburbs.
Kangaroo Press & The Royal Botanic Gardens, Sydney, NSW

[3] Mattheck, Dr. Claus & Breloer, Helge (1994) – Sixth Edition (2001)
The Body Language of Trees – A Handbook for Failure Analysis
The Stationery Office, London, England

[4] Barrell, Jeremy (1996)
Pre-development Tree Assessment
Proceedings of the International Conference on Trees and Building Sites (Chicago)
International Society of arboriculture, Illinois, USA

[5] Office of Environment and Heritage (
State Heritage Inventory – Heritage Database
Loreto Convent Group, grounds Gates and Cemetery
http://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=1780857

[6] Council of Standards Australia (August 2009)
AS 4970 – 2009 – Protection of Trees on Development Sites
Standards Australia, Sydney

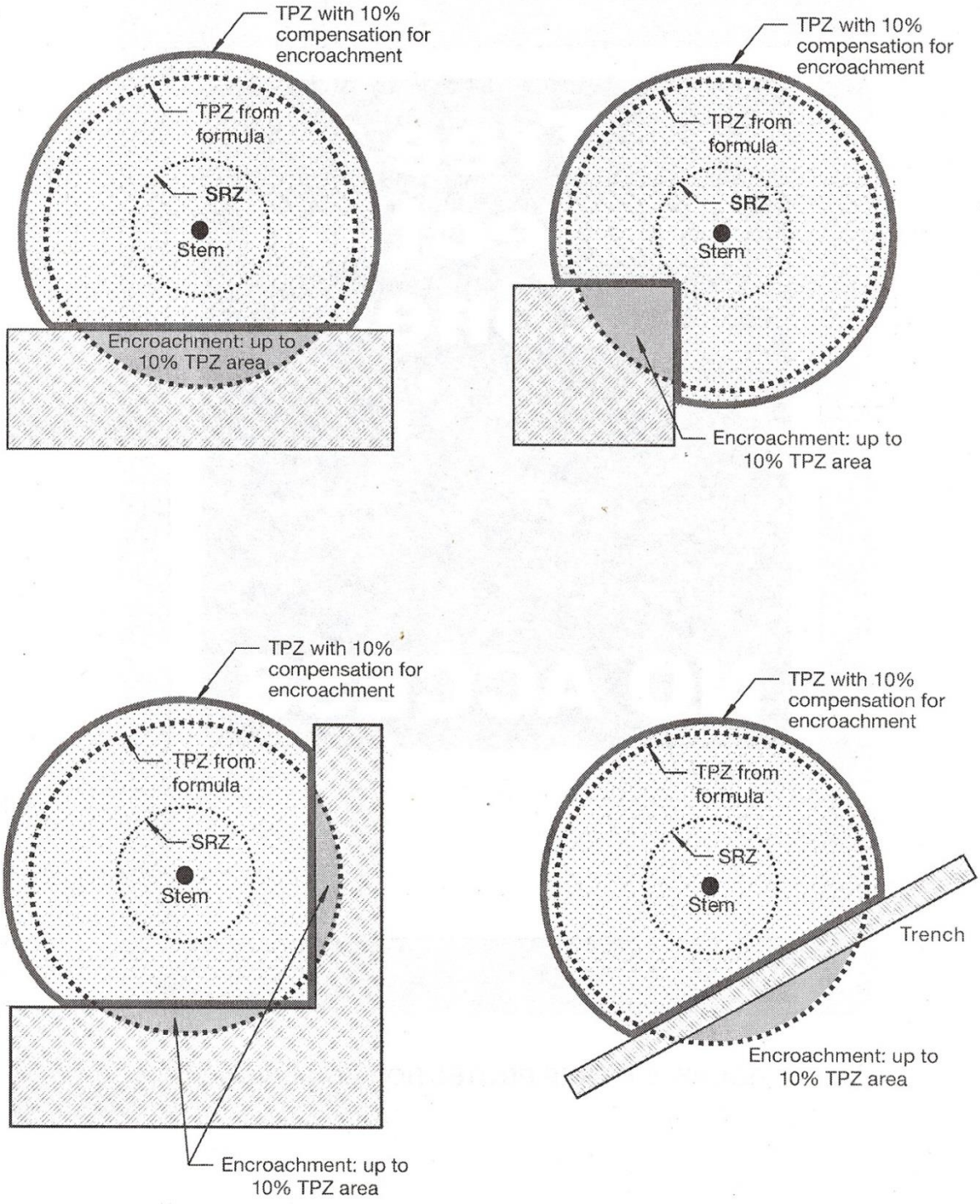
APPENDIX 1 - CRITERIA FOR ASSESSMENT OF LANDSCAPE SIGNIFICANCE

RATING	HERITAGE VALUE	ECOLOGICAL VALUE	AMENITY VALUE
1. SIGNIFICANT	The subject tree is listed as a Heritage Item under the Local Environment Plan (LEP) with a local, state or national level of significance or is listed on Council's Significant Tree Register	The subject tree is scheduled as a Threatened Species as defined under the Threatened Species Conservation Act 1995 (NSW) or the Environmental Protection and Biodiversity Conservation Act 1999	The subject tree has a very large live crown size exceeding 300m² with normal to dense foliage cover, is located in a visually prominent position in the landscape, exhibits very good form and habit typical of the species
	The subject tree forms part of the curtilage of a Heritage Item (building /structure /artefact as defined under the LEP) and has a known or documented association with that item	The tree is a locally indigenous species, representative of the original vegetation of the area and is known as an important food, shelter or nesting tree for endangered or threatened fauna species	The subject tree makes a significant contribution to the amenity and visual character of the area by creating a sense of place or creating a sense of identity
	The subject tree is a Commemorative Planting having been planted by an important historical person (s) or to commemorate an important historical event	The subject tree is a Remnant Tree, being a tree in existence prior to development of the area	The tree is visually prominent in view from surrounding areas, being a landmark or visible from a considerable distance.
2. VERY HIGH	The tree has a strong historical association with a heritage item (building/structure/artefact/garden etc) within or adjacent the property and/or exemplifies a particular era or style of landscape design associated with the original development of the site.	The tree is a locally-indigenous species, representative of the original vegetation of the area and is a dominant or associated canopy species of an Endangered Ecological Community (EEC) formerly occurring in the area occupied by the site.	The subject tree has a very large live crown size exceeding 200m²; a crown density exceeding 70% (normal-dense), is a very good representative of the species in terms of its form and branching habit or is aesthetically distinctive and makes a positive contribution to the visual character and the amenity of the area
3. HIGH	The tree has a suspected historical association with a heritage item or landscape supported by anecdotal or visual evidence	The tree is a locally-indigenous species and representative of the original vegetation of the area and the tree is located within a defined Vegetation Link / Wildlife Corridor or has known wildlife habitat value	The subject tree has a large live crown size exceeding 100m²; The tree is a good representative of the species in terms of its form and branching habit with minor deviations from normal (e.g. crown distortion/suppression) with a crown density of at least 70% (normal); The subject tree is visible from the street and surrounding properties and makes a positive contribution to the visual character and the amenity of the area
4. MODERATE	The tree has no known or suspected historical association, but does not detract or diminish the value of the item and is sympathetic to the original era of planting.	The subject tree is a non-local native or exotic species that is protected under the provisions of this DCP.	The subject tree has a medium live crown size exceeding 40m²;The tree is a fair representative of the species, exhibiting moderate deviations from typical form (distortion/suppression etc) with a crown density of more than 50% (thinning to normal); and
			The tree is visible from surrounding properties, but is not visually prominent – view may be partially obscured by other vegetation or built forms. The tree makes a fair contribution to the visual character and amenity of the area.
5. LOW	The subject tree detracts from heritage values or diminishes the value of a heritage item	The subject tree is scheduled as exempt (not protected) under the provisions of this DCP due to its species, nuisance or position relative to buildings or other structures.	The subject tree has a small live crown size of less than 40m² and can be replaced within the short term (5-10 years) with new tree planting
6. VERY LOW	The subject tree is causing significant damage to a heritage Item.	The subject tree is listed as an Environment Weed Species in the relevant Local Government Area, being invasive, or is a known nuisance species.	The subject tree is not visible from surrounding properties (visibility obscured) and makes a negligible contribution or has a negative impact on the amenity and visual character of the area. The tree is a poor representative of the species, showing significant deviations from the typical form and branching habit with a crown density of less than 50% (sparse).
7. INSIGNIFICANT	The tree is completely dead and has no visible habitat value	The tree is a declared Noxious Weed under the Noxious Weeds Act (NSW) 1993 within the relevant Local Government Area.	The tree is completely dead and represents a potential hazard.

Ref:- Morton, A (2006) **Determining the Retention Value of Trees on Development Sites**

TreeNet - Proceedings of the 7th National Street Tree Symposium 2006 Government of South Australia Department for Transport, Energy and Infrastructure

APPENDIX 2 – ACCEPTABLE INCURSIONS TO THE TREE PROTECTION ZONE (TPZ)



NOTE: Less than 10% TPZ area and outside SRZ. Any loss of TPZ compensated for elsewhere.

REF:- Council of Standards Australia (August 2009)
AS 4970 – 2009 – Protection of Trees on Development Sites
Standards Australia, Sydney

APPENDIX 3 - TREE HEALTH AND CONDITION ASSESSMENT SCHEDULE

Tree Identification No.	Species	Height (m)	Spread (m)	Trunk Diameter (mm)	Live Crown Size (m^2)	Maturity Class	Condition	Previous Pruning	Health		Remaining Safe Useful Life Expectancy (SULE)	Landscape Significance Rating	Retention Value	Location
									Vigour	Pest & Disease				
192	***Sapium sebiferum*** (Chinese Tallow tree)	5	5	236	15	SM	Appears stable with sound branching structure. Growing on steep embankment.	Selectively pruned & deadwooded.	Good	No Evidence	Long - more than 40 years	5	**Moderate**	On-site
193	***Sapium sebiferum*** (Chinese Tallow tree)	5	4	236	12	SM	Appears stable with sound branching structure. Growing on steep embankment. Exhibits a very prominent lean to the north-east (self-corrected).	Selectively pruned & deadwooded.	Good	No Evidence	Long - more than 40 years	5	**Moderate**	On-site
194	***Sapium sebiferum*** (Chinese Tallow tree)	6	5	255	20	SM	Appears stable with fair branching structure. Growing on steep embankment. Multiple epib=cormic sprouts emanating from old pruning wounds at 2.5 metres.	Lopped at 2.5 metres (crown restored)	Good	No Evidence	Medium 15-40 Years	5	**Low**	On-site
195	***Eucalyptus robusta*** (Swamp Mahogany)	12	12	510	96	M	Appears stable with sound branching structure. Located within small traffic island. Lifting and displacing asphalt pavement.	Crown lifted to 2 metres. Deadwooded.	Good	No Evidence	Short 5-15 Years	3	**Moderate**	On-site
195a	Row of 8 x ***Allocasuarina torulosa*** (Forest Oak)	8	5	229	35	SM	Appears stable with fair branching structure.	No Evidence	Very Good	No Evidence	Long - more than 40 years	5	**Moderate**	On-site
195b	Row of 5 x ***Syzygium australe*** (Lillypilly)	5	5	150	25	SM	Appears stable with fair branching structure.	No Evidence	Very Good	No Evidence	Long - more than 40 years	5	**Moderate**	Nature strip
196	***Lagerstroemia indica*** (Crepe Myrtle)	5	7	300	21	M	Appears stable with fair branching structure.	No Evidence	Good	No Evidence	Medium 15-40 Years	5	**Low**	On-site
196a	***Acmena smithii*** (Lillypilly)	8	7	309	42	SM	Appears stable with sound branching structure.	Crown lifted to 2 metres	Good	No Evidence	Medium 15-40 Years	4	**Moderate**	On-site
196b	***Pittosporum undulatum*** (Sweet Pittosporum)	7	4	166	20	SM	Appears stable with fair branching structure.	Crown lifted to 2 metres	Good	No Evidence	Short 5-15 Years	5	**Low**	On-site
196c	***Olea europaea var africana*** (African Olive)	6	6	150x3	24	SM	Appears stable with poor branching structure. Exhibits multiple moderate bark inclusions at GL.	Crown lifted to 2 metres	Good	No Evidence	Short 5-15 Years	6	**Very Low**	On-site

PL = Primary Limb; SL = Secondary Limb;
TL = Tertiary Limb. GL = Ground Level

APPENDIX 3 - TREE HEALTH AND CONDITION ASSESSMENT SCHEDULE

Tree Identification No.	Species	Height (m)	Spread (m)	Trunk Diameter (mm)	Live Crown Size (m^2)	Maturity Class	Condition	Previous Pruning	Health		Remaining Safe Useful Life Expectancy (SULE)	Landscape Significance Rating	Retention Value	Location
									Vigour	Pest & Disease				
197	***Tibouchina granulosa*** (Lasiandra)	4	4	160	12	SM	Appears stable with sound branching structure.	No Evidence	Fair with slightly thinning crown	No Evidence	Short 5-15 Years	5	Low	On-site
198	***Eucalyptus globulus subsp. globulus*** (Tasmanian Blue Gum)	18	14	646	168	M	Appears stable with sound branching structure. Some dieback with 10% deadwood. Exhibits multiple axial wound on trunk at 5 metres with decay and part cavity. Moderate wound and suspected cavity at 10 metres at junction of PLs.	Deadwooded	Fair with slightly thinning crown	Suspected Phellinus sp. (Bracket Fungus) infection at 5 metres	Short 5-15 Years	3	Moderate	Nature strip
199	***Callistemon salignus*** (Willow Bottlebrush)	7	7	380	42	M	Appears stable with poor branching structure. Exhibits a broken suspended TL at 3-4 metres. Moderate wound at 4 metres due branch loss. Multiple high bark inclusions at 1 metre at junctions of PLs.	Crown lifted to 2 metres. Lopped to clear domestic powerline	Good	No Evidence	Short 5-15 Years	4	Low	Nature strip
200	***Erythrina crista-galli*** (Cockscomb Coral)	4	5	180 + 150	10	SM	Appears stable with fair branching structure.	Crown lifted to 2 metres. Deadwooded.	Fair	No Evidence	Short 5-15 Years	6	Very Low	Nature strip
201	***Liquidambar styraciflua*** (Liquidambar)	18	14	739	210	M	Appears stable with sound branching structure. Exhibits a moderate wound and decay at 3 metres.	Selectively pruned & deadwooded	Good	No Evidence	Medium 15-40 Years	3	Moderate	On-site
202	***Liquidambar styraciflua*** (Liquidambar)	16	18	860	216	M	Appears stable with poor branching structure. Exhibits multiple co-dominant PLs at 7 metres (7). Multiple low bark inclusions at 2 metres. Crown suppressed on the east side due to crowding.	Selectively pruned & deadwooded	Good	No Evidence	Medium 15-40 Years	3	Moderate	On-site
203	***Phoenix canariensis*** (Canary Island Palm)	5	6	600	24	I	Appears stable with sound branching structure.	Crown lifted to 1 metre.	Very Good	No Evidence	Long - more than 40 years	6	Low	On-site
203a	***Cinnamomum camphora*** (Camphor Laurel)	8	7	180x3	42	SM	Appears stable with sound branching structure.	No Evidence	Good	Moderate Possum defoliation	Short 5-15 Years	7	Very Low	On-site

PL = Primary Limb; SL = Secondary Limb; TL = Tertiary Limb. GL = Ground Level

APPENDIX 3 - TREE HEALTH AND CONDITION ASSESSMENT SCHEDULE

Tree Identification No.	Species	Height (m)	Spread (m)	Trunk Diameter (mm)	Live Crown Size (m^2)	Maturity Class	Condition	Previous Pruning	Health		Remaining Safe Useful Life Expectancy (SULE)	Landscape Significance Rating	Retention Value	Location
									Vigour	Pest & Disease				
204	***Cinnamomum camphora*** (Camphor Laurel)	9	9	380	63	SM	Appears stable with sound branching structure.	Selectively pruned.	Good	Moderate Possum defoliation	Long - more than 40 years	7	Very Low	On-site
205	***Malus sp*** (Apple)	5	5	200	20	M	Appears stable with fair branching structure.	Selectively pruned.	Fair with thinning crown	No Evidence	Short 5-15 Years	6	Very Low	On-site
206	***Malus sp*** (Apple)	5	7	350	28	M	Appears stable with fair branching structure.	Selectively pruned.	Fair with thinning crown	No Evidence	Short 5-15 Years	6	Very Low	On-site
206a	***Melaleuca styphelioides*** (Prickly Paperbark)	8	10	500	80	M	Appears stable with sound branching structure.	No Evidence	Very Good	No Evidence	Long - more than 40 years	4	Moderate	On-site
207	***Acer negundo*** (Box Elder)	5	6	229	24	I	Appears stable with sound branching structure. Located close to existing dwelling (< 1 metre)	Crown lifted to 2 metres	Very Good	No Evidence	Short 5-15 Years	6	Very Low	On-site
208	***Pyrus salicifolia*** (Silver Pear)	5	5	150	25	OM	Appears stable with poor branching structure.	Selectively pruned.	Poor with sparse crown	No Evidence	Transient (less than 5 years)	5	Very Low	On-site
209	***Corymbia maculata*** (Spotted Gum)	20	14	650	238	M	Appears stable with sound branching structure.	No Evidence	Very Good	No Evidence	Long - more than 40 years	3	High	Nature strip
210	***Agathis robusta*** (Queensland Kauri)	18	5	300	65	SM	Appears stable with sound branching structure.	No Evidence	Very Good	No Evidence	Long - more than 40 years	4	Moderate	Nature strip
211	***Jacaranda mimosifolia*** (Jacaranda)	6	6	255	30	SM	Appears stable with sound branching structure. Exhibits a prominent lean to the west (self-corrected).	Crown lifted to 3 metres	Good	No Evidence	Long - more than 40 years	4	Moderate	Nature strip
212	***Jacaranda mimosifolia*** (Jacaranda)	6	8	331	32	SM	Appears stable with sound branching structure.	Crown lifted to 2 metres. Deadwooded.	Good	No Evidence	Long - more than 40 years	4	Moderate	Nature strip
213	***Melaleuca quinquenervia*** (Broad-leaved Paperbark)	7	5	255 + 220	25	SM	Appears stable with poor branching structure. Exhibits a severe bark inclusion at GL.	Crown lifted to 2 metres	Fair with thinning crown	No Evidence	Short 5-15 Years	5	Low	Nature strip

PL = Primary Limb; SL = Secondary Limb; TL = Tertiary Limb. GL = Ground Level

APPENDIX 3 - TREE HEALTH AND CONDITION ASSESSMENT SCHEDULE

Tree Identification No.	Species	Height (m)	Spread (m)	Trunk Diameter (mm)	Live Crown Size (m^2)	Maturity Class	Condition	Previous Pruning	Health		Remaining Safe Useful Life Expectancy (SULE)	Landscape Significance Rating	Retention Value	Location
									Vigour	Pest & Disease				
214	***Melaleuca quinquenervia*** (Broad-leaved Paperbark)	7	6	357	30	SM	Appears stable with fair branching structure. Exhibits a large wound on trunk in branch collar of PL at 1 metre due branch loss.	Crown lifted to 2 metres	Fair with thinning crown	No Evidence	Short 5-15 Years	5	**Low**	Nature strip
226	***Eucalyptus botryoides*** (Bangalay)	20	18	440 + 420 + 450	270	M	Appears stable with poor branching structure. Exhibits multiple moderate wounds to lower trunk due borer damage. Multiple small bark inclusions at junction of co-dominant leaders close to GL.	Crown lifted to 3 metres	Fair	Severe longicorn borer infestation	Short 5-15 Years	3	**Moderate**	Nature strip
227	***Melaleuca quinquenervia*** (Broad-leaved Paperbark)	9	5	392	35	M	Appears stable with fair branching structure. Exhibits multiple high bark inclusions at 1 metre.	No Evidence	Fair with thinning crown	No Evidence	Short 5-15 Years	4	**Low**	Nature strip
228	***Melaleuca quinquenervia*** (Broad-leaved Paperbark)	8	3	210	15	SM	Appears stable with poor branching structure. Exhibits a high bark inclusion at 1.5 metres.	No Evidence	Poor with sparse crown	No Evidence	Transient (less than 5 years)	5	**Very Low**	Nature strip
229	***Eucalyptus punctata*** (Grey Gum)	22	16	825	256	M	Appears stable with sound branching structure. Exhibits a small axial wound in trunk at 2.5 metres with decay evident. 20% epicormic growth 15% deadwood.	No Evidence	Good	Moderate Phellinus sp. (Bracket Fungus) infection at 2.5 metres.	Long - more than 40 years	3	**High**	Nature strip
230	***Eucalyptus pilularis*** (Blackbutt)	20	8	360	136	SM	Appears stable with poor branching structure. Exhibits a severe bark inclusion at GL at junction of basal sprout/PL.	Crown lifted to 2 metres	Good	No Evidence	Medium 15-40 Years	4	**Moderate**	Nature strip
301	***Melaleuca styphelioides*** (Prickly Paperbark)	4	4	70x3	16	I	Appears stable with fair branching structure. Exhibits multiple moderate bark inclusions at GL.	No Evidence	Good	No Evidence	Long - more than 40 years	5	**Moderate**	On-site
302	***Acacia decurrens*** (Black Wattle)	6	5	169	25	SM	Appears stable with fair branching structure. Exhibits a prominent lean to the west.	No Evidence	Good	No Evidence	Short 5-15 Years	5	**Low**	On-site
303	***Acacia decurrens*** (Black Wattle)	5	4	100x2	16	I	Appears stable with poor branching structure. Exhibits a severe bark inclusion at GL	No Evidence	Poor with sparse crown	Severe borer infestation	Transient (less than 5 years)	5	**Very Low**	On-site

PL = Primary Limb; SL = Secondary Limb; TL = Tertiary Limb. GL = Ground Level

APPENDIX 3 - TREE HEALTH AND CONDITION ASSESSMENT SCHEDULE

Tree Identification No.	Species	Height (m)	Spread (m)	Trunk Diameter (mm)	Live Crown Size (m^2)	Maturity Class	Condition	Previous Pruning	Health		Remaining Safe Useful Life Expectancy (SULE)	Landscape Significance Rating	Retention Value	Location
									Vigour	Pest & Disease				
304	***Allocasuarina torulosa*** (Forest Oak)	5	3	143	9	SM	Appears stable with sound branching structure. Exhibits a prominent lean to the west.	No Evidence	Good	No Evidence	Medium 15-40 Years	5	**Low**	On-site
305	***Melaleuca styphelioides*** (Prickly Paperbark)	6	3	131	15	I	Appears stable with fair branching structure. Exhibits a moderate bark inclusion at junction of co-dominant PLs at 3.5 metres.	No Evidence	Fair	No Evidence	Medium 15-40 Years	5	**Low**	On-site
306	***Eucalyptus sp.*** (Eucalypt)	5	6	191	12	SM	Stability suspect with poor branching structure. Exhibits a very prominent lean to the north-west. Poor form and habit.	No Evidence	Fair	No Evidence	Transient (less than 5 years)	5	**Very Low**	On-site
307	***Corymbia maculata*** (Spotted Gum)	23	11	739	198	M	Appears stable with sound branching structure.	No Evidence	Very Good	No evidence	Long - more than 40 years	2	**High**	On-site
308	***Corymbia maculata*** (Spotted Gum)	22	10	646	170	M	Appears stable with sound branching structure.	No Evidence	Very Good	No evidence	Long - more than 40 years	2	**High**	On-site
309	***Eucalyptus globulus subsp. globulus*** (Tasmanian Blue Gum)	10	6	379	48	SM	Appears stable with fair branching structure. Crown suppressed on the west side due to overshadowing. Main lader suppressed & distorted. Prominent lean to the east.	No Evidence	Good	No Evidence	Short 5-15 Years	4	**Low**	On-site
310	***Eucalyptus scoparia*** (Willow Gum)	12	7	258	77	SM	Appears stable with poor branching structure. Crown suppressed on the north-east side due to overshadowing. Prominent lean to the east. Exhibits some dieback with 25% deadwood and 40% epicormic growth.	No Evidence	Poor with sparse crown	No Evidence	Short 5-15 Years	5	**Low**	On-site
311	***Eucalyptus tereticornis*** (Forest Red Gum)	18	8	373	80	SM	Appears stable with sound branching structure.	No Evidence	Good	No Evidence	Long - more than 40 years	3	**High**	On-site
312	***Eucalyptus crebra*** (Narrow-leaved Ironbark)	13	5	229	45	SM	Appears stable with sound branching structure.	No Evidence	Good	No Evidence	Long - more than 40 years	4	**Moderate**	On-site
313	***Corymbia maculata*** (Spotted Gum)	11	5	213	35	SM	Appears stable with sound branching structure.	No Evidence	Very Good	No Evidence	Long - more than 40 years	5	**Moderate**	On-site

PL = Primary Limb; SL = Secondary Limb; TL = Tertiary Limb. GL = Ground Level

APPENDIX 3 - TREE HEALTH AND CONDITION ASSESSMENT SCHEDULE

Tree Identification No.	Species	Height (m)	Spread (m)	Trunk Diameter (mm)	Live Crown Size (m^2)	Maturity Class	Condition	Previous Pruning	Health		Remaining Safe Useful Life Expectancy (SULE)	Landscape Significance Rating	Retention Value	Location
									Vigour	Pest & Disease				
314	***Corymbia maculata*** (Spotted Gum)	15	7	420	70	M	Appears stable with sound branching structure. Crown suppressed on the west side due to crowding.	No Evidence	Very Good	No Evidence	Long - more than 40 years	3	**High**	On-site
315	***Corymbia maculata*** (Spotted Gum)	20	8	497	128	M	Appears stable with sound branching structure.	No Evidence	Very Good	No Evidence	Long - more than 40 years	3	**High**	On-site
316	***Eucalyptus sp.*** (Scribbly Gum)	6	5	185	10	SM	Appears stable with fair branching structure. Exhibits a prominent lean to the west. Multiple moderate wounds from GL to 1 metre due borer damage.	No Evidence	Fair	Low borer infestation.	Short 5-15 Years	5	**Low**	On-site
317	***Eucalyptus pilularis*** (Blackbutt)	12	8	318	48	SM	Stability suspect with poor branching structure. Exhibits a large wound at GL with decay due previous branch loss (main leader broken out at 0.3 metres). Very prominent lean to the north-west (self-corrected).	No Evidence	Fair	Moderate borer infestation.	Transient (less than 5 years)	5	**Very Low**	On-site
318	***Corymbia maculata*** (Spotted Gum)	18	9	382	117	M	Appears stable with sound branching structure.	Deadwooded	Good	No Evidence	Long - more than 40 years	3	**High**	On-site
319	***Eucalyptus pilularis*** (Blackbutt)	9	5	201	30	I	Appears stable with sound branching structure.	No Evidence	Good	No Evidence	Long - more than 40 years	5	**Moderate**	On-site
320	***Corymbia maculata*** (Spotted Gum)	8	4	159	24	I	Appears stable with sound branching structure.	No Evidence	Good	No Evidence	Long - more than 40 years	5	**Moderate**	On-site
321	***Angophora costata*** (Sydney Red Gum)	17	7	293	77	SM	Appears stable with sound branching structure.	No Evidence	Very Good	No Evidence	Long - more than 40 years	3	**High**	On-site
322	***Eucalyptus sp.*** (Scribbly Gum)	7	6	277	30	SM	Appears stable with sound branching structure.	No Evidence	Good	No Evidence	Long - more than 40 years	4	**Moderate**	On-site
323	***Casuarina cunninghamiana (River Oak)***	6	3	182	15	I	Appears stable with fair branching structure. Exhibits a moderate occluded axial wound on lower trunk from GL to 1.5 metres. Upper crown suppressed due overshadowing.	No Evidence	Good	No Evidence	Short 5-15 Years	5	**Low**	On-site

PL = Primary Limb; SL = Secondary Limb; TL = Tertiary Limb. GL = Ground Level

APPENDIX 3 - TREE HEALTH AND CONDITION ASSESSMENT SCHEDULE

Tree Identification No.	Species	Height (m)	Spread (m)	Trunk Diameter (mm)	Live Crown Size (m^2)	Maturity Class	Condition	Previous Pruning	Health		Remaining Safe Useful Life Expectancy (SULE)	Landscape Significance Rating	Retention Value	Location
									Vigour	Pest & Disease				
324	***Eucalyptus saligna*** (Sydney Blue Gum)	23	6	325	102	SM	Appears stable with sound branching structure.	No Evidence	Good	No Evidence	Long - more than 40 years	3	High	On-site
325	***Eucalyptus acmenioides*** (White Mahogany)	11	4	188	20	I	Appears stable with sound branching structure.	No Evidence	Good	No Evidence	Long - more than 40 years	4	Moderate	On-site
326	***Eucalyptus acmenioides*** (White Mahogany)	13	5	248	40	SM	Appears stable with sound branching structure.	No Evidence	Good	No Evidence	Long - more than 40 years	4	Moderate	On-site
327	***Eucalyptus sp.*** (Eucalypt)	5	5	150	20	I	Appears stable with poor branching structure. Exhibits a very prominent lean to the west. 50% epicormic growth and 10% deadwood.	No Evidence	Fair with thinning crown	No Evidence	Short 5-15 Years	5	Low	On-site
328	***Corymbia eximia*** (Yellow Bloodwood)	22	14	538	238	M	Appears stable with sound branching structure.	No Evidence	Very Good	No Evidence	Long - more than 40 years	3	High	On-site
329	***Syncarpia glomulifera*** (Turpentine)	8	5	226	40	SM	Appears stable with sound branching structure.	No Evidence	Very Good	No Evidence	Long - more than 40 years	5	Moderate	On-site
330	***Eucalyptus sp.*** (Scribbly Gum)	6	4	169	16	I	Appears stable with sound branching structure. Exhibits a prominent lean to the east. Small wound on lower trunk due to mechanical injury.	No Evidence	Good	No Evidence	Short 5-15 Years	5	Low	On-site
332	***Eucalyptus crebra*** (Narrow-leaved Ironbark)	12	6	197	60	I	Appears stable with sound branching structure.	No Evidence	Good	No Evidence	Long - more than 40 years	4	Moderate	On-site
333	***Eucalyptus pilularis*** (Blackbutt)	14	4	182	36	I	Appears stable with sound branching structure.	No Evidence	Good	No Evidence	Long - more than 40 years	4	Moderate	On-site
334	***Syncarpia glomulifera*** (Turpentine)	10	5	239	45	SM	Appears stable with sound branching structure.	No Evidence	Good	No Evidence	Long - more than 40 years	4	Moderate	On-site
336	***Corymbia maculata*** (Spotted Gum)	9	4	175	16	I	Appears stable with sound branching structure.	No Evidence	Good	No Evidence	Long - more than 40 years	5	Moderate	On-site

PL = Primary Limb; SL = Secondary Limb; TL = Tertiary Limb. GL = Ground Level

APPENDIX 3 - TREE HEALTH AND CONDITION ASSESSMENT SCHEDULE

Tree Identification No.	Species	Height (m)	Spread (m)	Trunk Diameter (mm)	Live Crown Size (m^2)	Maturity Class	Condition	Previous Pruning	Health		Remaining Safe Useful Life Expectancy (SULE)	Landscape Significance Rating	Retention Value	Location
									Vigour	Pest & Disease				
337	***Eucalyptus globulus subsp. globulus*** (Tasmanian Blue Gum)	11	4	140	28	I	Appears stable with sound branching structure. Exhibits a prominent lean to the south-east.	No Evidence	Good	No Evidence	Short 5-15 Years	5	**Low**	On-site
338	***Eucalyptus pilularis*** (Blackbutt)	20	4	255	32	SM	Appears stable with sound branching structure. Exhibits a moderate occluded axial wound from GL to 1 metre.	No Evidence	Good	No Evidence	Long - more than 40 years	5	**Moderate**	On-site
339	***Syncarpia glomulifera*** (Turpentine)	9	4	162	32	SM	Appears stable with sound branching structure.	No Evidence	Good	No Evidence	Long - more than 40 years	5	**Moderate**	On-site
340	***Eucalyptus punctata*** (Grey Gum)	11	5	150	40	I	Appears stable with sound branching structure.	No Evidence	Good	No Evidence	Long - more than 40 years	5	**Moderate**	On-site
341	***Corymbia maculata*** (Spotted Gum)	10	5	175	35	I	Appears stable with sound branching structure.	No Evidence	Good	No Evidence	Long - more than 40 years	5	**Moderate**	On-site
342	***Corymbia maculata*** (Spotted Gum)	23	10	621	170	M	Appears stable with sound branching structure.	No Evidence	Very Good	No Evidence	Long - more than 40 years	3	**High**	On-site
343	***Eucalyptus acmenioides*** (White Mahogany)	8	5	140 + 115	20	I	Appears stable with fair branching structure. Exhibits twin co-dominant trunks at GL.	No Evidence	Fair	No Evidence	Short 5-15 Years	5	**Low**	On-site
344	***Syncarpia glomulifera*** (Turpentine)	7	5	169	30	I	Appears stable with sound branching structure.	No Evidence	Good	No Evidence	Long - more than 40 years	5	**Moderate**	On-site
345	***Eucaltptus sp.*** (Eucalypt)	15	14	583	182	M	Appears stable with sound branching structure.	No Evidence	Very Good	No Evidence	Long - more than 40 years	3	**High**	On-site
346	***Corymbia maculata*** (Spotted Gum)	11	4	166	20	I	Appears stable with sound branching structure.	No Evidence	Good	No Evidence	Long - more than 40 years	5	**Moderate**	On-site
347	***Eucalyptus saligna*** (Sydney Blue Gum)	20	6	283	60	SM	Appears stable with sound branching structure. Exhibits a moderate occluded wound at GL due to mechanical injury.	No Evidence	Good	No Evidence	Long - more than 40 years	4	**Moderate**	On-site

PL = Primary Limb; SL = Secondary Limb; TL = Tertiary Limb. GL = Ground Level

APPENDIX 3 - TREE HEALTH AND CONDITION ASSESSMENT SCHEDULE

Tree Identification No.	Species	Height (m)	Spread (m)	Trunk Diameter (mm)	Live Crown Size (m^2)	Maturity Class	Condition	Previous Pruning	Health		Remaining Safe Useful Life Expectancy (SULE)	Landscape Significance Rating	Retention Value	Location
									Vigour	Pest & Disease				
348	***Eucalyptus pilularis*** (Blackbutt)	15	8	255	88	SM	Appears stable with sound branching structure. Upper crown suppressed due to overshadowing.	No Evidence	Good	No Evidence	Short 5-15 Years	4	**Low**	On-site
349	***Eucalyptus paniculata*** (Grey Ironbark)	22	10	510	160	M	Appears stable with sound branching structure.	No Evidence	Very Good	No Evidence	Long - more than 40 years	3	**Moderate**	On-site
350	***Eucalyptus globulus subsp. globulus*** (Tasmanian Blue Gum)	16	7	293	56	SM	Stability suspect with sound branching structure. Exhibits a very prominent lean to the south.	No Evidence	Fair with slightly thinning crown	No Evidence	Short 5-15 Years	4	**Low**	On-site
600	***Eucalyptus punctata*** (Grey Gum)	15	8	350	88	SM	Appears stable with sound branching structure. Upper crown suppressed on west side due to overshadowing with distorted leader.	No Evidence	Good	No Evidence	Long - more than 40 years	4	**Moderate**	On-site
601	***Casuarina glauca*** (Swamp Oak)	13	4	217	40	SM	Appears stable with fair branching structure.	No Evidence	Fair with thinning crown	No Evidence	Short 5-15 Years	5	**Low**	On-site
602	***Eucalyptus grandis*** (Flooded Gum)	25	9	420	171	M	Appears stable with sound branching structure.	No Evidence	Good	No Evidence	Long - more than 40 years	3	**High**	On-site
603	***Corymbia eximia*** (Yellow Bloodwood)	12	11	446	110	SM	Appears stable with fair branching structure.	No Evidence	Good	No Evidence	Long - more than 40 years	4	**Moderate**	On-site
604	***Corymbia maculata*** (Spotted Gum)	8	4	150	12	I	Appears stable with sound branching structure. Upper crown suppressed due to overshadowing with distorted leader.	No Evidence	Fair	No Evidence	Short 5-15 Years	5	**Low**	On-site
605	***Acacia decurrens*** (Black Wattle)	8	8	210	56	M	Appears stable with sound branching structure. Moderate wound at 3 metres due to branch loss (PL).	No Evidence	Good	Low borer infestation	Short 5-15 Years	4	**Low**	On-site
606	***Acacia decurrens*** (Black Wattle)	9	7	245	56	M	Appears stable with sound branching structure. Exhibits a prominent lean to the west.	No Evidence	Good	Low borer infestation	Short 5-15 Years	4	**Low**	On-site

PL = Primary Limb; SL = Secondary Limb;
TL = Tertiary Limb. GL = Ground Level

APPENDIX 4 - IMPACT ASSESSMENT SCHEDULE

Tree Identification No.	Species	Construction Tolerance	Tree Protection Zone (m R)	Structural Root Zone (m R)	TPZ (m^2)	Incursions To Root Zone &/or Canopy	Likely Impact	Recommendation
148	***Livistona australis*** (Cabbage Tree Palm)	G	4.2	2.1	55.4	No proposed works within TPZ.	No adverse impact.	To be retained - no special tree protection measures required.
148a	***Howea forsteriana*** (Kentia Palm)	G	2.6	1.8	21.9	Located within footprint of proposed new terrace garden area at RL? & close to proposed retaining walls (< 1 metre).	Proposed works will necessitate removal.	Remove tree.
148b	***Howea forsteriana*** (Kentia Palm)	G	2.4	1.7	18.2	Located within footprint of proposed new terrace garden area at RL? & close to proposed retaining walls (< 1 metre).	Proposed works will necessitate removal.	Remove tree.
149	***Camellia sasanqua*** (Sasanqua)	M	4.8	2.3	72.3	No proposed works within TPZ.	No adverse impact.	To be retained - no special tree protection measures required.
150	***Ulmus parvifolia*** (Chinese Elm)	M	5.0	1.9	78.5	No proposed works within TPZ.	No adverse impact.	To be retained - no special tree protection measures required.
151	***Syzygium paniculatum*** (Magenta Cherry)	M	4.1	2.1	53.5	No proposed works within TPZ.	No adverse impact.	To be retained - no special tree protection measures required.
151a	***Trachycarpus fortunei*** (Chinese Windmill Palm)	M	2.4	1.7	18.1	No proposed works within TPZ.	No adverse impact.	To be retained - no special tree protection measures required.
152	***Syzygium paniculatum*** (Magenta Cherry)	M	4.0	2.0	50.2	No proposed works within TPZ.	No adverse impact.	To be retained - no special tree protection measures required.
153	***Syzygium paniculatum*** (Magenta Cherry)	M	3.0	1.8	28.3	No proposed works within TPZ.	No adverse impact.	To be retained - no special tree protection measures required.
154	***Sapium sebiferum*** (Chinese Tallow tree)	M	4.2	2.1	56.5	No proposed works within TPZ.	No adverse impact.	To be retained - no special tree protection measures required.
154a	***Trachycarpus fortunei*** (Chinese Windmill Palm)	M	2.4	1.7	18.1	No proposed works within TPZ.	No adverse impact.	To be retained - no special tree protection measures required.

PL = Primary Limb; SL = Secondary Limb; TL = Tertiary Limb. GL = Ground Level

APPENDIX 4 - IMPACT ASSESSMENT SCHEDULE

Tree Identification No.	Species	Construction Tolerance	Tree Protection Zone (m R)	Structural Root Zone (m R)	TPZ (m^2)	Incursions To Root Zone &/or Canopy	Likely Impact	Recommendation
155	***Syzygium paniculatum*** (Magenta Cherry)	M	3.1	1.9	30.1	No proposed works within TPZ.	No adverse impact.	To be retained - no special tree protection measures required.
156	***Syzygium paniculatum*** (Magenta Cherry)	M	2.3	1.7	16.5	No proposed works within TPZ.	No adverse impact.	To be retained - no special tree protection measures required.
157	***Sapium sebiferum*** (Chinese Tallow tree)	M	4.0	2.0	50.2	No proposed works within TPZ.	No adverse impact.	To be retained - no special tree protection measures required.
159	***Metasequoia glyptostroboides*** (Dawn Redwood)	M	5.9	2.5	108.8	No proposed works within TPZ.	No adverse impact.	To be retained - no special tree protection measures required.
160	***Juniperus chinensis* 'Pfitzeriana'** (Juniper)	M	2.9	1.8	26.0	No proposed works within TPZ.	No adverse impact.	To be retained - no special tree protection measures required.
161	***Thuja plicata*** (Western Red Cedar)	M	3.0	2.5	28.3	No proposed works within TPZ.	No adverse impact.	To be retained - no special tree protection measures required.
162	***Juniperus chinensis* 'Pfitzeriana'** (Juniper)	M	2.9	1.8	26.0	No proposed works within TPZ.	No adverse impact.	To be retained - no special tree protection measures required.
165	***Jacaranda mimosifolia*** (Jacaranda)	M	7.0	2.4	153.9	Proposed lawn terrace and associated retaining wall offset 3.0 metres north at RL 193.80 (800mm above grade). Excavations for wall foundations and placement of non-engineered fill within TPZ. Encroachment to TPZ = 8%.	Extent of encroachment to root zone is less than 10% of the TPZ, which is within acceptable limits under AS 4970:2009. No adverse impact.	Retain in accordance with recommended Tree Protection Measures (Section 10). Install Tree Protection Fencing in accordance with Section 10.3. Undertake all excavations for new wall footings within TPZ in accordance with Section 10.6.
167	***Cyathea cooperi*** (Rough Tree Fern)	G	2.0	1.2	12.6	Proposed lawn terrace and associated retaining wall offset 0.5 metres north at RL 193.80 (800mm above grade). Excavations for wall foundations and placement of non-engineered fill within TPZ/SRZ.	Proposed works will necessitate removal.	Remove tree.

PL = Primary Limb; SL = Secondary Limb; TL = Tertiary Limb. GL = Ground Level

APPENDIX 4 - IMPACT ASSESSMENT SCHEDULE

Tree Identification No.	Species	Construction Tolerance	Tree Protection Zone (m R)	Structural Root Zone (m R)	TPZ (m^2)	Incursions To Root Zone &/or Canopy	Likely Impact	Recommendation
169	***Acer palmatum*** (Japanese Maple)	M	5.4	2.4	91.6	Proposed lawn terrace and associated retaining wall offset 2.4 metres north, east and west (semi-circular) at RL 193.80 (600mm above grade). Excavations for wall foundations and placement of non-engineered fill within TPZ (partly within footprint of existing building). Encroachment to TPZ = 40%.	Extent of encroachment to TPZ exceeds acceptable limits under AS 4970:2009. Proposed works may result in some adverse impact.	Retain in accordance with recommended Tree Protection Measures (Section 10). Install Tree Protection Fencing in accordance with Section 10.3. Demolish existing building within TPZ in accordance with Section 10.5. Undertake all excavations for new wall footings within TPZ in accordance with Section 10.6. Use pier and beam footings to bridge woody roots where required. Install fill for new landscape terrace in accordance with Section 10.10.
170	***Sapium sebiferum*** (Chinese Tallow tree)	M	4.0	2.1	50.6	No proposed works within TPZ.	No adverse impact.	To be retained - no special tree protection measures required.
172	***Populus nigra* 'Italica'** (Lombardy Poplar)	M	5.4	2.4	91.2	Located within footprint of proposed new terrace lawn area at RL?	Proposed works will necessitate removal.	Remove tree.
173	***Populus nigra* 'Italica'** (Lombardy Poplar)	M	3.0	1.6	28.3	Located within footprint of proposed new terrace lawn area at RL?	Proposed works will necessitate removal.	Remove tree.
174	***Populus nigra* 'Italica'** (Lombardy Poplar)	M	3.7	2.0	44.0	Located within footprint of proposed new terrace lawn area at RL?	Proposed works will necessitate removal.	Remove tree.

PL = Primary Limb; SL = Secondary Limb; TL = Tertiary Limb. GL = Ground Level

APPENDIX 4 - IMPACT ASSESSMENT SCHEDULE

Tree Identification No.	Species	Construction Tolerance	Tree Protection Zone (m R)	Structural Root Zone (m R)	TPZ (m^2)	Incursions To Root Zone &/or Canopy	Likely Impact	Recommendation
177	***Betula sp [nigra]*** (Tropical Birch)	M	5.0	2.2	78.5	Proposed elevated pavement and stairs offset 2.3 metres west at RL193.00 (350mm above grade to RL 191.60 (150mm above grade). Excavations for pier footings within TPZ (partly within footprint of existing pavements). Proposed elevated pavement and stairs offset 4.3 metres north at RL193.00 (350mm above grade to RL 191.60 (150mm above grade). Excavations for pier footings within TPZ (partly within footprint of existing pavements).	Excavations for pier footings will not result in any adverse impact provided that all excavations within the TPZ are undertaken as recommended.	Retain in accordance with recommended Tree Protection Measures (Section 10). Install Tree Protection Fencing in accordance with Section 10.3. Demolish existing concrete pavements within TPZ in accordance with Section 10.5. Undertake all excavations for new pier footings within TPZ in accordance with Section 10.6.
178	***Betula sp [nigra]*** (Tropical Birch)	M	6.0	2.1	113.0	Proposed elevated pavement and stairs offset 3.1 metres west at RL191.60 (250mm above grade to RL 192.90 (1.5 metres above grade). Excavations for pier footings within TPZ (within footprint of existing roadway). Proposed elevated pavement and stairs offset 3.0 metres east at RL193.00 (350mm above grade to RL 191.60 (150mm above grade). Excavations for pier footings within TPZ (partly within footprint of existing pavements).	Excavations for pier footings will not result in any adverse impact provided that all excavations within the TPZ are undertaken as recommended.	Retain in accordance with recommended Tree Protection Measures (Section 10). Install Tree Protection Fencing in accordance with Section 10.3. Demolish existing concrete pavements within TPZ in accordance with Section 10.5. Undertake all excavations for new pier footings within TPZ in accordance with Section 10.6.
179	***Betula sp [nigra]*** (Tropical Birch)	M	7.0	2.4	153.9	Proposed elevated pavement and stairs offset 3.7 metres west at RL191.50 (700mm above grade to RL 189.70 (700mm below grade). Excavations for pier footings within and stair foundations within TPZ (within footprint of existing roadway). Encroachment to TPZ = 14%. Proposed paved area offset 3.4 metres NE at RL 191.50 (400mm above grade). Minor excavation and filling within TPZ for pavement sub-grade (partly within footprint of existing pavement).	Extent of encroachment to TPZ exceeds acceptable limits under AS 4970:2009. However, this tree will tolerate the extent of the encroachment proposed given the minimal increase in encroachment from the existing situation.	Retain in accordance with recommended Tree Protection Measures (Section 10). Install Tree Protection Fencing in accordance with Section 10.3. Demolish existing concrete pavements within TPZ in accordance with Section 10.5. Undertake all excavations for new pier footings within TPZ in accordance with Section 10.6.

PL = Primary Limb; SL = Secondary Limb; TL = Tertiary Limb. GL = Ground Level

APPENDIX 4 - IMPACT ASSESSMENT SCHEDULE

Tree Identification No.	Species	Construction Tolerance	Tree Protection Zone (m R)	Structural Root Zone (m R)	TPZ (m^2)	Incursions To Root Zone &/or Canopy	Likely Impact	Recommendation
180	***Magnolia grandiflora*** (Bullbay Magnolia)	M	4.5	2.2	63.9	Located within footprint of proposed new terrace garden area at RL? & close to proposed retaining walls (< 1 metre).	Proposed works will necessitate removal.	Undertake replacement planting with a new tree elsewhere within the site to compensate for loss of amenity in accordance with Section 11.
183	***Gleditsia triacanthos*** (Honey Locust)	M	4.0	1.6	50.2	No proposed works within TPZ.	No adverse impact.	To be retained - no special tree protection measures required.
185	***Liquidambar styraciflua*** (Liquidambar)	M	8.2	2.8	212.0	No proposed works within TPZ.	No adverse impact.	To be retained - no special tree protection measures required.
186	***Brachychiton discolor*** (Queensland Lacebark)	M	11.4	3.2	404.5	No proposed works within TPZ.	No adverse impact.	To be retained - no special tree protection measures required.
188	***Brachychiton discolor*** (Queensland Lacebark)	M	9.6	3.0	286.6	No proposed works within TPZ.	No adverse impact.	To be retained - no special tree protection measures required.
189	***Acer negundo*** (Box Elder)	M	6.0	2.4	113.0	No proposed works within TPZ.	No adverse impact.	To be retained - no special tree protection measures required.
190	***Tristaniopsis laurina*** (Water Gum)	M	3.4	2.0	37.1	No proposed works within TPZ.	No adverse impact.	To be retained - no special tree protection measures required.
190a	***Syzygium paniculatum*** (Magenta Cherry)	M	5.0	2.1	78.5	No proposed works within TPZ.	No adverse impact.	To be retained - no special tree protection measures required.
190b	***Syzygium paniculatum*** (Magenta Cherry)	M	5.0	2.2	78.5	No proposed works within TPZ.	No adverse impact.	To be retained - no special tree protection measures required.

PL = Primary Limb; SL = Secondary Limb; TL = Tertiary Limb. GL = Ground Level

APPENDIX 4 - IMPACT ASSESSMENT SCHEDULE

Tree Identification No.	Species	Construction Tolerance	Tree Protection Zone (m R)	Structural Root Zone (m R)	TPZ (m^2)	Incursions To Root Zone &/or Canopy	Likely Impact	Recommendation
192	***Sapium sebiferum*** (Chinese Tallow tree)	M	2.8	1.8	25.1	No proposed works within TPZ.	No adverse impact.	To be retained - no special tree protection measures required.
193	***Sapium sebiferum*** (Chinese Tallow tree)	M	2.8	1.8	25.1	No proposed works within TPZ.	No adverse impact.	To be retained - no special tree protection measures required.
194	***Sapium sebiferum*** (Chinese Tallow tree)	M	3.1	1.9	29.4	No proposed works within TPZ.	No adverse impact.	To be retained - no special tree protection measures required.
195	***Eucalyptus robusta*** (Swamp Mahogany)	P	7.0	2.5	153.9	Existing asphalt pavement and associated kerb and gutter offset 1.8 metres all round to be demolished within TPZ. Area to south to be returned to soft landscape and existing ground levels to be maintained. Proposed new fence offset 2.5 metres to the south. Excavations for post footings within TPZ. Proposed new pavement offset 2 metres north (beyond existing kerb, within footprint of existing asphalt) at RL 191.20 (close to existing grade). No increase in encroachment from present situation.	Extent of encroachment to TPZ exceeds acceptable limits under AS 4970:2009. However, this species will tolerate the extent of the encroachment proposed, provided all works within the TPZ are undertaken as recommended, given that there is no change from the present encroachment.	Retain in accordance with recommended Tree Protection Measures (Section 10). Install Tree Protection Fencing in accordance with Section 10.3. Demolish existing kerb and gutter and asphalt pavement within TPZ in accordance with Section 10.5. Undertake all excavations for new pavement sub-grade and fence footings within TPZ in accordance with Section 10.6.
195a	Row of 8 x ***Allocasuarina torulosa*** (Forest Oak)	M	2.8	1.8	23.8	Located within footprint of proposed pathway and associated stairs and retaining walls.	Proposed works will necessitate removal.	Undertake replacement planting with a new tree elsewhere within the site to compensate for loss of amenity in accordance with Section 11.
195b	Row of 5 x ***Syzygium australe*** (Lillypilly)	M	1.8	1.5	10.2	Located within footprint of proposed paved area.	Proposed works will necessitate removal.	Undertake replacement planting with a new tree elsewhere within the site to compensate for loss of amenity in accordance with Section 11.
196	***Lagerstroemia indica*** (Crepe Myrtle)	M	3.6	2.0	40.7	Located within footprint of proposed building.	Proposed works will necessitate removal.	Remove tree.

PL = Primary Limb; SL = Secondary Limb; TL = Tertiary Limb. GL = Ground Level

APPENDIX 4 - IMPACT ASSESSMENT SCHEDULE

Tree Identification No.	Species	Construction Tolerance	Tree Protection Zone (m R)	Structural Root Zone (m R)	TPZ (m^2)	Incursions To Root Zone &/or Canopy	Likely Impact	Recommendation
196a	***Acmena smithii*** (Lillypilly)	M	3.7	2.0	43.1	Located within footprint of proposed paved area.	Proposed works will necessitate removal.	Undertake replacement planting with a new tree elsewhere within the site to compensate for loss of amenity in accordance with Section 11.
196b	***Pittosporum undulatum*** (Sweet Pittosporum)	M	3.0	1.6	28.3	Located within footprint of proposed paved area.	Proposed works will necessitate removal.	Remove tree.
196c	***Olea europaea var africana*** (African Olive)	M	4.0	2.0	50.2	Located within footprint of proposed paved area.	Proposed works will necessitate removal.	Remove tree.
197	***Tibouchina granulosa*** (Lasiandra)	M	3.0	1.5	28.3	Located within footprint of proposed pathway.	No adverse impact.	Remove tree.
198	***Eucalyptus globulus subsp. globulus*** (Tasmanian Blue Gum)	P	7.8	2.8	189.0	No proposed works within TPZ.	No adverse impact.	To be retained - no special tree protection measures required.
199	***Callistemon salignus*** (Willow Bottlebrush)	M	4.6	2.2	65.3	Existing driveway offset 3.1 metres south to be demolished within TPZ.	No adverse impact, assuming that all demolition works within TPZ are undertaken as recommended.	Retain in accordance with recommended Tree Protection Measures (Section 10). Install Tree Protection Fencing in accordance with Section 10.3. Demolish existing concrete pavement within TPZ in accordance with Section 10.5.
200	***Erythrina crista-galli*** (Cockscomb Coral)	M	3.0	1.8	28.3	Located within footprint of proposed new landscape works.	Proposed works will necessitate removal.	Remove tree.
201	***Liquidambar styraciflua*** (Liquidambar)	M	8.9	2.9	246.8	Located within footprint of proposed entry pavement and building.	Proposed works will necessitate removal.	Undertake replacement planting with a new tree elsewhere within the site to compensate for loss of amenity in accordance with Section 11.

PL = Primary Limb; SL = Secondary Limb; TL = Tertiary Limb. GL = Ground Level

APPENDIX 4 - IMPACT ASSESSMENT SCHEDULE

Tree Identification No.	Species	Construction Tolerance	Tree Protection Zone (m R)	Structural Root Zone (m R)	TPZ (m^2)	Incursions To Root Zone &/or Canopy	Likely Impact	Recommendation
202	***Liquidambar styraciflua*** (Liquidambar)	M	10.3	3.1	334.3	Located within footprint of proposed building.	Proposed works will necessitate removal.	Undertake replacement planting with a new tree elsewhere within the site to compensate for loss of amenity in accordance with Section 11.
203	***Phoenix canariensis*** (Canary Island Palm)	G	5.0	2.7	78.5	Located within footprint of proposed pathway and associated stairs and retaining walls.	Proposed works will necessitate removal.	Remove tree.
203a	***Cinnamomum camphora*** (Camphor Laurel)	M	4.3	2.2	58.6	Located within footprint of proposed pathway and associated stairs and retaining walls.	Proposed works will necessitate removal.	Remove tree.
204	***Cinnamomum camphora*** (Camphor Laurel)	M	4.6	2.2	65.3	Located within footprint of proposed pathway and associated stairs and retaining walls.	Proposed works will necessitate removal.	Remove tree.
205	***Malus sp*** (Apple)	M	3.0	1.7	28.3	Located within footprint of proposed pathway and associated stairs and retaining walls.	Proposed works will necessitate removal.	Remove tree.
206	***Malus sp*** (Apple)	M	4.2	2.1	55.4	Proposed paved area and associated retaining wall offset 1.5 metres south-west at RL? Excavations for wall foundations within SRZ.	Proposed works will necessitate removal.	Remove tree.
206a	***Melaleuca styphelioides*** (Prickly Paperbark)	M	6.0	2.5	113.0	Located within footprint of proposed building (Boarding House).	Proposed works will necessitate removal.	Undertake replacement planting with a new tree elsewhere within the site to compensate for loss of amenity in accordance with Section 11.
207	***Acer negundo*** (Box Elder)	M	3.0	1.8	28.3	Located within footprint of proposed building (Boarding House).	Proposed works will necessitate removal.	Remove tree.
208	***Pyrus salicifolia*** (Silver Pear)	M	3.0	1.5	28.3	Existing building offset 2.5 metres and retaining wall 1.7 metres west to be demolished within TPZ.	No adverse impact, assuming that all demolition works within TPZ are undertaken as recommended.	Consider removal (poor specimen).

PL = Primary Limb; SL = Secondary Limb; TL = Tertiary Limb. GL = Ground Level

APPENDIX 4 - IMPACT ASSESSMENT SCHEDULE

Tree Identification No.	Species	Construction Tolerance	Tree Protection Zone (m R)	Structural Root Zone (m R)	TPZ (m^2)	Incursions To Root Zone &/or Canopy	Likely Impact	Recommendation
209	***Corymbia maculata*** (Spotted Gum)	P	7.8	2.8	191.0	Proposed building (Boarding House) offset 7.5 metres south-west at RL184.80 (4 metres below grade). Excavations for building foundations within TPZ. Minor encroachment to TPZ (1%). N.B - Extent of cut and fill TBC.	Extent of encroachment to root zone is less than 10% of the TPZ, which is within acceptable limits under AS 4970:2009. No adverse impact.	Retain in accordance with recommended Tree Protection Measures (Section 10). Install Tree Protection Fencing in accordance with Section 10.3. Undertake all excavations for building foundations within TPZ in accordance with Section 10.6.
210	***Agathis robusta*** (Queensland Kauri)	M	3.6	2.0	40.7	Proposed new pathway offset 2.0 metres north-west at RL? Excavations for pavement sub-grade within TPZ. Encroachment to TPZ = 15%.	Extent of encroachment to TPZ exceeds acceptable limits under AS 4970:2009. However, this species will tolerate the extent of the encroachment proposed, provided all works within the TPZ are undertaken as recommended.	Retain in accordance with recommended Tree Protection Measures (Section 10). Install Tree Protection Fencing in accordance with Section 10.3. Undertake all excavations for pavement sub-grade within TPZ in accordance with Section 10.6.
211	***Jacaranda mimosifolia*** (Jacaranda)	M	4.0	1.9	50.2	No proposed works within TPZ.	No adverse impact.	To be retained - no special tree protection measures required.
212	***Jacaranda mimosifolia*** (Jacaranda)	M	4.0	2.1	49.6	No proposed works within TPZ.	No adverse impact.	To be retained - no special tree protection measures required.
213	***Melaleuca quinquenervia*** (Broad-leaved Paperbark)	M	4.2	2.1	55.4	No proposed works within TPZ.	No adverse impact.	To be retained - no special tree protection measures required.
214	***Melaleuca quinquenervia*** (Broad-leaved Paperbark)	M	4.3	2.1	57.5	No proposed works within TPZ.	No adverse impact.	To be retained - no special tree protection measures required.
226	***Eucalyptus botryoides*** (Bangalay)	P	9.6	3.0	289.4	Proposed driveway (loading dock access) offset 1.6 metres south at RL? Excavations for pavement sub-grade within SRZ/TPZ. Encroachment to TPZ = 32%. NB extent of cut/fill batters TBC.	Extent of encroachment to TPZ exceeds acceptable limits under AS 4970:2009. Proposed works will result in an adverse impact.	Undertake replacement planting with a new tree elsewhere within the site to compensate for loss of amenity in accordance with Section 11.
227	***Melaleuca quinquenervia*** (Broad-leaved Paperbark)	M	4.7	2.2	69.4	Located within footprint of proposed driveway.	Proposed works will necessitate removal.	Remove tree.

PL = Primary Limb; SL = Secondary Limb; TL = Tertiary Limb. GL = Ground Level

APPENDIX 4 - IMPACT ASSESSMENT SCHEDULE

Tree Identification No.	Species	Construction Tolerance	Tree Protection Zone (m R)	Structural Root Zone (m R)	TPZ (m^2)	Incursions To Root Zone &/or Canopy	Likely Impact	Recommendation
228	***Melaleuca quinquenervia*** (Broad-leaved Paperbark)	M	2.5	1.7	20.0	Located within footprint of proposed driveway.	Proposed works will necessitate removal.	Remove tree.
229	***Eucalyptus punctata*** (Grey Gum)	P	9.9	3.1	307.6	Proposed driveway offset 2.8 metres north at RL186.18 (close to existing grade). Excavations for pavement sub-grade within SRZ/TPZ. Encroachment to TPZ = 23%. NB extent of cut/fill batters TBC.	Extent of encroachment to TPZ exceeds acceptable limits under AS 4970:2009. Proposed works will result in an adverse impact.	Retain in accordance with recommended Tree Protection Measures (Section 10). Install Tree Protection Fencing in accordance with Section 10.3. Undertake all excavations for pavement sub-grade within TPZ in accordance with Section 10.6. Place driveway above grade within TPZ where possible in accordance with Sections 10.8 & 10.9 to minimise excavation for the pavement sub-grade.
230	***Eucalyptus pilularis*** (Blackbutt)	P	5.5	2.2	95.0	No proposed works within TPZ.	No adverse impact.	To be retained - no special tree protection measures required.
301	***Melaleuca styphelioides*** (Prickly Paperbark)	M	2.0	1.4	12.6	Located within footprint of proposed building (Boarding House).	Proposed works will necessitate removal.	Undertake replacement planting with a new tree elsewhere within the site to compensate for loss of amenity in accordance with Section 11.
302	***Acacia decurrens*** (Black Wattle)	M	3.0	1.6	28.3	Located within footprint of proposed building (Boarding House).	Proposed works will necessitate removal.	Remove tree.
303	***Acacia decurrens*** (Black Wattle)	M	2.5	1.5	19.6	Located within footprint of proposed building (Boarding House).	Proposed works will necessitate removal.	Remove tree.
304	***Allocasuarina torulosa*** (Forest Oak)	M	1.7	1.5	9.3	Located within footprint of proposed building (Boarding House).	Proposed works will necessitate removal.	Remove tree.
305	***Melaleuca styphelioides*** (Prickly Paperbark)	M	1.6	1.4	7.7	Located within footprint of proposed building (Boarding House).	Proposed works will necessitate removal.	Remove tree.

PL = Primary Limb; SL = Secondary Limb; TL = Tertiary Limb. GL = Ground Level

APPENDIX 4 - IMPACT ASSESSMENT SCHEDULE

Tree Identification No.	Species	Construction Tolerance	Tree Protection Zone (m R)	Structural Root Zone (m R)	TPZ (m^2)	Incursions To Root Zone &/or Canopy	Likely Impact	Recommendation
306	***Eucalyptus sp.*** (Eucalypt)	P	4.0	1.7	50.2	Located within footprint of proposed building (Boarding House).	Proposed works will necessitate removal.	Remove tree.
307	***Corymbia maculata*** (Spotted Gum)	P	8.9	2.9	246.8	Located within footprint of proposed building (Boarding House).	Proposed works will necessitate removal. There are no feasible options that can be recommended to preserve this tree given the extent of the development and the location of this tree within the site.	Undertake replacement planting with a new tree elsewhere within the site to compensate for loss of amenity in accordance with Section 11.
308	***Corymbia maculata*** (Spotted Gum)	P	7.8	2.8	189.0	Proposed building (Boarding House) offset 2.9 metres west at RL181.90 (5.6 metres below grade). Excavations for building foundations within TPZ/SRZ. Encroachment to TPZ = 24%. Courtyard offset 0.4 metres west at FFL 187.90 (at grade to 600mm above grade). Placement of fill for terrace within TPZ. Cumulative encroachment = 35%	Proposed works will necessitate removal. There are no feasible options that can be recommended to preserve this tree given the extent of the development and the location of this tree within the site.	Undertake replacement planting with a new tree elsewhere within the site to compensate for loss of amenity in accordance with Section 11.
309	***Eucalyptus globulus subsp. globulus*** (Tasmanian Blue Gum)	P	4.5	2.2	64.9	Proposed building (Boarding House) offset 4.6 metres west at RL181.90 (5.6 metres below grade). No encroachment to TPZ (extent of cut and fill TBC). Courtyard offset 2.1 metres west at FFL187.90 (at grade to 600mm above grade). Placement of fill for terrace within TPZ. Cumulative encroachment = 19%	Extent of encroachment to TPZ exceeds acceptable limits under AS 4970:2009. Proposed works may result in some adverse impact.	Remove tree.
310	***Eucalyptus scoparia*** (Willow Gum)	P	4.0	1.9	50.2	No proposed works within TPZ. N.B. Extent of cut and fill for building foundations TBC.	No adverse impact.	Remove tree.
311	***Eucalyptus tereticornis*** (Forest Red Gum)	P	4.5	2.2	62.8	Located within footprint of proposed building (Boarding House).	Proposed works will necessitate removal. There are no feasible options that can be recommended to preserve this tree given the extent of the development and the location of this tree within the site.	Undertake replacement planting with a new tree elsewhere within the site to compensate for loss of amenity in accordance with Section 11.

PL = Primary Limb; SL = Secondary Limb; TL = Tertiary Limb. GL = Ground Level

APPENDIX 4 - IMPACT ASSESSMENT SCHEDULE

Tree Identification No.	Species	Construction Tolerance	Tree Protection Zone (m R)	Structural Root Zone (m R)	TPZ (m^2)	Incursions To Root Zone &/or Canopy	Likely Impact	Recommendation
312	***Eucalyptus crebra*** (Narrow-leaved Ironbark)	P	3.0	1.8	28.3	Located within footprint of proposed building (Boarding House).	Proposed works will necessitate removal.	Undertake replacement planting with a new tree elsewhere within the site to compensate for loss of amenity in accordance with Section 11.
313	***Corymbia maculata*** (Spotted Gum)	P	3.0	1.7	28.3	Located within footprint of proposed building (Boarding House).	Proposed works will necessitate removal.	Undertake replacement planting with a new tree elsewhere within the site to compensate for loss of amenity in accordance with Section 11.
314	***Corymbia maculata*** (Spotted Gum)	P	5.0	2.3	79.9	Proposed building (Boarding House) offset 3.8 metres west at RL181.90 (5.6 metres below grade). Excavations for building foundations within TPZ. Encroachment to TPZ = 8% (extent of cut and fill TBC). Courtyard offset 1.3 metres west at FFL187.90 (1.3 metres above grade). Placement of fill for terrace within TPZ. Proposed egress stairs and path offset 2.2 metres south at RL? Excavations for stair and wall foundations within TPZ. Cumulative encroachment = 35%	Extent of encroachment to TPZ exceeds acceptable limits under AS 4970:2009. Proposed works will result in an adverse impact. Proposed works will necessitate removal. There are no feasible options that can be recommended to preserve this tree given the extent of the development and the location of this tree within the site	Undertake replacement planting with a new tree elsewhere within the site to compensate for loss of amenity in accordance with Section 11.
315	***Corymbia maculata*** (Spotted Gum)	P	6.0	2.5	111.6	Located within footprint of proposed driveway (loading dock entry).	Proposed works will necessitate removal. There are no feasible options that can be recommended to preserve this tree given the extent of the development and the location of this tree within the site.	Undertake replacement planting with a new tree elsewhere within the site to compensate for loss of amenity in accordance with Section 11.
316	***Eucalyptus sp.*** (Scribbly Gum)	P	3.0	1.6	28.3	Located within footprint of proposed driveway (loading dock entry).	Proposed works will necessitate removal.	Remove tree.
317	***Eucalyptus pilularis*** (Blackbutt)	P	4.5	2.0	63.6	Located within footprint of proposed driveway (loading dock entry).	Proposed works will necessitate removal.	Remove tree.

PL = Primary Limb; SL = Secondary Limb; TL = Tertiary Limb. GL = Ground Level

APPENDIX 4 - IMPACT ASSESSMENT SCHEDULE

Tree Identification No.	Species	Construction Tolerance	Tree Protection Zone (m R)	Structural Root Zone (m R)	TPZ (m^2)	Incursions To Root Zone &/or Canopy	Likely Impact	Recommendation
318	***Corymbia maculata*** (Spotted Gum)	P	6.0	2.2	113.0	Proposed new driveway (loading dock entry) & associated retaining wall offset 3.3 metres west at RL 187.40 (1.8 metres below grade). Excavation for driveway and retaining wall foundations within TPZ. Proposed egress stairs offset 3.4 metres north-west within TPZ. Encroachment to TPZ = 22%. NB: extent of any batter TBC.	Extent of encroachment to TPZ exceeds acceptable limits under AS 4970:2009. Proposed works will result in an adverse impact. Proposed works will necessitate removal. There are no feasible options that can be recommended to preserve this tree given the extent of the development and the location of this tree within the site	Undertake replacement planting with a new tree elsewhere within the site to compensate for loss of amenity in accordance with Section 11.
319	***Eucalyptus pilularis*** (Blackbutt)	P	3.5	1.7	38.5	Proposed new driveway (loading dock entry) & associated retaining wall offset 2.3 metres west at RL 187.40 (1.8 metres below grade). Excavations for driveway and wall foundations within TPZ. Encroachment to TPZ = 13%. NB: extent of any batter TBC.	Extent of encroachment to TPZ exceeds acceptable limits under AS 4970:2009. Proposed works may result in an adverse impact.	Undertake replacement planting with a new tree elsewhere within the site to compensate for loss of amenity in accordance with Section 11.
320	***Corymbia maculata*** (Spotted Gum)	P	3.0	1.5	28.3	Proposed new driveway (loading dock entry) & associated retaining wall offset 2.3 metres west at RL 187.40 (1.8 metres below grade). Excavations for driveway and wall foundations within TPZ. Encroachment to TPZ = 6%. NB: extent of any batter TBC.	Extent of encroachment to root zone is less than 10% of the TPZ, which is within acceptable limits under AS 4970:2009. No adverse impact.	Undertake replacement planting with a new tree elsewhere within the site to compensate for loss of amenity in accordance with Section 11.
321	***Angophora costata*** (Sydney Red Gum)	P	3.5	2.0	38.8	Located within footprint of proposed driveway (loading dock entry).	Proposed works will necessitate removal. There are no feasible options that can be recommended to preserve this tree given the extent of the development and the location of this tree within the site.	Undertake replacement planting with a new tree elsewhere within the site to compensate for loss of amenity in accordance with Section 11.
322	***Eucalyptus sp.*** (Scribbly Gum)	P	3.3	1.9	34.7	Located within footprint of proposed driveway (loading dock entry).	Proposed works will necessitate removal.	Undertake replacement planting with a new tree elsewhere within the site to compensate for loss of amenity in accordance with Section 11.

PL = Primary Limb; SL = Secondary Limb; TL = Tertiary Limb. GL = Ground Level

APPENDIX 4 - IMPACT ASSESSMENT SCHEDULE

Tree Identification No.	Species	Construction Tolerance	Tree Protection Zone (m R)	Structural Root Zone (m R)	TPZ (m^2)	Incursions To Root Zone &/or Canopy	Likely Impact	Recommendation
323	***Casuarina cunninghamiana*** (River Oak)	M	2.2	1.6	14.9	Proposed new driveway (loading dock entry) offset 0.3 metres north-west at RL 184.70-187.00. Excavations for pavement sub-grade within TPZ/SRZ. Encroachment to TPZ = 35%. NB: pavement level and extent of any batter TBC.	Extent of encroachment to TPZ exceeds acceptable limits under AS 4970:2009. Proposed works may result in an adverse impact.	Remove tree.
324	***Eucalyptus saligna*** (Sydney Blue Gum)	P	3.9	2.1	47.7	Proposed new driveway & associated retaining wall offset 2.3 metres south-west at RL 184.70-187.00. Excavations for pavement sub-grade & wall foundations within TPZ. Encroachment to TPZ = 18%. NB: pavement level and extent of any batter TBC.	Extent of encroachment to TPZ exceeds acceptable limits under AS 4970:2009. Proposed works may result in some adverse impact.	Undertake replacement planting with a new tree elsewhere within the site to compensate for loss of amenity in accordance with Section 11.
325	***Eucalyptus acmenioides*** (White Mahogany)	P	2.3	1.6	16.0	Located within footprint of proposed driveway.	Proposed works will necessitate removal.	Undertake replacement planting with a new tree elsewhere within the site to compensate for loss of amenity in accordance with Section 11.
326	***Eucalyptus acmenioides*** (White Mahogany)	P	3.0	1.8	27.9	Located within footprint of proposed driveway.	Proposed works will necessitate removal.	Undertake replacement planting with a new tree elsewhere within the site to compensate for loss of amenity in accordance with Section 11.
327	***Eucalyptus sp.*** (Eucalypt)	P	3.0	1.5	28.3	Located within footprint of proposed driveway (fill batter).	Proposed works will necessitate removal.	Remove tree.
328	***Corymbia eximia*** (Yellow Bloodwood)	P	6.5	2.6	131.0	Located within footprint of proposed pathway.	Proposed works will necessitate removal. There are no feasible options that can be recommended to preserve this tree given the extent of the development and the location of this tree within the site.	Undertake replacement planting with a new tree elsewhere within the site to compensate for loss of amenity in accordance with Section 11.

PL = Primary Limb; SL = Secondary Limb; TL = Tertiary Limb. GL = Ground Level

APPENDIX 4 - IMPACT ASSESSMENT SCHEDULE

Tree Identification No.	Species	Construction Tolerance	Tree Protection Zone (m R)	Structural Root Zone (m R)	TPZ (m^2)	Incursions To Root Zone &/or Canopy	Likely Impact	Recommendation
329	***Syncarpia glomulifera*** (Turpentine)	M	3.0	1.8	28.3	Proposed new driveway (loading dock entry) offset 1.8 metres north at RL 184.70-187.00. Excavations for pavement sub-grade within TPZ. Encroachment to TPZ = 12%. NB: pavement level and extent of any batter TBC.	Extent of encroachment to TPZ exceeds acceptable limits under AS 4970:2009. Proposed works may result in some adverse impact.	Undertake replacement planting with a new tree elsewhere within the site to compensate for loss of amenity in accordance with Section 11.
330	***Eucalyptus sp.*** (Scribbly Gum)	P	3.0	1.6	28.3	Proposed new driveway offset 0.9 metres south at RLRL185.26 (700mm above grade) to186.18 (at grade). Excavations for pavement sub-grade within TPZ/SRZ. Encroachment to TPZ = 31%. NB: pavement level and extent of any batter TBC.	Extent of encroachment to TPZ exceeds acceptable limits under AS 4970:2009. Proposed works will result in an adverse impact.	Remove tree.
332	***Eucalyptus crebra*** (Narrow-leaved Ironbark)	P	3.5	1.7	38.5	Located within footprint of proposed driveway.	Proposed works will necessitate removal.	Undertake replacement planting with a new tree elsewhere within the site to compensate for loss of amenity in accordance with Section 11.
333	***Eucalyptus pilularis*** (Blackbutt)	P	2.2	1.6	14.9	Located within footprint of proposed driveway.	Proposed works will necessitate removal.	Undertake replacement planting with a new tree elsewhere within the site to compensate for loss of amenity in accordance with Section 11.
334	***Syncarpia glomulifera*** (Turpentine)	M	2.9	1.8	25.8	Proposed new driveway offset 1.7 metres north at RL185.26 (700mm above grade) to186.18 (at grade). Excavations/placement of engineered fill for pavement sub-grade within TPZ/SRZ. Encroachment to TPZ = 14%. NB: pavement level and extent of any batter TBC.	Extent of encroachment to TPZ exceeds acceptable limits under AS 4970:2009. Proposed works may result in some adverse impact.	Retain in accordance with recommended Tree Protection Measures (Section 10). Install Tree Protection Fencing in accordance with Section 10.3. Undertake all excavations for retaining wall foundations and pavement sub-grade within TPZ in accordance with Section 10.6.
336	***Corymbia maculata*** (Spotted Gum)	P	2.1	1.6	13.9	Located within footprint of proposed driveway.	Proposed works will necessitate removal.	Undertake replacement planting with a new tree elsewhere within the site to compensate for loss of amenity in accordance with Section 11.

PL = Primary Limb; SL = Secondary Limb; TL = Tertiary Limb. GL = Ground Level

APPENDIX 4 - IMPACT ASSESSMENT SCHEDULE

Tree Identification No.	Species	Construction Tolerance	Tree Protection Zone (m R)	Structural Root Zone (m R)	TPZ (m^2)	Incursions To Root Zone &/or Canopy	Likely Impact	Recommendation
337	***Eucalyptus globulus subsp. globulus*** (Tasmanian Blue Gum)	P	2.5	1.4	19.6	Located within footprint of proposed driveway.	Proposed works will necessitate removal.	Remove tree.
338	***Eucalyptus pilularis*** (Blackbutt)	P	3.1	1.9	29.4	Located within footprint of proposed driveway.	Proposed works will necessitate removal.	Undertake replacement planting with a new tree elsewhere within the site to compensate for loss of amenity in accordance with Section 11.
339	***Syncarpia glomulifera*** (Turpentine)	M	2.5	1.5	19.6	Proposed new driveway offset 2.1 metres north at RL185.26 (800mm above grade). Excavations/placement of engineered fill for pavement sub-grade within TPZ/SRZ. Encroachment to TPZ = 14%. NB: pavement level and extent of any batter TBC.	Extent of encroachment to TPZ exceeds acceptable limits under AS 4970:2009. Proposed works may result in some adverse impact.	Retain in accordance with recommended Tree Protection Measures (Section 10). Install Tree Protection Fencing in accordance with Section 10.3. Undertake all excavations for retaining wall foundations and pavement sub-grade within TPZ in accordance with Section 10.6.
340	***Eucalyptus punctata*** (Grey Gum)	P	3.0	1.5	28.3	No proposed works within TPZ. NB - extent of any proposed batter TBC.	No adverse impact.	Retain in accordance with recommended Tree Protection Measures (Section 10). Install Tree Protection Fencing in accordance with Section 10.3. Undertake all excavations for retaining wall foundations and pavement sub-grade within TPZ in accordance with Section 10.6.
341	***Corymbia maculata*** (Spotted Gum)	P	3.0	1.6	28.3	Proposed new driveway offset 1.8 metres north at RL185.26 (6-800mm above grade). Excavations/placement of engineered fill for pavement sub-grade within TPZ/SRZ. Encroachment to TPZ = 8%. NB: pavement level and extent of any batter TBC.	Extent of encroachment to root zone is less than 10% of the TPZ, which is within acceptable limits under AS 4970:2009. No adverse impact.	Retain in accordance with recommended Tree Protection Measures (Section 10). Install Tree Protection Fencing in accordance with Section 10.3. Undertake all excavations for retaining wall foundations and pavement sub-grade within TPZ in accordance with Section 10.6.

PL = Primary Limb; SL = Secondary Limb; TL = Tertiary Limb. GL = Ground Level

APPENDIX 4 - IMPACT ASSESSMENT SCHEDULE

Tree Identification No.	Species	Construction Tolerance	Tree Protection Zone (m R)	Structural Root Zone (m R)	TPZ (m^2)	Incursions To Root Zone &/or Canopy	Likely Impact	Recommendation
342	***Corymbia maculata*** (Spotted Gum)	P	7.5	2.7	174.4	Proposed new driveway offset 5.2 metres north-east at RL183.55 (1 metre above grade) to RL185.26 (6-800mm above grade). Excavations/placement of engineered fill for pavement sub-grade within TPZ/SRZ. Encroachment to TPZ = 9%. NB: extent of any fill batter TBC.	Extent of encroachment to root zone is less than 10% of the TPZ, which is within acceptable limits under AS 4970:2009. No adverse impact.	Retain in accordance with recommended Tree Protection Measures (Section 10). Install Tree Protection Fencing in accordance with Section 10.3. Undertake all excavations for retaining wall foundations and pavement sub-grade within TPZ in accordance with Section 10.6.
343	***Eucalyptus acmenioides*** (White Mahogany)	P	3.0	1.6	28.3	No proposed works within TPZ.	No adverse impact.	To be retained - no special tree protection measures required.
344	***Syncarpia glomulifera*** (Turpentine)	M	3.0	1.6	28.3	No proposed works within TPZ.	No adverse impact.	To be retained - no special tree protection measures required.
345	***Eucaltptus sp.*** (Eucalypt)	P	7.0	2.6	153.6	No proposed works within TPZ.	No adverse impact.	To be retained - no special tree protection measures required.
346	***Corymbia maculata*** (Spotted Gum)	P	2.5	1.6	19.6	No proposed works within TPZ.	No adverse impact.	To be retained - no special tree protection measures required.
347	***Eucalyptus saligna*** (Sydney Blue Gum)	P	3.4	1.9	36.3	No proposed works within TPZ.	No adverse impact.	To be retained - no special tree protection measures required.
348	***Eucalyptus pilularis*** (Blackbutt)	P	5.0	1.9	78.5	No proposed works within TPZ.	No adverse impact.	To be retained - no special tree protection measures required.
349	***Eucalyptus paniculata*** (Grey Ironbark)	P	6.1	2.5	117.4	No proposed works within TPZ.	No adverse impact.	To be retained - no special tree protection measures required.
350	***Eucalyptus globulus subsp. globulus*** (Tasmanian Blue Gum)	P	4.0	2.0	50.2	No proposed works within TPZ.	No adverse impact.	To be retained - no special tree protection measures required.

PL = Primary Limb; SL = Secondary Limb; TL = Tertiary Limb. GL = Ground Level

APPENDIX 4 - IMPACT ASSESSMENT SCHEDULE

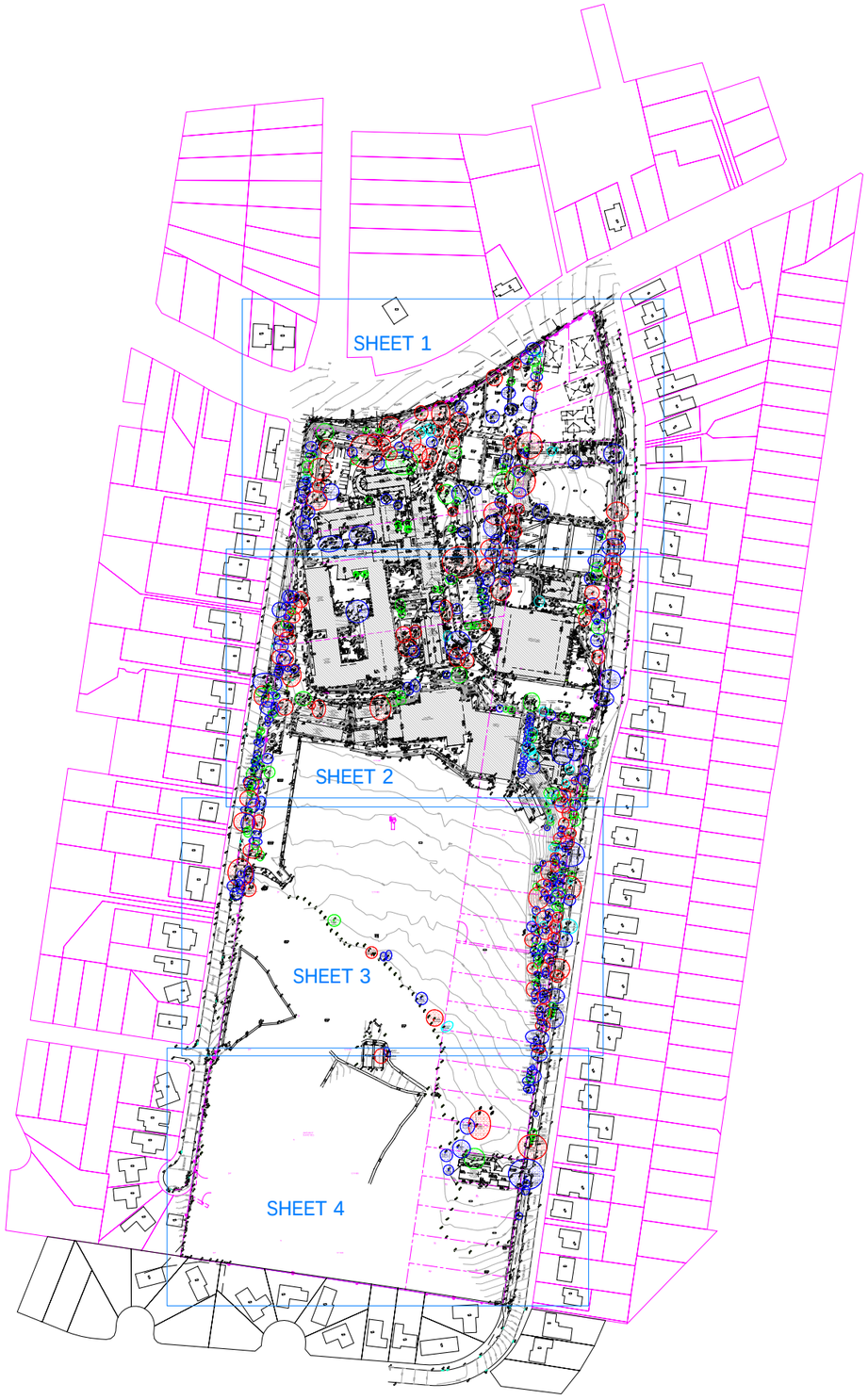
Tree Identification No.	Species	Construction Tolerance	Tree Protection Zone (m R)	Structural Root Zone (m R)	TPZ (m^2)	Incursions To Root Zone &/or Canopy	Likely Impact	Recommendation
600	***Eucalyptus punctata*** (Grey Gum)	P	4.2	2.1	55.5	Proposed egress pathway & stairs offset 3.1 metres south at RL? Excavations for pavement sub-grade and stair foundations within TPZ/SRZ. Encroachment to TPZ = 7%.	Extent of encroachment to root zone is less than 10% of the TPZ, which is within acceptable limits under AS 4970:2009. No adverse impact.	Retain in accordance with recommended Tree Protection Measures (Section 10). Install Tree Protection Fencing in accordance with Section 10.3. Undertake all excavations for building foundations within TPZ in accordance with Section 10.6. Install pavement in accordance with Section 10.8 & 10.9.
601	***Casuarina glauca*** (Swamp Oak)	M	2.6	1.7	21.2	No proposed works within TPZ. N.B. Extent of cut and fill for building foundations TBC.	No adverse impact.	To be retained - no special tree protection measures required. N.B. subject to landscape works.
602	***Eucalyptus grandis*** (Flooded Gum)	P	5.0	2.3	79.9	Proposed building (Boarding House) offset 1.5 metres south-west at RL184.80 (3.2 metres below grade). Excavations for building foundations within TPZ/SRZ. Encroachment to TPZ = 35%.	Extent of encroachment to TPZ exceeds acceptable limits under AS 4970:2009. Proposed works will result in an adverse impact.	Undertake replacement planting with a new tree elsewhere within the site to compensate for loss of amenity in accordance with Section 11.
603	***Corymbia eximia*** (Yellow Bloodwood)	P	5.4	2.4	89.9	Located within footprint of proposed building (Boarding House).	Proposed works will necessitate removal.	Undertake replacement planting with a new tree elsewhere within the site to compensate for loss of amenity in accordance with Section 11.
604	***Corymbia maculata*** (Spotted Gum)	P	1.8	1.5	10.1	Located within footprint of proposed building (Boarding House).	Proposed works will necessitate removal.	Remove tree.
605	***Acacia decurrens*** (Black Wattle)	M	4.5	1.7	63.6	Located within footprint of proposed building (Boarding House).	Proposed works will necessitate removal.	Remove tree.
606	***Acacia decurrens*** (Black Wattle)	M	4.0	1.8	50.2	Located within footprint of proposed building (Boarding House).	Proposed works will necessitate removal.	Remove tree.

PL = Primary Limb; SL = Secondary Limb; TL = Tertiary Limb. GL = Ground Level

MGA

TN

APPROX.



MGA

TN

APPROX.

LEGEND
TREE RETENTION VALUES

- HIGH
- MODERATE
- LOW
- VERY LOW

APPENDIX 5
TREE LOCATION PLAN SHOWING
TREE RETENTION VALUES
LORETO COLLEGE
91-93 PENNANT HILLS ROAD, NORMANHURST

Earthscape Horticultural Services
Arboricultural and Horticultural Consultants
PO Box 364
BEROWRA NSW 2081
Ph: 02 9456 4787
Fax: 02 9456 5757 e: earthscape@iinet.net.au

Based on the Survey Drawing
prepared by Lockley Land Title Solutions
Dwg Ref No. 44200DT [B]
Dated 18/06/2018

DWG No. T18-071901 [E]

KEY PLAN

DATE: 17/12/2018

LEGEND
TREE RETENTION VALUES

HIGH

MODERATE

LOW

VERY LOW

APPENDIX 5
TREE LOCATION PLAN SHOWING TREE RETENTION VALUES

LORETO COLLEGE
91-93 PENNANT HILLS ROAD, NORMANHURST

Earthscape Horticultural Services
Arboricultural and Horticultural Consultants
PO Box 364
BEROWRA NSW 2081
Ph: 02 9456 4787
Fax: 02 9456 5757 e: earthscape@iinet.net.au

Based on the Survey Drawing
prepared by Lockley Land Title Solutions
Dwg Ref No. 44200DT [B]
Dated 18/06/2018

MGA

DWG No. T18-071901 [D]

SHEET 2

DATE: 29/11/2018

LEGEND
TREE RETENTION VALUES

HIGH

MODERATE

LOW

VERY LOW

OSBORN ROAD

PLEASANT AVENUE

MOUNT PLEASANT AVENUE

BITUMEN CARPARK

GRASS

DENSE TREES

GARDEN

CONCRETE DRIVEWAY

GATE

BITUMEN DRIVEWAY

FENCE

MESH

TRACK

DP 1217496

DP 1145801

DP 6612

DP 34834

No.34

No.44

T265 Grey Ironbark

T266 Flooded Gum

T263 Sydney Blue Gum

T262 Sydney Blue Gum

T261 Sydney Blue Gum

T264 Blackbutt

T260 White Mahogany

T259 White Mahogany

T258 Blackbutt

T257 Red Mahogany

T226 Bangalay

T227 Broad-leaved Paperbark

T228 Broad-leaved Paperbark

T229 Grey Gum

T230 Blackbutt

T231 Grey Gum

T232 Grey Gum

T233 Grey Gum

T234 Forest Red Gum

T235 Grey Gum

T236 Cocos Palm

T237 Cocos Palm

T238 Cocos Palm

T239 Cocos Palm

T240 Grey Gum

T241 Sydney Blue Gum

T242

APPENDIX 5
TREE LOCATION PLAN SHOWING TREE RETENTION VALUES

LORETO COLLEGE
91-93 PENNANT HILLS ROAD, NORMANHURST

Earthscape Horticultural Services
Arboricultural and Horticultural Consultants
PO Box 364
BEROWRA NSW 2081
Ph: 02 9456 4787
Fax: 02 9456 5757 e: earthscape@iinet.net.au

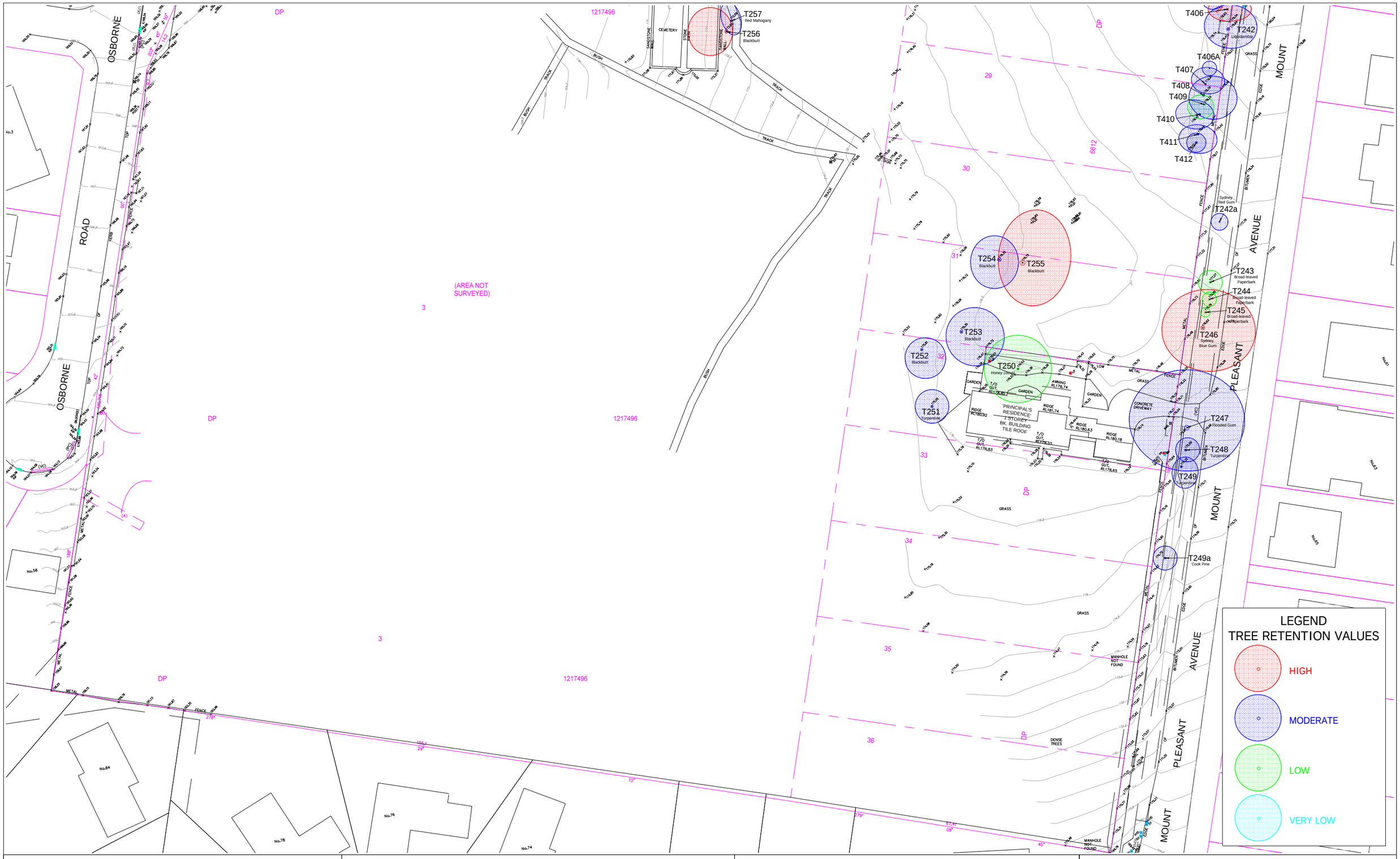
Based on the Survey Drawing
prepared by Lockley Land Title Solutions
Dwg Ref No. 44200DT [B]
Dated 18/06/2018

MGA

DWG No. T18-071901 [D]

SHEET 3

DATE: 29/11/2018



APPENDIX 5
TREE LOCATION PLAN SHOWING
TREE RETENTION VALUES

LORETO COLLEGE
91-93 PENNANT HILLS ROAD, NORMANHURST

Earthscape Horticultural Services
Arboricultural and Horticultural Consultants
PO Box 364
BEROWRA NSW 2081
Ph: 02 9456 4787
Fax: 02 9456 5757 e: earthscape@iinet.net.au

Based on the Survey Drawing
prepared by Lockley Land Title Solutions
Dwg Ref No. 44200DT [B]
Dated 18/06/2018

MGA

DWG No. T18-071901 [D]

SHEET 4

DATE: 29/11/2018

MGA

TN

APPROX.

MGA

TN

APPROX.

APPENDIX 6

TREE PROTECTION PLAN

LORETO COLLEGE
91-93 PENNANT HILLS ROAD, NORMANHURST

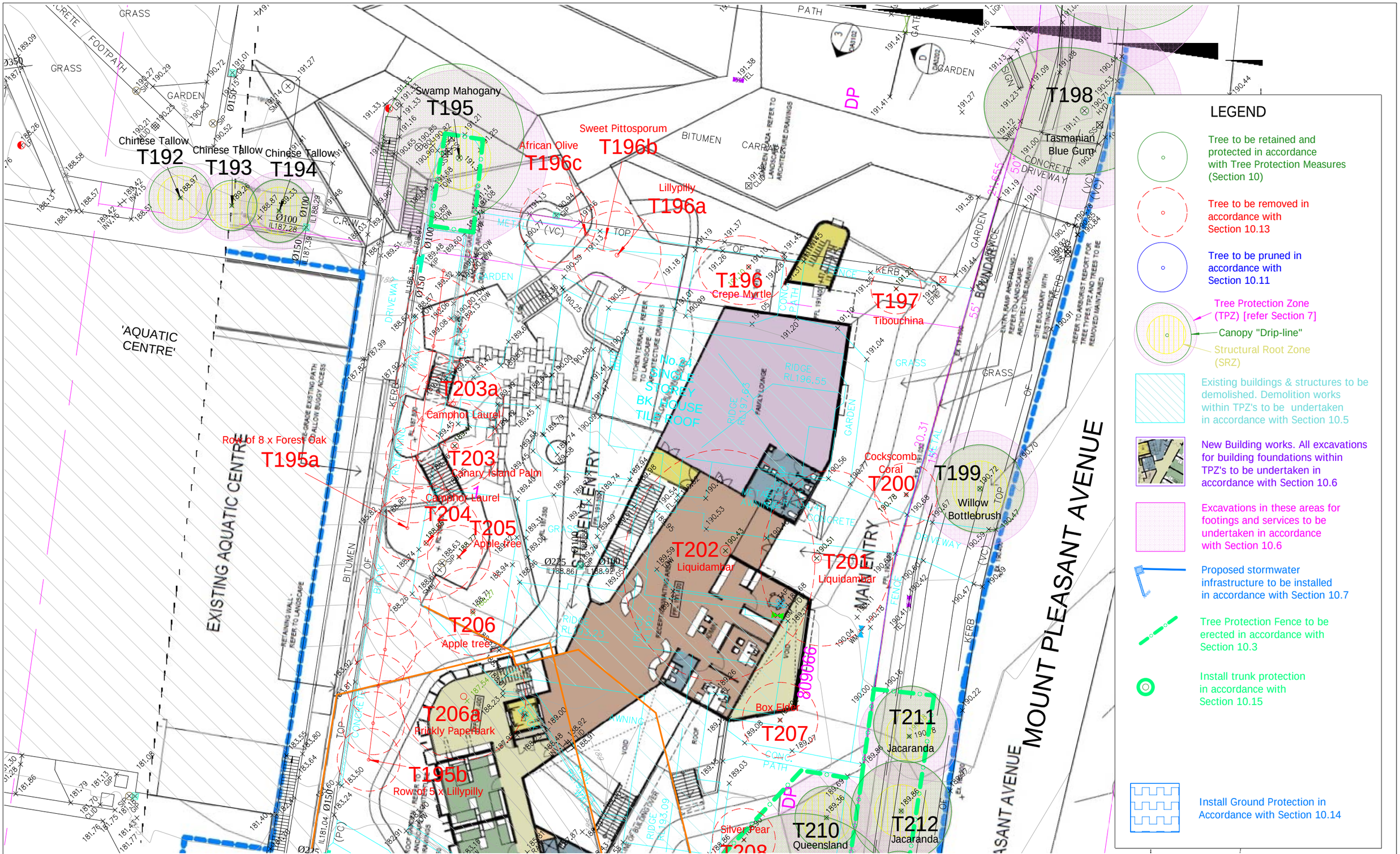
Earthscape Horticultural Services
Arboricultural and Horticultural Consultants
PO Box 364
BEROWRA NSW 2081
Ph: 02 9456 4787
Fax: 02 9456 5757 e: earthscape@iinet.net.au

Based on the Survey Drawing
prepared by Lockley Land Title Solutions
Dwg Ref No. 44200DT [B]
Dated 18/06/2018

DWG No. T18-071902 [F]

KEY PLAN

DATE: 18/12/2018



LEGEND

- Tree to be retained and protected in accordance with Tree Protection Measures (Section 10)
- Tree to be removed in accordance with Section 10.13
- Tree to be pruned in accordance with Section 10.11
- Tree Protection Zone (TPZ) [refer Section 7]
  - Canopy "Drip-line"
  - Structural Root Zone (SRZ)
- Existing buildings & structures to be demolished. Demolition works within TPZ's to be undertaken in accordance with Section 10.5
- New Building works. All excavations for building foundations within TPZ's to be undertaken in accordance with Section 10.6
- Excavations in these areas for footings and services to be undertaken in accordance with Section 10.6
- Proposed stormwater infrastructure to be installed in accordance with Section 10.7
- Tree Protection Fence to be erected in accordance with Section 10.3
- Install trunk protection in accordance with Section 10.15
- Install Ground Protection in Accordance with Section 10.14

APPENDIX 6

TREE PROTECTION PLAN

LORETO COLLEGE
91-93 PENNANT HILLS ROAD, NORMANHURST

Earthscape Horticultural Services
Arboricultural and Horticultural Consultants
PO Box 364
BEROWRA NSW 2081
Ph: 02 9456 4787
Fax: 02 9456 5757 e: earthscape@iinet.net.au

Based on the Survey Drawing
prepared by Lockley Land Title Solutions
Dwg Ref No. 44200DT [B]
Dated 18/06/2018

MGA

DWG No. T18-071902 [J]

SHEET 6

DATE: 11/01/2019

LEGEND

- Tree to be retained and protected in accordance with Tree Protection Measures (Section 10)
- Tree to be removed in accordance with Section 10.13
- Tree to be pruned in accordance with Section 10.11
- Tree Protection Zone (TPZ) [refer Section 7]
- Canopy "Drip-line"
- Structural Root Zone (SRZ)
- Existing buildings & structures to be demolished. Demolition works within TPZ's to be undertaken in accordance with Section 10.5
- New Building works. All excavations for building foundations within TPZ's to be undertaken in accordance with Section 10.6
- Excavations in these areas for footings and services to be undertaken in accordance with Section 10.6
- Proposed stormwater infrastructure to be installed in accordance with Section 10.7
- Tree Protection Fence to be erected in accordance with Section 10.3
- Install trunk protection in accordance with Section 10.15
- Install Ground Protection in Accordance with Section 10.14

APPENDIX 6

TREE PROTECTION PLAN

LORETO COLLEGE
91-93 PENNANT HILLS ROAD, NORMANHURST

Earthscape Horticultural Services
Arboricultural and Horticultural Consultants
PO Box 364
BEROWRA NSW 2081
Ph: 02 9456 4787
Fax: 02 9456 5757 e: earthscape@iinet.net.au

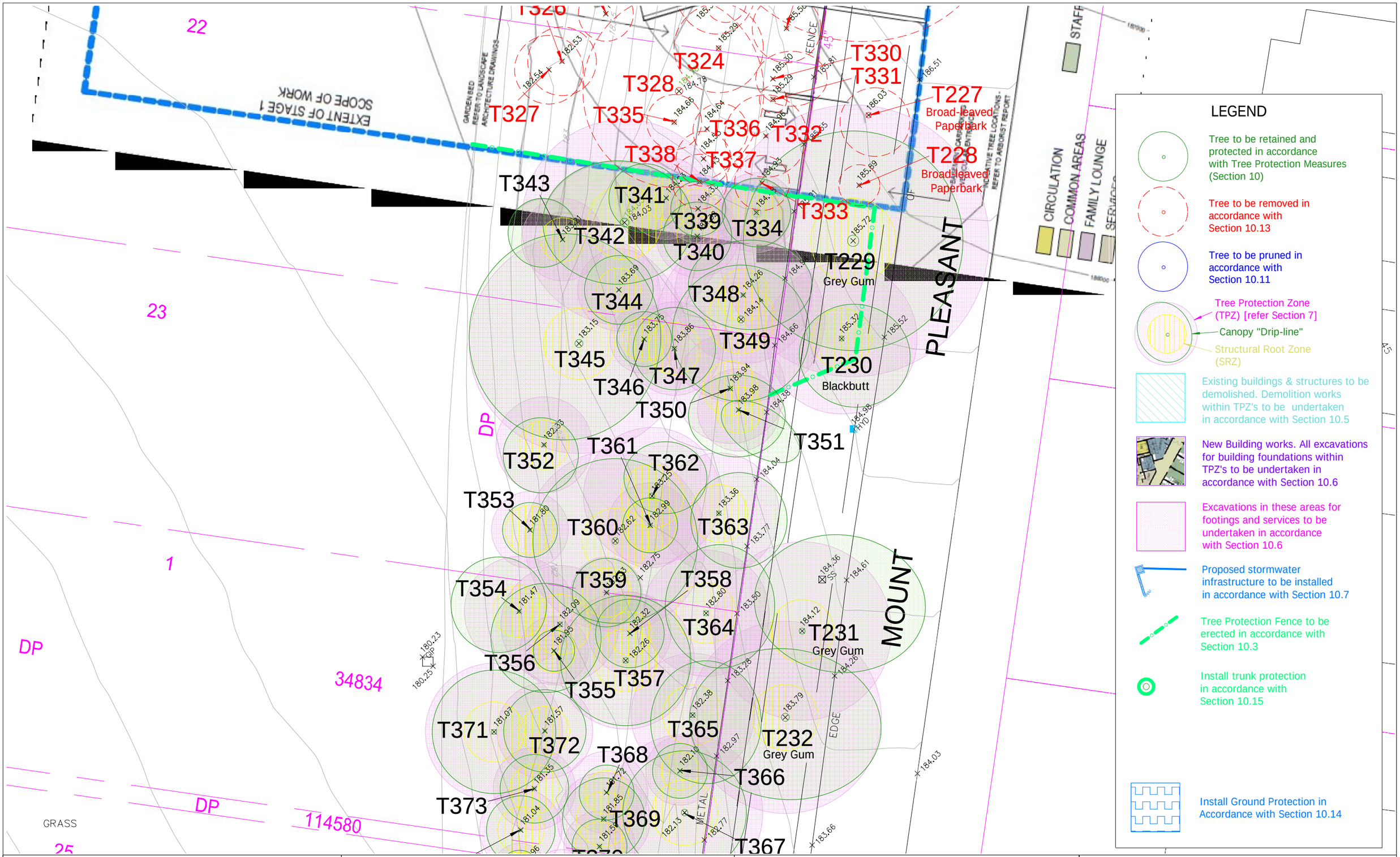
Based on the Survey Drawing
prepared by Lockley Land Title Solutions
Dwg Ref No. 44200DT [B]
Dated 18/06/2018

MGA

DWG No. T18-071902 [G]

SHEET 7

DATE: 07/01/2018



LEGEND

- Tree to be retained and protected in accordance with Tree Protection Measures (Section 10)
- Tree to be removed in accordance with Section 10.13
- Tree to be pruned in accordance with Section 10.11
- Tree Protection Zone (TPZ) [refer Section 7]
  - Canopy "Drip-line"
  - Structural Root Zone (SRZ)
- Existing buildings & structures to be demolished. Demolition works within TPZ's to be undertaken in accordance with Section 10.5
- New Building works. All excavations for building foundations within TPZ's to be undertaken in accordance with Section 10.6
- Excavations in these areas for footings and services to be undertaken in accordance with Section 10.6
- Proposed stormwater infrastructure to be installed in accordance with Section 10.7
- Tree Protection Fence to be erected in accordance with Section 10.3
- Install trunk protection in accordance with Section 10.15
- Install Ground Protection in Accordance with Section 10.14

APPENDIX 6

TREE PROTECTION PLAN

LORETO COLLEGE
91-93 PENNANT HILLS ROAD, NORMANHURST

Earthscape Horticultural Services
Arboricultural and Horticultural Consultants
PO Box 364
BEROWRA NSW 2081
Ph: 02 9456 4787
Fax: 02 9456 5757 e: earthscape@iinet.net.au

Based on the Survey Drawing
prepared by Lockley Land Title Solutions
Dwg Ref No. 44200DT [B]
Dated 18/06/2018

MGA
TN

DWG No. T18-071902 [G]

SHEET 8

DATE: 07/01/2018

LEGEND

Tree to be retained and protected in accordance with Tree Protection Measures (Section 10)

Tree to be removed in accordance with Section 10.13

Tree to be pruned in accordance with Section 10.11

Tree Protection Zone (TPZ) [refer Section 7]

Canopy "Drip-line"

Structural Root Zone (SRZ)

Existing buildings & structures to be demolished. Demolition works within TPZ's to be undertaken in accordance with Section 10.5

New Building works. All excavations for building foundations within TPZ's to be undertaken in accordance with Section 10.6

Excavations in these areas for footings and services to be undertaken in accordance with Section 10.6

Proposed stormwater infrastructure to be installed in accordance with Section 10.7

Tree Protection Fence to be erected in accordance with Section 10.3

Install trunk protection in accordance with Section 10.15

Install Ground Protection in Accordance with Section 10.14

'DINING ROOM' 3 STOREY BK. BUILDING TILE ROOF

'BOARDING' 2 STOREY BK. BUILDING TILE ROOF

'MARY WARD WING' 4 STOREY BK. BUILDING TILE ROOF

T147 English Oak

T148 Cabbage Tree Palm

T148a Kentia Palm

T148b Kentia Palm

T149 Sasanqua Camellia

T150 Chinese Elm

T151 Magenta Cherry

T151a Windmill Palm

T152 Magenta Cherry

T153 Magenta Cherry

T154 Chinese Tallow

T154a Windmill Palm

T155 Magenta Cherry

T156 Magenta Cherry

T157 Chinese Tallow

T159 Dawn Redwood

T160 Juniper

T161 Western Red Cedar

T162 Juniper

T165 Jacaranda

T167 Tree Fern

T169 Japanese Maple

T170 Chinese Tallow

T172 Lombardy Poplar

T173 Lombardy Poplar

T174 Lombardy Poplar

T177 Tropical Birch

T178 Tropical Birch

T183 Honey Locust

T185 Liquidambar

T139 Camphor Laurel

T140 Chinese Elm

T141 Camphor Laurel

T145 Chinese Elm

T146 Pin Oak

T13 Coast E

TENNIS COURT

APPENDIX 6
TREE PROTECTION PLAN

LORETO COLLEGE
91-93 PENNANT HILLS ROAD, NORMANHURST

Earthscape Horticultural Services
Arboricultural and Horticultural Consultants
PO Box 364
BEROWRA NSW 2081
Ph: 02 9456 4787
Fax: 02 9456 5757 e: earthscape@iinet.net.au

Based on the Survey Drawing
prepared by Lockley Land Title Solutions
Dwg Ref No. 44200DT [B]
Dated 18/06/2018

MGA
TN

DWG No. T18-071902 [H]

SHEET 9

DATE: 11/01/2019

LEGEND

Tree to be retained and protected in accordance with Tree Protection Measures (Section 10)

Tree to be removed in accordance with Section 10.13

Tree to be pruned in accordance with Section 10.11

Tree Protection Zone (TPZ) [refer Section 7]

Canopy "Drip-line"

Structural Root Zone (SRZ)

Existing buildings & structures to be demolished. Demolition works within TPZ's to be undertaken in accordance with Section 10.5

New Building works. All excavations for building foundations within TPZ's to be undertaken in accordance with Section 10.6

Excavations in these areas for footings and services to be undertaken in accordance with Section 10.6

Proposed stormwater infrastructure to be installed in accordance with Section 10.7

Tree Protection Fence to be erected in accordance with Section 10.3

Install trunk protection in accordance with Section 10.15

Install Ground Protection in Accordance with Section 10.14

T174 Lombardy Poplar
T177 Tropical Birch
T178 Tropical Birch
T179 Tropical Birch
T180 Bullbay Magnolia
T165 Jacaranda
Japanese Maple
T156 Magenta Cherry
T157 Chinese Tallow
Western Red Cedar T161
T162 Juniper
T160 Juniper
T159 Dawn Redwood
Honey Locust T183
Liquidambar T185
T186
Queensland Lacebark
T188 Queensland Lacebark
Water Gum T190
T189 Box Elder
Magenta Cherry T190a
Magenta Cherry T190b
T216
T217 Weeping
Weeping Bottlebrush
'MARY WARD WING' 4 STOREY BK. BUILDING TILE ROOF
'GYMNASIUM'
Chinese Tallow T192
Chinese Tallow
Chinese Ta

APPENDIX 6

TREE PROTECTION PLAN

LORETO COLLEGE
91-93 PENNANT HILLS ROAD, NORMANHURST

Earthscape Horticultural Services
Arboricultural and Horticultural Consultants
PO Box 364
BEROWRA NSW 2081
Ph: 02 9456 4787
Fax: 02 9456 5757 e: earthscape@iinet.net.au

Based on the Survey Drawing
prepared by Lockley Land Title Solutions
Dwg Ref No. 44200DT [B]
Dated 18/06/2018

MGA

DWG No. T18-071902 [H]

SHEET 10

DATE: 11/01/2019