Arboricultural Impact Assessment Statement

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Statement of Authorship

This study and report were undertaken by Kingfisher at 113 Orchard St, Warriewood. The author of the report is Vicki Beecher with qualifications BSc. majoring in Geology and Climate Science with over 20 years' experience in this field, AQF level 5 Horticulture, AQF level 5 Horticulture (Arboriculture) and AQF level 3 Landscape Construction.

Limitations Statement

Information presented in this report is based on an objective study undertaken in response to the brief provided by the client. Any opinions expressed in this report are the professional, objective opinions of the authors and are not intended to advocate any proposal or pre-determined position.

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1 Introduction

1.1 Background

1.1.1 This Arboricultural Impact Assessment Statement was prepared for Mr Tony McLain of Tony McLain Architects on behalf of the owners of 113 Orchard Street, Warriewood (the site). It relates to the proposed development of the site.

1.1.2 The proposed development involves the construction of a horse arena, day arena, paddocks, access drive, turning and parking as well as additions to the existing dwelling. The works also involve associated earth and landscape works including gabion walls.

1.1.3 Tony McLain Architects have instructed Kingfisher Urban Ecology and Wetlands to undertake an inspection of trees located within the footprint of the proposed development works. The following documentation was provided to assist with the onsite assessment trees and the preparation of this report:

- Plan Showing Detail & Levels Over LOT 6 in DP749791, prepared by Axiom Surveying, dated 22.02.18.
- Proposed Dwelling and Equestrian Facilities– Site Plan, prepared by Tony McLain Architect, drawing number DA01, rev D, dated July 2019.
- Proposed Horse Arena and Facilities – Site Sections, prepared by Tony McLain Architect, drawing number DA03, rev D, dated August 2019.
- Proposed Dwelling and Equestrian Facilities– Day Paddock Detail, prepared by Tony McLain Architect.

1.1.4 This report is to be used in its entirety only. Any written or verbal submission, report or presentation that includes statements taken from the findings, discussions, conclusions or recommendations made in this report may only be used where the whole original report (or a copy) is referenced to and directly attached to that submission, report or presentation. Information contained in the report covers only the trees that were inspected and reflects the trees condition at the time of the inspection. There is no guarantee, expressed or implied, that problems or deficiencies of the subject trees may not arise in the future.

1.1.5 General guidance notes regarding the protection of trees on development sites have been given as Appendix 7 of this report. These notes contain basic requirements and procedures to ensure that the impacts of construction works on site trees are minimised. Advice from the project arborist is to be sought prior to undertaking works within a tree protection zone.

1.2 The Site

1.2.1 The subject site identified as 113 Orchard Street, Warriewood – Lot 6 DP 749791, a proposed development with an addition to existing dwelling, horse arena, paddocks, access driveway and parking and associated landscape/earth works located on the Eastern side of the block. The site is zoned RU2 'Rural Landscape' within Northern Beaches Council LEP 2014. It is a rural square block of 9500m^2.

1.2.2 Existing site features include:

- An eastern aspect
- Sandstone outcrops with elevated tors to rear of property
- The block has a moderate slope with an eastern aspect
- An existing residential dwelling
- The site is densely vegetated with a mix of native species

1.2.3 The image below shows the subject site (highlighted). Lot number is not shown.

Fig 1: Aerial image (SIX Maps, accessed -25/09/18) showing site.

1.2.4 The site is protected under the conditions of the Northern Beaches Tree Preservation Order.

1.2.5 The trees surveyed onsite are located within an area of biodiversity and are a species found within Sydney Turpentine Ironbark Forest.

1.2.6 Trees 1 and 77 are exempt species under the Tree Preservation Order and may be removed irrespective of the proposed works.

- Tree 1 – *Prunus spp*.
- Tree 77 – *Jacaranda Mimmosifolia*

1.2.7 Trees 37 and 50 were found to be *Livistona australis* – an endemic species. These trees have the potential to be transplanted and retained onsite. A professional tree transplanting company or qualified horticulturalist should be engaged to oversee/carry out these works.

1.2.8 In general the *Corymbia gummifera* (Red Bloodwoods) located on the lower portion of block (Eastern aspect) were found to be in poor health and condition. This tree species is not considered to be conducive to this area of the site.

1.2.9 Trees 5, 6, 147 and 167 are in significant decline and are recommended for removal.

2 Inspection Methodology

2.1 On September 24th 2018, 7th June, 27th August 2019 and 31st March, 22nd April 2020 Vicki Beecher attended the site to undertake the tree assessment and collect data.

2.2 The tree(s) were assessed using the principles of a ground based Visual Tree Assessment (VTA)[1] and methods consistent with modern arboriculture. No aerial (climbing) inspection, tissue sampling or diagnostic testing was undertaken as part of the inspection process unless otherwise stated. Weather conditions at the time of the inspection were clear and fine.

2.3 The physical dimensions of the tree(s) including height, radial canopy spread, and trunk diameter have been estimated or measured. Refer Tree Assessment Criteria. Tree data collected at the time of the inspection can be found within the Tree Assessment Schedule, Appendix 1.

2.4 Trees were numbered and tagged to correspond with the provided site survey and proposed development plan.

2.5 Methodology for determining vigour, condition, age class, Safe Useful Life Expectancy (SULE), can be found as Appendix 3.

2.6 The landscape significance of each tree has been assessed using the Institute of Australian Consulting Arborists (IACA) Significance of a Tree Assessment Rating System (STARS). The STARS assessment criteria can be found as Appendix 5.

[1] Mattheck, C. and Breloer, H (2006), *The Body Language of Trees – A Handbook for Failure Analysis*, The Stationary Office. Pages 118-122.

2.7 Tree protection zones have been scaled and plotted over the proposed works and can be found as Appendix 2: Tree Retention and Removal Plan.

3 Development Impacts

3.1 Trees 68, 77 and 143 are located within the footprint of the proposed access driveway and cannot be retained.

3.2 Proposed access driveway poses a major encroachment into the protection zones of Trees 5 (21%), 6 (37%), 144 (21%), 147 (12%), and a minor encroachment into the protection zone of tree 145 (8%). It has been advised that the road is to be constructed on grade as such that the encroachment through the protection zone of Tree 144 is thought to require minor increases in level alterations. Existing dip in surface area to the east of T144 is to be mitigated by a non-solid bridge which will provide vehicle access and not impact on tree roots.

3.3 Tree 2 is located within the footprint of the proposed car parking area and cannot be retained.

3.4 Tree 42 is located within the footprint of the proposed paddock shelter and cannot be retained.

3.5 Trees 39, 40, 41, 43, 44, 198, 208 are located within the footprint of the Upper Paddock area7 and cannot be retained.

3.6 Upper paddocks pose a major encroachment into the protection zones of Trees 45 (17%), 46 (10%), 60 (32%), 197 (57%), 198 (61%), 206 (17%), 207 (41%), 210 (11%). Compaction of soils within the protection zone of trees in the Upper paddocks caused by horses may result in a decline in tree health and condition.

3.7 Upper paddocks pose a minor encroachment into the protection zones of Trees 26 (1%), 27 (6%), 199 (7%), 212 (2%). Compaction of soils within the protection zone of trees in the Upper paddocks caused by horses may result in a decline in tree health and condition.

3.8 Trees 64, 65, 66, 68, 69, 72, 73 are located within the footprint of the elevated day yards and cannot be retained.

3.9 Elevated day yards pose a major encroachment into trees 52 (12%), 54 (25%), 67 (26%), 147 (40%), 150 (25%). Although major encroachment it is felt these trees can be retained as the elevated platforms are constructed on screw piles.

3.10 Elevated day yards pose a minor encroachment into trees 51 (1%), 71 (6%), 152(4%). Although minor encroachment it is felt these trees can be retained as the elevated platform are constructed on screw piles.

3.11 Trees 74, 75, 141, 142 are located within the footprint of the day arena and therefore cannot be retained.

3.12 Trees 76, 161 are located within the footprint of the gabion wall and therefore cannot be retained.

3.13 Tree 165 is located within the proposed footprint of the absorption pit and therefore cannot be retained.

3.14 The proposed absorption bed poses a major encroachment into the protection zone of Trees 166 (38%), 167 (12%). The requirement to severe roots within the structural root zone has the potential to compromise the stability, heath and condition of these trees.

3.15 The proposed absorption bed poses a minor encroachment into the protection zone of Tree 169 (6%). The requirement to severe roots within the structural root zone has the potential to compromise the stability, heath and condition of these trees.

3.16 Trees 32, 38, 53, 63 are located within the footprint of the proposed horse track and therefore cannot be retained.

3.17 The proposed Horse track poses a major encroachment into the protection zone of Trees 17 (10%), 30 (37%), 52 (19%), 54 (14%), 60 (12%), 62 (24%). The requirement to severe roots within the structural root zone has the potential to compromise the stability, heath and condition of these trees. Further assessment shall be required to fully assess the impact upon this tree.

3.18 The proposed Horse track poses a minor encroachment into the protection zone of Trees 58 (4%), 65 (5%).

3.19 The footprint of the proposed Store area poses a major encroachment into the protection zone of Trees 57 (26%), 58 (25%) however, Site Section 2 drawing number DA03 D indicates the store is to be mounted upon screw piles. These screw piles are likely to pose a minimal encroachment into the tree protection zones.

3.20 The proposed Store area poses a minor encroachment into the protection zone of Tree 56 (9%) however, Site Section 2 drawing number DA03 D indicates the store is to be mounted upon screw piles. These screw piles are likely to pose a minimal encroachment into the tree protection zones.

3.21 The proposed House extension poses a minor encroachment into the protection zone of Trees 11 (2%), 36 (3%), 171 (2%).

4 Conclusions and Recommendations

4.1 Based on plans provided the following trees cannot be retained due to development encroachments or poor health and condition 2, 5, 6, 32, 38, 39, 40, 41, 42, 43, 44, 53, 63, 64, 65, 66, 68, 69, 72, 73, 74, 75, 76, 77, 141, 142, 165, 167, 198, 208.

4.2 Excavation for the proposed absorption pit within the protection zones of trees 166 and 169 is to be undertaken using methods that do not damage tree roots. This is work is to be supervised by the project aborist.

4.3 Based on plans provided where it is found that a minor encroachment applies no significant impact upon the tree is anticipated.

4.4 Screw piles located within the TPZ of trees 52, 54, 56, 57, 67, 150 are to be manually excavated using hand tools to their fullest extent. Where this is not deemed possible, they are to be manually excavated to a minimum depth of 600mm. Any further excavation that is then to be undertaken mechanically is to be of a diameter less than that excavated by hand. Appropriate ground protection measures are to be implemented to stand and operate excavation equipment within a tree protection zone. A degree of flexibility should be built into the design to allow for the pile locations to be moved if structural or significant roots are found. Tree roots less than 30mm diameter exposed by the excavations can be pruned to allow the sighting of piles. A minimum clearance of 100mm is to be left around significant roots.

4.5 Trees retained on site are to be protected through the establishment of a Tree Protection Zone.

4.6 It is understood that the ability to establish a tree protection zone, to its fully extent, may be difficult and impractical due to physical site restrictions and the need for a workable area. It is recommended that the tree protection measures are established, prior to site establishment, under consultation between the property owner, building contractor and project arborist. Tree protection measures may be altered and adjusted under guidance of the project arborist as construction works progress. Where encroachments through or over a tree protection zone are required appropriate ground protection measures are to be implemented.

4.7 It is recommended that upon completion of working plans a Tree Protection Plan be prepared to manage trees retained on the site.

4.8 All tree removal works are to be undertaken by suitably qualified tree workers (AQF 3), and in accordance with Safe Work Australia's Guide to Managing Risks of Tree Trimming and Removal Works. All appropriate approvals and consents are to be obtained prior to tree removal works commencing. Care is to be undertaken to avoid damaging trees to be retained during tree removal operations.

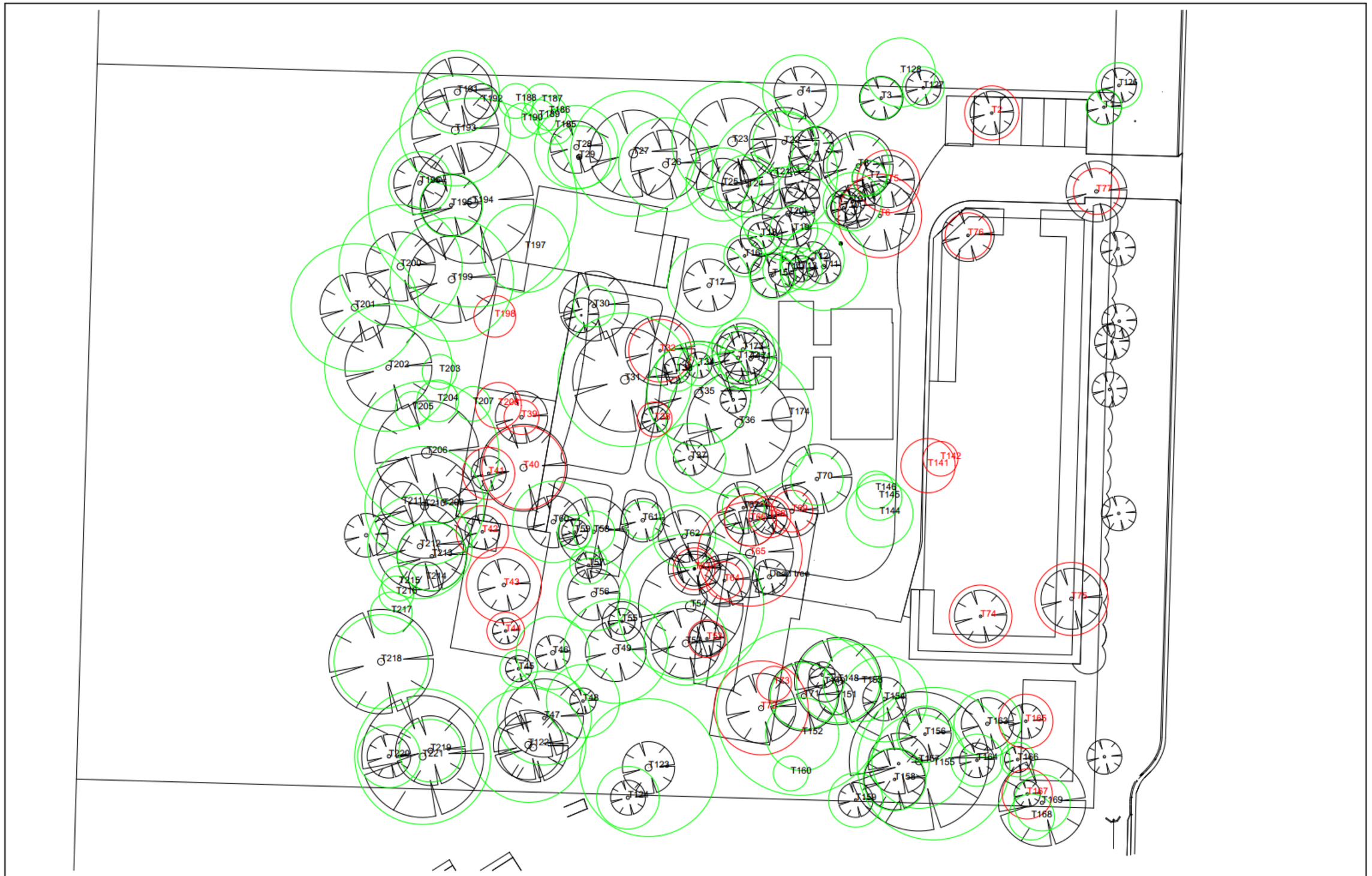
Appendix 1: Tree assessment schedule

Tree Number	Botanical Name	Common Name	Height (m)	Canopy Spread (m)	DBH (mm)	DAB (mm)	Age Class	Vigour	Condition	SULE	Landscape Significance	Retention Value	TPZ (m)	SRZ (m)	Tree Characteristics
1	*Prunus* sp	Blossom tree	1-5	2x2	170	300	M	-	G	S	M	L	2.04	2.00	3 stems 100mm DBH each. Seasonal loss of leaves prevents assessment of tree vigour, tree has been pruned to shape.
2	*Macadamia integrifolia*	Macadamia	5-10	3x3	260	300	M	N	G	M	M	M	3.12	2.00	3 stems 150mm DBH each. Multi-stemmed specimen with inclusions. Tree suffering from nutrient deficiency.
3	*Corymbia gummifera*	Red Bloodwood	10-5	3x3	200	300	M	N	F	S	M	L	2.40	2.00	Trunk forks @ 3.5m into two stems, junction appears included. Dieback and epicormics throughout canopy.
4	*Syncarpia glomulifera*	Turpentine	15-20	5x5	360	300	M	N	F	M	M	M	4.32	2.00	2 stems 300mm and 200mm DBH. Multi-stemmed specimen, suppressed with deadwood.
5	*Angophora floribunda*	Rough Barked Apple	5-10	5x5	400	500	M	N	F	S	M	L	4.80	2.47	Suppressed specimen with canopy skew to the east. Tree has been poorly pruned resulting in stubs. Dieback and epicormics throughout canopy. Surface roots around base of tree.
6	*Angophora floribunda*	Rough Barked Apple	10-15	5x5	400	500	M	N	F	S	M	L	4.80	2.47	Suppressed specimen with canopy skew to the east. Dieback and epicormics throughout canopy. Surface roots around base of tree. Kink in trunk.
7	*Corymbia gummifera*	Red Bloodwood	5-10	3x3	120	180	M	N	F	S	M	L	2	1.61	Suppressed specimen with dieback and epicormics throughout canopy. Minimum TPZ applies.
8	*Corymbia gummifera*	Red Bloodwood	10-15	5x5	300	400	M	N	G	M	M	M	3.60	2.25	Dieback, deadwood and epicormics throughout canopy. Surface root extends 3,2m from the base of tree on its northern side.
9	*Syncarpia glomulifera*	Turpentine	10-15	5x5	280	400	M	N	G	M	M	M	3.36	2.25	2 stems 200mm DBH each. Twin stemmed from base of tree. Epicormics and deadwood observed.
10	*Syncarpia glomulifera*	Turpentine	10-15	3x3	170	300	M	N	G	M	M	M	2.04	2.00	2 stems 120mm DBH each. Twin stemmed from base of tree.
11	*Syncarpia glomulifera*	Turpentine	10-15	3x3	420	500	M	L	F	S	L	L	5.04	2.47	2 stems 300mm DBH each. Twin stemmed from base of tree. Dieback and epicormics observed.
12	*Syncarpia glomulifera*	Turpentine	10-15	3x3	300	400	M	N	G	M	M	M	3.60	2.25	Dieback, deadwood and epicormics observed within canopy.
13	*Syncarpia glomulifera*	Turpentine	15-20	2x2	200	350	M	N	G	M	M	M	2.40	2.13	Suppressed specimen with epicormics.
14	*Syncarpia glomulifera*	Turpentine	15-20	3x3	220	400	M	N	G	M	M	M	2.64	2.25	2 stems 100mm and 200mm DBH. Twin stemmed tree. Epicormics observed.
15	*Syncarpia glomulifera*	Turpentine	15-20	4x4	220	500	M	N	G	M	M	M	2.64	2.47	3 stems 100mm and 200mm DBH. Twin stemmed tree. Epicormics observed.
16	*Syncarpia glomulifera*	Turpentine	10-15	3x3	200	250	M	N	G	M	M	M	2.40	1.85	Epicormics.
17	*Syncarpia glomulifera*	Turpentine	15-20	6x6	400	450	M	N	G	M	M	M	4.80	2.37	Epicormics.
18	*Syncarpia glomulifera*	Turpentine	10-15	2x2	200	450	M	N	G	M	M	M	2.40	2.37	Suppressed specimen.
19	*Allocasuarina littoralis*	Black Sheoak	10-15	4x4	230	400	M	N	G	M	M	M	2.76	2.25	2 stems 120mm and 200mm DBH. Small fungal fruiting body observed in stub. Some dieback observed.
20	*Eucalyptus robusta*	Swamp Mahogany	25-30	8x8	450	550	M	N	G	M	M	M	5.40	2.57	
21	*Eucalyptus robusta*	Swamp Mahogany	25-30	8x8	600	700	M	N	G	M	M	M	7.20	2.85	Dieback, deadwood and epicormics throughout canopy. Branch failure @ 6m.
22	*Syncarpia glomulifera*	Turpentine	15-20	4x4	300	400	M	N	G	M	M	M	3.60	2.25	Suppressed specimen has developed skewed canopy. Deadwood and dieback observed.
23	*Eucalyptus botryoides*	Southern Mahogany	25-30	10x10	580	700	M	N	G	M	M	M	6.96	2.85	2 stems 300mm and 500mm DBH. Suppressed specimen has developed skewed canopy.
24	*Angophora costata*	Smooth Barked Apple	10-15	4x4	300	400	M	N	G	M	M	M	3.60	2.25	
25	*Allocasuarina littoralis*	Black Sheoak	10-15	5x5	350	450	M	N	G	M	M	M	4.20	2.37	Deadwood and dieback observed.
26	*Eucalyptus piperita*	Sydney Peppermint	25-30	5x5	450	550	M	N	F	M	M	M	5.40	2.57	Deadwood, dieback and epicormics observed. Multiple branch failure points throughout canopy.
27	*Eucalyptus* sp	Eucalypt	25-30	8x8	680	700	M	N	F	M	M	M	8.16	2.85	2 stems 550mm and 400mm DBH. Cavity in base of tree. Deadwood and dieback observed in canopy.
28	*Angophora costata*	Smooth Barked Apple	25-30	6x6	400	500	M	N	F	M	M	M	4.80	2.47	Dieback, deadwood and epicormics observed within canopy.
29	*Eucalyptus* sp	Eucalypt	25-30	4x4	300	400	M	N	F	M	M	M	3.60	2.25	Dieback, deadwood and epicormics observed within canopy.
30	*Eucalyptus* sp	Eucalypt	15-20	3x3	200	300	M	N	F	S	M	L	2.40	2.00	Dieback, deadwood and epicormics observed within canopy.
31	*Eucalyptus* sp	Eucalypt	20-25	12x12	640	800	M	N	G	M	M	M	7.68	3.01	2 stems 400mm and 500mm DBH. Twin stemmed specimen, cavity in junction.
32	*Syncarpia glomulifera*	Turpentine	10-15	3x3	300	320	M	N	G	M	M	M	3.60	2.05	Dieback, deadwood and epicormics observed within canopy.
33	*Corymbia gummifera*	Red Bloodwood	10-15	3x3	200	300	M	N	G	M	M	M	2.40	2.00	Dieback, deadwood and epicormics observed within canopy.
34	*Allocasuarina littoralis*	Black Sheoak	10-15	4x4	200	300	M	N	G	M	M	M	2.40	2.00	Dieback, deadwood and epicormics observed within canopy.
35	*Eucalyptus* sp	Eucalypt	25-30	12x12	500	600	M	N	G	M	M	M	6.00	2.67	Some deadwood within canopy.
36	*Eucalyptus* sp	Eucalypt	25-30	12x12	700	800	M	N	G	M	M	M	8.40	3.01	Some deadwood within canopy.
37	*Livistona australis*	Cabbage Palm	5-10	3x3	300	400	M	N	G	M	M	M	3.60	2.25	
38	*Eucalyptus* sp	Eucalypt	10-15	3x3	150	250	M	N	G	M	M	M	2	1.85	Some deadwood within canopy. Branch failure point observed. Minimum TPZ applies.
39	*Eucalyptus* sp	Eucalypt	15-20	4x4	200	300	M	N	G	M	M	M	2.40	2.00	Dieback, deadwood and epicormics observed within canopy. Skewed canopy.
40	*Corymbia gummifera*	Red Bloodwood	20-25	7x7	400	500	M	N	G	M	M	M	4.80	2.47	Dieback and deadwood in canopy, some sap bleeding observed.
41	*Eucalyptus* sp	Eucalypt	10-15	5x5	250	350	M	N	G	M	M	M	3.00	2.13	Dieback, deadwood and epicormics observed within canopy.
42	*Eucalyptus* sp	Eucalypt	10-15	4x4	250	350	M	N	G	M	M	M	3.00	2.13	Suppressed tree has developed skewed canopy.
43	*Eucalyptus* sp	Eucalypt	15-20	5x5	360	400	M	N	G	M	M	M	4.32	2.25	2 stems 200mm and 300mm DBH. Dieback, deadwood and epicormics observed within canopy.
44	*Allocasuarina littoralis*	Black Sheoak	5-10	3x3	180	280	M	N	F	S	M	L	2.16	1.94	Dieback, deadwood and epicormics observed within canopy. Extensive cambial dieback and degraded woody tissue.
45	*Corymbia gummifera*	Red Bloodwood	5-10	3x3	180	280	M	N	G	M	M	M	2.16	1.94	
46	*Allocasuarina littoralis*	Black Sheoak	15-20	3x3	350	400	M	L	F	S	L	L	4.20	2.25	Dieback, deadwood and epicormics observed within canopy. Extensive cambial dieback and degraded woody tissue.
47	*Eucalyptus* sp	Eucalypt	20-25	8x8	450	550	M	N	G	M	M	M	5.40	2.57	Some deadwood and dieback within canopy.
48	*Eucalyptus* sp	Eucalypt	25-30	8x8	350	450	M	N	G	M	M	M	4.20	2.37	Some deadwood within canopy.
49	*Eucalyptus robusta*	Swamp Mahogany	25-30	8x8	500	600	M	N	G	M	M	M	6.00	2.67	Some deadwood, thinning canopy.
50	*Livistona australis*	Cabbage Palm	5-10	5x5	500	600	M		**D**						Tree failed in storm of 7-9th February 2020
51	*Eucalyptus* sp	Eucalypt	20-25	8x8	500	600	M		**D**						Tree failed in storm of 7-9th February 2020
52	*Syncarpia glomulifera*	Turpentine	15-20	8x8	400	500	M	N	G	M	M	M	4.80	2.47	Some deadwood and dieback within canopy. Possible basal defect.
53	*Syncarpia glomulifera*	Turpentine	15-20	3x3	180	280	M	N	G	M	M	M	2.16	1.94	

Tree Number	Botanical Name	Common Name	Height (m)	Canopy Spread (m)	DBH (mm)	DAB (mm)	Age Class	Vigour	Condition	SULE	Landscape Significance	Retention Value	TPZ (m)	SRZ (m)	Tree Characteristics
54	*Eucalyptus piperita*	Sydney Peppermint	25-30	12x12	700	850	M	N	G	M	M	M	8.40	3.09	Dieback, deadwood and epicormics observed within canopy. Branch failure point observed.
55	*Eucalyptus* sp	Eucalypt	10-15	3x3	210	300	M	N	G	M	M	M	2.52	2.00	2 stems 120mm and 170mm DBH. Suppressed specimen with some deadwood.
56	*Eucalyptus piperita*	Sydney Peppermint	25-30	8x8	350	450	M	N	G	M	M	M	4.20	2.37	Some deadwood and dieback within canopy.
57	*Corymbia gummifera*	Red Bloodwood	10-15	3x3	180	280	M	N	G	M	M	M	2.16	1.94	Suppressed specimen with some deadwood and dieback.
58	*Eucalyptus robusta*	Swamp Mahogany	15-20	3x3	200	400	M	N	F	S	M	L	2.40	2.25	Cavity in base of tree and old pruning/branch site @ 1m. Tree canopy has extensive skew to the east
59	*Eucalyptus* sp	Eucalypt	15-20	1x1	150	250	M	N	F	S	M	L	2	1.85	Some deadwood and dieback within canopy. Minimum TPZ applies.
60	*Angophora costata*	Smooth Barked Apple	25-30	4x4	390	400	M	N	G	M	M	M	4.68	2.25	2 stems 250mm and 300mm DBH. Rib formation on northern side of western stem. Canopy skewed.
61	*Syncarpia glomulifera*	Turpentine	10-15	2x2	180	280	M	N	G	M	M	M	2.16	1.94	
62	*Eucalyptus piperita*	Sydney Peppermint	10-15	2x2	300	400	M	N	F	S	M	L	3.60	2.25	Extensive dieback, canopy consists mainly of epicormic growth.
63	*Eucalyptus* sp	Eucalypt	10-15	2x2	200	300	M	N	P	S	M	L	2.40	2.00	Extensive dieback, canopy consists mainly of epicormic growth.
64	*Eucalyptus* sp	Eucalypt	5-10	3x3	180	280	M	L	P	S	L	L	2.16	1.94	Advanced state of decline, near dead.
65	*Eucalyptus piperita*	Sydney Peppermint	25-30	10x10	500	600	M	N	G	M	M	M	6.00	2.67	Cavity in base of tree. Minor deadwood throughout canopy.
66	*Syncarpia glomulifera*	Turpentine	15-20	5x5	250	350	M	N	G	M	M	M	3.00	2.13	
67	*Allocasuarina littoralis*	Black Sheoak	15-20	5x5	200	300	M	N	G	M	M	M	2.40	2.00	Tree has developed skewed canopy.
68	*Syncarpia glomulifera*	Turpentine	10-15	4x4	200	300	M	N	G	M	M	M	2.40	2.00	
69	*Syncarpia glomulifera*	Turpentine	10-15	3x3	200	300	M	N	G	M	M	M	2.40	2.00	
70	*Angophora costata*	Smooth Barked Apple	15-20	5x5	250	300	M	N	G	M	M	M	3.00	2.00	Minor deadwood and epicormic growth. Branch failure point northern side of trunk @ 2.5m.
71	*Corymbia gummifera*	Red Bloodwood	10-15	4x4	320	500	M	N	F	S	M	L	3.84	2.47	2 stems 300mm and 100mm DBH. Minor deadwood and epicormic growth.
72	*Eucalyptus piperita*	Sydney Peppermint	15-20	5x5	450	550	M	N	G	M	M	M	5.40	2.57	
73	*Corymbia gummifera*	Red Bloodwood	10-15	3x3	120	220	M	N	G	M	M	M	2	1.75	Minor deadwood and epicormic growth. Minimum TPZ applies.
74	*Angophora floribunda*	Rough Barked Apple	10-15	4x4	300	400	M	N	G	M	M	M	3.60	2.25	Minor dieback, deadwood and epicormic growth.
75	*Eucalyptus robusta*	Swamp Mahogany	10-15	6x6	350	450	M	N	G	M	M	M	4.20	2.37	Pruned to maintain clearance from overhead electrical network. Epicormics.
76	*Callistemon viminalis*	Bottlebrush	5-10	6x6	220	200	M	N	F	S	M	L	2.64	1.68	2 stems 120mm and 180mm DBH. Multi-stemmed tree, crack has formed in stem junction.
77	*Jacaranda mimmosifolia*	Jacaranda	5-10	6x6	220	200	M	N	G	S	M	L	2.64	1.68	2 stems 120mm and 180mm DBH. Seasonal loss of leaves prevents assessment of tree vigour. Pruned to maintain clearance from overhead electrical network. Epicormics. Exempt tree species under Councils tree preservation order.
126	*Callistemon salignus*	Willow Bottlebrush	5-10	3x3	220	400	M	N	G	M	M	M	2.64	2.25	Approx. 6 stems all 100mm DBH. Tree located on road reserve to the front of the property.
127	*Glochidion ferdinandi*	Cheese tree	5-10	4x4	200	300	M	N	G	M	M	M	2.40	2.00	supressed tree. Canopy skewed to the south. Included junction observed at the base of tree.
128	*Eucalyptus robusta*	Swam Mahogany	10-15	3x3	330	330	M	N	G	M	M	M	3.96	2.08	Tree located on neighbouring property behind tree 127.
129	*Syncarpia glomulifera*	Turpentine	1-5	3x3	160	200	M	N	G	M	M	M	1.92	1.68	Suppressed and skewed canopy.
130	*Syncarpia glomulifera*	Turpentine	5-10	4x4	290	350	M	N	G	M	M	M	3.48	2.13	Suppressed and skewed canopy.
131	*Syncarpia glomulifera*	Turpentine	5-10	4x4	310	430	M	N	G	M	M	M	3.72	2.32	2 stems 220mm and 220mm DBH. Included stem junction at base of tree.
132	*Corymbia gummifera*	Red Bloodwood	10-15	1x1	210	150	M	L	P	S	L	L	2.52	1.49	Tree in decline.
133	*Corymbia gummifera*	Red Bloodwood	10-15	1x1	140	160	M	L	P	S	L	L	2	1.53	Tree in decline. Minimum TPZ applies.
134	*Syncarpia glomulifera*	Turpentine	10-15	3x3	200	280	M	N	G	M	M	M	2.40	1.94	
135	*Corymbia gummifera*	Red Bloodwood	10-15	2x2	210	270	M	L	P	S	L	L	2.52	1.91	Suppressed specimen.
136	*Syncarpia glomulifera*	Turpentine	10-15	3x3	260	300	M	N	G	M	M	M	3.12	2.00	2 stems 210mm and 160mm DBH.
137	*Corymbia maculata*	Spotted Gum	5-10	2x2	130	180	Y	N	G	M	M	M	2	1.61	Appears to be new planting. Minimum TPZ applies.
138	*Various*	Various	1-5	2x2			M	N	G	M	M	M	2	1.5	Screen planting of eight trees consisting of 2 Bottlebrush, 2 Lilly Pilly and 4 Grevillea. Minimum TPZ and SRZ applies.
139	*Angophora costata*	Smooth Barked Apple	20-25	8x8	640	770			**D**						Tree failed in storm of 7-9th February 2020
140	*Corymbia gummifera*	Red Bloodwood	10-15	3x3	230	270			**D**						Tree failed in storm of 7-9th February 2020
141	*Syzygium* sp	Lilly Pilly	5-10	3x3	260	300	M	N	G	M	M	M	3.12	2.00	2 stems 160mm and 200mm DBH. Included stem junction from base of tree.
142	*Acmena* sp	Lilly Pilly	1-5	4x4	-	400	M	N	G	M	M	M	2	1.5	Multi-stemmed specimen. Minimum TPZ and SRZ applies.
143	*Corymbia gummifera*	Red Bloodwood	10-15	5x5	420	500			**D**						Tree failed in storm of 7-9th February 2020
144	*Unknown*	Unknown	10-15	4x4	320	450	M	N	G	M	M	M	3.84	2.37	
145	*Syncarpia glomulifera*	Turpentine	5-10	3x3	220	300	M	N	G	M	M	M	2.64	2.00	2 stems 170mm and 170mm DBH.
146	*Corymbia gummifera*	Red Bloodwood	5-10	2x2	180	250	M	N	G	M	M	M	2.16	1.85	Trunk kinks at approximately 2m.
147	*Corymbia gummifera*	Red Bloodwood	10-15	3x3	290	340	M	N	G	M	M	M	3.48	2.10	Tree in an advanced state of decline.
148	*Angophora costata*	Smooth Barked Apple	15-20	5x5	400	430	M	L	F	S	L	L	4.80	2.32	Deadwood and minor epicormics observed within canopy.
149	*Banksia integrifolia*	Coastal Banksia	5-10	1x1	40	100	Y	N	G	M	M	M	2	1.5	Minimum TPZ and SRZ applies.
150	*Corymbia gummifera*	Red Bloodwood	5-10	2x2	800	1000	M	L	P	S	L	L	9.60	3.31	Tree in an advanced state of decline.
151	*Elaeocarpus reticulatus*	Blueberry Ash	5-10	2x2	110	100	M	N	G	M	M	M	2	1.5	2 stems 80mm and 80mm DBH. Minimum TPZ and SRZ applies.
152	*Livistona australis*	Cabbage palm	10-15	3x3	350	350	M	N	G	M	M	M	4.20	2.13	Deadwood and epicormics observed within canopy.
153	*Livistona australis*	Cabbage palm	10-15	3x3	370	370	M	N	G	M	M	M	4.44	2.18	Deadwood and epicormics observed within canopy.
154	*Corymbia gummifera*	Red Bloodwood	15-20	3x3	410	480	M	N	F	M	M	M	4.92	2.43	Deadwood and epicormics observed within canopy.
155	*Eucalyptus piperita*	Sydney Peppermint	25-10	8x8	730	850	M	N	G	M	M	M	8.76	3.09	Deadwood observed within canopy.
156	*Angophora costata*	Smooth Barked Apple	10-15	3x3	270	300	M	L	F	S	L	L	3.24	2.00	Suppressed specimen with skewed canopy. Small foliage size for the species.
157	*Corymbia gummifera*	Red Bloodwood	15-20	4x4	450	450	M	L	F	S	L	L	5.40	2.37	Suppressed tree in decline.

Tree Number	Botanical Name	Common Name	Height (m)	Canopy Spread (m)	DBH (mm)	DAB (mm)	Age Class	Vigour	Condition	SULE	Landscape Significance	Retention Value	TPZ (m)	SRZ (m)	Tree Characteristics
158	*Angophora costata*	Smooth Barked Apple	10-15	4x4	300	350	M	N	G	M	M	M	3.60	2.13	Suppressed specimen.
159	*Angophora costata*	Smooth Barked Apple	10-15	4x4	260	320	M	N	G	M	M	M	3.12	2.05	Suppressed specimen.
160	*Eucalyptus paniculata*	Grey Ironbark	5-10	2x2	80	80	Y	N	G	M	M	M	2	1.5	Minimum TPZ and SRZ applies.
161	*Corymbia gummifera*	Red Bloodwood	10-15	3x3	330	400			D						Tree failed in storm of 7-9th February 2020
162	*Corymbia gummifera*	Red Bloodwood	10-15	3x3	300	400			D						Tree failed in storm of 7-9th February 2020
163	*Allocasuarina torulosa*	Forest Sheoak	10-15	4x4	320	420	M	N	F	M	M	M	3.84	2.30	2 stems 260mm and 180mm DBH. Wound with decay observed within base of tree.
164	*Syncarpia gummifera*	Turpentine	5-10	3x3	250	340	M	N	G	M	M	M	3.00	2.10	Slight suppression and skewed canopy.
165	*Corymbia gummifera*	Red Bloodwood	10-15	2x2	260	360	M	L	P	S	L	L	3.12	2.15	Tree in an advanced state of decline.
166	*Glochidion ferdinandi*	Cheese tree	5-10	3x3		400	M	N	G	M	M	M	0.00	2.25	Multiple stems.
167	*Corymbia gummifera*	Red Bloodwood	10-15	3x3	240	300	M	L	F	S	L	L	2.88	2.00	Suppressed specimen.
168	*Banksia integrifolia*	Coastal Banksia	10-15	4x4	220	300	M	N	G	M	M	M	2.64	2.00	Trunk kinks at approximately 1m.
169	*Glochidion ferdinandi*	Cheese tree	10-15	5x5	270	370	M	N	G	M	M	M	3.24	2.18	Tree located on edge of neighbouring properties driveway.
170	*Various*	Various	1-5	3x3	-	-	M	N	F	M	M	M	2	1.5	Various trees consisting of Bottlebrush, Tea Tree and Lilly Pilly located along the frontage of the property within the road reserve. Trees have been pruned under overhead power lines. Minimum TPZ and SRZ applies.
171	*Syncarpia glomulifera*	Turpentine	10-15	4x4	300	390	M	N	G	M	M	M	3.60	2.23	Suppressed specimen with skewed canopy.
172	*Syncarpia glomulifera*	Turpentine	10-15	4x4	300	390	M	N	G	M	M	M	3.60	2.23	Suppressed specimen with skewed canopy.
173	*Allocasuarina torulosa*	Forest Sheoak	10-15	5x5	300	390	M	N	G	M	M	M	3.60	2.23	Tree is growing on a lean towards the east. Basal wound area observed with good wound wood development.
174	*Corymbia gummifera*	Red Bloodwood	10-15	2x2	200	250	M	L	P	S	L	L	2.4	1.85	Tree in advanced state of decline.
175	*Syncarpia glomulifera*	Turpentine	10-15	2x2	110	300	M	N	F	M	M	M	2	2.00	2 stems 80mm and 80mm DBH. Minimum TPZ applies.
176	*Syncarpia glomulifera*	Turpentine	10-15	2x2	200	200	M	N	G	M	M	M	2.40	1.68	suppressed specimen. Basal wound area observed.
177	*Syncarpia glomulifera*	Turpentine	5-10	1x1	100	150	M	N	F	M	M	M	2	1.49	Trunk kinks at approximately 2.5m. Minimum TPZ applies.
178	*Syncarpia glomulifera*	Turpentine	10-15	2x2	210	280	M	N	G	M	M	M	2.52	1.94	
179	*Corymbia gummifera*	Red Bloodwood	10-15	3x3	220	280	M	N	F	M	M	M	2.64	1.94	
180	*Syncarpia glomulifera*	Turpentine	10-15	2x2	150	230	M	N	G	M	M	M	2	1.79	Minimum TPZ applies.
181	*Syncarpia glomulifera*	Turpentine	10-15	2x2	180	240	M	N	G	M	M	M	2.16	1.82	
182	*Syncarpia glomulifera*	Turpentine	10-15	2x2	160	240	M	N	G	M	M	M	2	1.82	Minimum TPZ applies.
183	*Eucalyptus piperita*	Sydney Peppermint	25-30	10x10	780	900	M	N	G	M	M	M	9.36	3.17	
184	*Corymbia gummifera*	Red Bloodwood	10-15	3x3	220	280	M	L	P	S	L	L	2.64	1.94	Tree in advanced state of decline.
185	*Glochidion ferdinandi*	Cheese tree	5-10	2x2	80	100	M	N	G	M	M	M	2	1.5	Suppressed specimen. Minimum TPZ and SRZ applies.
186	*Allocasuarina torulosa*	Forest Sheoak	5-10	3x3	100	180	M	N	G	M	M	M	2	1.61	Suppressed specimen. Minimum TPZ applies.
187	*Allocasuarina torulosa*	Forest Sheoak	10-15	3x3	120	400	M	N	G	M	M	M	1.44	2.25	
188	*Angophora costata*	Smooth Barked Apple	5-10	1x1	80	100	Y	N	G	M	M	M	0.96	1.26	Suppressed specimen.
189	*Elaeocarpus reticulatus*	Blueberry Ash	5-10	2x2	100	160	M	N	G	M	M	M	2	1.53	Minimum TPZ applies.
190	*Banksia integrifolia*	Coastal Banksia	1-5	1x1	40	60	M	L	F	S	L	L	2	1.5	Suppressed specimen. Minimum TPZ and SRZ applies.
191	*Eucalyptus robusta*	Swamp Mahogany	15-20	5x5	400	450	M	L	P	S	L	L	4.80	2.37	Top of tree is dead; rest of tree is in a state of decline.
192	*Elaeocarpus reticulatus*	Blueberry Ash	5-10	2x2	90	120	M	N	G	M	M	M	2	1.5	Minimum TPZ and SRZ applies.
193	*Angophora costata*	Smooth Barked Apple	15-20	10x10	530	600	M	N	F	M	M	M	6.36	2.67	
194	*Eucalyptus piperita*	Sydney Peppermint	20-25	8x8	1000	1100	M	L	P	S	L	L	12	3.44	Basal cavity observed on western side of trunk. Previous failures within canopy, structurally compromised.
195	*Eucalyptus robusta*	Swamp Mahogany	15-20	5x5	300	350	M	N	F	M	M	M	3.60	2.13	Suppressed specimen with skewed canopy.
196	*Eucalyptus robusta*	Swamp Mahogany	15-20	4x4	300	500	M	N	G	M	M	M	3.60	2.47	Defective area observed around base of tree.
197	*Allocasuarina torulosa*	Forest Sheoak	10-15	5x5	420	500	M	N	F	M	M	M	5.04	2.47	2 stems 300mm and 300mm DBH. Basal defect observed with decay.
198	*Banksia serrata*	Old Man Banksia	5-10	3x3	200	300	M	N	G	M	M	M	2.40	2.00	
199	*Eucalyptus piperita*	Sydney Peppermint	15-20	6x6	590	590	M	N	F	M	M	M	7.08	2.65	Cavity observed at the base of the tree's trunk. tree
200	*Eucalyptus piperita*	Sydney Peppermint	25-30	7x7	590	690	M	N	G	M	M	M	7.08	2.83	
201	*Eucalyptus piperita*	Sydney Peppermint	25-30	8x8	610	700	M	N	G	M	M	M	7.32	2.85	Trunk kinks at 1.5m. Twin stems develop above kink.
202	*Eucalyptus piperita*	Sydney Peppermint	25-30	9x9	640	720	M	N	G	M	M	M	7.68	2.88	
203	*Allocasuarina torulosa*	Forest Sheoak	10-15	3x3	150	200	M	N	G	M	M	M	2	1.68	Minimum TPZ applies.
204	*Corymbia gummifera*	Red Bloodwood	10-15	2x2	200	250	M	N	G	M	M	M	2.40	1.85	
205	*Angophora costata*	Smooth Barked Apple	10-15	2x2	110	130	M	N	G	M	M	M	2	1.5	Trunk kinks at approximately 1.8m. Minimum TPZ and SRZ applies.
206	*Eucalyptus piperita*	Sydney Peppermint	20-25	9x9	690	770	M	N	G	M	M	M	8.28	2.97	
207	*Allocasuarina torulosa*	Forest Sheoak	10-15	3x3	160	300	M	N	G	M	M	M	2	2.00	Minimum TPZ applies.
208	*Eucalyptus* sp	Eucalyptus	10-15	3x3	220	280	M	N	G	M	M	M	2.64	1.94	
209	*Allocasuarina torulosa*	Forest Sheoak	15-20	3x3	170	210	M	N	G	M	M	M	2.04	1.72	Skewed canopy.
210	*Eucalyptus robusta0*	Swamp Mahogany	30-35	10x10	570	660	M	N	G	M	M	M	6.84	2.78	
211	*Corymbia gummifera*	Red Bloodwood	15-20	2x2	210	230	Y	N	P	S	L	L	2.52	1.79	Epicormics observed within canopy.
212	*Eucalyptus robusta*	Swamp Mahogany	20-25	5x5	500	560	M	N	G	M	M	M	6.00	2.59	
213	*Eucalyptus robusta*	Swamp Mahogany	15-20	5x5	330	400	M	N	F	M	M	M	3.96	2.25	Suppressed specimen with skewed canopy.
214	*Allocasuarina torulosa*	Forest Sheoak	5-10	2x2	140	200	M	N	G	M	M	M	2	1.68	2 stems 120mm and 80mm DBH. Minimum TPZ applies.
215	*Allocasuarina torulosa*	Forest Sheoak	5-10	1x1	60	150	M	N	G	M	M	M	2	1.5	2 stems 60mm and 20mm DBH. Minimum TPZ and SRZ applies.

Tree Number	Botanical Name	Common Name	Height (m)	Canopy Spread (m)	DBH (mm)	DAB (mm)	Age Class	Vigour	Condition	SULE	Landscape Significance	Retention Value	TPZ (m)	SRZ (m)	Tree Characteristics
216	*Allocasuarina torulosa*	Forest Sheoak	5-10	1x1	110	180	M	N	G	M	M	M	2	1.61	2 stems 90mm and 60mm DBH. Minimum TPZ applies.
217	*Allocasuarina torulosa*	Forest Sheoak	5-10	3x3	200	220	M	N	G	M	M	M	2.40	1.75	
218	*Eucalyptus robusta*	Swamp Mahogany	15-20	5x5	450	500	M	L	P	S	L	L	5.40	2.47	Tree in an advanced state of decline.
219	*Eucalyptus robusta*	Swamp Mahogany	10-15	4x4	300	350	M	N	G	M	M	M	3.60	2.13	
220	*Corymbia gummifera*	Red Bloodwood	25-30	4x4	300	400	M	N	F	M	M	M	3.60	2.25	
221	*Eucalyptus piperita*	Sydney Peppermint	20-25	8x8	650	800	M	L	P	S	L	L	7.80	3.01	Tree located on property boundary. Half of the tree is dead.
222	*Eucalyptus piperita*	Sydney Peppermint	25-30	8x8	550	650	M	N	G	M	M	M	6.60	2.76	Eastern side of the tree has failed.
223	*Eucalyptus piperita*	Sydney Peppermint	20-25	6x6	660	850	M	N	G	M	M	M	7.92	3.09	
224	*Eucalyptus robusta*	Swamp Mahogany	10-15	4x4	300	400	M	N	F	M	M	M	3.60	2.25	



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T1 Tree Identification Number
Tree Protection Zone
Tree Within Development Fooprint

DRAWN	
DATE	
SCALE	

TITLE/DWG NO.

Appendix 2 Tree Retention and Removal Plan

Appendix 3: Tree assessment criteria

Tree number: Identifying number given to individual (or group) trees.

Botanical Name: Latin name for tree showing genus and species.

Common Name: The common name given to the tree.

Tree Dimensions: The physical dimensions of the tree.

- Height: Estimated or measured height of tree in meters.
- Spread: Estimated or measured radial canopy spread of tree in meters.
- Diameter at Breast Height (DBH): The diameter of trunk in given in millimetres measured at 1.4m from ground.

Age Class: An estimation of how old the tree is in relation to its life expectancy.

- **Young** – Age less than 20% of life expectancy of tree in situ
- **Mature** – Age 20% - 80% of life expectancy of tree in situ
- **Old** – Age greater than 80% of life expectancy of tree in situ
- **Dead** – Tree is dead

Vigour: Ability of a tree to sustain its life processes. This is independent of the condition of a tree but may impact upon it. Vigour can appear to alter rapidly with change of seasons (seasonality) e.g. dormant, deciduous or semi-deciduous trees. Vigour can be categorised as Dormant, Low, Normal and High.

Dormant Vigour – Determined by the existing turgidity in the lower order branches in the outer extremity of the crow, with good bud set and formation, and where the last extension growth is distinct from those most recently preceding it, evident by bud scale scars. Normal vigour during dormancy is achieved when such growth is evident on a majority of branches throughout the crown.

Low Vigour – Reduced ability of a tree to sustain its life processes. This may be evident by the atypical growth of leaves, reduced crown cover and reduced crown density, branches, roots and trunk, and a deterioration of their functions with reduced resistance to predation. This is independent of the condition of a tree but may impact upon it, and especially the ability of a tree to sustain itself against predation.

Normal Vigour – Ability of a tree to maintain and sustain its life processes. This may be evident by the typical growth of leaves, crown cover and crown density, branches, roots and trunk and resistance to predation. This is independent of the condition of a tree but may impact upon it, and especially the ability of a tree to sustain itself against predation.

High Vigour – Accelerated growth of a tree due to incidental or deliberate artificial changes to its growing environment that are seemingly beneficial, but may result in premature aging or failure if the favourable conditions cease, or promote prolonged senescence if the favourable conditions remain, e.g. water from a leaking pipe, water and nutrients from a leaking or disrupted sewer pipe, nutrients from animal waste, a tree growing next to a chicken coop, or a stock feed lot, or a regularly used stockyard, a tree subject to stringent watering and fertilisation program, or some trees may achieve an extended lifespan from continuous pollarding practices over the life of the tree.

Condition: A tree's crown form and growth habit, as modified by its environment (aspect, suppression by other trees, soils) the stability and viability of the root plate, trunk and structural branches (first (1^{st}) and possibly (2^{nd}) order branches), including structural defects such as wounds, cavities or hollows, crooked trunk or weak trunk/branch junctions and the effects of predation by pests and diseases. These may not be directly connected with vigour and it is possible for a tree to be of normal vigour but in poor condition. Condition can be categorised as Dead, Poor, Fair and Good.

Dead Condition – Tree is no longer capable of performing any of the following processes or is exhibiting any of the following symptoms; Photosynthesis via its foliage crown (as indicated by the presence of moist, green or other coloured leaves), Osmosis (the ability of the roots system to take up water), Turgidity (the ability of the plant to sustain moisture pressure in its cells), Epicormic shoots or epicormic strands in Eucalypts (the production of new shoots as a response to stress, generated from latent or adventitious buds or from a lignotuber), Permanent leaf loss, Permanent leaf wilting (the loss of turgidity which is marked by desiccation of stems leaves and roots), Abscission of the epidermis (bark desiccates and peels off to the beginning of the sap wood).

Poor Condition - Tree is of good habit or misshapen, a form that may be severely restricted for space and light, exhibits symptoms of advanced and irreversible decline such as fungal, or bacterial infestation, major die-back in the branch and foliage crown, structural deterioration from insect damage e.g. termite infestation, or storm damage or lightning strike, ring barking from borer activity in the trunk, root damage or instability of the tree, or damage from physical wounding impacts or abrasion, or from altered local environmental conditions and has been unable to adapt to such changes and may decline further to death regardless of remedial works or other modifications to the local environment that would normally be sufficient to provide for its basic survival if in good to fair condition. Deterioration physically, often characterised by a gradual and continuous reduction in vigour but may be independent of a change in vigour, but characterised by a proportionate increase in susceptibility to, and predation by pests and diseases against which the tree cannot be sustained. Such conditions may also be evident in trees of advanced senescence due to normal phenological processes, without modifications to the growing environment or physical damage having been inflicted upon the tree. This may be independent from or contributed to by vigour.

Fair Condition - Tree is of good habit or misshapen, a form not severely restricted for space and light, has some physical indication of decline due to the early effects of predation by pests and diseases, fungal, bacterial, or insect infestation, or has suffered physical injury to itself that may be contributing to instability or structural weaknesses, or is faltering due to the modification of the environment essential for its basic survival. Such a tree may recover with remedial works where appropriate, or without intervention may stabilise or improve over time, or in response to the implementation of beneficial changes to its local environment. This may be independent from or contributed to by vigour.

Good Condition - Tree is of good habit, with crown form not severely restricted for space and light, physically free from the adverse effects of predation by pests and diseases, obvious instability or structural weaknesses, fungal, bacterial or insect infestation and is expected

to continue to live in much the same condition as at the time of inspection provided conditions around it for its basic survival do not alter greatly. This may be independent from or contributed to by vigour.

Safe Useful Life Expectancy (**SULE**) - SULE is the length of time that the arboriculturist assesses an individual tree can be retained with an acceptable level of risk based on the information available at the time of inspection. It is a snapshot in time of the potential an individual tree has for survival in the eyes of the assessor. SULE is not static – it is closely related to tree health and the surrounding conditions. Alterations in these variables may result in changes to the SULE assessment. Consequently, the reliability all SULE assessments have will decrease as time passes from the initial assessment and the potential for changes in variables increases. SULE assessment categories include:

- **Long** SULE **(L)**: Trees that appear to be retainable at the time of the assessment for more than 40 years with an acceptable level of risk.
- **Medium** SULE **(M)**: Trees that appear to be retainable at the time of the assessment for 15-40 years with an acceptable level of risk.
- **Short** SULE **(S)**: Trees that appear to be retainable at the time of the assessment for 5-15 years with an acceptable level of risk.
- **Remove (R)**: Trees that should be removed within the next 5 years.
- **Young or Small Trees (Y)**: Trees that can be reliably moved or replaced.

Comments: Any noteworthy or significant points regarding the tree.

Appendix 4: Tree Significance Assessment Criteria and Retention Value Matrix

IACA Significance of a Tree, Assessment Rating System (STARS) ©

(IACA 2010) ©

In the development of this document IACA acknowledges the contribution and original concept of the Footprint Green Tree Significance & Retention Value Matrix, developed by Footprint Green Pty Ltd in June 2010.

The landscape significance of a tree is an essential criterion to establish the importance that a particular tree may have on a site. However, rating the significance of a tree becomes subjective and difficult to ascertain in a consistent and repetitive fashion due to assessor bias. It is therefore necessary to have a rating system utilising structured quantative criteria to assist in determining the retention value for a tree. To assist this process all definitions for terms used in the *Tree significance – Assessment Criteria* and *Tree Retention Value – Priority Matrix*, are taken from the IACA Dictionary for Managing Trees in Urban Environments 2009.

This rating system will assist in the planning processes for proposed works, above and below ground where trees are to be retained on or adjacent a development site. The system uses a scale of High, Medium and Low significance in the landscape. Once the landscape significance of an individual tree has been defined, the retention value can be determined.

Tree Significance – Assessment Criteria

1. High significance in landscape

- The tree is in good condition and good vigour
- The tree has a form typical for the species
- The tree is a remnant or is a planted locally indigenous specimen and/or is rare or uncommon in the local area or of botanical interest or of substantial age
- The tree is listed as a heritage item, threatened species or part of an endangered ecological community or listed on council's significant tree register
- The tree is visually prominent and visible from a considerable distance when viewed from most directions within the landscape due to its size and scale and makes a positive contribution to the local amenity
- The tree supports social and cultural sentiments or spiritual associations, reflected by the broader population or community group or has commemorative values
- The tree's growth is unrestricted by above and below ground influences, supporting its ability to reach dimensions typical for the taxa in situ – tree is appropriate to the site conditions

2. Medium significance in landscape

- The tree is in fair-good condition and good or low vigour
- The tree has form typical or atypical of the species
- The tree is a planted locally indigenous or a common species with its taxa commonly planted in the local area
- The tree is visible from surrounding properties, although not visually prominent as partially obstructed by other vegetation or buildings when viewed from the street
- The tree provides a fair contribution to the visual character and amenity of the local area
- The tree's growth is moderately restricted by above or below ground influences, reducing its ability to reach dimensions typical for the taxa in situ

3. Low significance in landscape

- The tree is in fair-poor condition and good or low vigour
- The tree has form atypical of the species
- The tree is not visible or is partly visible from the surrounding properties as obstructed by other vegetation or buildings
- The tree provides a minor contribution or has a negative impact on the visual character and amenity of the local area
- The tree is a young specimen which may or may not have reached dimensions to be protected by local Tree Preservation Orders or similar protection mechanisms and can easily be replaced with a suitable specimen
- The tree's growth is severely restricted by above or below ground influences, unlikely to reach dimensions typical for the taxa in situ – tree is inappropriate to the site conditions
- The tree is listed as exempt under the provisions of the local Council Tree Preservation Order or similar protection mechanisms
- The tree has a wound or defect that has the potential to become structurally unsound

Environmental Pest / Noxious Weed Species

- The tree is an environmental pest species due to its invasiveness or poisonous/allergenic properties.
- The tree is a declared noxious weed by legislation

Hazardous / Irreversible Decline

- The tree is structurally unsound and/or unstable and is considered potentially dangerous
- The tree is dead, or is in irreversible decline, or has the potential to fail or collapse in full or in part in the immediate to short term

The tree is to have a minimum of three (3) criteria in a category to be classified in that group.

Note: The assessment criteria are for individual trees only, however, can be applied to a monoculture stand in its entirety e.g. hedge.

References

Australia ICOMOS Inc. 1999, The Burra Charter – The Australian OCOMOS Charter for Places of Cultural Significance, International Council of Monuments and Sites, www.icomos.org/australia

Draper BD and Richards PA 2009, Dictionary for Managing Trees in Urban Environments, Institute of Australian Consulting Arboriculturists (IACA), CSIRO Publishing, Collingwood Victoria, Australia.

Footprint Green Pty Ltd 2001, Footprint Green Tree Significance & Retention Value Matrix, Avalon, NSW Australia, www.footprintgreen.com.au

Appendix 5: General guidance notes for protecting trees on development sites

1.0 Purpose of this guidance note

1.1 This guidance note details the basic general requirements that must be followed when trees are retained on and in some cases adjacent to development sites. The tree protection requirements are determined by the tree species, the existing physical constraints of the growing environment both above and below ground and the development proposal itself.

1.2 This guidance note should always be used in conjunction with the tree assessment information specific for the particular site.

1.3 The aim of this guidance note is to provide site personnel with a basic understanding of the requirements needed to successfully protect and maintain trees whilst development works are undertaken. All personnel working adjacent to or within tree protection zones must be properly briefed about their responsibilities towards the trees and their retention.

1.4 This guidance note is based on the Australian Standard AS4970 – *2009 Protection of Trees on Development Sites* and AS 4373 – 2007 *Pruning of Amenity Trees*.

2.0 Site Personnel

2.1 All site personnel including contractors are to be made aware of the relevant tree protection requirements and the role of tree protection zones on the site.

3.0 The project arborist

3.1 A project arborist shall be engaged prior to any works commencing on the site. The project arborist shall have a minimum qualification of the Australian Qualifications Framework (AQF) level 5 in Arboriculture.

3.2 The project arborist is to advise on, monitor, inspect and ensure compliance where trees are retained within and where required adjacent to the development site.

3.3 Any work within a designated tree protection zone requires authorisation from the project arborist.

4.0 Tree and vegetation removal and pruning

4.1 Trees and vegetation approved for removal by the relevant consent authority shall be undertaken prior to any other works commencing on site, including the establishment of tree protection zones.

4.2 All tree removal works are to be undertaken by suitably qualified tree workers (minimum AQF level 2) and in accordance with the NSW Workcover Code of Practice for the Amenity Tree Industry 1998.

4.3 In addition, all tree pruning works (including roots) are to be undertaken in accordance with the Australian Standard AS4373-2007 *Pruning of Amenity Trees*.

4.4 All care shall be taken to avoid damaging trees identified for retention during removal and pruning works.

5.0 Tree Protection Zone (TPZ)

5.1 The tree protection zone is the designated area around a tree to protect the trunk, roots and crown during development works.

5.2 Tree protection fencing is to be installed in compliance with Section 4 of the Australian Standard AS4970-2009 *Protection of Trees on Development Sites*.

5.3 The following activities unless otherwise authorised by the project arborist are restricted within the tree protection zone:

- Machine excavation including trenching
- Excavation for silt/sediment fencing
- Cultivation
- Storage
- Preparation of chemicals, including preparation of cement products
- The parking of vehicle and/or plant
- Refuelling
- Dumping of waste
- Washing down and cleaning of equipment
- Placement of fill
- Lighting of fires
- Soil level changes
- Temporary or permanent installation of utilities and signs
- Physical damage to the trees

5.4 Any work within a designated tree protection zone requires authorisation from the project arborist.

6.0 Signage

6.1 Signs identifying the TPZ shall be attached to the tree protection fencing and clearly visible from within the development site. The contact details of either the site manager or project arborist shall be displayed on the sign.

6.2 Further reference to the Australian Standard AS4970-2009 *Protection of Trees on Development Sites* should be made regarding signage.

7.0 Tree protection fencing

7.1 Tree protection fencing is to be installed at the limits of the TPZ or as determined by the project arborist. Fencing shall consist of 1.8m high interlocking chain link or plywood fencing panels. The fencing shall be erected in such a way as to prevent building materials, soil and unauthorised personnel entering the TPZ.

8.0 Trunk and branch protection

8.1 Where necessary trunk protection may be required. Trunk protection is installed by first wrapping the stem of the tree in hessian or like material then strapping timber battens over the top. It is recommended that timber battens with the dimensions of length 2000mm,

width 75mm and depth 50mm are used. The battens are not to be directly screwed or nailed into the tree.

8.2 Where necessary branch protection may be required. Branch protection is installed in the same fashion as the trunk protection mentioned above but cut to suit the shape of the branch.

8.3 Reference to Section 4.5.2 of the Australian Standard AS4970-2009 *Protection of Trees on Development Sites* should be made for further details.

9.0 Ground protection

9.1 Where temporary access or encroachment into the TPZ is required ground protection measures are to be implemented. The purpose of ground protection measures is to avoid damage to tree roots and compaction of the soils within the TPZ.

9.2 Ground protection generally consists of 100mm deep layer of mulch overlaid with rumble boards or road plates (light traffic). Where heavy traffic through or over the TPZ is required the existing ground is be protected by a geo-textile fabric covered with a 300mm layer of compacted road base or railway ballast.

9.3 Reference to Section 4.5.3 of the Australian Standard AS4970-2009 *Protection of Trees on Development Sites* should be made for further details.

10.0 Excavation within the TPZ

10.1 Excavations within the TPZ may only be undertaken under the supervision and authorisation of the site arborist.

10.2 All excavation within the tree protection zone must be carried out carefully using spades, forks, and trowels, taking care not to damage the bark and wood of any roots. Specialist tools for removing soil around roots using compressed air may be an appropriate alternative to hand digging, if available. All soil removal must be undertaken with care to minimise disturbance of roots beyond the immediate area of the excavation. Where possible, flexible clumps of smaller roots, including fibrous roots, should be retained if they can be displaced temporarily or permanently beyond the excavation without damage. If digging by hand, a fork should be used to loosen the soil and help located any substantial roots. Once roots have been located, the trowel should be used to clear the soil away from them without damaging the bark.

10.3 Roots temporarily exposed must be protected from direct sunlight, drying out and extremes of temperature by appropriate covering.

11.0 Fill within the TPZ

11.1 Where possible soil levels are not to be raised within the TPZ. Retaining walls and alternate engineering solutions are to be considered to avoid over battering and encroachment into the TPZ.

11.2 Where fill is required within the TPZ it is to be of an approved courser material than the existing site soil and allow for free gaseous and water exchange into the natural soil profile.

12.0 Pier and beam footings within the TPZ

12.1 Where footings are required within the TPZ they are to be of pier and beam type construction. Excavation shall be restricted to pier/post holes only. All other footing and foundation parts shall be constructed and installed above the existing ground level.

12.2 Pier locations within the TPZ are to be excavated using non-destructive techniques and where possible to their full extent. Where this is not achievable a minimum depth of 600mm shall be excavated. Any further excavation that is then to be undertaken mechanically is to be of a diameter less than that excavated by hand whilst avoiding compaction of the soils within the TPZ.

12.3 A degree of flexibility should be built into the design to allow for the pier locations to be moved if structural or significant roots are found. A minimum clearance distance of 100mm shall be allowed around significant roots.

13.0 Scaffolding

13.1 Where possible scaffolding shall not be erected or installed within the TPZ nor come into contact with any part of a tree scheduled for retention and protection.

13.2 Where scaffolding is required within the TPZ suitable ground protection measures are to be implemented. Flexible branches shall be temporarily tied back to avoid the need for unnecessary pruning or potential tree damage.

13.3 Further reference to section 4.5.6 of the Australian Standard AS4970-2009 *Protection of Trees on Development Sites* should be made for further details.

14.0 Damage to Trees

14.1 Damage to any part of the tree including roots, bark, trunk, branches and leaf material shall be avoided.

14.2 Damage to trees may also be incurred by contamination of the TPZ through chemical, paint or cement wash out.

14.3 The ripping and tearing of roots by excavators or shovels will cause damage and potentially impact tree health. Where roots are accidentally damaged during the works they are to be exposed back to intact woody tissue and pruned in accordance with the arborist's recommendations.

14.4 Any damage to any part of a retained tree is to be reported to the project arborist immediately.

15.0 Demolition of structures and surfaces within the TPZ

15.1 The demolition of existing structures and surfaces within the TPZ is to be supervised by the project arborist.

15.2 Where possible existing structures are to be dismantled manually using hand tools. Demolition works should start closest to the tree and work backwards moving out of the TPZ avoiding damage or compaction to the soil. Heavy machinery such as excavators should not be used within the TPZ unless they can be positioned on and work from existing hard surfaces such as concrete slabs.

15.3 Tree roots exposed by the demolition of existing site structures are to be kept in place and advice sought from the project arborist.

16.0 Soft landscaping within the TPZ

16.1 Soft landscaping works are regarded as the installation of plants or organic ground covers (mulch). New tree plantings requiring excavation should refer to section 10.0 *Excavation within the TPZ*. Hard landscaping features such as retaining walls, edging and footpaths are regarded as construction works.

16.2 Where possible trees to be retained shall be incorporated into the landscape design.

16.3 Where fill is required for planting it is to be of an approved courser grade than the site soils and comply with section 11.2.

17.0 Utilities and services within the TPZ

17.1 Where possible the installation of utilities and services are to be kept out of the TPZ.

17.2 Where this is not deemed possible trenchless or underground boring techniques are to be employed. Underground boring should be no less than 600mm below the existing soil level.

17.3 Suspension of service wires through the TPZ should be kept clear of the trees canopy and regulatory safety clearances observed.