

AUSTRALIS
Tree Management



Arboriculture Impact Assessment

**Silver Pond Investments Pty Ltd
ATF Silver Pond Unit Trust**

Commissioned By: C/- PDS Group
Level 1, York Street,
SYDNEY NSW 2000

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Prepared By: Meredith Gibbs (Dip. Hort. Arb.)

Australis Tree Management
PO Box 3453
DURAL NSW 2158
Email: info@australistrees.com.au

Document Details

Document Title	Arboriculture Impact Assessment		
Client	Silver Pond Investments Pty Ltd ATF Silver Pond Unit Trust C/ PDS Group		
Client Contact	Amanda Torville, PDS Group		
Site Details	18 – 32 Holdsworth Avenue & 21 – 41 Canberra Avenue, St Leonards		
Lot No.s	Lots 15-35, Sect 3 in DP 7259, Lots 1-2 in DP 105732, Lots A-B in DP 345135 & Lots A-B in DP 411375		
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Meredith Gibbs
Australis Tree Management
1 February 2022

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Summary

Australis Tree Management has been commissioned by PDS Group on behalf of their client Silver Pond Investments Pty Ltd ATF Silver Pond Unit Trust to complete an arboriculture impact assessment. The development proposed is for the demolition of existing structures for the construction of a multi-level apartment complex.

This report aims to identify the health and condition of the trees, potential impacts from proposed works and to provide recommendations regarding tree retention, protection and removals.

- In total one-hundred and three (103) trees were assessed
- Trees No. 40 and 65 located on the nature strip have been previously removed
- Two (2) trees are located on the subject site and proposed for retention
- Eight-three (83) trees on site are proposed for removal
- Thirteen (13) trees are located on the nature strips with (one) of these trees proposed for removal
- Four (4) trees are located on adjoining private properties
- Eight-six (86) trees are protected by council
- Seventeen (17) trees are exempt from council protection
- Four (4) trees are dead

Trees proposed for retention will require tree protection measures throughout the development works to ensure their long-term survival.

The tree defects and symptoms that were encountered have been discussed and a detailed tree schedule is included in Appendix A. A Tree Protection Plan has been prepared containing specifications related to the proposed works.

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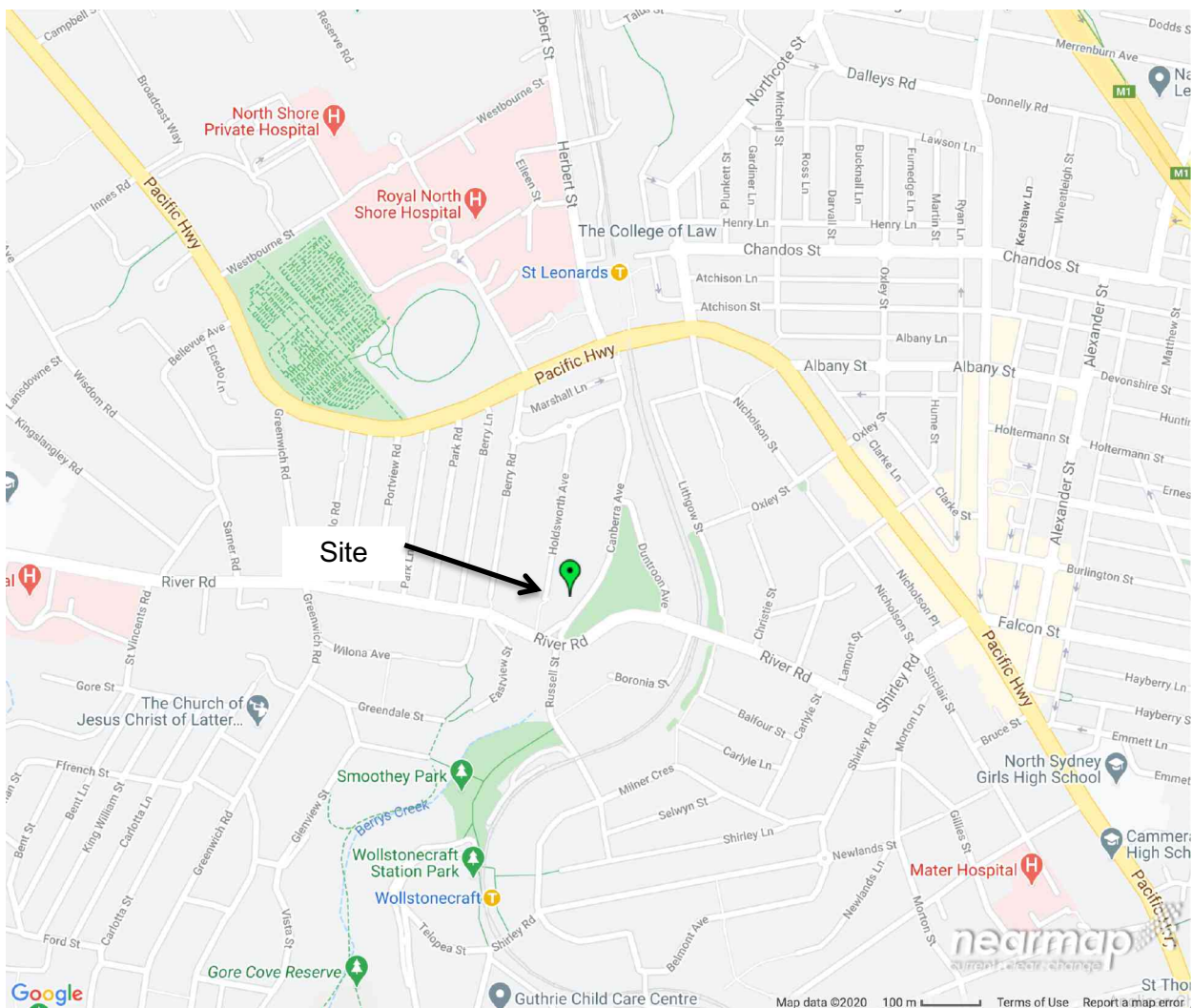
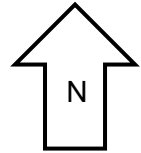
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Abbreviations & Glossary

Abbreviation	Term	Definition
DBH	Diameter at breast height	The diameter of a tree's stem typically measured with a diameter tape at 1.4 metres height
DCP	Development Control Plan	
ENCR	Encroachment	AS4970-2009 Protection of trees on development sites – Propose or existing TPZ encroachments
LEP	Local Environmental Plan	
LGA	Local Government Authority	
SRZ	Structural Root Zone	The SRZ is the area required for tree stability. A larger area is required to maintain a viable tree.
TPO	Tree Preservation Order	Tree Protection Council Policy
TPP	Tree Protection Plan	Showing the TPZs for trees being retained taking into account the proposed development.
TPZ	Tree Protection Zone	The tree protection zone (TPZ) is the principal means of protecting trees on development sites. The TPZ is a combination of the root area and crown area requiring protection. It is an area isolated from construction disturbance, so that the tree remains viable.

Location Map

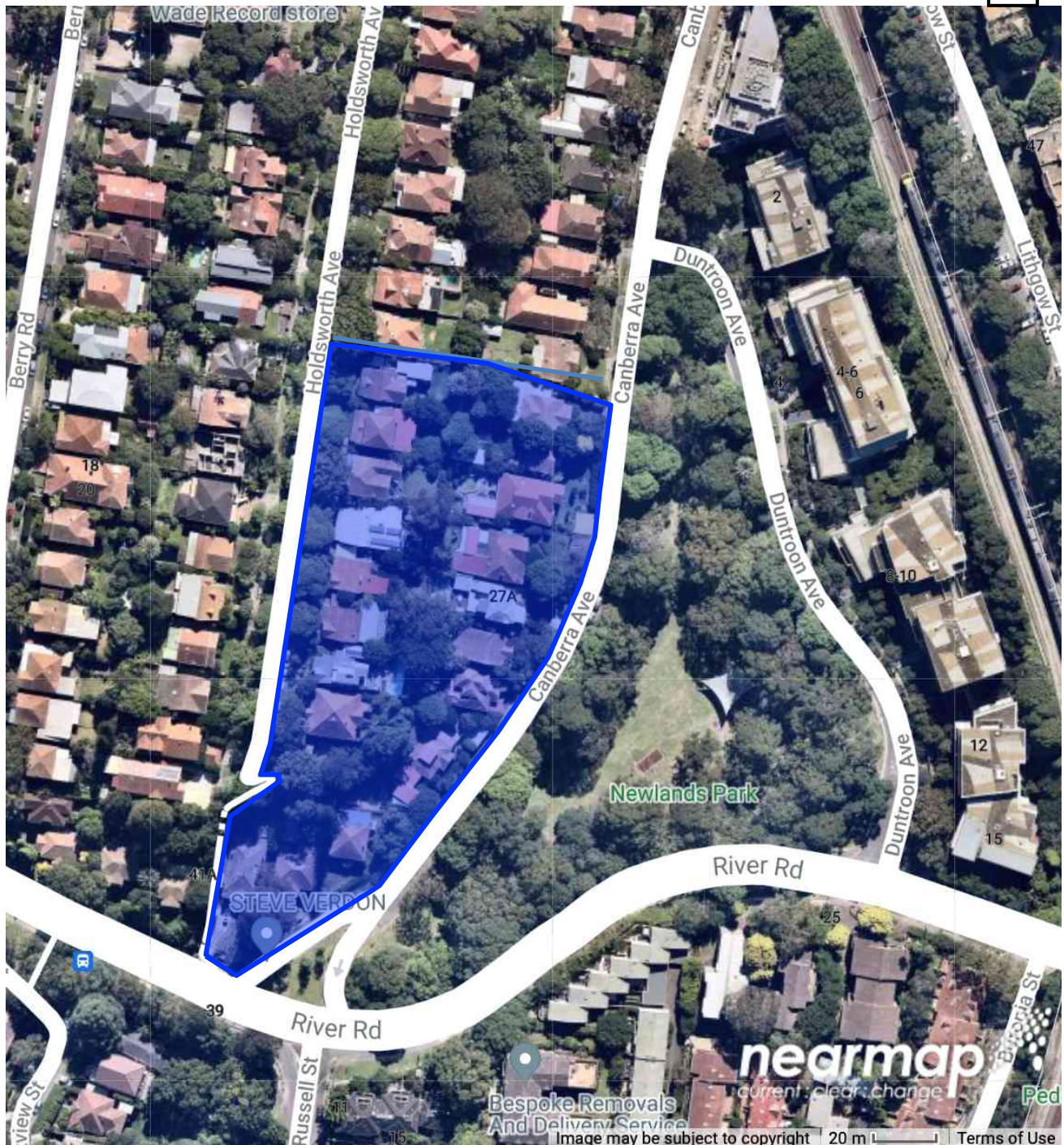
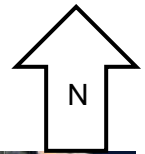
18 – 32 Holdsworth Avenue & 21 – 41 Canberra Avenue, St Leonards



Source – Near Map 23/11/2020
Figure 1. Location Map

Site Map

18 – 32 Holdsworth Avenue & 21 – 41 Canberra Avenue, St Leonards



Source – Near Map 31/5/2021
Figure 2. Site Map

1 Introduction

1.1 Project Description

The development proposed is for the demolition of existing structures within 18 - 32 Holdsworth Avenue and 21 - 41 Canberra Avenue, St Leonards for the construction of a multi-level apartment complex.

1.2 Brief

PDS Group provided instructions to inspect and assess the health and condition of the trees at 27-31 Canberra Ave and 26-32 Holdsworth Ave, St Leonards, including any tree within the vicinity of the proposed works including trees on adjoining properties. I have prepared an Arboriculture Impact Assessment on the proposed impacts of the development works on the subject trees. The report will provide recommendations regarding tree protection during the development process.

1.3 Aims

- Undertake field surveys for tree health and condition.
- Conduct a literature review on the tree defects and symptoms.
- Search databases for relevant tree species information including Council Tree Protection Policies.

1.4 Qualifications and Experience

This report has been based upon site observations and the assessment of the subject trees. Conclusions have been reached from experience and follow up research. Qualification details are included in the appendix.

1.5 Documents Provided

Australis Tree Management	5/10/20	4718_DE_SERV_Canberra Ave_Holdsworth Ave_St Leonards_July2016 Page_2 Tree numbering.pdf 4718_DE_SERV_Canberra Ave_Holdsworth Ave_St Leonards_July2016 Page_3 Tree numbering.pdf 4718_DE_SERV_Canberra Ave_Holdsworth Ave_St Leonards_July2016 Page_4 Tree numbering.pdf
Bates Smart	20/5/21	210520_TopSpring_StLeonards_PlanElevation Update Binder.pdf
Deloitte PDS Group	6/12/21	18-542_Top Spring_DA_[B] 211203.pdf

Table 1. Documents Provided

1.6 Scope

This report is only concerned with the health and condition of the subject trees and the potential impacts from the proposed development. Root mapping, invasive structural strength of the trees, soils assessments or aerial inspections were not performed. This report has been prepared in accordance with Lane Cove Council. It includes a detailed assessment based on the site visit and the documents provided.

2 Methodology

2.1 Methods

The following relevant information was compiled for consideration of the proposed works. Details are located in the appendices.

- AS 4970- 2009 Protection of trees on development sites
- AS 4373 - 2007 Pruning of amenity trees
- Tree Survey Form (Matheny & Clark, 1994)
- Visual Tree Assessment (Mattheck & Breloer, 1994)

2.2 TreeAZ (Barrell, 2016)

- **TreeAZ 'A'** - Moderate and high-quality trees suitable for retention for more than 10 years, and worthy of being a material constraint
- **TreeAZ 'Z'** - Low quality trees not worthy of being material constraint

2.3 Information Collected

Information collected includes tree species, dimensions, tree health and condition, tree assessment ratings and tree protection zones etc. Trees located on adjoining properties will be inspected from the ground on the subject site or public land only. All relevant information is included in the Tree Schedule (Appendix A). The inspection was of a preliminary nature and did not involve any climbing or detailed investigation beyond what was visible from accessible points at ground level.

2.4 Species Identification

Identification of the subject trees are determined by visible features only at the time of the inspection. Every effort is made to correctly identify the subject trees where time permits. Photographs are compared with varying text listed in 'References'.

2.5 Australian Standard 4970-2009 Protection of Trees on Development Sites

In accordance with AS 4970-2009 tree trunk diameters were measured with a diameter tape at 1.4m high (unless stated). Tree heights are measured with a clinometer and canopy spreads estimated accordingly.

Tree Protection Zone (TPZ) is the principal means of protecting trees on development sites. The TPZ is a combination of the root area and crown area requiring protection. It is an area isolated from construction disturbance, so that the tree remains viable. If the proposed encroachment is less than 10% of the area of the TPZ and is outside the SRZ, detailed root investigations should not be required. The area lost to this encroachment should be compensated for elsewhere and contiguous with the TPZ.

2.6 Photography

A Nikon D5200 SLR camera or an iPhone were used. In low light levels photographs maybe altered to improve visual quality, this involves adjustments to exposure, contrast, reduction of shadows and increased sharpness. No adjustments to vibrancy that alter natural colours were applied.

2.7 Australian Standard 4373 - 2007 Pruning of amenity trees

All pruning specifications are written in compliance of *AS 4373 - 2007 Pruning of amenity trees* and should be carried out in accordance with *AS 4373 - 2007* and Workcover NSW Code of Practice '*Amenity Tree Industry*', 1998. Definitions for all terminology used in this report are taken from *AS 4373 - 2007 Pruning of amenity trees*, *AS 4970- 2009 Protection of trees on development sites* and the International Society of Arboriculture's Glossary of Arboricultural Terms.

2.8 Vegetation

Vegetation types have been determined using a variety of methods depending on the location and LGA. Depending on the sources results can vary and should be used as a guide only.

2.9 Wildlife

Interactions between the tree and possible fauna were examined to the best of my ability through text listed in the references. An expert opinion may be required confirm or deny any fauna activities.

3 Site Visit and Observations

3.1 Field Visit

The unaccompanied site visit was conducted on Wednesday, 11 November 2020. All observations were from ground level without detailed investigations. The weather at the time of the inspection was sunny and clear with adequate visibility.

3.2 Brief Site Description

Canberra Ave and Holdsworth Ave is located in the residential suburb of St Leonards located approximately 7km north from Sydney CBD in the Lower North Shore region. The entire site contains similar residential developments with the site sloping downwards from the north west to the south east.

3.3 Location of the Trees

The trees in question are located throughout the entire the site. The trees have been located on the supplied site plan and numbered accordingly. These plans are illustrative purposes only and should not be used directly for scaling measurements. Trees no. 4, 5, 6, 7, 8, 9, 45, 70, 76, 77, 78, 80, 84, 85, 97, 98, 99, 100, 101 & 105 were not located on the supplied survey plan and have been approximately located therefore, inaccuracies may occur.

3.4 On Site Vegetation

The site contains indigenous, planted native and exotic tree species. They are of varying ages and stages of maturity. There is some remnant vegetation on site. The nearest indigenous vegetation community is located within 50m east at Newlands Park and mapped as Coastal Sandstone Gully Forest (DECCW, 2009). The subject site has been completely modified with the removal of all of the native under storey, ground cover plants and shrubs. The subject dominant trees together with other indigenous trees in the surrounding residences are connected to the remainder of the ecological communities nearby.

Indigenous species assessed are:

- *Ceratopetalum gummiferum* (NSW Christmas Bush)
- *Cyathea australis* (Tree Fern)
- *Cyathea cooperi* (Coinspot Tree Fern)
- *Eucalyptus saligna* (Sydney Blue Gum)
- *Glochidion ferdinandi* (Cheese Tree)
- *Pittosporum undulatum* (Sweet Pittosporum)
- *Syncarpia glomulifera* (Turpentine)
- *Tristaniopsis laurina* (Water Gum)

According to NSW Property the subject site does not contain Riparian Lands & Watercourses, Wetlands, Terrestrial Biodiversity, Environmentally Sensitive Land

4 Legislation & Policies

4.1 Vegetation in Non-Rural Areas [NSW] (2017)

The State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017 includes provisions requiring the preservation of trees and bushland within Lane Cove Council LGA.

3 Aims of Policy

The aims of this Policy are:

- (a) to protect biodiversity values of trees and vegetation in non-rural areas of the State, and
- (b) to preserve the amenity of non-rural areas of the State through the preservation of trees and other vegetation.

4.2 Tree Protection

This report relies on the information contained within Lane Cove Local Environmental Plan and Development Control Plan. This report may include trees on adjoining properties that are likely to be impacted by the proposed development regardless of the definition contained in the LEP and DCP.

The trees in Lane Cove are protected under the State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017 (Vegetation SEPP). This policy allows Council to regulate their tree canopy through the Lane Cove Council Development Control Plan 2010. Failure to comply can incur fines or prosecution of up to \$1,100,000.

You require Council consent to prune or remove a tree:

- Greater than 4m in height and/or
- A trunk diameter more than 150mm measured 1m above existing ground level.

Exempt Species

The following tree species are listed in councils' list of exempt species, exempt of works or undersized.

Note: Exempt species *

- Tree No. 3 *Schefflera actinophylla* (Queensland Umbrella Tree)* - Exempt species
- Tree No. 12 *Melaleuca linariifolia* (Snow in Summer)* - Dead
- Tree No. 30 *Cotoneaster glaucophyllus* (Cotoneaster)* - Exempt species
- Tree No. 39, 52, 53, 54, 55, 56, 57, 58, 59 × *Cupressocyparis leylandii* 'Leighton Green' (Leyland's Cypress)* - Exempt species
- Tree No.69 *Robinia pseudoacacia* 'Frisia' (Golden Robinia)* - Dead
- Tree No. 76 *Plumeria acutifolia* (Frangipani)* - Dead
- Tree No. 77 *Prunus sp* (Ornamental Plum)* - Dead
- Tree No. 85 *Nerium oleander* (Oleander)* - Undersize
- Tree No. 97 *Lagerstroemia indica* (Crepe Myrtle)* - Undersize
- Tree No. 102 *Celtis sinensis* (Chinese Nettle)* - Exempt species

4.3 Threatened Species

The following tree species is listed in the NSW Biodiversity Conservation Act (2016) and The Environment Protection and Biodiversity Conservation Act (1999). It is a horticultural planting in declining health and this specimen is of no relevance to the conservation of the species.

- Tree No. 79 *Eucalyptus scoparia* (Wallangarra White Gum)
 - Conservation status in NSW: Endangered (BC Act 2016)
 - Commonwealth: Vulnerable (EPBC Act 1999)

4.4 Biosecurity Act 2015

The following tree species are listed in the Biosecurity Act 2015 and classed as 'General'. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable.

- Tree No. 102 *Celtis sinensis* (Chinese Nettle)*
- Tree No. 73 *Cinnamomum camphora* (Camphor Laurel)
- Trees No. 2, 32, 36 & 103 *Pittosporum undulatum* (Sweet Pittosporum)
- Tree No. 3 *Schefflera actinophylla* (Queensland Umbrella Tree)*

5 Results

* Unprotected trees

5.1 Tree AZ & Life Expectancy

5.1.1 **TreeAZ 'A'** - Moderate and high-quality trees suitable for retention for more than 10 years, and worthy of being a material constraint (**AA1 Trees**).

Tree No.	Species	Life Expect'y	Location
1	<i>Glochidion ferdinandi</i> (Cheese Tree)	40+yrs	adjoining property
2	<i>Pittosporum undulatum</i> (Sweet Pittosporum)	15-40yrs	adjoining property
10	<i>Citharexylum spinosum</i> (Fiddlewood)	40+yrs	on site
11	<i>Glochidion ferdinandi</i> (Cheese Tree)	15-40yrs	on site
13	<i>Quercus palustris</i> (Pin Oak)	40+yrs	on site
14	<i>Eucalyptus saligna</i> (Sydney Blue Gum)	40+yrs	on site
15, 16	<i>Liquidambar styraciflua</i> (Liquidamber)	40+yrs	on site
19	<i>Araucaria heterophylla</i> (Norfolk Island Pine)	40+yrs	on site
21	<i>Eucalyptus</i> sp (Gum Tree)	15-40yrs	on site
22	<i>Liriodendron tulipifera</i> (Tulip Tree)	40+yrs	on site
26, 28, 31, 35, 46, 62	<i>Jacaranda mimosifolia</i> (Jacaranda)	40+yrs	on site
27	<i>Corymbia maculata</i> (Spotted Gum)	40+yrs	on site
29	<i>Brachychiton acerifolius</i> (Illawarra Flame Tree)	15-40yrs	on site
32	<i>Pittosporum undulatum</i> (Sweet Pittosporum)	15-40yrs	on site
43	<i>Archontophoenix cunninghamiana</i> (Bangalow Palm)	40+yrs	on site
44	<i>Eucalyptus sclerophylla</i> (Scribbly Gum)	15-40yrs	nature strip
49 -50	<i>Waterhousea floribunda</i> (Weeping Lilli Pilli)	40+yrs	on site
61	<i>Syncarpia glomulifera</i> (Turpentine)	40+yrs	on site
63	<i>Juniperus chinensis</i> 'Keteleeri' (Keteleer Chinese Juniper)	40+yrs	on site
64	<i>Stenocarpus sinuatus</i> (Fire Wheel Tree)	40+yrs	on site
66	<i>Eucalyptus globulus</i> subsp <i>bicostata</i> (Southern Blue Gum)	15-40yrs	on site
67, 72, 83	<i>Phoenix canariensis</i> (Canary Island Date Palm)	40+yrs	on site
73	<i>Cinnamomum camphora</i> (Camphor Laurel)	15-40yrs	on site
79	<i>Eucalyptus scoparia</i> (Wallangara White Gum)	15-40yrs	on site
82	<i>Syzygium australe</i> (Brush Cherry)	40+yrs	on site
86, 89	<i>Eucalyptus microcorys</i> (Tallowwood)	40+yrs	nature strip
87, 88, 90 - 94	<i>Lophostemon confertus</i> (Queensland Brush Box)	40+yrs	nature strip
95	<i>Lophostemon confertus</i> (Queensland Brush Box)	40+yrs	nature strip
96	<i>Melia azedarach</i> (White Cedar)	15-40yrs	on site
101	<i>Archontophoenix cunninghamiana</i> (Bangalow Palm)	40+yrs	on site

Table 2. Tree AZ 'A' and Life Expectancy

5.1.2 **TreeAZ 'Z'** - Low quality trees not worthy of being material constraint

Tree No.	Species	Life Expect'y	Location
3	<i>Schefflera actinophylla</i> (Queensland Umbrella Tree)*	5-15yrs	adjoining property
4	<i>Elaeocarpus emundi</i> (Emundi Quandong)	40+yrs	on site
5	<i>Camellia reticulata</i> (Reticulata Camellia)	40+yrs	on site
6 - 9	<i>Cyathea australis</i> (Tree Fern)	40+yrs	on site
17	<i>Tristanopsis laurina</i> (Water Gum)	40+yrs	nature strip
18	<i>Thuja plicata</i> (Western Red Cedar)	40+yrs	on site
20	<i>Casuarina cunninghamiana</i> (River Oak)	5-15yrs	on site
23, 24	<i>Phoenix canariensis</i> (Canary Island Date Palm)	40+yrs	on site
25	<i>Thuja plicata</i> (Western Red Cedar)	15-40yrs	on site
30	<i>Cotoneaster glaucophyllus</i> (Cotoneaster) *	15-40yrs	on site
33	<i>Tristanopsis laurina</i> (Water Gum)	40+yrs	nature strip
34	<i>Backhousia citriodora</i> (Lemon Scented Myrtle)	5-15yrs	on site
36	<i>Pittosporum undulatum</i> (Sweet Pittosporum)	15-40yrs	on site
37, 38	<i>Glochidion ferdinandi</i> (Cheese Tree)	15-40yrs	on site
39	× <i>Cupressocyparis leylandii</i> 'Leighton Green' (Leyland's Cypress) *	40+yrs	on site
41	<i>Cyathea australis</i> (Tree Fern)	40+yrs	on site
42	<i>Phoenix canariensis</i> (Canary Island Date Palm)	40+yrs	on site
45	<i>Magnolia x soulangeana</i> (Magnolia)	15-40yrs	on site
47	<i>Hymenoporus flavum</i> (Native Frangipani)	15-40yrs	on site
48	<i>Thuja plicata</i> (Western Red Cedar)	40+yrs	on site
52 -58	× <i>Cupressocyparis leylandii</i> 'Leighton Green' (Leyland's Cypress) *	40+yrs	on site
59	<i>Agonis flexuosa</i> (Willow Myrtle)	5-15yrs	on site
60	<i>Ceratopetalum gummiferum</i> (NSW Christmas Bush)	15-40yrs	on site
68	<i>Callistemon viminalis</i> (Weeping Bottlebrush)	15-40yrs	on site
70	<i>Camellia sasanqua</i> (Small-leaved Camellia)	40+yrs	on site
71	<i>Tibouchina lepidota</i> 'Alstonville' (Alstonville Tibouchina)	5-15yrs	on site
74	<i>Camellia reticulata</i> (Reticulata Camellia)	15-40yrs	on site
75	<i>Malus floribunda</i> (Crab Apple)	15-40yrs	on site
78	<i>Plumeria acutifolia</i> (Frangipani)	15-40yrs	on site
80	<i>Pittosporum tenuifolium</i> (James Stirling)	5-15yrs	on site
81	<i>Melaleuca bracteata</i> (Revolution Green)	15-40yrs	on site
84	<i>Syzygium</i> sp (Lilly Pilly)	40+yrs	adjoining property
85	<i>Nerium oleander</i> (Oleander) *	40+yrs	on site
97	<i>Lagerstroemia indica</i> (Crepe Myrtle) *	40+yrs	on site
98	<i>Cyathea australis</i> (Tree Fern)	40+yrs	on site
99, 100	<i>Cyathea cooperi</i> (Coinspot Tree Fern)	40+yrs	on site
102	<i>Celtis sinensis</i> (Chinese Nettle) *	40+yrs	on site
103	<i>Pittosporum undulatum</i> (Sweet Pittosporum)	15-40yrs	on site
104	<i>Phoenix canariensis</i> (Canary Island Date Palm)	40+yrs	on site
105	<i>Citharexylum spinosum</i> (Fiddlewood)	40+yrs	on site

Table 3. Tree AZ 'Z' and Life Expectancy

5.1.3 Dead or Removed Trees

Tree No.	Species	Location
12	<i>Melaleuca linariifolia</i> (Snow in Summer) *	on site
40	<i>Previously removed</i>	Canberra Ave nature strip
65	<i>Previously removed</i>	Canberra Ave nature strip
69	<i>Robinia pseudoacacia</i> (Robinia) *	on site
76	<i>Plumeria acutifolia</i> (Frangipani) *	on site
77	<i>Prunus sp</i> (Ornamental Plum) *	on site

Table 4. Dead or Removed Trees

5.2 Trees Proposed for Retention

Tree No.	Species	TPZ	Proposed Encr	Location
1	<i>Glochidion ferdinandi</i> (Cheese Tree)	7.2m	0%	adjoining property
2	<i>Pittosporum undulatum</i> (Sweet Pittosporum)	5.4m	0%	adjoining property
3	<i>Schefflera actinophylla</i> (Queensland Umbrella Tree)*	4.0m	0%	adjoining property
14	<i>Eucalyptus saligna</i> (Sydney Blue Gum)	9.6m	9%	on site
17	<i>Tristanopsis laurina</i> (Water Gum)	3.0m	0%	nature strip
33	<i>Tristanopsis laurina</i> (Water Gum)	2.0m	0%	nature strip
79	<i>Eucalyptus scoparia</i> (Wallangara White Gum)	8.4m	4%	on site
84	<i>Syzygium sp</i> (Lilly Pilly)	2.4m	0%	adjoining property
86	<i>Eucalyptus microcorys</i> (Tallowwood)	7.8m	0%	nature strip
87	<i>Lophostemon confertus</i> (Queensland Brush Box)	8.5m	0%	nature strip
88	<i>Lophostemon confertus</i> (Queensland Brush Box)	8.4m	0%	nature strip
89	<i>Eucalyptus microcorys</i> (Tallowwood)	10.8m	0%	nature strip
90	<i>Lophostemon confertus</i> (Queensland Brush Box)	8.4m	0%	nature strip
91	<i>Lophostemon confertus</i> (Queensland Brush Box)	8.4m	0%	nature strip
92	<i>Lophostemon confertus</i> (Queensland Brush Box)	9.6m	0%	nature strip
93	<i>Lophostemon confertus</i> (Queensland Brush Box)	9.6m	0%	nature strip
94	<i>Lophostemon confertus</i> (Queensland Brush Box)	9.6m	0%	nature strip
95	<i>Lophostemon confertus</i> (Queensland Brush Box)	9.6m	0%	nature strip

Table 5. Trees Proposed for Retention

5.3 Trees Proposed for Removal ('A' Trees)

Tree no.	Species	TPZ	Proposed Encr	Location
10	<i>Citharexylum spinosum</i> (Fiddlewood)	5.4m	100%	on site
11	<i>Glochidion ferdinandi</i> (Cheese Tree)	6.8m	100%	on site
13	<i>Quercus palustris</i> (Pin Oak)	5.4m	100%	on site
15	<i>Liquidambar styraciflua</i> (Liquidamber)	7.2m	0%	on site
16	<i>Liquidambar styraciflua</i> (Liquidamber)	7.2m	0%	on site
19	<i>Araucaria heterophylla</i> (Norfolk Island Pine)	7.8m	100%	on site
21	<i>Eucalyptus</i> sp (Gum Tree)	6.0m	100%	on site
22	<i>Liriodendron tulipifera</i> (Tulip Tree)	8.4m	24%	on site
26	<i>Jacaranda mimosifolia</i> (Jacaranda)	6.0m	100%	on site
27	<i>Corymbia maculata</i> (Spotted Gum)	6.0m	100%	on site
28	<i>Jacaranda mimosifolia</i> (Jacaranda)	3.6m	100%	on site
29	<i>Brachychiton acerifolius</i> (Illawarra Flame Tree)	3.6m	100%	on site
31	<i>Jacaranda mimosifolia</i> (Jacaranda)	6.6m	100%	on site
32	<i>Pittosporum undulatum</i> (Sweet Pittosporum)	5.4m	100%	on site
35	<i>Jacaranda mimosifolia</i> (Jacaranda)	6.0m	50%	on site
44	<i>Eucalyptus sclerophylla</i> (Scribbly Gum)	7.2m	100%	nature strip
46	<i>Jacaranda mimosifolia</i> (Jacaranda)	6.0m	100%	on site
49	<i>Waterhousea floribunda</i> (Weeping Lilli Pilli)	4.8m	100%	on site
50	<i>Waterhousea floribunda</i> (Weeping Lilli Pilli)	4.2m	100%	on site
51	<i>Waterhousea floribunda</i> (Weeping Lilli Pilli)	6.0m	100%	on site
61	<i>Syncarpia glomulifera</i> (Turpentine)	7.8m	100%	on site
62	<i>Jacaranda mimosifolia</i> (Jacaranda)	7.8m	100%	on site
63	<i>Juniperus chinensis</i> 'Keteleeri' (Keteleer Chinese Juniper)	8.4m	100%	on site
64	<i>Stenocarpus sinuatus</i> (Fire Wheel Tree)	7.2m	100%	on site
66	<i>Eucalyptus globulus</i> subsp <i>bicostata</i> (Southern Blue Gum)	7.8m	100%	on site
67	<i>Phoenix canariensis</i> (Canary Island Date Palm)	4.0m	100%	on site
72	<i>Phoenix canariensis</i> (Canary Island Date Palm)	4.5m	100%	on site
73	<i>Cinnamomum camphora</i> (Camphor Laurel)	10.8m	100%	on site
82	<i>Syzygium australe</i> (Brush Cherry)	5.4m	100%	on site
83	<i>Phoenix canariensis</i> (Canary Island Date Palm)	5.0m	100%	on site
96	<i>Melia azedarach</i> (White Cedar)	5.4m	14%	on site
101	<i>Archontophoenix cunninghamiana</i> (Bangalow Palm)	3.5m	100%	on site

Table 6. Trees Proposed for Removal ('A' Trees)

5.4 Trees Proposed for Removal ('Z' Trees)

Tree no.	Species	TPZ	Proposed Encl	Location
4	<i>Elaeocarpus emundi</i> (Emundi Quandong)	2.0m	100%	on site
5	<i>Camellia reticulata</i> (Reticulata Camellia)	2.0m	100%	on site
6, 7, 8, 41	<i>Cyathea australis</i> (Tree Fern)	2.5m	100%	on site
9	<i>Cyathea australis</i> (Tree Fern)	3.0m	100%	on site
12	<i>Melaleuca linariifolia</i> (Snow In Summer) *	Dead		on site
18	<i>Thuja plicata</i> (Western Red Cedar)	2.4m	100%	on site
20	<i>Casuarina cunninghamiana</i> (River Oak)	6.0m	100%	on site
23, 24	<i>Phoenix canariensis</i> (Canary Island Date Palm)	6.0m	100%	on site
25	<i>Thuja plicata</i> (Western Red Cedar)	3.6m	100%	on site
30	<i>Cotoneaster glaucophyllus</i> (Cotoneaster) *	2.0m	100%	on site
34	<i>Backhousia citriodora</i> (Lemon Scented Myrtle)	6.0m	100%	on site
36	<i>Pittosporum undulatum</i> (Sweet Pittosporum)	2.4m	100%	on site
37	<i>Glochidion ferdinandi</i> (Cheese Tree)	3.0m	23%	on site
38	<i>Glochidion ferdinandi</i> (Cheese Tree)	9.6m	40%	on site
39	× <i>Cupressocyparis leylandii</i> 'Leighton Green' (Leyland's Cypress) *	6.0m	100%	on site
42	<i>Phoenix canariensis</i> (Canary Island Date Palm)	5.0m	100%	on site
43	<i>Archontophoenix cunninghamiana</i> (Bangalow Palm)	3.0m	100%	on site
45	<i>Magnolia x soulangeana</i> (Magnolia)	3.6m	100%	on site
47	<i>Hymenosporum flavum</i> (Native Frangipani)	4.8m	100%	on site
48	<i>Thuja plicata</i> (Western Red Cedar)	8.4m	100%	on site
52	× <i>Cupressocyparis leylandii</i> 'Leighton Green' (Leyland's Cypress) *	7.2m	100%	on site
53	× <i>Cupressocyparis leylandii</i> 'Leighton Green' (Leyland's Cypress) *	3.0m	100%	on site
54, 56	× <i>Cupressocyparis leylandii</i> 'Leighton Green' (Leyland's Cypress) *	5.4m	100%	on site
55, 58	× <i>Cupressocyparis leylandii</i> 'Leighton Green' (Leyland's Cypress) *	4.8m	100%	on site
57	× <i>Cupressocyparis leylandii</i> 'Leighton Green' (Leyland's Cypress) *	4.2m	100%	on site
59	<i>Agonis flexuosa</i> (Willow Myrtle)	3.6m	100%	on site
60	<i>Ceratopetalum gummiferum</i> (NSW Christmas Bush)	6.0m	100%	on site
68	<i>Callistemon viminalis</i> (Weeping Bottlebrush)	4.2m	100%	on site
69	<i>Robinia pseudoacacia</i> (Robinia) *	Dead		on site
70	<i>Camellia sasanqua</i> (Small-leaved Camellia)	3.6m	100%	on site
71	<i>Tibouchina lepidota</i> (Alstonville Tibouchina)	4.2m	100%	on site
74	<i>Camellia reticulata</i> (Reticulata Camellia)	2.0m	100%	on site
75	<i>Malus floribunda</i> (Crab Apple)	7.2m	100%	on site
76	<i>Plumeria acutifolia</i> (Frangipani) *	Dead		on site
77	<i>Prunus sp</i> (Ornamental Plum) *	Dead		on site
78	<i>Plumeria acutifolia</i> (Frangipani)	2.0m	100%	on site
80	<i>Pittosporum tenuifolium</i> (James Stirling)	2.4m	100%	on site
81	<i>Melaleuca bracteata</i> (Revolution Green)	2.4m	100%	on site
85	<i>Nerium oleander</i> (Oleander) *	4.2m	100%	on site

Table 7. Trees Proposed for Removal ('Z' Trees)
Continued on following page

Continued

Tree no.	Species	TPZ	Proposed Encr	Location
97	<i>Lagerstroemia indica</i> (Crepe Myrtle) *	3.4m	100%	on site
98	<i>Cyathea australis</i> (Tree Fern)	3.0m	100%	on site
99, 100	<i>Cyathea cooperi</i> (Coinspot Tree Fern)	2.5m	100%	on site
102	<i>Celtis sinensis</i> (Chinese Nettle) *	7.2m	100%	on site
103	<i>Pittosporum undulatum</i> (Sweet Pittosporum)	5.4m	100%	on site
104	<i>Phoenix canariensis</i> (Canary Island Date Palm)	4.0m	100%	on site
105	<i>Citharexylum spinosum</i> (Fiddlewood)	2.4m	100%	on site

Table 8. Continued - Trees Proposed for Removal ('Z' Trees)

5.5 Trees Proposed for Pruning

Tree no.	Species	Pruning Class		Canopy Percentage
14	<i>Eucalyptus saligna</i> (Sydney Blue Gum)	Crown Modification	Reduction Pruning	13%
79	<i>Eucalyptus scoparia</i> (Wallangara White Gum)	Crown Modification	Reduction Pruning	9%

Table 9. Trees Proposed for Pruning

6 The Proposed Development

The development proposed is for the demolition of existing structures for the construction of a multi-level apartment complex. and associated works.

6.1 Demolition

The demolition and removal of structures can cause damage to trees if work occurs within TPZ's. Machinery used for demolition must stay outside of TPZ's and within existing structure locations or similar during removal. Tree protection fencing must be in place prior to demolition.

6.2 Basement Construction

The proposed basement excavations and construction activities are likely to result in major site disturbances and may cause detrimental impacts to the subject trees. Generally, soil disturbances occur at a minimum of 1.5m from the construction works. Soil compaction can occur with foot traffic as well as machinery. This reduces available water and oxygen to penetrate the root zone resulting in death to fibrous roots used for moisture and nutrient uptake.

6.3 Service Locations

Trenching for connection of services will cause significant damage to the root system and likely to reduce the trees life expectancy and potentially jeopardize tree stability. Therefore, thrust boring or hand excavations are recommended within TPZ's only.

6.4 Storm Water Locations

Storm water locations have not been supplied. No trenching within any TPZ as damage is likely to reduce the trees life expectancy.

6.1 Erosion and Sediment Control Fencing

Erosion and sediment control fencing located within the TPZ's must not be excavated. A soil strip may be mounded 200mm. Star pickets must not be installed within any Structural Root Zone.

6.2 On Site Detention

Service line locations have not been supplied, therefore must remain outside any TPZ.

6.3 Driveway

The proposed driveway is located within the TPZ for trees 44 and will require its removal.

6.4 Soil Water Availability

Trees adapt to the existing distribution of soil water in its own particular situation and to the usual fluctuations of water supply that exists. Newly constructed roads, paths, roofs and other impermeable surfaces located upslope from trees prevent rainwater from entering the soil and seeping downslope to trees. Therefore, removing rainwater and

redirecting soil water will lead to a deterioration in health and reduced life expectancy for trees located the down slope from the development.

6.5 Wind Exposure

Trees growing in dense stands become prone to windthrow when surrounding trees are removed, which exposes the remaining trees to the full force of the wind. Trees growing in an open environment are generally shorter and strongly tapered. The construction of buildings adjacent to trees results in the removal of surrounding trees that provide protection. Buildings also alter to natural wind directions and these changes are likely to increase wind stresses on retained trees, which may result in branch failures until the tree has time to adapt and strengthen to the new conditions.

6.6 Landscaping

Proposed landscaping installation must NOT alter soil levels within TPZ's, this includes the addition of garden mixes. By raising existing soils levels gaseous exchange is reduced resulting in stress to the tree and can significantly reduce the trees' life expectancy. These signs may not be visible for some time. The installation of new plants can significantly damage fibrous roots, therefore reducing the trees ability to absorb moisture and nutrients. All new plantings within the SRZ must be tube stock or envirocells size and within the TPZ no larger than 140mm pot size. No root over 40mm in diameter must be severed or damaged.

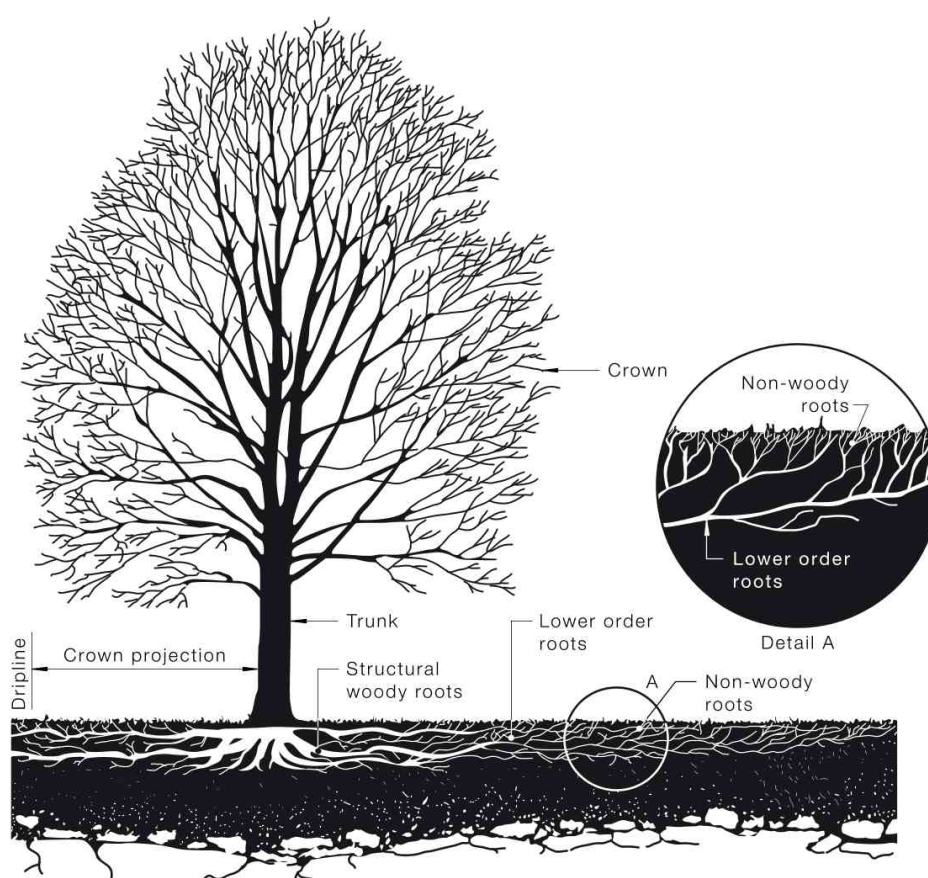


Figure 3. Tree Anatomy

6.7 Tree Tolerance

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

A tree that is already compromised or showing signs of stress is far less likely to tolerate construction impacts due to its lower levels of energy reserves and already weakened state. Therefore, a tree that is only in a fair condition or poor condition is less likely to tolerate construction impacts than a young tree in good or excellent condition. Weakened or stressed trees are also far less able to combat the myriad of normal environmental stresses and pathogens that are naturally imposed against them such as drought, decay, fungi, bacteria and insect pests.

7 Discussion

7.1 On Site Trees Proposed for Retention

7.1.1 Tree No. 14 *Eucalyptus saligna* (Sydney Blue Gum)

- 7.1.1.1 This indigenous tree is located on site being 37 Canberra Ave and is protected by council. It is mature in age and appears to be in good (4) health and fair structural condition with minor branch wounds, minor deadwood and hardware attached to trunk. It has a 'TreeAZ' rating of 'AA1' and an estimated life expectancy of 40+yrs.
- 7.1.1.2 The proposed building is located approximately 6m from the trunk inside the 9.6m TPZ with a 9% encroachment. This is considered minor in accordance with AS4970-2009. Strict protection will be required to ensure tree protection specifications are upheld and fencing remains in place and unaltered during construction activities. More information is located in sections 8 and 9. No soil level changes are proposed.
- 7.1.1.3 Approximately 13% of the canopy is proposed for construction scaffold clearance of approximately 1.5m to 2m. Pruning is limited to the removal of approximately nine (9) 3rd and 4th order branches with a maximum diameter of 150mm at the branch collar that encroaches the scaffolding. See Figures 4 and 5 for pruning markups. At the time of scaffold installation and inspection must occur to determine which branches will require protection.
- 7.1.1.4 The proposed demolition of the existing driveway will require work within the TPZ. The driveway may be broken up by machine (with machine remaining outside the TPZ) with the broken concrete pieces being removed by hand within the TPZ only.

7.1.2 Tree No. 79 *Eucalyptus scoparia* (Wallangara White Gum)

- 7.1.2.1 This is a native tree and is protected by council. The species is listed under Biodiversity Conservation Act (2016) as being 'Endangered' and the species is listed under the Environment Protection and Biodiversity Conservation Act (1999) as being 'Vulnerable'. It is mature in age and appears to be in average (3) health and fair structural condition. The tree has *thaumasticorid* evidence as well as twig dieback and deadwood. It has a 'TreeAZ' rating of 'A' and an estimated life expectancy of 15-40yrs.
- 7.1.2.2 The proposed building and basement are located approximately 5.6m from the trunk inside the 8.4m TPZ with a 4% encroachment. This is considered minor in accordance with AS4970-2009.
- 7.1.2.3 An elevated decking area is proposed under the entire canopy. This must be permeable allowing moisture and airflow to penetrate the root system. Decking footings must be hand excavated to protect roots

over 40mm in diameter within the 8.m TPZ. No soil level changes are proposed.

- 7.1.2.4 Approximately 9% of the canopy is proposed for construction scaffold clearance. Pruning is limited to the removal of 3rd and 4th order branches with a maximum diameter of 150mm at the branch collar that encroaches the scaffolding.

7.2 On Site Trees Proposed for Removal

The following trees are located on site and either within or very close to the development envelope.

7.2.1 No. 21 Canberra Avenue

- 7.2.1.1 Tree No. 59 *Agonis flexuosa* (Willow Myrtle) is a native tree and is protected by council. It is mature in age and appears to be in average (3) health and fair structural condition. It has a 'TreeAZ' rating of 'Z1' and an estimated life expectancy of 5-15yrs.
- 7.2.1.2 Tree No. 60 *Ceratopetalum gummiferum* (NSW Christmas Bush) is an indigenous tree and is protected by council. It is mature in age and appears to be in average (3) health and fair structural condition. It has a 'TreeAZ' rating of 'Z1' and an estimated life expectancy of 15-40yrs.
- 7.2.1.3 Tree No. 61 *Syncarpia glomulifera* (Turpentine) is an indigenous tree and is protected by council. It is mature in age and appears to be in good (4) health and fair structural condition. It has a 'TreeAZ' rating of 'A' and an estimated life expectancy of 40+yrs.
- 7.2.1.4 Tree No. 62 *Jacaranda mimosifolia* (Jacaranda) is an exotic tree and is protected by council. It is semi mature in age and appears to be in average (3) health and fair structural condition with some watersprout growth. It has a 'TreeAZ' rating of 'A' and an estimated life expectancy of 40+yrs.
- 7.2.1.5 Tree No. 63 *Juniperus chinensis* 'Keteleeri' (Keteleer Chinese Juniper) is an exotic tree and is protected by council. It is mature in age and appears to be in good (4) health and poor structural condition. The tree has included bark in codominant trunk union and other unions throughout. It has a 'TreeAZ' rating of 'A' and an estimated life expectancy of 40+yrs.
- 7.2.1.6 Tree No. 64 *Stenocarpus sinuatus* (Fire Wheel Tree) is a native tree and is protected by council. It is mature in age and appears to be in average (3) health and fair structural condition. It has a 'TreeAZ' rating of 'A' and an estimated life expectancy of 40+yrs.

7.2.2 No. 23 Canberra Avenue

- 7.2.2.1 Tree No. 48 *Thuja plicata* (Western Red Cedar) is an exotic tree and is protected by council. It is mature in age and appears to be in good (4)

health and poor structural condition. The tree has included bark in codominant trunk union and other unions throughout. It has a 'TreeAZ' rating of 'Z4' and an estimated life expectancy of 40+yrs.

- 7.2.2.2 Tree No. 49 *Syzygium floribunda* syn *Waterhousea floribunda* (Weeping Lilli Pilli) is a native tree and is protected by council. It is mature in age and appears to be in good (4) health and fair structural condition. The tree has included bark in branch unions and evidence of pruning events. It has a 'TreeAZ' rating of 'A' and an estimated life expectancy of 40+yrs.
- 7.2.2.3 Tree No. 50 *Syzygium floribunda* syn *Waterhousea floribunda* (Weeping Lilli Pilli) is a native tree and is protected by council. It is mature in age and appears to be in good (4) health and fair structural condition. The tree has included bark in branch unions and evidence of pruning events as well as watersprout growth. It has a 'TreeAZ' rating of 'A' and an estimated life expectancy of 40+yrs.
- 7.2.2.4 Tree No. 51 *Syzygium floribunda* syn *Waterhousea floribunda* (Weeping Lilli Pilli) is a native tree and is protected by council. It is mature in age and appears to be in good (4) health and fair structural condition. The tree has included bark in branch unions and evidence of pruning events as well as watersprout growth. It has a 'TreeAZ' rating of 'A' and an estimated life expectancy of 40+yrs.
- 7.2.2.5 Trees No. 52 to 58 × *Cupressocyparis leylandii* 'Leighton Green' (Leyland's Cypress)* are exotic trees and are not protected by council. They are mature in age and appear to be in good (4) health and fair structural condition. The trees have included bark in branch unions. It has a 'TreeAZ' rating of 'Z2' and an estimated life expectancy of 40+yrs.

7.2.3 No. 25 Canberra Avenue

- 7.2.3.1 Tree No. 85 *Nerium oleander* (Oleander)* is an exotic tree and is not protected by council. It is mature in age and appears to be in average (3) health and fair structural condition. It has a 'TreeAZ' rating of 'Z1' and an estimated life expectancy of 40+yrs.

7.2.4 No. 27 Canberra Avenue

- 7.2.4.1 Tree No. 45 *Magnolia x soulangeana* (Magnolia) is an exotic tree and is protected by council. It is mature in age and appears to be in average (3) health and fair structural condition. It has a 'TreeAZ' rating of 'Z1' and an estimated life expectancy of 15-40yrs.
- 7.2.4.2 Tree No. 46 *Jacaranda mimosifolia* (Jacaranda) is an exotic tree and is protected by council. It is semi mature in age and appears to be in good (4) health and fair structural condition. The tree has surface roots and watersprout growth. It has a 'TreeAZ' rating of 'A' and an estimated life expectancy of 40+yrs.

- 7.2.4.3 Tree No. 47 *Hymenosporum flavum* (Native Frangipani) is a native tree and is protected by council. It is mature in age and appears to be in average (3) health and fair structural condition. It has a 'TreeAZ' rating of 'Z1' and an estimated life expectancy of 15-40yrs.

7.2.5 No. 29 Canberra Avenue

- 7.2.5.1 Tree No. 96 *Melia azedarach* (White Cedar) is a native tree and is protected by council. It is mature in age and appears to be in average (3) health and fair structural condition. The tree has included bark within the scaffold bark union. It has a 'TreeAZ' rating of 'A' and an estimated life expectancy of 15-40yrs.
- 7.2.5.2 Tree No. 97 *Lagerstroemia indica* (Crepe Myrtle)* is a native tree and is not protected by council. It is mature in age and appears to be in average (3) health and fair structural condition. It has a 'TreeAZ' rating of 'Z2' and an estimated life expectancy of 40+yrs.
- 7.2.5.3 Tree No. 98 *Cyathea australis* (Tree Fern) is an indigenous tree fern is that is protected by council. It is semi mature in age and appears to be in good (4) health and fair structural condition. It has a 'TreeAZ' rating of 'Z1' and an estimated life expectancy of 40+yrs.
- 7.2.5.4 Trees No. 99 & 100 *Cyathea cooperi* (Coinspot Tree Fern) are indigenous tree ferns that are protected by council. They are mature in age and appears to be in average (3) health and fair structural condition. They have 'TreeAZ' ratings of 'Z1' and estimated life expectancies of 40+yrs.
- 7.2.5.5 Tree No. 101 *Archontophoenix cunninghamiana* (Bangalow Palm) is a native tree and is protected by council. It is mature in age and appears to be in average (3) health and fair structural condition. It has a 'TreeAZ' rating of 'A' and an estimated life expectancy of 40+yrs.
- 7.2.5.6 Tree No. 102 *Celtis sinensis* (Chinese Nettle)* is an exotic tree and is not protected by council. The species is listed under the Biosecurity Act 2015 as having 'General Biosecurity Duty'. It is mature in age and appears to be in average (3) health and fair structural condition. It has a 'TreeAZ' rating of 'Z2' and an estimated life expectancy of 40+yrs.
- 7.2.5.7 Tree No. 103 *Pittosporum undulatum* (Sweet Pittosporum) is an indigenous tree and is protected by council. The species is listed under the Biosecurity Act 2015 as having 'General Biosecurity Duty'. It is mature in age and appears to be in average (3) health and fair structural condition. It has a 'TreeAZ' rating of 'Z1' and an estimated life expectancy of 15-40yrs.
- 7.2.5.8 Tree No. 104 *Phoenix canariensis* (Canary Island Date Palm) is an exotic tree and is protected by council. It is young in age and appears to be in average (3) health and fair structural condition. It has a 'TreeAZ' rating of 'Z1' and an estimated life expectancy of 40+yrs.

7.2.6 No. 31 Canberra Avenue

- 7.2.6.1 Tree No. 41 *Cyathea australis* (Tree Fern) is an indigenous tree fern that is protected by council. It is mature in age and appears to be in average (3) health and fair structural condition. It has a 'TreeAZ' rating of 'Z1' and an estimated life expectancy of 40+ yrs.
- 7.2.6.2 Tree No. 43 *Archontophoenix cunninghamiana* (Bangalow Palm) is a native palm and is protected by council. It is mature in age and appears to be in average (3) health and fair structural condition. It has a 'TreeAZ' rating of 'A' and an estimated life expectancy of 40+ yrs.

7.2.7 No. 33 Canberra Avenue

- 7.2.7.1 Tree No. 34 *Backhousia citriodora* (Lemon Scented Myrtle) is a native tree and is protected by council. It is mature in age and appears to be in low (2-3) health and fair structural condition. The tree has suffered from pruning events and has watersprout growth as well as deadwood. It has a 'TreeAZ' rating of 'Z3' and an estimated life expectancy of 5-15 yrs.
- 7.2.7.2 Tree No. 35 *Jacaranda mimosifolia* (Jacaranda) is an exotic tree and is protected by council. It is mature in age and appears to be in average (3) health and fair structural condition. The tree has minor deadwood in the canopy deadwood. It has a 'TreeAZ' rating of 'A' and an estimated life expectancy of 40+ yrs.
- 7.2.7.3 Tree No. 36 *Pittosporum undulatum* (Sweet Pittosporum) is an indigenous tree and is protected by council. The species is listed under the Biosecurity Act 2015 as having 'General Biosecurity Duty'. It is mature in age and appears to be in average (3) health and fair structural condition. It has a 'TreeAZ' rating of 'Z1' and an estimated life expectancy of 15-40 yrs.
- 7.2.7.4 Tree No. 37 *Glochidion ferdinandi* (Cheese Tree) is an indigenous tree and is protected by council. It is mature in age and appears to be in average (3) health and fair structural condition. It has a 'TreeAZ' rating of 'Z1' and an estimated life expectancy of 15-40 yrs.
- 7.2.7.5 Tree No. 38 *Glochidion ferdinandi* (Cheese Tree) is an indigenous tree and is protected by council. It is mature in age and appears to be in average (3) health and fair structural condition. It has a 'TreeAZ' rating of 'Z1' and an estimated life expectancy of 15-40 yrs.
- 7.2.7.6 Tree No. 39 × *Cupressocyparis leylandii* 'Leighton Green' (Leyland's Cypress)* is an exotic tree and is not protected by council. It is mature in age and appears to be in average (3) health and fair structural condition. It has a 'TreeAZ' rating of 'Z2' and an estimated life expectancy of 40+ yrs.
- 7.2.7.7 Tree No. 42 *Phoenix canariensis* (Canary Island Date Palm) is an exotic tree and is protected by council. It is semi mature in age and

appears to be in good (4) health and fair structural condition. It has a 'TreeAZ' rating of 'Z1' and an estimated life expectancy of 40+yrs.

7.2.8 No. 35 Canberra Avenue

- 7.2.8.1 Tree No. 28 *Jacaranda mimosifolia* (Jacaranda) is an exotic tree and is protected by council. It is semi mature in age and appears to be in average (3) health and fair structural condition. It has a 'TreeAZ' rating of 'A' and an estimated life expectancy of 40+yrs.
- 7.2.8.2 Tree No. 29 *Brachychiton acerifolius* (Illawarra Flame Tree) is a native tree and is protected by council. It is semi mature in age and appears to be in average (3) health and fair structural condition. It has a 'TreeAZ' rating of 'A' and an estimated life expectancy of 15-40yrs.
- 7.2.8.3 Tree No. 30 *Cotoneaster glaucophyllus* (Cotoneaster) is an exotic tree and is not protected by council. The species is listed under the Biosecurity Act 2015 as having 'General Biosecurity Duty'. It is mature in age and appears to be in average (3) health and fair structural condition. It has a 'TreeAZ' rating of 'Z2' and an estimated life expectancy of 15-40yrs.
- 7.2.8.4 Tree No. 31 *Jacaranda mimosifolia* (Jacaranda) is an exotic tree and is protected by council. It is semi mature in age and appears to be in average (3) health and fair structural condition. It has a 'TreeAZ' rating of 'A' and an estimated life expectancy of 15-40yrs.
- 7.2.8.5 Tree No. 32 *Pittosporum undulatum* (Sweet Pittosporum) is an indigenous tree and is protected by council. The species is listed under the Biosecurity Act 2015 as having 'General Biosecurity Duty'. It is mature in age and appears to be in average (3) health and fair structural condition. It has a 'TreeAZ' rating of 'A' and an estimated life expectancy of 15-40yrs.

7.2.9 No. 37 Canberra Avenue

- 7.2.9.1 Tree No. 13 *Quercus palustris* (Pin Oak) is an exotic tree and is protected by council. It is mature in age and appears to be in good (4) health and fair structural condition. It has a 'TreeAZ' rating of 'A' and an estimated life expectancy of 40+yrs.
- 7.2.9.2 Tree No. 15 *Liquidambar styraciflua* (Liquidamber) is an exotic tree and is protected by council. It is mature in age and appears to be in average (3) health and fair structural condition. Though it has a lack of basal flare on southern side. It has a 'TreeAZ' rating of 'A' and an estimated life expectancy of 40+yrs. There are no proposed new works within the TPZ.
- 7.2.9.3 Tree No. 16 *Liquidambar styraciflua* (Liquidamber) is an exotic tree and is protected by council. It is mature in age and appears to be in average (3) health and fair structural condition. Though it has a lack of basal flare on southern side. It has a 'TreeAZ' rating of 'A' and an

estimated life expectancy of 40+yrs. There are no proposed new works within the TPZ.

- 7.2.9.4 Tree No. 18 *Thuja plicata* (Western Red Cedar) is an exotic tree and is protected by council. It is semi mature in age and appears to be in average (3) health and good structural condition. The tree has codominant trunk with included bark. It has a 'TreeAZ' rating of 'Z1' and an estimated life expectancy of 40+yrs.
- 7.2.9.5 Tree No. 19 *Araucaria heterophylla* (Norfolk Island Pine) is a native tree and is protected by council. It is mature in age and appears to be in good (4) health and good structural condition with no significant issues sighted. It has a 'TreeAZ' rating of 'A' and an estimated life expectancy of 40+yrs.
- 7.2.9.6 Tree No. 20 *Casuarina cunninghamiana* (River Oak) is a native tree and is protected by council. It is mature in age and appears to be in low (2-3) health and fair structural condition with a thin canopy and an area of bark lifting at 5m. It has a 'TreeAZ' rating of 'Z3' and an estimated life expectancy of 5-15yrs.
- 7.2.9.7 Tree No. 21 *Eucalyptus sp* (Gum Tree) is a native tree and is protected by council. It is young mature in age and appears to be in low (2-3) health and fair structural condition with minor deadwood. It has a 'TreeAZ' rating of 'A' and an estimated life expectancy of 15-40yrs.
- 7.2.9.8 Tree No. 22 *Liriodendron tulipifera* (Tulip Tree) is and exotic tree and is protected by council. It is mature in age and appears to be in good (4) health and fair structural condition with evidence of previous pruning events. It has a 'TreeAZ' rating of 'AA1' and an estimated life expectancy of 40+yrs.
- 7.2.9.9 Tree No. 23 *Phoenix canariensis* (Canary Island Date Palm) is an exotic tree and is protected by council. It is young in age and appears to be in average (3) health and fair structural condition. It has a 'TreeAZ' rating of 'Z1' and an estimated life expectancy of 40+yrs.
- 7.2.9.10 Tree No. 24 *Phoenix canariensis* (Canary Island Date Palm) is an exotic tree and is protected by council. It is young in age and appears to be in average (3) health and fair structural condition. It has a 'TreeAZ' rating of 'Z1' and an estimated life expectancy of 40+yrs.
- 7.2.9.11 Tree No. 25 *Thuja plicata* (Western Red Cedar) is an exotic tree and is protected by council. It is semi mature in age and appears to be in average (3) health and fair structural condition. It has a 'TreeAZ' rating of 'Z1' and an estimated life expectancy of 15-40yrs.
- 7.2.9.12 Tree No. 26 *Jacaranda mimosifolia* (Jacaranda) is exotic tree is and is protected by council. It is semi mature in age and appears to be in average (3) health and fair structural condition. It has a 'TreeAZ' rating of 'A' and an estimated life expectancy of 40+yrs.

- 7.2.9.13 Tree No. 27 *Corymbia maculata* (Spotted Gum) is a native tree and is protected by council. It is semi mature in age and appears to be in good (4) health and fair structural condition. It has a 'TreeAZ' rating of 'A' and an estimated life expectancy of 40+yrs.

7.2.10 No. 39 Canberra Avenue

- 7.2.10.1 Tree No. 12 *Melaleuca linariifolia* (Snow in Summer) is a dead tree and is not protected by council.

7.2.11 No. 41 Canberra Avenue

- 7.2.11.1 Tree No. 4 *Elaeocarpus emundi* (Emundi Quandong) is native tree and is protected by council. It is semi mature in age and appears to be in excellent (5) health and fair structural condition. It has a 'TreeAZ' rating of 'Z1' and an estimated life expectancy of 40+yrs.
- 7.2.11.2 Tree No. 5 *Camellia reticulata* (Reticulata Camellia) is an exotic tree and is protected by council. It is mature in age and appears to be in good (4) health and fair structural condition. It has a 'TreeAZ' rating of 'Z1' and an estimated life expectancy of 40+yrs.
- 7.2.11.3 Tree No. 6 - 9 *Cyathea australis* (Tree Fern) are indigenous tree fern that are protected by council. They are mature in age and appear to be in good (4) health and fair structural condition. They have 'TreeAZ' ratings of 'Z1' and estimated life expectancies of 40+yrs.
- 7.2.11.4 Tree No. 7 *Cyathea australis* (Tree Fern) is an indigenous tree and is protected by council. It is mature in age and appears to be in good (4) health and fair structural condition. It has a 'TreeAZ' rating of 'Z1' and an estimated life expectancy of 40+yrs.
- 7.2.11.5 Tree No. 10 *Citharexylum spinosum* (Fiddlewood) is an exotic tree and is protected by council. It is mature in age and appears to be in good (4) health and fair structural condition. It has a 'TreeAZ' rating of 'A' and an estimated life expectancy of 40+yrs.
- 7.2.11.6 Tree No. 11 *Glochidion ferdinandi* (Cheese Tree) is an indigenous tree and is protected by council. It is mature in age and appears to be in average (3) health and fair structural condition. It has a 'TreeAZ' rating of 'A' and an estimated life expectancy of 15-40yrs.

7.2.12 No. 18 Holdsworth Avenue

- 7.2.12.1 Tree No. 80 *Pittosporum tenuifolium* (James Stirling) is an exotic tree and is protected by council. It is mature in age and appears to be in low (2-3) health and fair structural condition. It has a 'TreeAZ' rating of 'Z1' and an estimated life expectancy of 5-15yrs.
- 7.2.12.2 Tree No. 81 *Melaleuca bracteata* (Revolution Green) is a native tree and is protected by council. It is mature in age and appears to be in good (4) health and fair structural condition. It has a 'TreeAZ' rating of 'Z1' and an estimated life expectancy of 15-40yrs.

7.2.12.3 Tree No. 82 *Syzygium australe* (Brush Cherry) is a native tree and is protected by council. It is mature in age and appears to be in good (4) health and fair structural condition. It has a 'TreeAZ' rating of 'A' and an estimated life expectancy of 40+yrs.

7.2.12.4 Tree No. 83 *Phoenix canariensis* (Canary Island Date Palm) is an exotic tree and is protected by council. It is mature in age and appears to be in good (4) health and fair structural condition. It has a 'TreeAZ' rating of 'A' and an estimated life expectancy of 40+yrs.

7.2.13 No. 22 Holdsworth Avenue

7.2.13.1 Tree No. 78 *Plumeria acutifolia* (Frangipani) is an exotic tree and is protected by council. It is mature in age and appears to be in good (4) health and fair structural condition. It has a 'TreeAZ' rating of 'Z1' and an estimated life expectancy of 15-40yrs.

7.2.14 No. 26 Holdsworth Avenue

7.2.14.1 Tree No. 71 *Tibouchina lepidota* 'Alstonville' (Alstonville Tibouchina) is an exotic tree and is protected by council. It is mature in age and appears to be in average (3) health and fair structural condition. It has a 'TreeAZ' rating of 'Z1' and an estimated life expectancy of 5-15yrs.

7.2.14.2 Tree No. 72 *Phoenix canariensis* (Canary Island Date Palm) is an exotic tree and is protected by council. It is semi mature in age and appears to be in average (3) health and fair structural condition. It has a 'TreeAZ' rating of 'A' and an estimated life expectancy of 40+yrs.

7.2.14.3 Tree No. 73 *Cinnamomum camphora* (Camphor Laurel) is an exotic tree and is protected by council. The species is listed under the Biosecurity Act 2015 as having 'General Biosecurity Duty'. It is mature in age and appears to be in low (2-3) health and fair structural condition. The tree has deadwood and twig dieback as well as numerous pruning events. It has a 'TreeAZ' rating of 'A' and an estimated life expectancy of 15-40yrs.

7.2.14.4 Tree No. 74 *Camellia reticulata* (Reticulata Camellia) is an exotic tree and is protected by council. It is mature in age and appears to be in average (3) health and fair structural condition. It has a 'TreeAZ' rating of 'Z1' and an estimated life expectancy of 15-40yrs.

7.2.14.5 Tree No. 75 *Malus floribunda* (Crab Apple) is an exotic tree and is protected by council. It is mature in age and appears to be in average (3) health and fair structural condition. It has a 'TreeAZ' rating of 'Z1' and an estimated life expectancy of 15-40yrs.

7.2.14.6 Tree No. 76 *Plumeria acutifolia* (Frangipani) is a dead tree and is not protected by council.

7.2.14.7 Tree No. 77 *Prunus* sp (Ornamental Plum) is a dead tree and is not protected by council.

- 7.2.14.8 Tree No. 105 *Citharexylum spinosum* (Fiddlewood) is an exotic tree and is protected by council. It is semi mature in age and appears to be in good (4) health and fair structural condition. It has a 'TreeAZ' rating of 'Z1' and an estimated life expectancy of 40+yrs.

7.2.15 No. 28 Holdsworth Avenue

- 7.2.15.1 Tree No. 70 *Camellia sasanqua* (Small-leaved Camellia) is an exotic tree and is protected by council. It is mature in age and appears to be in good (4) health and fair structural condition. It has a 'TreeAZ' rating of 'Z1' and an estimated life expectancy of 40+yrs.

7.2.16 No. 30 Holdsworth Avenue

- 7.2.16.1 Tree No. 68 *Callistemon viminalis* (Weeping Bottlebrush) is a native tree and is protected by council. It is mature in age and appears to be in average (3) health and fair structural condition. The tree has included bark within branch unions and pruning events. It has a 'TreeAZ' rating of 'Z1' and an estimated life expectancy of 15-40yrs.
- 7.2.16.2 Tree No. 69 *Robinia pseudoacacia* 'Frisia' (Golden Robinia) is a dead tree and is not protected by council.

7.2.17 No. 32 Holdsworth Avenue

- 7.2.17.1 Tree No. 66 *Eucalyptus globulus* subsp *bicostata* (Southern Blue Gum) is a native tree and is protected by council. It is mature in age and appears to be in low (2-3) health and fair structural condition. The tree has deadwood and epicormic growth. It has a 'TreeAZ' rating of 'A' and an estimated life expectancy of 15-40yrs.
- 7.2.17.2 Tree No. 67 *Phoenix canariensis* (Canary Island Date Palm) is an exotic tree and is protected by council. It is mature in age and appears to be in good (4) health and good structural condition. It has a 'TreeAZ' rating of 'A' and an estimated life expectancy of 40+yrs.

7.3 Nature Strip Trees Proposed for Retention

7.3.1 Tree No. 17 *Tristaniopsis laurina* (Water Gum)

- 7.3.1.1 This indigenous tree is located on the nature strip being Canberra Ave and is protected by council. It is semi mature in age and appears to be in good (4) health and fair structural condition with evidence of lopping for overhead line clearance. The tree also has included bark within the scaffold bark union. It has a 'TreeAZ' rating of 'Z1' and an estimated life expectancy of 40+yrs.
- 7.3.1.2 There are no proposed works within the 3m TPZ for this tree and no canopy pruning is required for the proposed works.

7.3.2 Tree No. 33 *Tristaniopsis laurina* (Water Gum)

- 7.3.2.1 This native tree is located on the nature strip being Canberra Ave and is protected by council. It is mature in age and appears to be in average (3) health and fair structural condition with no significant issues sighted. It has a 'TreeAZ' rating of 'Z1' and an estimated life expectancy of 40+yrs.
- 7.3.2.2 There are no proposed works within the 2m TPZ for this tree and no canopy pruning is required for the proposed works.
- 7.3.3 Tree No. 86 *Eucalyptus microcorys* (Tallowwood)
- 7.3.3.1 This native tree is located on the nature strip being Holdsworth Ave and is protected by council. It is mature in age and appears to be in adequate (3) health and fair structural condition. The tree has included bark in branch unions within the canopy and deadwood branches also, though these are not excessive. It has a 'TreeAZ' rating of 'AA1' and an estimated life expectancy of 40+yrs.
- 7.3.3.2 There are no proposed works within the 7.8m TPZ for this tree and no canopy pruning is required for the proposed works.
- 7.3.4 Tree No. 87 *Lophostemon confertus* (Queensland Brush Box)
- 7.3.4.1 This native tree is located on the nature strip being Holdsworth Ave and is protected by council. It is mature in age and appears to be in average (3) health and fair structural condition. The tree has suffered from lopping for overhead line clearance and has a minor amount of deadwood branches. It has a 'TreeAZ' rating of 'AA1' and an estimated life expectancy of 40+yrs.
- 7.3.4.2 There are no proposed works within the 8.52m TPZ for this tree and no canopy pruning is required for the proposed works.
- 7.3.5 Tree No. 88 *Lophostemon confertus* (Queensland Brush Box)
- 7.3.5.1 This native tree is located on the nature strip being Holdsworth Ave and is protected by council. It is mature in age and appears to be in good (4) health and fair structural condition. The tree has suffered from lopping for overhead line clearance. It has a 'TreeAZ' rating of 'AA1' and an estimated life expectancy of 40+yrs.
- 7.3.5.2 The existing dwelling is located 6.9m from the tree and existing driveway is 2.2m to the south, these obstruct the TPZ by 21% and does not include the roadway.
- 7.3.5.3 The proposed development is located 5.0m from the trunk (partially inside the existing dwelling) inside the 8.4m TPZ with a 14.5% encroachment. There are no proposed works within the 3m SRZ. The proposed encroachment is considered major in accordance with AS4970-2009. The proposed encroachment is likely to cause root system disturbances. Any detrimental impacts will be significantly reduced if hand excavated with no trenching with the top 1.2m of soil

within TPZ only occurred within the 8.4m TPZ. Trenching is not recommended due to the severance of necessary feeder roots used for nutrient and moisture uptake will cause stress and may reduce life expectancy.

7.3.6 Tree No. 89 *Eucalyptus microcorys* (Tallowwood)

- 7.3.6.1 This native tree is located on the nature strip being Holdsworth Ave and is protected by council. It is mature in age and appears to be in average (3) health and fair structural condition. The tree has included bark in branch unions, a minor amount of deadwood in the canopy and the tree has suffered from pruning events. It has a 'TreeAZ' rating of 'AA1' and an estimated life expectancy of 40+yrs.
- 7.3.6.2 The existing dwelling is located 6.1m from the tree and existing driveways are 4m to the north and 7.2m to the south, these obstruct the 10.8m TPZ by 22% and does not include the roadway.
- 7.3.6.3 The proposed development is located 6.4m from the trunk within the existing dwelling and driveway footprints. There are no proposed works within the 3m SRZ.
- 7.3.6.4 As the proposed encroachment is located within the existing dwelling and driveway footprint the likelihood of roots is reduced nevertheless roots measuring over 40mm in diameter must be protected at the edge of the proposed development works.

7.3.7 Tree No. 90 *Lophostemon confertus* (Queensland Brush Box)

- 7.3.7.1 This native tree is located on the nature strip being Holdsworth Ave and is protected by council. It is mature in age and appears to be in good (4) health and fair structural condition. The tree has suffered from lopping for overhead line clearance creating watersprout growth. It has a 'TreeAZ' rating of 'AA1' and an estimated life expectancy of 40+yrs.
- 7.3.7.2 The existing driveway is located 1.5m from the tree and an existing dwelling at approximately 6m, these obstruct the TPZ by 25% and does not include the roadway.
- 7.3.7.3 The proposed development is located 6.3m from the trunk within the existing dwelling and driveway footprints. There are no proposed works within the 3m SRZ.
- 7.3.7.4 As the proposed encroachment is located within the existing dwelling and driveway footprint the likelihood of roots is reduced nevertheless roots measuring over 40mm in diameter must be protected at the edge of the proposed development works.

7.3.8 Tree No. 91 *Lophostemon confertus* (Queensland Brush Box)

- 7.3.8.1 This native tree is located on the nature strip being Holdsworth Ave and is protected by council. It is mature in age and appears to be in low (2-3) health with a thin canopy and in fair structural condition. The

tree has suffered from lopping for overhead line clearance creating watersprout growth. thin canopy. It has a 'TreeAZ' rating of 'AA1' and an estimated life expectancy of 40+yrs.

7.3.8.2 The existing driveway is located 2.6m from the tree and an existing dwelling at approximately 6.2m, these obstruct the TPZ by 22% and does not include the roadway.

7.3.8.3 The proposed development is located 6.7m from the trunk within the existing dwelling footprint. There are no proposed works within the 3m SRZ.

7.3.9 Tree No. 92 *Lophostemon confertus* (Queensland Brush Box)

7.3.9.1 This native tree is located on the nature strip being Holdsworth Ave and is protected by council. It is mature in age and appears to be in good (4) health and fair structural condition. The tree has suffered from lopping for overhead line clearance creating watersprout growth. thin canopy. It has a 'TreeAZ' rating of 'AA1' and an estimated life expectancy of 40+yrs.

7.3.9.2 The existing dwelling is located 6.3m from the tree and an existing driveway at approximately 6.5m, these obstruct the TPZ by 14% and does not include the roadway.

7.3.9.3 The proposed development is located 6.3m from the trunk within the existing dwelling footprint. There are no proposed works within the 3m SRZ.

7.3.10 Tree No. 93 *Lophostemon confertus* (Queensland Brush Box)

7.3.10.1 This native tree is located on the nature strip being Holdsworth Ave and is protected by council. It is mature in age and appears to be in good (4) health and fair structural condition. Once again, the tree has suffered from lopping for overhead line clearance creating watersprout growth. It has visible surface roots with lawn mower damage. It has a 'TreeAZ' rating of 'AA1' and an estimated life expectancy of 40+yrs.

7.3.10.2 An existing paved area is located 2m from the tree and an existing driveway at approximately 6.5m, these obstruct the TPZ by 21% and does not include the roadway.

7.3.10.3 The proposed development is located 6.3m from the trunk within the existing dwelling footprint. There are no proposed works within the 3m SRZ.

7.3.11 Tree No. 94 *Lophostemon confertus* (Queensland Brush Box)

7.3.11.1 This native tree is also located on the nature strip being Holdsworth Ave and is protected by council. It is mature in age and appears to be in good (4) health and fair structural condition. Once again, the tree has suffered from lopping for overhead line clearance creating watersprout growth. It has visible surface roots with lawn mower

damage. It has a 'TreeAZ' rating of 'AA1' and an estimated life expectancy of 40+yrs.

7.3.11.2 A paved entrance is located 1.2m from the trunk obstructing the TPZ by 3.5%. This does not include the roadway.

7.3.11.3 The proposed development is located 6.3m from the trunk within the existing dwelling footprint. There are no proposed works within the 3m SRZ.

7.3.12 Tree No. 95 *Lophostemon confertus* (Queensland Brush Box)

7.3.12.1 This native tree is located on the nature strip being Holdsworth Ave and is protected by council. It is mature in age and appears to be in low (2-3) health and fair structural condition. Once again, the tree has suffered from lopping for overhead line clearance creating watersprout growth. It has visible surface roots with lawn mower damage. It has a 'TreeAZ' rating of 'AA1' and an estimated life expectancy of 40+yrs.

7.3.12.2 An existing brick garage is located 3.7m from the tree and an existing driveway at approximately 2.3m, these obstruct the TPZ by 27-30% and does not include the roadway.

7.3.12.3 The proposed development is located 6.3m from the trunk within the existing dwelling footprint. There are no proposed works within the 3m SRZ.

7.4 Nature Strip Trees Proposed for Removal

7.4.1 Canberra Avenue Nature Strip

7.4.1.1 Tree No. 44 *Eucalyptus sclerophylla* (Scribbly Gum) is a native tree and is protected by council. It is mature in age and appears to be in low (2-3) health and fair structural condition. The tree has surface roots, a trunk wound, a wound on the scaffold limb and deadwood in the canopy. It has a 'TreeAZ' rating of 'A' and an estimated life expectancy of 15-40yrs.

7.5 Adjoining Properties Trees

7.5.1 Tree No. 1 *Glochidion ferdinandi* (Cheese Tree)

7.5.1.1 This indigenous tree is located on the adjoining private property being 42 Canberra Ave and is protected by council. It is mature in age and appears to be in good (4) health and fair structural condition with evidence of some pruning events. It has a 'TreeAZ' rating of 'A' and an estimated life expectancy of 40+yrs.

7.5.1.2 There are no proposed works within the 7.2m TPZ for this tree and no canopy pruning is required for the proposed works.

7.5.2 Tree No. 2 *Pittosporum undulatum* (Sweet Pittosporum)

- 7.5.2.1 This indigenous tree is located on the adjoining private property being 42 Canberra Ave and is protected by council. The species is listed under the Biosecurity Act 2015 as having 'General Biosecurity Duty'. It is mature in age and appears to be in average (3) health and fair structural condition with crossing branches and minor deadwood. It has a 'TreeAZ' rating of 'A' and an estimated life expectancy of 15-40yrs.
- 7.5.2.2 There are no proposed works within the 5.4m TPZ for this tree and no canopy pruning is required for the proposed works.
- 7.5.3 Tree No. 3 *Schefflera actinophylla* (Queensland Umbrella Tree)
 - 7.5.3.1 This exotic tree is located on the adjoining private property being 42 Canberra Ave and is not protected by council. The species is listed under the Biosecurity Act 2015 as having 'General Biosecurity Duty'. It is mature in age and appears to be in decline (2) health and fair structural condition. It has a 'TreeAZ' rating of 'Z2' and an estimated life expectancy of 5-15yrs.
 - 7.5.3.2 There are no proposed works within the 3.12m TPZ for this tree and no canopy pruning is required for the proposed works.
- 7.5.4 Tree No. 84 *Syzygium sp* (Lilly Pilly)
 - 7.5.4.1 This native tree is located on the adjoining private property being 18 Holdsworth Ave and is protected by council. It is semi mature in age and appears to be in good (4) health and fair structural condition with no significant issues sighted. It has a 'TreeAZ' rating of 'Z1' and an estimated life expectancy of 40+yrs.
 - 7.5.4.2 There are no proposed works within the 2.4m TPZ for this tree and no canopy pruning is required for the proposed works.

8 Conclusion & Recommendations

8.1 Trees Proposed for Retention

8.1.1 Tree No. 1 *Glochidion ferdinandi* (Cheese Tree) is a mature, indigenous tree located on the adjoining private property with a 'TreeAZ' rating of 'A' and a 40+ yrs life expectancy. There are no proposed works within the 7.2m TPZ for this tree. A maximum of 10% of the canopy may require pruning for boundary clearance. No pruning is required for the proposed works.

- Recommendations
 - Existing boundary fence is adequate for Tree Protection Fencing
 - Apply general tree protection methods (section 9)

8.1.2 Tree No. 2 *Pittosporum undulatum* (Sweet Pittosporum) is a mature, indigenous tree located on the adjoining private property with a 'TreeAZ' rating of 'A' and a 15-40 yrs life expectancy. There are no proposed works within the 5.4m TPZ. No pruning is required for the proposed works.

- Recommendations
 - Existing boundary fence is adequate for Tree Protection Fencing
 - Apply general tree protection methods (section 9)

8.1.3 Tree No. 3 *Schefflera actinophylla* (Queensland Umbrella Tree) is a mature, exotic tree located on the adjoining private property with a 'TreeAZ' rating of 'Z2' and a 5-15 yrs life expectancy. There are no proposed works within the 4m TPZ for this tree. No pruning is required for the proposed works.

- Recommendations
 - Existing boundary fence is adequate for Tree Protection Fencing
 - Apply general tree protection methods (section 9)

8.1.4 Tree No. 14 *Eucalyptus saligna* (Sydney Blue Gum) is a mature, indigenous tree located on site with a 'TreeAZ' rating of 'AA1' and a 40+ yrs life expectancy. The proposed development is located 6m from the trunk encroaching the TPZ by 9%. The canopy will require pruning by approximately 13% for scaffolding and building clearance. No soil level changes are proposed.

- Recommendations
 - No excavation within SRZ
 - Hand excavation within TPZ
 - Do not cut roots over 40mm in diameter
 - Properly prune roots under 40mm sharply
 - No soil level changes within TPZ
 - Mulch using composted leaf mulch
 - Apply micro irrigation to TPZ remaining connected to a designated water source
 - Pruning up to 13% of the canopy (3rd and 4th order branches only) for scaffolding and building clearance only.
 - All pruning works must be in accordance with AS4373-2007

- All pruning works must be supervised by site arborist
- Timber boarding attached to scaffolding to protect limbs
- Tree protection fencing
- Apply general tree protection methods (section 9)
- Apply a 'Tree Management Plan' to minimise stress

8.1.5 Tree No. 17 *Tristania laurina* (Water Gum) is a semi mature, indigenous tree located on the nature strip with a 'TreeAZ' rating of 'Z1' and a 40+ yrs life expectancy. There are no proposed works within the 3m TPZ for this tree. No pruning is required for the proposed works.

- Recommendations
 - Tree protection fencing
 - Apply general tree protection methods (section 9)

8.1.6 Tree No. 33 *Tristania laurina* (Water Gum) is a semi mature, indigenous tree located on the nature strip with a 'TreeAZ' rating of 'Z1' and a 40+ yrs life expectancy. There are no proposed works within the 2m TPZ for this tree. No pruning is required for the proposed works.

- Recommendations
 - Tree protection fencing
 - Apply general tree protection methods (section 9)

8.1.7 Tree No. 79 *Eucalyptus scoparia* (Wallangara White Gum) is a mature, native tree located on site with a 'TreeAZ' rating of 'AA1' and a 40+ yrs life expectancy. The proposed development is located 5.6m from the trunk encroaching the TPZ by 9%. No soil level changes are proposed. The elevated decking area is proposed around the tree. The canopy will require pruning by approximately 9% for scaffolding and building clearance.

- Recommendations
 - Decking must be permeable
 - Hand excavation within SRZ and TPZ
 - Do not cut roots over 40mm in diameter
 - Properly prune roots under 40mm sharply
 - No soil level changes within TPZ
 - Mulch TPZ using composted leaf mulch
 - Apply micro irrigation to TPZ remaining connected to a designated water source
 - Pruning up to 9% of the canopy for scaffolding and building clearance only in accordance with AS4373-2007 only
 - Timber boarding attached to scaffolding to protect limbs
 - Tree protection fencing
 - Apply general tree protection methods (section 9)
 - Apply a 'Tree Management Plan' to minimise stress

8.1.8 Tree No. 84 *Syzygium sp* (Lilly Pilly) is a semi mature, native tree located on the adjoining private property with a 'TreeAZ' rating of 'Z1' and a 40+yrs life expectancy. There are no proposed works within the 2.4m TPZ for this tree

- Recommendations
 - Tree protection fencing
 - Apply general tree protection methods (section 9)

8.1.9 Tree No. 86 *Eucalyptus microcorys* (Tallowwood) is a mature, native tree located on the nature strip with a 'TreeAZ' rating of 'AA1' and a 40+yrs life expectancy. There are no proposed works within the 7.8m TPZ for this tree

- Recommendations
 - Tree protection fencing
 - Apply general tree protection methods (section 9)

8.1.10 Tree No. 87 *Lophostemon confertus* (Queensland Brush Box) is a mature, native tree located on the nature strip with a 'TreeAZ' rating of 'AA1' and a 40+yrs life expectancy. There are no proposed works within the 8.5m TPZ for this tree.

- Recommendations
 - Tree protection fencing
 - Apply general tree protection methods (section 9)

8.1.11 There are eight (8) mature native trees located on the Holdsworth Ave nature strip with 'TreeAZ' ratings of 'A' and 'AA1' with life expectancies between 15-40yrs and 40+yrs. The proposed development activities are located within existing dwellings and driveways footprints therefore impacts within these existing encroachments are unlikely. Nevertheless, care must be given to properly prune roots that may be within the vicinity of the proposed excavations. Some hand excavations may be necessary to locate these roots over 40mm. This applies to trees:

- Tree No. 88 *Lophostemon confertus* (Queensland Brush Box)
- Tree No. 89 *Eucalyptus microcorys* (Tallowwood)
- Tree No. 90 *Lophostemon confertus* (Queensland Brush Box)
- Tree No. 91 *Lophostemon confertus* (Queensland Brush Box)
- Tree No. 92 *Lophostemon confertus* (Queensland Brush Box)
- Tree No. 93 *Lophostemon confertus* (Queensland Brush Box)
- Tree No. 94 *Lophostemon confertus* (Queensland Brush Box)
- Tree No. 95 *Lophostemon confertus* (Queensland Brush Box)
- Recommendations
 - No excavation within SRZ
 - Hand excavation within TPZ
 - Do not cut roots over 40mm in diameter
 - Properly prune roots under 40mm sharply
 - No soil level changes within TPZ
 - Apply micro irrigation to TPZ remaining connected to a designated

water source

- Tree protection fencing
- Apply general tree protection methods (section 9)
- Trunk protection required
- Raised foot traffic platform
- Apply a 'Tree Management Plan' to minimise stress

8.2 Trees Proposed for Removal

The following trees are located either within or very close to the development envelope.

- *Agonis flexuosa* (Willow Myrtle) - Tree No. 59
- *Araucaria heterophylla* (Norfolk Island Pine) - Tree No. 19
- *Archontophoenix cunninghamiana* (Bangalow Palm) - Trees No. 43, 101
- *Backhousia citriodora* (Lemon Scented Myrtle) - Tree No. 34
- *Brachychiton acerifolius* (Illawarra Flame Tree) - Tree No. 29
- *Callistemon viminalis* (Weeping Bottlebrush) - Tree No. 68
- *Camellia* sp (Camellia) - Trees No. 5, 70 & 74
- *Casuarina cunninghamiana* (River Oak) - Tree No. 20
- *Celtis sinensis* (Chinese Nettle)* - Tree No. 102
- *Ceratopetalum gummiferum* (NSW Christmas Bush) - Tree No. 60
- *Cinnamomum camphora* (Camphor Laurel) - Tree No. 73
- *Citharexylum spinosum* (Fiddlewood) - Trees No. 10 & 105
- *Corymbia maculata* (Spotted Gum) - Tree No. 27
- *Cotoneaster glaucophyllus* (Cotoneaster)* - Tree No. 30
- *Cyathea australis* (Tree Fern) – Trees No. 6, 7, 8, 9, 41, 98
- *Cyathea cooperi* (Coinspot Tree Fern) – Trees No. 99, 100
- *Elaeocarpus emundi* (Emundi Quandong) - Tree No. 4
- *Eucalyptus* sp (Gum Tree) - Trees No. 21, 44, 66
- *Glochidion ferdinandi* (Cheese Tree) - Trees No. 11, 37 & 38
- *Hymenosporum flavum* (Native Frangipani) - Tree No. 47
- *Jacaranda mimosifolia* (*Jacaranda*) - Trees No. 26, 28, 31, 35, 46 & 62
- *Juniperus chinensis* 'Keteleeri' (Keteleer Chinese Juniper) - Tree No. 63
- *Lagerstroemia indica* (Crepe Myrtle)* - Tree No. 97
- *Liquidambar styraciflua* (Liquidamber) - Trees No. 15 & 16
- *Liriodendron tulipifera* (Tulip Tree) - Tree No. 22
- *Magnolia x soulangeana* (Magnolia) - Tree No. 45
- *Malus floribunda* (Crab Apple) - Tree No. 75
- *Melaleuca* sp (Tea Tree) - Trees No. 12* (dead), 81
- *Melia azedarach* (White Cedar) - Tree No. 96
- *Nerium oleander* (Oleander)* - Tree No. 85
- *Phoenix canariensis* (Canary Island Date Palm) - Trees No. 23, 24, 42, 67, 72, 83 & 104
- *Pittosporum tenuifolium* (James Stirling) - Tree No. 80
- *Pittosporum undulatum* (Sweet Pittosporum) - Trees No. 32, 36 & 103
- *Plumeria acutifolia* (Frangipani) - Trees No. 76* (dead) & 78

-
- *Prunus sp* (Ornamental Plum)* - Tree No. 77 (dead)
 - *Quercus palustris* (Pin Oak) - Tree No. 13
 - *Robinia pseudoacacia* 'Frisia' (Golden Robinia) - Tree No. 69* (dead)
 - *Stenocarpus sinuatus* (Fire Wheel Tree) - Tree No. 64
 - *Syncarpia glomulifera* (Turpentine) - Tree No. 61
 - *Syzygium australe* (Brush Cherry) - Tree No. 82
 - *Thuja plicata* (Western Red Cedar) - Trees No. 18, 25 & 48
 - *Tibouchina lepidota* 'Alstonville' (Alstonville Tibouchina) - Tree No. 71
 - × *Cupressocyparis leylandii* 'Leighton Green' (Leyland's Cypress)* - Trees No. 39 & 52 – 58
 - *Waterhousea floribunda* (Weeping Lilli Pilli) - Trees No. 49 & 50

9 Tree Protection Measures

These specifications are for the trees identified and selected for retention including any tree located on adjoining properties.

9.1 Tree Protection

- 9.1.1 All tree parts must be protected - This includes roots, trunks and branches.
- 9.1.2 **Trunk Protection** - If working within TPZ, trunk protection shall consist of hessian or padding wrapped around the trunk, two meter lengths of timber (100 x 50mm) spaced at 100-150mm centres secured together with 2mm galvanised wire. These shall be strapped around the trunk and not fixed to the tree in any way to avoid mechanical injury or damage.
- 9.1.3 **Fencing** - A 1.8m chain wire fence, secured and fastened to prevent movement be installed in accordance with AS4970-2009 and AS 4687-2007. The TPZ distances are located within the tree schedule. Woody roots must not be damage during fencing TPZ fencing installation. The installation of all required tree protection fencing must include shade cloth attached to the fencing to reduce transport of dust, particulates and liquids from entering the tree protection zone. No fence relocation is permitted without Arborist permission.
- 9.1.4 **Ground Protection** - Ground surface protection must be installed if construction access is required through any TPZ. Protected with boarding (ie scaffolding board or plywood sheeting or similar material), placed over a layer of mulch to a depth of at least 75mm and geotextile fabric. The protective boarding must be left in place for the duration of the construction and development. The existing concrete driveway is to be left in-situ and forms part of the ground surface protection.
- 9.1.5 **Signage** - "Tree Protection Zone, No Entry". With project arborist contact details to be attached to the protective fencing.
- 9.1.6 **Machinery Movements** - When machinery movements are required within the TPZ then a geotextile permeable membrane to be laid under mulch or crushed rock under rumble boards must be in place.
- 9.1.7 **Foot Traffic** - Raised platforms using scaffolding and boards or similar must be constructed if foot traffic occurs within TPZ. Scaffold with boards is sufficient.
- 9.1.8 **AS4970-2009** - Activities generally excluded from the TPZ include but are not limited to;
- soil cutting or fill including trenching
 - machine excavation including trenching;
 - excavation for silt fencing;
 - soil cultivation, disturbance or compaction;
 - stockpiling, storage or mixing of materials;
 - preparation of chemicals, including preparation of cement products;

- parking of vehicles and plant;
- disposal of liquids and refueling;
- dumping of waste;
- disposal of building materials;
- wash down and cleaning of equipment;
- placement of fill;
- lighting of fires;
- soil level changes;
- temporary or permanent installation of utilities and signs, and
- physical damage to the tree.
- site offices or shed locations

9.1.9 **Scaffolding** - All construction scaffolding must be erected around all branches not approved for pruning or removal.

9.1.10 **Pruning** - Pruning is limited to the removal of 3rd and 4th order branches with a maximum diameter of 150mm at the branch collar that encroaches and overhangs the proposed development. Remove of all dead stubs and failed branches leaving a clean cut with no splinters or pieces of wood that may prevent wound wood closure. Any pruning required must be in accordance with AS 4373-2007 Pruning of Amenity Trees, Standards Australia and completed by level 3 qualified arborist or higher. Climbing spikes MUST NOT be used.

9.1.11 **Mulch** - Within the TPZ fencing up to 50mm of COMPOSTED organic mulch must be applied to help retain moisture levels, suppress weed growth and reduce tree stress. Mulch must be in accordance with AS4454-2012 Composts, soil conditioners and mulches.

9.1.12 **Irrigation** - All trees must be thoroughly watered regularly throughout the development process. This is dependent on weather conditions where more water applied during hot and or winding weather. Micro-irrigation lines must be connected to a designated water source that remains connected throughout the development works.

9.1.13 **Tree Damage** - If any tree is damaged the project arborist should be notified, engaged to inspect and provide advice as well as written documentation to be supplied to the certifying authority.

9.2 Tree Monitoring Schedule

- During site occupation all TPZ's and trees must be monitored, assessed and recorded by the project arborist according to council's determinations.
- Any work that must occur within a TPZ must be witnessed and directed by the project arborist.
- In the event that any tree is declining in health the project arborist shall be engaged to supply written remedial applications that must be applied immediately.
- Excavation Within Tree Protection Zones
- Any excavation work within a Tree Protection Zone must be monitored by the project arborist.

9.3 Root Pruning

- Roots measuring over 40mm in diameter must not be pruned within the Structural Root Zone unless directed by the project arborist ONLY.
- Roots measuring over 40mm in diameter within the Tree Protection Zone and outside the Structural Root Zone may be pruned at the discretion of the project arborist.
- Root exposure must be applied with hand tools or Air Spade to prevent damage to the root system.
- Root pruning can be performed by a level 3 arborist or higher.
- All pruning equipment must be sharp and clean. Secateurs, loppers or pruning saws should be used and can be cleaned with methylated spirits to prevent disease and pathogen spread.
- Bolt or wire cutters must not be used for root pruning.

9.4 Root Care

- Any roots exposed must be wrapped or covered with hessian or cloth and kept moist to prevent drying out and sunburn until backfilling occurs.
- Backfill must be watered in and mulched with composted leaf mulch.

9.5 Project Arborist Monitoring

1	Project arborist (level 5) must oversee tree retention
2	All tree related matters must be discussed with the project arborist
3	The builder / site manager is responsible to inform the project arborist of any issues during works
4	Project arborist must maintain a monthly log including site visits, notes and photographs.
5	Project arborist must provide feedback the builder / site manager / council.

Table 10. Project Arborist Monitoring

9.6 Project Arborist Supervision

An Arborist with minimum qualifications in Arboriculture of Level 5 (under the Australian Qualification Framework) must oversee various stages of work within the Tree Protection Zone of any tree listed for retention. The Arborist must certify compliance with each key milestone as detailed below

1	Installation of tree protection measures
2	Any pruning works
3	During demolition of any ground surface materials (paving, concrete, grass etc) within the Tree Protection Zone (TPZ) of any tree to be retained
4	During construction of all pier and beam footings within any Tree Protection Zones. Footings shall be relocated / realigned if any tree root greater than 40mm in diameter is encounter during excavations. A minimum of 150mm clearance shall be provided between the tree root and footing
5	During any excavation and trenching which has been approved by Council within the TPZ of any tree to be retained
6	During any Landscape works within the TPZ of any tree to be retained

Table 11. Project Arborist Supervision

9.7 Project Arborist Hold Points

Hold Point	Task	Timing	Certification
1	Appoint project arborist to ensure protection of trees	Prior to demolition of structures	
2	Tree Protection Plan be onsite prior to works (AS4970-2009)		
3	Required Tree Pruning		
4	Inspect Tree Protection Fencing with signage. (AS4970-2009)	Prior to demolition of structures	Project Arborist
5	Supervise all work within any TPZ's	As required prior to works proceeding	
6	Install Trunk Protection where applicable		
7	Tree Inspection	Monthly during all construction works	
8	Final Tree Inspection	Post construction	

Table 12. Project Arborist Hold Points

Appendix A - Tree Schedule

Tree no.	Species	Location	DBH @ 1.4m (cm)	DGL (cm)	Height (m)	Canopy (m)	Age Class	Life Expectancy	Crown Class	Crown Condition	Structure Condition	Type	Tree AZ	Council Protected	TPZ (m) SRZ (m)	Proposed Works	Distance (m)	Proposed Encroachment	Proposed Status
1	Glochidion ferdinandi (Cheese Tree)	on the adjoining private property 42 Canberra Ave	60	80	10	12	mature	40+ yrs	dominant	good (4)	fair	indigenous	A	yes	7.2 3.0	no works	3.0	0%	Retain
					Comments pruning events														
2	Pittosporum undulatum (Sweet Pittosporum)	on the adjoining private property 42 Canberra Ave	45	50	8	8	mature	15-40 yrs	codominant	average (3)	fair	indigenous	A	yes	5.4 2.5	no works	2.8	0%	Retain
					Comments crossing branches / minor deadwood														
3	Schefflera actinophylla (Queensland Umbrella Tree)	on the adjoining private property 42 Canberra Ave	26	60	8	6	mature	5-15 yrs	dominant	decline (2)	fair	exotic	Z2	no	4.0 N/A	no works	2.8	0%	Retain
					Comments climber														
4	Elaeocarpus emundi (Emundi Quandong)	on site 41 Canberra Ave	10	10	7	3	semi mature	40+ yrs	dominant	excellent (5)	fair	native	Z1	yes	2.0 1.3	landscaping	0.0	100%	Remove
					Comments														
5	Camellia reticulata (Reticulata Camellia)	on site 41 Canberra Ave	17	20	4	6	mature	40+ yrs	dominant	good (4)	fair	exotic	Z1	yes	2.0 1.7	landscaping	0.0	100%	Remove
					Comments														
6	Cyathea australis (Tree Fern)	on site 41 Canberra Ave	30		5	4	mature	40+ yrs	dominant	good (4)	fair	indigenous	Z1	yes	3.0 N/A	landscaping	0.0	69%	Remove
					Comments														
7	Cyathea australis (Tree Fern)	on site 41 Canberra Ave	30		5	4	mature	40+ yrs	dominant	good (4)	fair	indigenous	Z1	yes	3.0 N/A	landscaping	0.0	69%	Remove
					Comments														
8	Cyathea australis (Tree Fern)	on site 41 Canberra Ave	25		3	4	mature	40+ yrs	dominant	good (4)	fair	indigenous	Z1	yes	3.0 N/A	landscaping	0.0	100%	Remove
					Comments														
9	Cyathea australis (Tree Fern)	on site 41 Canberra Ave	25		4	3	mature	40+ yrs	dominant	good (4)	fair	indigenous	Z1	yes	3.0 N/A	landscaping	0.0	69%	Remove
					Comments														
10	Citharexylum spinosum (Fiddlewood)	on site 41 Canberra Ave	45	55	8	10	mature	40+ yrs	codominant	good (4)	fair	exotic	A	yes	5.4 2.6	landscaping	0.0	100%	Remove
					Comments														
11	Glochidion ferdinandi (Cheese Tree)	on site 41 Canberra Ave	57	60	12	10	mature	15-40 yrs	codominant	average (3)	fair	indigenous	A	yes	6.8 2.7	landscaping	0.0	100%	Remove
					Comments														
12	Melaleuca linariifolia (Snow In Summer)	on site 39 Canberra Ave	55	50	8	8	mature	dead		dead			Z	no	6.6 2.5			0%	Remove
					Comments														
13	Quercus palustris (Pin Oak)	on site 37 Canberra Ave	45	60	14	10	mature	40+ yrs	dominant	good (4)	fair	exotic	A	yes	5.4 2.7	electrical	1.0	38%	Remove
					Comments pruning events														
14	Eucalyptus saligna (Sydney Blue Gum)	on site 37 Canberra Ave	80	85	28	16	mature	40+ yrs	dominant	good (4)	fair	indigenous	AA	yes	9.6 3.1	development	6.3	9%	Remove
					Comments minor branch wounds / Minor deadwood / hardware attached to trunk														
15	Liquidambar styraciflua (Liquidamber)	on site 37 Canberra Ave	60	60	14	12	mature	40+ yrs	codominant	average (3)	fair	exotic	A	yes	7.2 2.7	no works		0%	Remove
					Comments pruning events / lack of basal flare on southern side														

Tree no.	Species	Location	DBH @ 1.4m (cm)	DGL (cm)	Height (m)	Canopy (m)	Age Class	Life Expectancy	Crown Class	Crown Condition	Structure Condition	Type	Tree AZ	Council Protected	TPZ (m) SRZ (m)	Proposed Works	Distance (m)	Proposed Encroachment	Proposed Status
16	Liquidambar styraciflua (Liquidamber)	on site 37 Canberra Ave	60	60	14	12	mature	40+yrs	codominant	average (3)	fair	exotic	A	yes	7.2 2.7	no works		0%	Retain
					Comments pruning events / lack of basal flare on northern side														
17	Tristanopsis laurina (Water Gum)	on the nature strip Canberra Ave	25	30	6	6	semi mature	40+yrs	dominant	good (4)	fair	indigenous	Z1	yes	3.0 2.0	no works	5.0	0%	Retain
					Comments lopped / scaffold bark union with included bark														
18	Thuja plicata (Western Red Cedar)	on site 37 Canberra Ave	20	20	6	4	semi mature	40+yrs	dominant	average (3)	good	exotic	Z1	yes	2.4 1.7	development	0.0	100%	Remove
					Comments codominant trunk with included bark														
19	Araucaria heterophylla (Norfolk Island Pine)	on site 37 Canberra Ave	65	70	26	10	mature	40+yrs	dominant	good (4)	good	native	A	yes	7.8 2.8	development	0.0	100%	Remove
					Comments														
20	Casuarina cunninghamiana (River Oak)	on site 37 Canberra Ave	50	60	18	12	mature	5-15yrs	dominant	low (2-3)	fair	native	Z3	yes	6.0 2.7	development	0.0	100%	Remove
					Comments Thin canopy / bark lifting at 5m														
21	Eucalyptus sp (Gum Tree)	on site 37 Canberra Ave	50	60	15	12	young mature	15-40yrs	dominant	low (2-3)	fair	native	A	yes	6.0 2.7	development	0.0	100%	Remove
					Comments deadwood														
22	Liriodendron tulipifera (Tulip Tree)	on site 37 Canberra Ave	70	75	15	20	mature	40+yrs	dominant	good (4)	fair	exotic	AA	yes	8.4 2.9	development	3.0	63%	Remove
					Comments pruning events														
23	Phoenix canariensis (Canary Island Date Palm)	on site 37 Canberra Ave	60		6	10	young	40+yrs	codominant	average (3)	fair	exotic	Z1	yes	6.0 N/A	development	0.0	69%	Remove
					Comments N/A														
24	Phoenix canariensis (Canary Island Date Palm)	on site 37 Canberra Ave	50		6	10	young	40+yrs	codominant	average (3)	fair	exotic	Z1	yes	6.0 N/A	development	0.0	100%	Remove
					Comments														
25	Thuja plicata (Western Red Cedar)	on site 37 Canberra Ave	30	30	6	5	semi mature	15-40yrs	dominant	average (3)	fair	exotic	Z1	yes	3.6 2.0	development	0.0	100%	Remove
					Comments														
26	Jacaranda mimosifolia (Jacaranda)	on site 37 Canberra Ave	50	45	9	8	semi mature	40+yrs	dominant	average (3)	fair	exotic	A	yes	6.0 2.4	development	0.0	100%	Remove
					Comments														
27	Corymbia maculata (Spotted Gum)	on site 37 Canberra Ave	50	50	16	10	semi mature	40+yrs	dominant	good (4)	fair	native	A	yes	6.0 2.5	development	0.0	100%	Remove
					Comments														
28	Jacaranda mimosifolia (Jacaranda)	on site 35 Canberra Ave	30	30	10	7	semi mature	40+yrs	codominant	average (3)	fair	exotic	A	yes	3.6 2.0	development	0.0	100%	Remove
					Comments														
29	Brachychiton acerifolius (Illawarra Flame Tree)	on site 35 Canberra Ave	30	35	9	5	semi mature	15-40yrs	dominant	average (3)	fair	native	A	yes	3.6 2.1	development	0.0	100%	Remove
					Comments pruning events														
30	Cotoneaster glaucophyllus (Cotoneaster)	on site 35 Canberra Ave	17	20	4	7	mature	15-40yrs	codominant	average (3)	fair	exotic	Z2	no	2.0 1.7	development	0.0	100%	Remove
					Comments pruning events														

Tree no.	Species	Location	DBH @ 1.4m (cm)	DGL (cm)	Height (m)	Canopy (m)	Age Class	Life Expectancy	Crown Class	Crown Condition	Structure Condition	Type	Tree AZ	Council Protected	TPZ (m) SRZ (m)	Proposed Works	Distance (m)	Proposed Encroachment	Proposed Status
31	Jacaranda mimosifolia (Jacaranda)	on site 35 Canberra Ave	55	65	14	12	semi mature	15-40yrs	dominant	average (3)	fair	exotic	A	yes	6.6 2.8	development	0.0	100%	Remove
					Comments														
32	Pittosporum undulatum (Sweet Pittosporum)	on site 35 Canberra Ave	45	55	8	10	mature	15-40yrs	codominant	average (3)	fair	indigenous	A	yes	5.4 2.6	development	0.0	100%	Remove
					Comments climber														
33	Tristanopsis laurina (Water Gum)	on the nature strip Canberra Ave	10	15	3	3	mature	40+yrs	dominant	average (3)	fair	native	Z1	yes	2.0 1.5	no works	3.0	0%	Retain
					Comments														
34	Backhousia citriodora (Lemon Scented Myrtle)	on site 33 Canberra Ave	50	50	9	6	mature	5-15yrs	dominant	low (2-3)	fair	native	Z3	yes	6.0 2.5	development	0.0	100%	Remove
					Comments pruning events / watersprouts / deadwood														
35	Jacaranda mimosifolia (Jacaranda)	on site 33 Canberra Ave	50	60	12	14	mature	40+yrs	dominant	average (3)	fair	exotic	A	yes	6.0 2.7	garden retaining wall	0.5	45%	Remove
					Comments deadwood														
36	Pittosporum undulatum (Sweet Pittosporum)	on site 33 Canberra Ave	20	25	6	8	mature	15-40yrs	codominant	average (3)	fair	indigenous	Z1	yes	2.4 1.8	development	0.0	100%	Remove
					Comments deadwood														
37	Glochidion ferdinandi (Cheese Tree)	on site 33 Canberra Ave	25	25	7	6	mature	15-40yrs	dominant	average (3)	fair	indigenous	Z1	yes	3.0 1.8	development	0.0	23%	Remove
					Comments deadwood														
38	Glochidion ferdinandi (Cheese Tree)	on site 33 Canberra Ave	80	60	8	14	mature	15-40yrs	dominant	average (3)	fair	indigenous	Z1	yes	9.6 2.7	near development	1.2	40%	Remove
					Comments pruning events / minor trunk wound														
39	× Cupressocyparis leylandii 'Leighton Green' (Leyland's)	on site 33 Canberra Ave	50	60	10	10	mature	40+yrs	dominant	average (3)	fair	exotic	Z2	no	6.0 2.7	development	0.0	100%	Remove
					Comments														
41	Cyathea australis (Tree Fern)	on site 31 Canberra Ave	30		5	2	mature	40+yrs	dominant	average (3)	fair	indigenous	Z1	yes	2.0 N/A	development	0.0	100%	Remove
					Comments														
42	Phoenix canariensis (Canary Island Date Palm)	on site 31 Canberra Ave	60		8	8	semi mature	40+yrs	dominant	good (4)	fair	exotic	Z1	yes	5.0 N/A	development	0.0	48%	Remove
					Comments														
43	Archontophoenix cunninghamiana (Bangalow Palm)	on site 31 Canberra Ave	25		10	4	mature	40+yrs	dominant	average (3)	fair	native	A	yes	3.0 N/A	development	0.0	100%	Remove
					Comments														
44	Eucalyptus sclerophylla (Scribbly Gum)	on the nature strip Canberra Ave	60	70	14	18	mature	15-40yrs	dominant	low (2-3)	fair	native	A	yes	7.2 2.8	car parking entrance	0.0	100%	Remove
					Comments surface roots / trunk wound / scaffold wound / deadwood														
45	Magnolia x soulangeana (Magnolia)	on site 27 Canberra Ave	30	40	5	7	mature	15-40yrs	dominant	average (3)	fair	exotic	Z1	yes	3.6 2.3	development	0.0	100%	Remove
					Comments														
46	Jacaranda mimosifolia (Jacaranda)	on site 27 Canberra Ave	50	50	8	12	semi mature	40+yrs	dominant	good (4)	fair	exotic	A	yes	6.0 2.5	development	0.0	100%	Remove
					Comments surface roots / watersprouts														

Tree no.	Species	Location	DBH @ 1.4m (cm)	DGL (cm)	Height (m)	Canopy (m)	Age Class	Life Expectancy	Crown Class	Crown Condition	Structure Condition	Type	Tree AZ	Council Protected	TPZ (m) SRZ (m)	Proposed Works	Distance (m)	Proposed Encroachment	Proposed Status
47	Hymenosporum flavum (Native Frangipani)	on site 27 Canberra Ave	40	45	8	6	mature	15-40yrs	dominant	average (3)	fair	native	Z1	yes	4.8 2.4	development	0.0	100%	Remove
48	Thuja plicata (Western Red Cedar)	on site 23 Canberra Ave	70	70	8	8	mature	40+yrs	codominant	good (4)	poor	exotic	Z4	yes	8.4 2.8	development	0.0	100%	Remove
49	Syzygium floribunda syn Waterhousea floribunda (Weeping Lilli Pilli)	on site 23 Canberra Ave	40	45	11	12	mature	40+yrs	codominant	good (4)	fair	native	A	yes	4.8 2.4	development	0.0	100%	Remove
50	Syzygium floribunda syn Waterhousea floribunda (Weeping Lilli Pilli)	on site 23 Canberra Ave	35	35	7	5	mature	40+yrs	codominant	good (4)	fair	native	A	yes	4.2 2.1	development	0.0	100%	Remove
51	Syzygium floribunda syn Waterhousea floribunda (Weeping Lilli Pilli)	on site 23 Canberra Ave	50	50	9	7	mature	40+yrs	codominant	good (4)	fair	native	A	yes	6.0 2.5	development	0.0	100%	Remove
52	× Cupressocyparis leylandii 'Leighton Green' (Leyland's)	on site 23 Canberra Ave	60	50	10	10	mature	40+yrs	codominant	good (4)	fair	exotic	Z2	no	7.2 2.5	development	0.0	100%	Remove
53	× Cupressocyparis leylandii 'Leighton Green' (Leyland's)	on site 23 Canberra Ave	25	25	8	6	mature	40+yrs	codominant	average (3)	fair	exotic	Z2	no	3.0 1.8	development	0.0	100%	Remove
54	× Cupressocyparis leylandii 'Leighton Green' (Leyland's)	on site 23 Canberra Ave	45	50	9	7	mature	40+yrs	intermediate	average (3)	fair	exotic	Z2	no	5.4 2.5	development	0.0	100%	Remove
55	× Cupressocyparis leylandii 'Leighton Green' (Leyland's)	on site 23 Canberra Ave	40	40	8	4	mature	40+yrs	intermediate	average (3)	fair	exotic	Z2	no	4.8 2.3	development	0.0	100%	Remove
56	× Cupressocyparis leylandii 'Leighton Green' (Leyland's)	on site 23 Canberra Ave	45	45	8	7	semi mature	40+yrs	intermediate	average (3)	fair	exotic	Z2	no	5.4 2.4	development	0.0	100%	Remove
57	× Cupressocyparis leylandii 'Leighton Green' (Leyland's)	on site 23 Canberra Ave	35	35	8	6	mature	40+yrs	intermediate	average (3)	fair	exotic	Z2	no	4.2 2.1	development	0.0	100%	Remove
58	× Cupressocyparis leylandii 'Leighton Green' (Leyland's)	on site 23 Canberra Ave	40	45	8	7	mature	40+yrs	intermediate	average (3)	fair	exotic	Z2	no	4.8 2.4	development	0.0	100%	Remove
59	Agonis flexuosa (Willow Myrtle)	on site 21 Canberra Ave	30	35	8	7	mature	5-15yrs	codominant	average (3)	fair	native	Z1	yes	3.6 2.1	development	0.0	100%	Remove
60	Ceratopetalum gummiferum (NSW Christmas Bush)	on site 21 Canberra Ave	50	40	8	5	mature	15-40yrs	dominant	average (3)	fair	indigenous	Z1	yes	6.0 2.3	development	0.0	100%	Remove
61	Syncarpia glomulifera (Turpentine)	on site 21 Canberra Ave	65	70	13	12	mature	40+yrs	dominant	good (4)	fair	indigenous	A	yes	7.8 2.8	development	0.0	48%	Remove

Tree no.	Species	Location	DBH @ 1.4m (cm)	DGL (cm)	Height (m)	Canopy (m)	Age Class	Life Expectancy	Crown Class	Crown Condition	Structure Condition	Type	Tree AZ	Council Protected	TPZ (m) SRZ (m)	Proposed Works	Distance (m)	Proposed Encroachment	Proposed Status
62	Jacaranda mimosifolia (Jacaranda)	on site 21 Canberra Ave	65	65	8	14	semi mature	40+yrs	codominant	average (3)	fair	exotic	A	yes	7.8 2.8	development	0.0	100%	Remove
63	Juniperus chinensis 'Keteleeri' (Keteleer Chinese Juniper)	on site 21 Canberra Ave	70	60	14	6	mature	40+yrs	dominant	good (4)	poor	exotic	A	yes	8.4 2.7	development	0.0	100%	Remove
64	Stenocarpus sinuatus (Fire Wheel Tree)	on site 21 Canberra Ave	60	65	15	10	mature	40+yrs	dominant	average (3)	fair	native	A	yes	7.2 2.8	development	0.0	100%	Remove
66	Eucalyptus globulus subsp bicostata (Southern Blue Gum)	on site 32 Holdsworth Ave	65	75	18	14	mature	15-40yrs	codominant	low (2-3)	fair	native	A	yes	7.8 2.9	landscaping	0.0	100%	Remove
67	Phoenix canariensis (Canary Island Date Palm)	on site 32 Holdsworth Ave	60		9	6	mature	40+yrs	dominant	good (4)	good	exotic	A	yes	4.0 N/A	landscaping	0.0	31%	Remove
68	Callistemon viminalis (Weeping Bottlebrush)	on site 30 Holdsworth Ave	35	45	8	6	mature	15-40yrs	dominant	average (3)	fair	native	Z1	yes	4.2 2.4	landscaping	0.0	100%	Remove
69	Robinia pseudoacacia 'Frisia' (Golden Robinia)	on site 30 Holdsworth Ave	25	25	5	8	mature	dead	codominant	dead	poor	exotic	Z	no	3.0 1.8			0%	Remove
70	Camellia sasanqua (Small-leaved Camellia)	on site 28 Holdsworth Ave	30	30	6	4	mature	40+yrs	dominant	good (4)	fair	exotic	Z1	yes	3.6 2.0	development	0.0	100%	Remove
71	Tibouchina lepidota 'Alstonville' (Alstonville Tibouchina)	on site 26 Holdsworth Ave	35	40	5	6	mature	5-15yrs	dominant	average (3)	fair	exotic	Z1	yes	4.2 2.3	development	0.0	100%	Remove
72	Phoenix canariensis (Canary Island Date Palm)	on site 26 Holdsworth Ave	33		10	7	semi mature	40+yrs	suppressed	average (3)	fair	exotic	A	yes	4.0 N/A	development	0.0	129%	Remove
73	Cinnamomum camphora (Camphor Laurel)	on site 26 Holdsworth Ave	90	90	16	25	mature	15-40yrs	dominant	low (2-3)	fair	exotic	A	yes	10.8 3.2	development	0.0	100%	Remove
74	Camellia reticulata (Reticulata Camellia)	on site 26 Holdsworth Ave	17	30	4	4	mature	15-40yrs	dominant	average (3)	fair	exotic	Z1	yes	2.0 2.0	development	0.0	100%	Remove
75	Malus floribunda (Crab Apple)	on site 26 Holdsworth Ave	60	40	6	8	mature	15-40yrs	dominant	average (3)	fair	exotic	Z1	yes	7.2 2.3	development	0.0	100%	Remove
76	Plumeria acutifolia (Frangipani)	on site 26 Holdsworth Ave	30	35	5	6	mature	dead	dominant	dead	poor	exotic	Z	no	3.6 2.1	development	0.0	100%	Remove
77	Prunus sp (Ornamental Plum)	on site 22 Holdsworth Ave	32	40	5	5	mature	dead	dominant	dead	poor	exotic	Z	no	3.8 2.3	development	0.0	100%	Remove

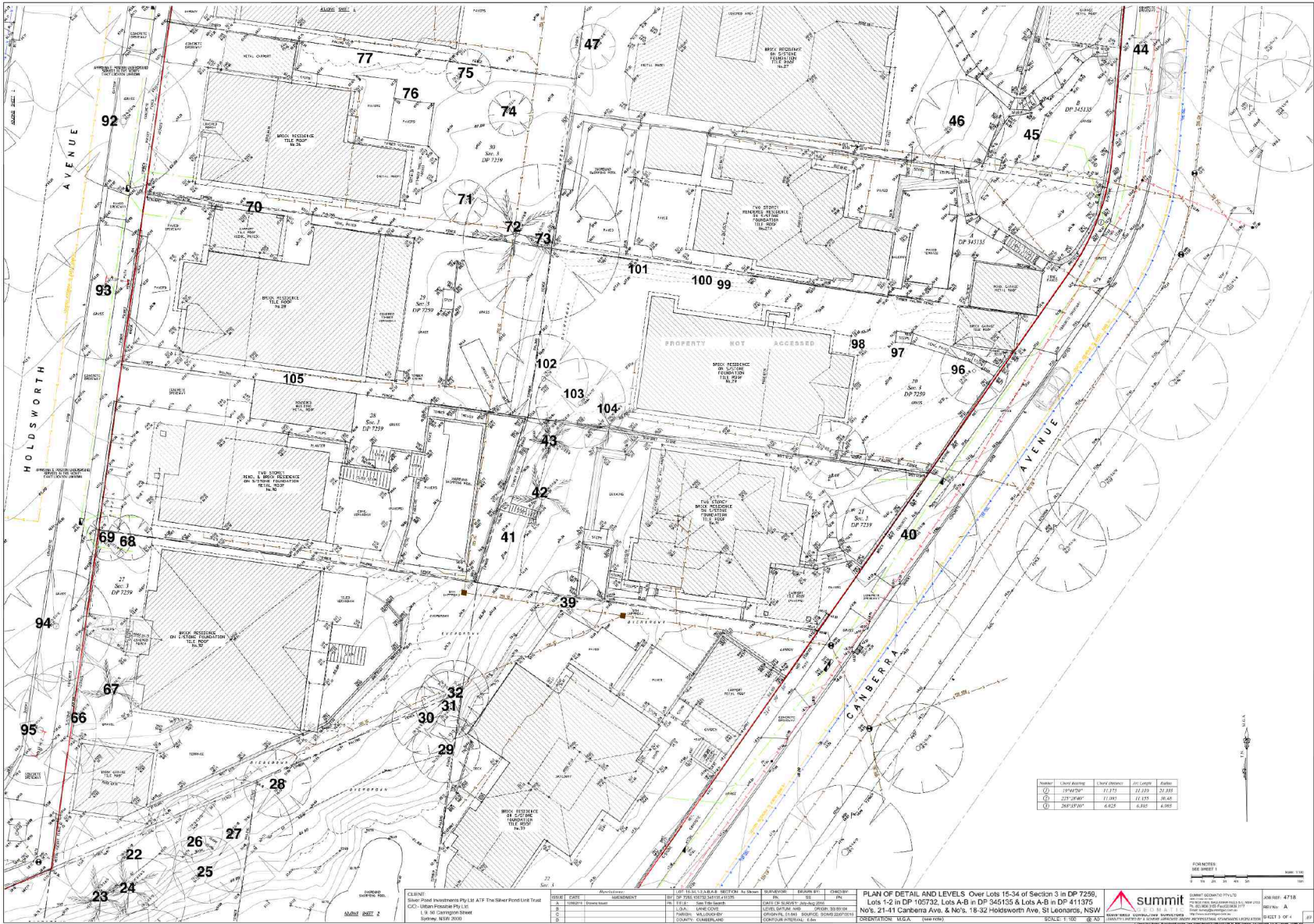
Tree no.	Species	Location	DBH @ 1.4m (cm)	DGL (cm)	Height (m)	Canopy (m)	Age Class	Life Expectancy	Crown Class	Crown Condition	Structure Condition	Type	Tree AZ	Council Protected	TPZ (m) SRZ (m)	Proposed Works	Distance (m)	Proposed Encroachment	Proposed Status
78	Plumeria acutifolia (Frangipani)	on site 22 Holdsworth Ave	17	40	4	6	mature	15-40yrs	dominant	good (4)	fair	exotic	Z1	yes	2.0 2.3	development	0.0	100%	Remove
79	Eucalyptus scoparia (Wallangara White Gum)	on site 22 Holdsworth Ave	70	85	16	12	mature	15-40yrs	dominant	average (3)	fair	native	A	yes	8.4 3.1	development	5.6	4%	Retain
					Comments	thaumasticorid / twig dieback / deadwood													
80	Pittosporum tenuifolium (James Stirling)	on site 18 Holdsworth Ave	20	25	7	3	mature	5-15yrs	dominant	low (2-3)	fair	exotic	Z1	yes	2.4 1.8	development	0.0	100%	Remove
					Comments														
81	Melaleuca bracteata (Revolution Green)	on site 18 Holdsworth Ave	20	45	6	4	mature	15-40yrs	codominant	good (4)	fair	native	Z1	yes	2.4 2.4	development	0.0	100%	Remove
					Comments														
82	Syzygium australe (Brush Cherry)	on site 18 Holdsworth Ave	45	50	9	7	mature	40+yrs	codominant	good (4)	fair	native	A	yes	5.4 2.5	development	0.0	100%	Remove
					Comments														
83	Phoenix canariensis (Canary Island Date Palm)	on site 18 Holdsworth Ave	45		14	8	mature	40+yrs	dominant	good (4)	fair	exotic	A	yes	5.0 N/A	development	0.0	86%	Remove
					Comments														
84	Syzygium sp (Lilly Pilly)	on the adjoining private property 18 Holdsworth Ave	20	30	4	4	semi mature	40+yrs	codominant	good (4)	fair	native	Z1	yes	2.4 2.0	no works		0%	Retain
					Comments														
85	Nerium oleander (Oleander)	on site 25 Canberra Ave	35	30	3	6	mature	40+yrs	dominant	average (3)	fair	exotic	Z1	no	4.2 2.0	development	0.0	100%	Remove
					Comments														
86	Eucalyptus microcorys (Tallowwood)	on the nature strip Holdsworth Ave	65	70	18	22	mature	40+yrs	dominant	average (3)	fair	native	AA	yes	7.8 2.8	no works	10.0	0%	Retain
					Comments	included bark in branch unions / deadwood													
87	Lophostemon confertus (Queensland Brush Box)	on the nature strip Holdsworth Ave	71	70	9	9	mature	40+yrs	dominant	average (3)	fair	native	AA	yes	8.5 2.8	substation (within existing dev)	2.0	22%	Retain
					Comments	lopped+ / deadwood / pruning events / cracked branch													
88	Lophostemon confertus (Queensland Brush Box)	on the nature strip Holdsworth Ave	70	70	12	12	mature	40+yrs	dominant	good (4)	fair	native	AA	yes	8.4 2.8	landscaping and paths (within . . .)	2.0	35%	Remove
					Comments	lopped+ / pruning events													
89	Eucalyptus microcorys (Tallowwood)	on the nature strip Holdsworth Ave	90	90	16	14	mature	40+yrs	dominant	average (3)	fair	native	AA	yes	10.8 3.2	near development	6.4	0%	Retain
					Comments	included bark in branch unions / deadwood / pruning events													
90	Lophostemon confertus (Queensland Brush Box)	on the nature strip Holdsworth Ave	70	70	10	12	mature	40+yrs	dominant	good (4)	fair	native	AA	yes	8.4 2.8	near development	6.3	0%	Retain
					Comments	lopped+ / pruning events / watersprouts													
91	Lophostemon confertus (Queensland Brush Box)	on the nature strip Holdsworth Ave	70	70	10	12	mature	40+yrs	dominant	low (2-3)	fair	native	AA	yes	8.4 2.8	near development	6.7	0%	Retain
					Comments	pruning events / lopped / watersprouts / thin canopy													
92	Lophostemon confertus (Queensland Brush Box)	on the nature strip Holdsworth Ave	80	80	15	17	mature	40+yrs	dominant	good (4)	fair	native	AA	yes	9.6 3.0	near development	5.0	18%	Retain
					Comments	pruning events / lopped / watersprouts													

Tree no.	Species	Location	DBH @ 1.4m (cm)	DGL (cm)	Height (m)	Canopy (m)	Age Class	Life Expectancy	Crown Class	Crown Condition	Structure Condition	Type	Tree AZ	Council Protected	TPZ (m) SR2 (m)	Proposed Works	Distance (m)	Proposed Encroachment	Proposed Status
93	Lophostemon confertus (Queensland Brush Box)	on the nature strip Holdsworth Ave	80	80	13	14	mature	40+yrs	dominant	good (4)	fair	native	AA	yes	9.6 3.0	near development	5.0	18%	Retain
					Comments pruning events / lopped / watersprouts / surface roots with mower damage														
94	Lophostemon confertus (Queensland Brush Box)	on the nature strip Holdsworth Ave	80	80	15	17	mature	40+yrs	dominant	good (4)	fair	native	AA	yes	9.6 3.0	near development with	8.0	4%	Retain
					Comments pruning events / lopped / watersprouts														
95	Lophostemon confertus (Queensland Brush Box)	on the nature strip Holdsworth Ave	80	70	10	14	mature	40+yrs	dominant	low (2-3)	fair	native	A	yes	9.6 2.8	near development with	5.0	18%	Retain
					Comments pruning events / lopped / watersprouts														
96	Melia azedarach (White Cedar)	on site 29 Canberra Ave	45	50	9	8	mature	15-40yrs	dominant	average (3)	fair	native	A	yes	5.4 2.5	landscaping	0.0	100%	Remove
					Comments included bark within the scaffold bark union														
97	Lagerstroemia indica (Crepe Myrtle)	on site 29 Canberra Ave	28 20 20	40	5	8	mature	40+yrs	dominant	average (3)	fair	native	Z2	no	3.4 2.3	landscaping	0.0	100%	Remove
					Comments														
98	Cyathea australis (Tree Fern)	on site 29 Canberra Ave	10		5	4	semi mature	40+yrs	dominant	good (4)	fair	indigenous	Z1	yes	3.0 N/A	development	0.0	100%	Remove
					Comments														
99	Cyathea cooperi (Coinspot Tree Fern)	on site 29 Canberra Ave	20		5	3	mature	40+yrs	dominant	average (3)	fair	indigenous	Z1	yes	3.0 N/A	development	0.0	100%	Remove
					Comments														
100	Cyathea cooperi (Coinspot Tree Fern)	on site 29 Canberra Ave	20		5	3	mature	40+yrs	dominant	average (3)	fair	indigenous	Z1	yes	4.0 N/A	development	0.0	100%	Remove
					Comments														
101	Archontophoenix cunninghamiana (Bangalow Palm)	on site 29 Canberra Ave	20		7	5	mature	40+yrs	dominant	average (3)	fair	native	A	yes	4.0 N/A	development	0.0	100%	Remove
					Comments														
102	Celtis sinensis (Chinese Nettle)	on site 29 Canberra Ave	60	70	12	14	mature	40+yrs	dominant	average (3)	fair	exotic	Z2	no	7.2 2.8	development	0.0	100%	Remove
					Comments														

Appendix B - Tree Schedule Definitions & Information

Location	Adjoining Property / Nature Strip / On Site	
Dimensions	Diameter at breast height (1.4m) (mm) DBH Diameter at ground level (mm) DGL Approximate height x canopy spread (m) H x C	
Age Class	Sapling / Young / Young mature / Semi mature / Mature / Over mature / Senescent	
Life Expectancy	>5 years / 5-15 years / 15-40 years / 40+ years	
Crown Class	Dominant Co-dominant Intermediate Suppressed Dead	Crown extends above general canopy; not restricted by other trees. Crown forms the bulk of the general canopy but crowded by other trees. Crown extends into dominant / co dominant canopy but quite crowded on all sides. Crown development restricted from overgrowing trees. Dead Tree
Crown Condition / Vitality	1 Severe decline 2 Declining 3 Average / low vigour 4 Good 5 Excellent	<20% canopy density; major dead wood 20-60% canopy density; twig and branch dieback 60-90% canopy density; twig dieback 90-100% canopy density; little or no dieback or other problems 100% canopy density; no deadwood or other problems
Structure Condition	Poor Fair Good	Wounds with fungal fruiting bodies, excessive included bark unions, numerous previous failures Included bark unions, minor wounds No significant issues
Tree Type	Endemic	Species that occur naturally and are restricted to a given area.
	Exotic	An introduced plant from outside Australia.
	Indigenous	Species that occur naturally to a given area but may not be restricted to only that area.
	Native	A general term referring to any plant indigenous to Australia including cultivars.
Root Zone	Compacted / Garden / Grass / Mulched / Natural Bush / Paved / Soil level lowered / Soil level raised	
Structures	Fence / Garage / Footpath / Verandah / Dwelling / Road / Driveway / Seat	

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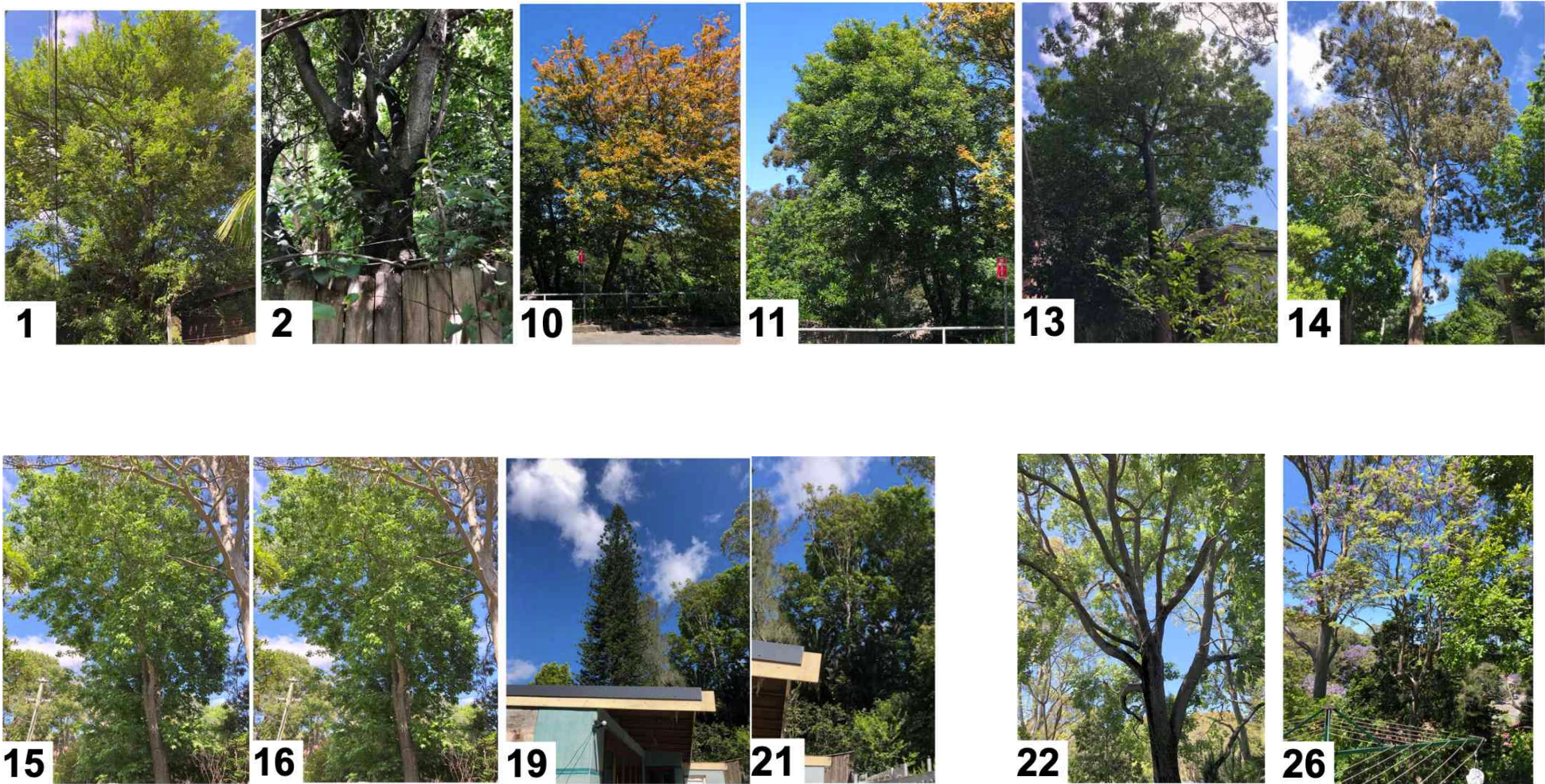


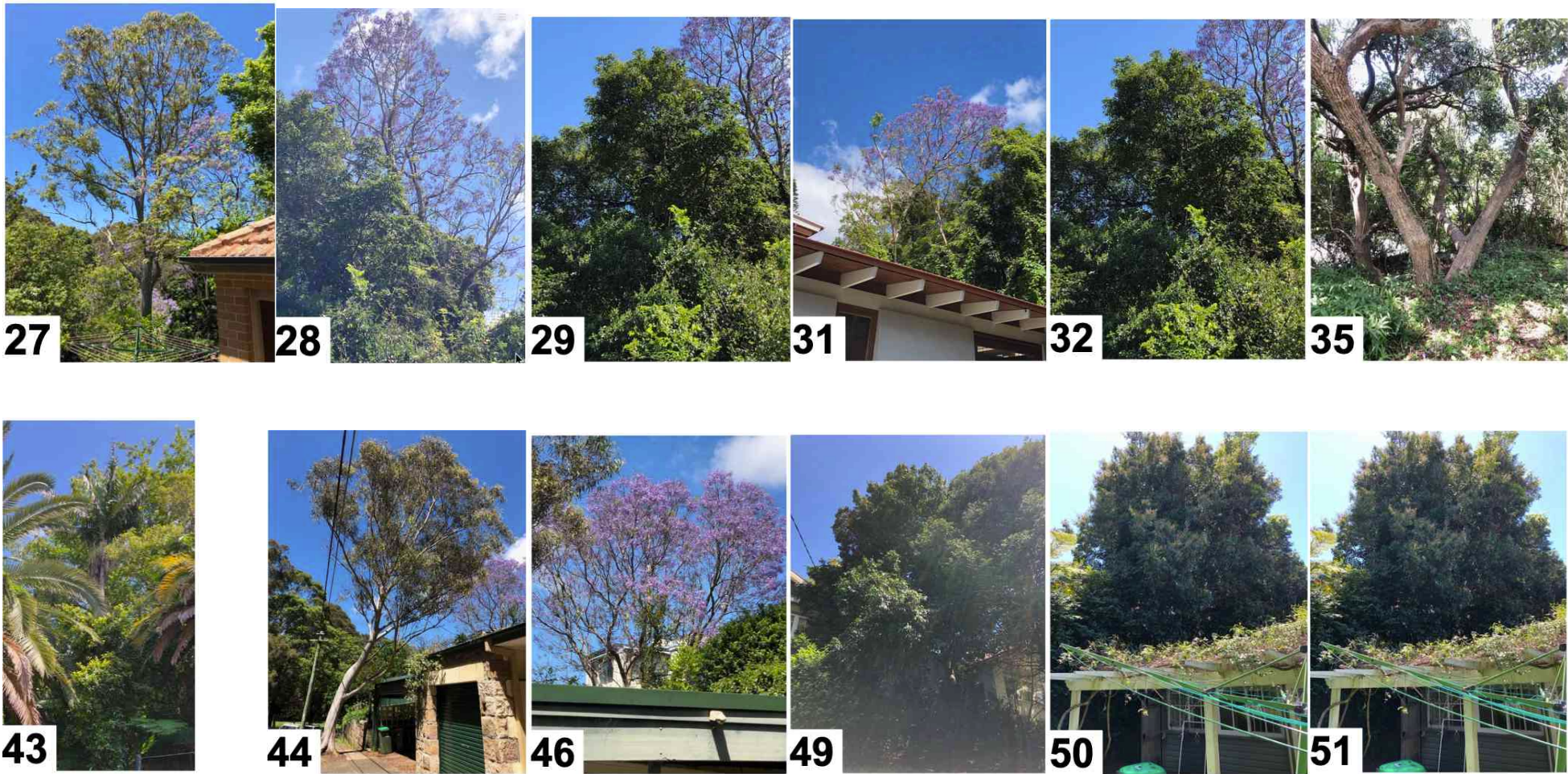
18 – 32 Holdsworth Avenue & 21 – 41 Canberra Avenue, St Leonards
Reference 20221863 Revision 6

1 February 2022



Appendix D - Thumbnail Photographs 'A' Trees











Appendix E – Tree No. 14 Pruning



Figure 4. Tree No. 14 canopy pruning (facing west)

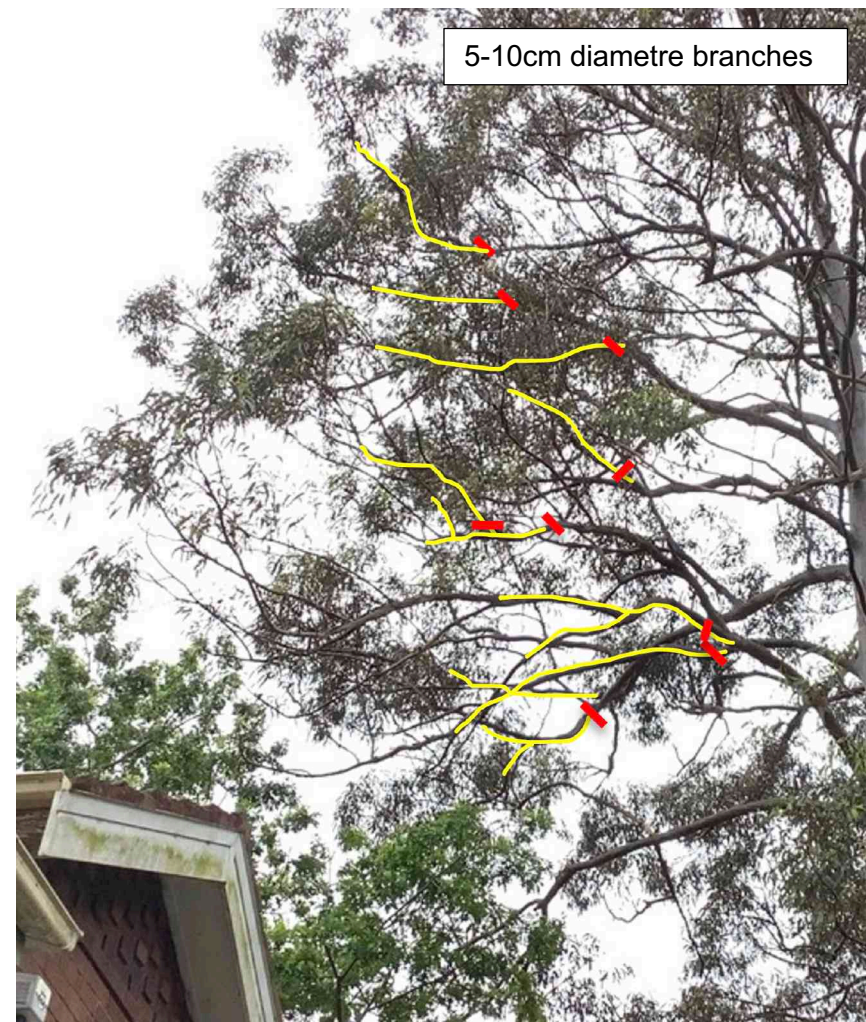
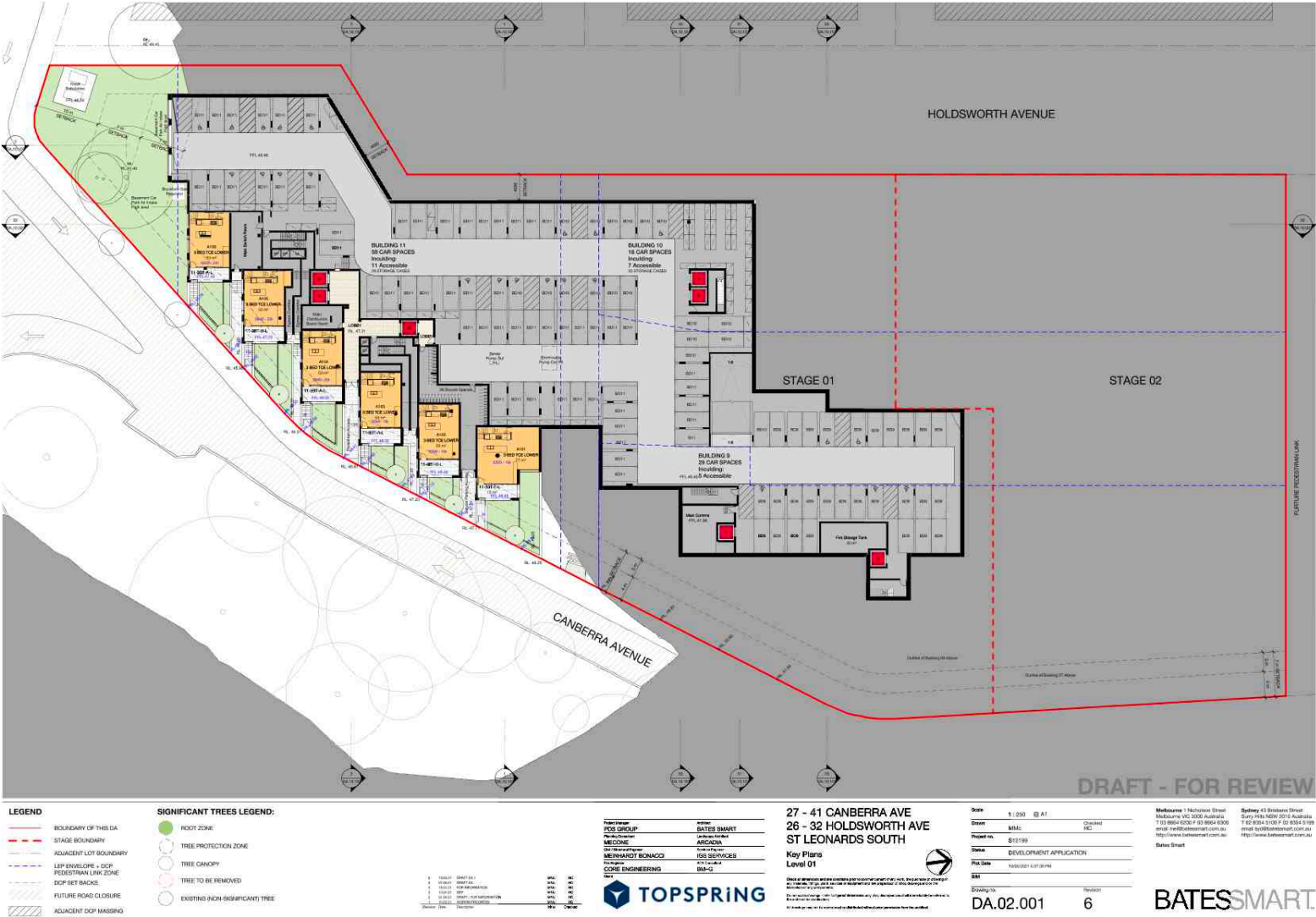


Figure 5. Tree No. 14 branch pruning (facing east)

Appendix F – Proposed Plans
Level 1



LEGEND

- BOUNDARY OF THIS DA
- STAGE BOUNDARY
- ADJACENT LOT BOUNDARY
- LIP ENVELOPE + DCP
- ROCKSTRAIN LINK ZONE
- DCP SET BACKS
- FUTURE ROAD CLOSURE
- ADJACENT DCP MISSING

SIGNIFICANT TREES LEGEND:

- ROOT ZONE
- TREE PROTECTION ZONE
- TREE CANOPY
- TREE TO BE REMOVED
- EXISTING NON-SIGNIFICANT TREE

27 - 41 CANBERRA AVE
26 - 32 HOLDSWORTH AVE
ST LEONARDS SOUTH

Key Plans
Level 01

Scale 1:250

Drawn MHC

Project No. \$12193

Client DEVELOPMENT APPLICATION

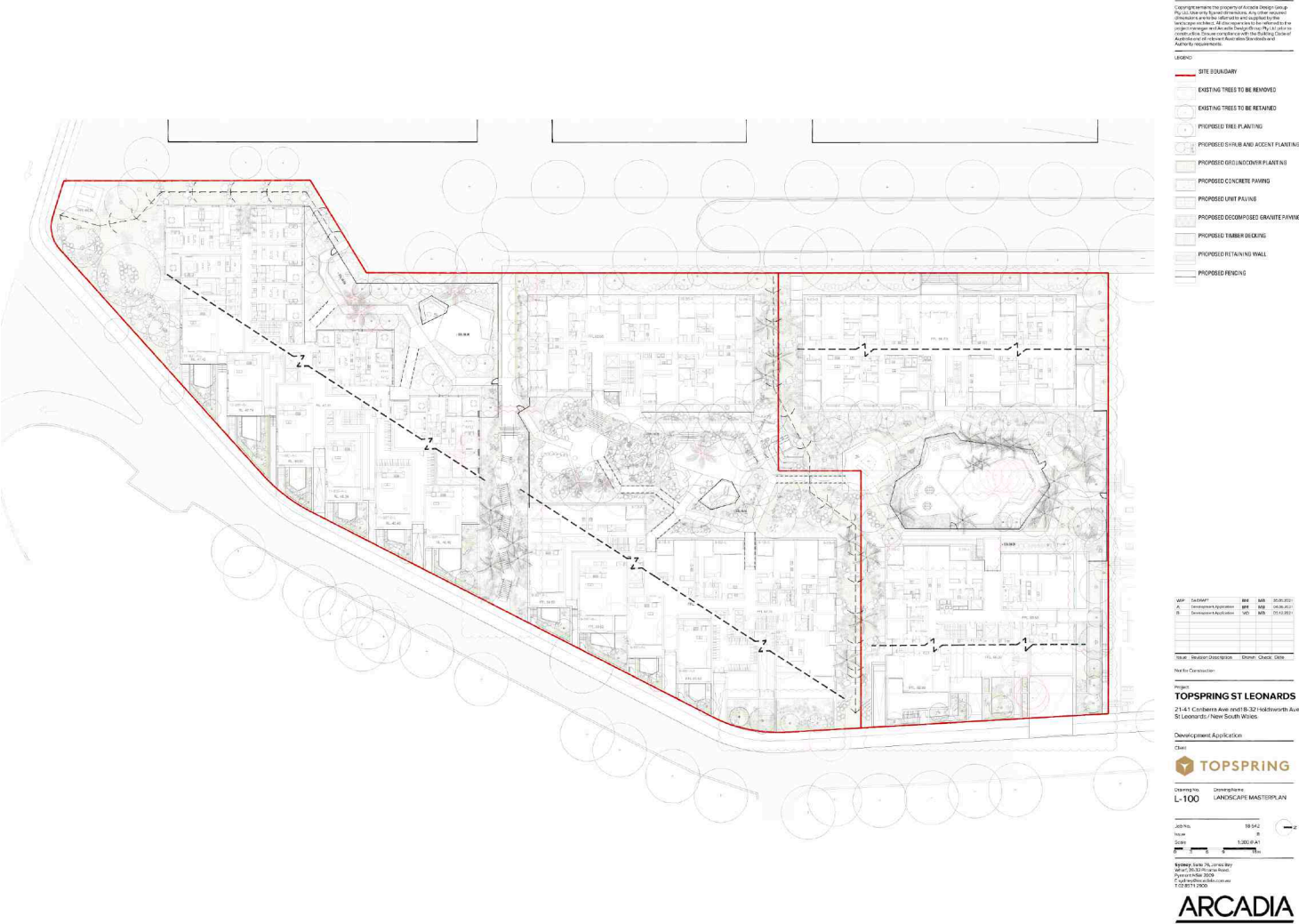
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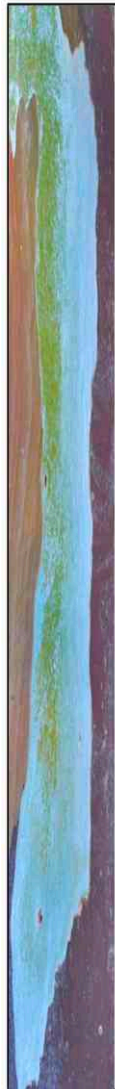
6

BATESMAR

Landscape Master Plan
18-542_Top Spring_DA_[B] 211203



Appendix G - Tree Protection Plan





Tree Protection Plan

AS 4970-2009 Protection of trees on development sites

Site Address:
Canberra Ave and Holdsworth Ave, St Leonards

Client:
Top Spring Australia

Date:
24 May 2021

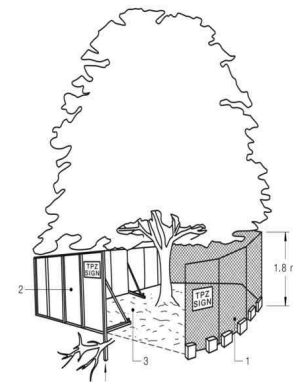
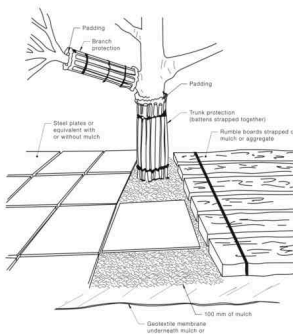
Reference:
20211793.3

Prepared By:
Meredith Gibbs

**PO Box 3453,
DURAL NSW 2158
www.australistrees.com.au**



Tree Schedule		Project Arborist Monitoring	Activities Excluded From Tree Protection Zones	Tree Protection Fencing
No.	Species	TPZ		
1	Glochidion ferdinandi (Cheese Tree)	7.2m	No soil level changes Machine excavation including trenching Excavation for silt fencing Cultivation Preparation of chemicals Parking of vehicles and machinery Refuelling Dumping of waste Wash down and cleaning of equipment Placement of fill Lighting of fires Temporary or permanent installation of utilities Physical damage to the tree Bolt cutters or wire cutters must not be used for root pruning	A 1.8m chain wire fence, secured and fastened to prevent movement be installed in accordance with AS4970-2009 and AS 4687-2007. Woody roots must not be damaged during fencing TPZ fencing installation. No fence relocation is permitted without Arborist permission. Signage - "Tree Protection Zone, No Entry". With project arborist contact details to be attached to the protective fencing. Within the TPZ fencing up to 50mm of COMPOSTED organic mulch must be applied to help retain moisture levels, suppress weed growth and reduce tree stress. Mulch must be in accordance with AS4454-2012 Composts, soil conditioners and mulches. All trees must be thoroughly watered regularly throughout the development works. This is dependent on weather conditions where more water applied during hot and or winding weather. Tree protection fencing must include shade cloth attached to the fencing to reduce transport of dust, particulates and liquids from entering the TPZ.
2	Pittosporum undulatum (Sweet Pittosporum)	5.4m		
3	Schefflera actinophylla (Queensland Umbrella Tree)	3.1m		
14	Eucalyptus saligna (Sydney Blue Gum)	9.6m		
17	Tristanopsis laurina (Water Gum)	3.0m		
92	Lophostemon confertus (Queensland Brush Box)	9.6m		
93	Lophostemon confertus (Queensland Brush Box)	9.6m		
94	Lophostemon confertus (Queensland Brush Box)	9.6m		
95	Lophostemon confertus (Queensland Brush Box)	9.6m		
79	Eucalyptus scoparia (Wallangara White Gum)	8.4m		
33	Tristanopsis laurina (Water Gum)	2.0m		
84	Syzygium sp (Lilly Pilly)	2.4m		
86	Eucalyptus microcorys (Tallowwood)	7.8m		
87	Lophostemon confertus (Queensland Brush Box)	8.5m		
89	Eucalyptus microcorys (Tallowwood)	10.8m		
90	Lophostemon confertus (Queensland Brush Box)	8.4m		
91	Lophostemon confertus (Queensland Brush Box)	8.4m		
		Project Hold Points <u>Prior to demolition of structures</u> Tree Protection Plan & Specifications must be onsite prior to works Project arborist must oversee tree retention and any tree pruning works Project arborist must inspect Tree Protection Fencing including adequate signage <u>As required</u> The builder / site manager is responsible to inform the project arborist of any issues during works <u>During all construction works</u> Project arborist must inspect trees monthly <u>Post construction</u> Final Tree Inspection	Activities Permissible Within Tree Protection Zones Any excavation work within a Tree Protection Zone must be monitored by the project arborist. Roots measuring over 40mm in diameter within the Tree Protection Zone and outside the Structural Root Zone may be pruned at the discretion of the project arborist. Root exposure must be applied with hand tools or Air Spade to prevent damage to the root system. All root pruning equipment must be sharp and clean. Secateurs, loppers or pruning saws should be used and can be cleaned with methylated spirits to prevent disease and pathogen spread. No bolt cutters. Any roots exposed must be wrapped or covered with hessian or cloth and kept moist to prevent drying out and sunburn until backfilling occurs. Backfill must be watered in and mulched with composted leaf mulch.	Trunk Protection Trunk protection shall consist of hessian wrapped around the trunk. Two metre lengths of timber (100 x 50mm) spaced at 100-150mm centres secured together with 2mm galvanised wire. These shall be strapped around the trunk and not fixed to the tree in any way to avoid mechanical injury or damage. Rumble Boards Ground protection If temporary access for machinery is required within the TPZ ground protection measures will be required. The purpose of ground protection is to prevent root damage and soil compaction within the TPZ. Measures may include a permeable membrane such as geotextile fabric beneath a layer of mulch or crushed rock below rumble boards. These measures may be applied to root zones beyond the TPZ. Foot Traffic Platforms Ground protection against foot traffic is required within the TPZ. Scaffolding with timber boards attached

Title: Tree Protection Specifications AS 4970-2009 Protection of trees on development sites	Client: Top Spring Australia		
Reference: 20221846.1	Site Address: Canberra Ave and Holdsworth Ave, St Leonards	Prepared By: Meredith Gibbs	Page: 3 / 3
Date: 7 December 2021			



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Tree Management

PO Box 3453, DURAL NSW 2158
Mobile: 0407 103 895
www.australistrees.com.au

Appendix H - Glossary

Shigo, A.L. (1986) A New Tree Biology Dictionary.

*Docktor, D (2001) City of Palo Alto, Tree Technical Manual.

Bark*	All tissue outside the vascular cambium. Bark is usually divided into inner bark active phloem and aging and dead crushed phloem.
Basal	Lower trunk area of the tree.
Branch*	Organ which supports leaves, flowers and fruit.
Branch collar*	Trunk tissue that forms around the base of a branch between the main stem and the branch wood and trunk wood to meet. Formed by compaction or expansion as the girth of the branch and trunk increase.
Canopy	The part of the crown composed of the leaves and small twigs.
Cavity	An open wound, characterized by the presence of decay and resulting in a hollow (Matheny & Clarke, 1994).
Codominant stems*	Stems or trunks of about the same size originating from the same position from the main stem.
Compaction	Compaction of soils causes roots to die due to lack of oxygen and water.
Compartmentalization*	Dynamic tree defense process involving protection features that resist the spread of pathogens.
Crown*	Portion of the tree consisting of branches and leaves and any part of the trunk from which branches arise.
Decay*	Degeneration and delignification of plant tissue, including wood, by pathogens or microorganisms.
Dieback	Dieback is the reduction in the dynamic mass of a tree as twigs and branches die and are walled off by protection boundaries.
Epicormic shoots*	Shoots produced by dormant buds within the bark or stems of a tree as a result of stress, lopping or increase light. Epicormic shoots usually have a weaker form of branch attachment.
Included bark*	Inwardly formed bark at the junction of branches or codominant stems.
Kino	A dark red to brown resin-like substance produced by the trees in the genera Eucalyptus and other related genera. Kino forms when living cells are injured and infected.
Lopping*	Random cutting of branches or stems between branch union or at internodes on young trees.
Mycorrhiza	A symbiotic, nonpathogenic, or weakly pathogenic association of fungi and non woody, absorbing roots of plants. The common belief is that the mycorrhiza help the tree with mineral absorption, especially phosphorus.
Microorganisms	An organism of microscopic size. Bacteria, the tree pathogens, may be as small as 3 microns wide by 5 microns long.
Pathogen	Any agent that causes disease.
Photosynthesis	A process where chlorophyll in plants traps the energy of the sun in a molecule of carbon dioxide and water that is called sugar.
Roots	An organ of a tree that serves to maintain mechanical support, to provide water and essential elements from the soil through absorption, and to store energy reserves.
Stem*	Organ which supports branches, leaves flowers and fruit.
Tree*	Long lived woody perennial plant greater than (or potentially greater than) 3m in height with one or relatively few stems.
Trunk*	The main stem.
Wound*	An opening that is created when the bark is cut, removed or injured.

Appendix I - TreeAZ (Barrell 2016)

TreeAZ Field Sheet

Heritage: Each tree is assessed by a visual check. If it is a designated heritage tree, then it is automatically categorized as AA, and is not subjected to any of the category ZZ, Z or A considerations.

Category ZZ (unsuitable for retention): Any remaining trees that are severely compromised and unsuitable for retention, even short term, are categorized as ZZ, i.e. Dead; irreversibly declining health; irremediable structural conditions; or, causing severe inconvenience to people or structural damage.

Category Z (low quality): Any remaining trees are systematically reviewed to decide if they fit into any of the four Z subcategory groups listed in the table below.

Category A (moderate quality): Any remaining trees are automatically category A, with the possibility of being promoted to category AA.

Category AA (high quality): If a category A tree is already Large, or has the potential to become so with limited intervention, it can be promoted to category AA, at the discretion of the assessor.

Category Z: Low quality trees not worthy of being material constraint

Z	Local policy exemptions: Trees that are unsuitable for legal protection for local policy reasons including size, proximity and species	
	1	Size: Young or insignificant small trees, e.g. below the local size threshold for legal protection, etc
	2	Proximity, hedge or species: Exempt from legal protection because of proximity to structures, a maintained hedge or unsuitable species, e.g. scheduled noxious weed, out of character in a setting of acknowledged importance, etc
	Deteriorating health/condition: Trees that are likely to be removed within 10 years because of deteriorating health and/or structural condition	
	3	Health: Deteriorating health with little realistic prospect of recovery
	4	Crown instability: Deteriorating structural conditions where an increasing risk of failure can be temporarily addressed by reasonable intervention, e.g. storm damage, cavities, decay, included bark, wounds, excessive imbalance, etc
	5	Root instability: Deteriorating whole tree stability through poor anchorage, increased exposure to weather, etc
	Ongoing nuisance: Trees that are likely to be removed within 10 years because of unsuitable impact on people	
	6	Inconvenience: Ongoing and increasing inconvenience to residents to the extent that a locally recognised court or tribunal would be likely to authorise removal, e.g. dominance, debris, interference, etc
	7	Damage: Ongoing and increasing structural damage to property to the extent that a locally recognised court or tribunal would be likely to authorise removal, e.g. worsening damage to surfacing and structures, etc
	Good management: Trees that are likely to be removed within 10 years through responsible management of the tree population	
	8	No future potential: Poor condition or location with no realistic potential for recovery or improvement, e.g. dominated by adjacent trees or buildings, poor architectural framework, etc
	9	Benefit nearby trees: Removal would benefit better adjacent trees, e.g. relieve physical interference, suppression, etc
	10	Maintenance costs: Unacceptably high maintenance costs, e.g. structural conditions requiring high levels of regular pruning, etc

NOTE: Although Z trees are not worthy of influencing new designs, urgent removal is not essential and they could be retained in the short term, if appropriate

Categories A and AA: Moderate and high quality trees suitable for retention for more than 10 years, and worthy of being a material constraint

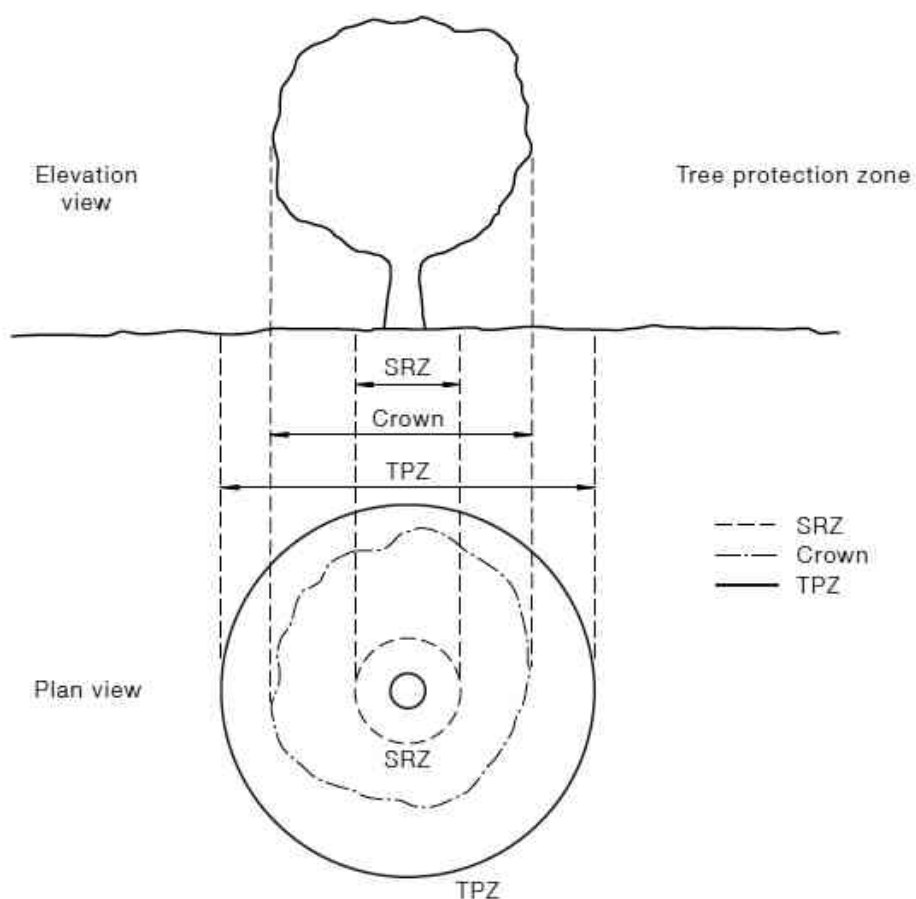
A	All trees that are not categories ZZ or Z that can be retained with limited intervention	
NOTE: Category A trees that are already large, or have the potential to become so, with limited intervention, can be promoted to category AA(1), at the discretion of the assessor. Designated heritage trees are automatically category AA(2). Although all category AA and A trees are sufficiently important to be material constraints, category AA trees are at the top of the categorization hierarchy and should be given the most weight in any selection process.		
AA	1	Single category A trees or small groups which, at the discretion of assessor, can be promoted to category AA because they are already large, or have the potential to become large
	2	Designated heritage tree

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Appendix J - Tree Protection Zones AS4970-2009

Tree Protection Zone

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



Determining the TPZ

The **radius** of the TPZ is calculated for each tree by multiplying its DBH $\times$ 12.
 $TPZ = DBH \times 12$
 Where DBH = trunk diameter measured at 1.4 m above ground

Radius is measured from the centre of the stem at ground level.

A TPZ should not be less than 2m nor greater than 15m (except where crown protection is required). Clause 3.3 covers variations to the TPZ.

The TPZ of palms, other monocots, cycads and tree ferns should not be less than 1 m outside the crown projection.

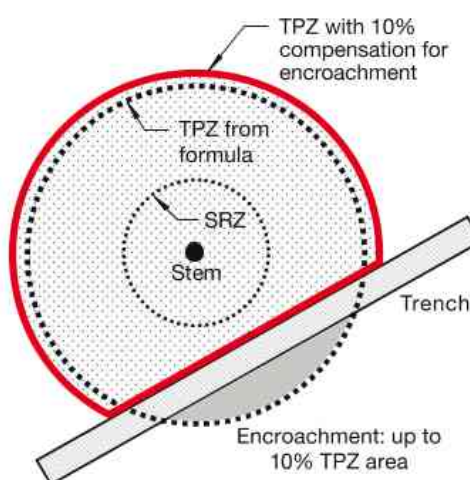
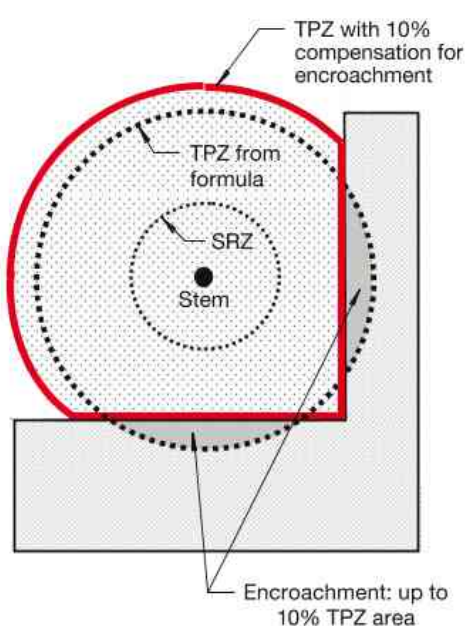
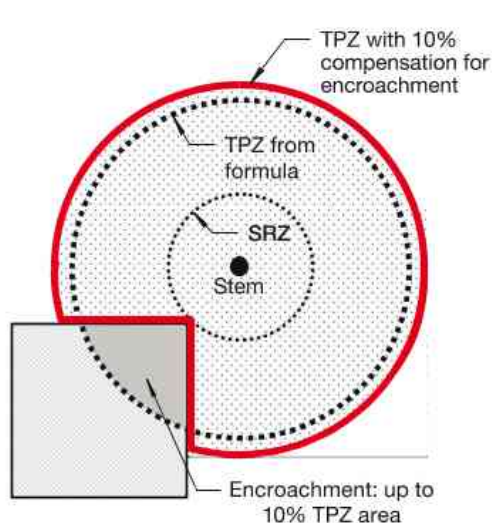
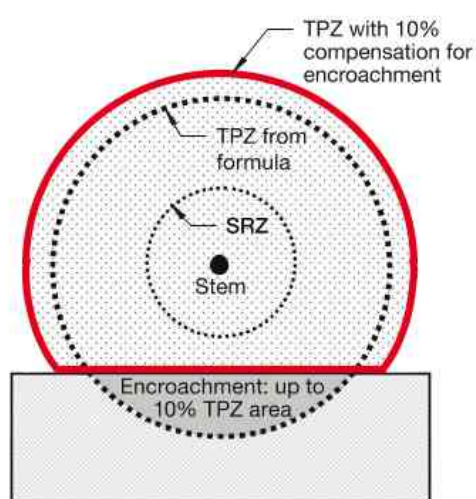
Appendix K - Tree Protection Zone Encroachments AS4970-2009

Minor Encroachments

The proposed encroachment is less than 10% of the area of the TPZ and is outside the SRZ. The area lost to this encroachment should be compensated for elsewhere and contiguous with the TPZ.

Major Encroachments

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



Appendix L - Qualifications & Experience



PO Box 3453
DURAL NSW 2158
Mobile 0407 103 895
Email: info@australistrees.com.au
Website: www.australistrees.com.au
ABN: 71 324 020 793

Meredith Gibbs (January 2020)

Qualifications:

- 1999 Advanced Certificate in Urban Horticulture
- 2002 Horticulture Diploma (Arboriculture) Level 5
- 2002 Occupational Health & Safety course
- 2002 Risk Management course
- 2002 Smart Train 008397
- 2010 Collecting Catchment Data
- 2011 Quantified Tree Risk Assessment
- 2014 Quantified Tree Risk Assessment
- 2015 Horticulture Diploma (Arboriculture), Level 5
- 2018 White Card Number 2234996

Practical experience:

- 1996 - 1998 Nursery Hand - Horticulturist
- 1988 - 2001 Garden Maintenance - Horticulturist
- 1997 - 2004 Silver Springs Nursery (Owner/Operator)
- 2000 - Australis Tree Management (Owner/Operator)

Memberships and affiliations:

- Arboriculture Australia
- Australian Institute of Horticulture
- Australian Plant Society of NSW
- Burrendong Botanic Garden & Arboretum
- International Society of Arboriculture
- Quantified Tree Risk Assessment Registered User
- Society of Municipal Arborists
- Women in Arboriculture

Insurance:

- Professional Indemnity Insurance
 - Liberty International Underwriters
 - \$5,000,000.00
 - Policy No. HC-ME-SPC-01-104260
- Public Liability Insurance
 - Liberty International Underwriters
 - \$20,000,000.00
 - Policy No. 463763

Pro Bono Work:

- Middle Dural Public School

Continuing Professional Development:

- NAAA Conference, Mature Trees, 2001
- Claus Mattheck Seminar 2001
- ISAAC Conference - Parramatta 2004
- AILA Tree Management Forum 2005
- Jeremy Barrell Tree AZ & Report Writing Workshop 2006
- A Practitioner's Guide to Visual Tree Assessment – Mike Ellison 2007
- Quantified Tree Risk Assessment Workshop – Mike Ellison 2007
- ISAAC Conference - Brisbane 2008
- ISAAC Conference Workshop Dr. David Lonsdale 2008
- ISAAC Conference Workshop Dr. Phillip Gibbons 2008
- ISAAC Conference - Newcastle 2009
- ISAAC Conference - Adelaide 2010
- ISA International Conference Parramatta 2011
- ISA International Conference Workshop Dr. Ken James 2011
- Arboriculture Australia Annual Conference - Sunshine Coast 2014
- Arboriculture Australia Annual Conference - Adelaide 2015
- Arboriculture Australia Annual Conference - Canberra 2017
- Jeremy Barrell Arboriculture Australia Workshop 2017
- Arboriculture Australia Annual Conference - Hobart 2018
- Arboriculture Australia Annual Conference - Alice Springs 2019

Past Projects

- Pennant Street Castle Hill (Castle Towers) 2006
- Fairway Drive, Kellyville 2012
- Summit Care, Baulkham Hills 2013
- 105-115 Portman Street, Zetland 2016
- 114 Tallawong Road, Rouse Hill 2016
- 2 Lexington Dr Bella Vista 2016
- The Hermitage - Gledswood Hills 2010-2019
- 105 Cudgegong Rd Rouse Hill Development 2018
- 33 Greenwich Road, Greenwich Redevelopment 2017-2019
- Gosford Park Redevelopment 2019
- Blacktown Workers Sports Club Redevelopment 2016-2019
- Gregory Hills Industrial Estate 2019



Appendix M - References

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