

Revision 7

MAY 2017

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Introduction

1.1 Brief

This Arboricultural Impact Assessment (AIA) was prepared by [REDACTED] and was commissioned by CPB Dragados Samsung Joint Venture (CDS-JV).

The site is along Campbell Road between Barwon Park Road and Burrows Road, St Peters, New South Wales. Trees located along the section of Campbell Road between Haber Street and Euston Road are not discussed within this report as these are covered in previous reports not by this author.

The subject site is within Road and Maritime Service owned land and the adjoining properties. The site location is attached as Appendix F – Overall Site Location Plan.

The proposed works are part of the larger WestConnex New M5 project. Scope of works specifically for the subject area are:

- The construction of a bicycle/shared pathway between Haber St & Barwon Park Rd;
- Installation of a drainage swale to mitigate existing drainage issues between Euston Road and Burrows Rd;
- Installation of underground high and low voltage electricity lines and service pits; between Barwon Park Rd and Burrows Rd; and
- Road construction.

This report gives recommendations for tree retention or removal and discusses the options of such. This report also provides guidelines for tree protection and maintenance.

Care has been taken to obtain all information from reliable sources. All data has been verified as far as possible; however, I can neither guarantee nor be responsible for the accuracy of information provided by others.

This report is not intended to be a comprehensive tree risk assessment; however, the report may make recommendations, where appropriate, for further assessment, treatment or testing of trees where potential structural problems have been identified, or where below ground investigation may be required.

This AIA is not intended as an assessment of any impacts on trees by any proposed future development of the site, other than the current discussed scope of work.

The purpose of this report is to assess the vigour and condition of the trees, and identify the potential impacts the proposed works may have on those trees to be retained in proximity to the works.

The author of this report holds an AQF Level 5 Diploma of Horticulture (Arboriculture) and has 23 years in the horticultural industry. 18 of these 23 years have been specifically within the field of arboriculture with roles varying from tree climber in private contracting companies to Council Tree Management Officer at several local Councils, and working with independent Consultants, prior to the start up of [REDACTED]. The author is independent from the project.

This AIA has been commissioned to ensure compliance with the requirements set out by the Department of Planning and Environment (DPE) as per Condition B63 - Table 1 (next page).

Condition	Requirement	Addressed in:
B63	The SSI must be designed to retain as many trees as possible and provide a net increase in the number of replacement trees. The Proponent must commission an independent experienced and suitably qualified arborist, to prepare a comprehensive Tree Report(s) prior to removing any trees on the periphery and/or outside the construction footprint as identified in the figures in Section 6 of the document referred to in condition A2(b), including any tree(s) removed along Euston Road. The Tree Report may be prepared for the entire SSI or separate reports may be prepared for individual areas where trees are required to be removed. The report(s) must identify the impacts of the SSI on trees and vegetation within and adjacent to the construction footprint. The report(s) must include:	This Report –Sections 2.3-2.5
B63(a)	a visual tree assessment with inputs from the design, landscape architect, construction team;	VTA noted in Appendix E. Design discussions as per Appendix D.
B63(b)	consideration of all options to amend the SSI where a tree has been identified for removal, including realignment, relocation of services, redesign of or relocation of ancillary components (such as substations, fencing etc.) and reduction of standard offsets to underground services.	Appendix D, onsite discussion.
B63(c)	Measures to avoid the removal of trees or minimise damage to existing trees and is to ensure the health and stability of those trees to be protected. This includes details of any proposed canopy or root pruning, excavation works, site controls on waste disposal, vehicular access, and storage of materials and protection of public utilities.	Section 2 Part 2.3-2.6 & Section 3 - Recommendations
	In the event that trees are to be removed, then replacement trees are to be planted within, or in close proximity to, the SSI boundary, including along Euston Road where feasible and reasonable The location of the trees must be determined in consultation with the relevant council(s). The replacement trees are to have a minimum pot size of 75 litres. A copy of the report(s) must be submitted to the Secretary for approval prior to the removal, damage and/or pruning of any trees, including those affected by site establishment works. All recommendations of the report must be implemented by the Proponent, unless otherwise agreed by the Secretary.	Consistent with earlier approved Tree Reports replanting will be detailed in the Urban Design & Landscape Plan in consultation with the relevant Council.

Table 1 –Condition of Approval B63 Compliance Table

1.2 Methodology

In preparation for this report, ground-level, visual tree assessments (VTA), or limited VTA (e.g. where access was limited), were completed by the author of this report on 20th and 21st March 2017 and surveyed by a CDS JV surveyor to verify specific locations. Inspection details of these trees are provided in Appendix E —Schedule of Assessed Trees.

The tree heights were visually estimated or measured using a Nikon ForestryPro Laser measurer. Unless otherwise noted in Appendix E, the trunk Diameter at Breast Height were measured at 1.4 metres above ground level (DBH) using a diameter tape. Tree canopy spreads were stepped out with field observations written down, and photographs of the site and trees were taken using an iphone 6.

No aerial inspections, root mapping or woody tissue testing were undertaken as part of this tree assessment.

Information contained in this report only reflects the condition of the trees at the time of inspection. Trees are dynamic, living things which can be subject to change without notice in certain circumstances.

Plans and documents referenced for the preparation of this report include:

- AS4970-2009 Protection of trees on development sites, Standards Australia;
- Conditions B63 –(Table 1);
- Marked up Aerial maps detailing proposed works location. This plan is attached as Appendix F—Overall Site Location Map

The subject trees are shown as dot markings on Aerial photography excerpts provided by the client. These marked-up plans are attached as Appendix E—Tree Location Plan.

1.3 Tree Preservation and Management Guidelines

The proposed works form part of the approved WestConnex New M5 State Significant Infrastructure project (SSI 6788), Clause 5.9 of the Sydney Local Environment Plan 2012 (SLEP) therefore does not apply.

What constitutes a ‘tree’ as per planning approval is any tree that:

- is equal to or greater than three metres in height; or
- for a single trunk species, a trunk circumference of 300 millimetres at a height of one metre above ground level; or
- for a multi-trunk species, a trunk circumference exceeding 100 millimetres at a height of one metre above ground level.

However this excludes any species listed under the Noxious Weeds Act 1993.

Observations and Discussion

2.1 Summary of Assessed Trees

Ninety (90) trees were assessed and included in this report. The prefix ‘U’ was used for tagging and numbering to denote tree surveying in relating to utilities works. Details of these trees are included in the Schedule of Assessed Trees – Appendix E. Of these trees:

- Eighty eight (88) are prescribed (i.e. considered a ‘tree’ under DPE approval/conditions) – Trees U33-U103, Trees U105-U108 and Trees U110-U122; and
- Two (2) are non-prescribed trees (i.e. exempt from DPE approval to remove or prune) – Tree 104 & 109. These trees are not located within RMS owned land.

Of the eighty eight (88) trees, the following Retention Value (RV- see Appendix C) was ascribed to each:

- Thirty two (32) trees have High RVs – Trees U35, U38-U41, U43-U46, U48, U49, U53, U56, U60, U61, U67, U69-U71, U74, U79, U80, U82, U102, U105-U107, U110, U113, U114, U119, U122;
- thirty (30) trees have Medium RVs - Trees U33, U34, U36, U37, U42, U55, U58, U59, U62, U64, U66, U72, U76, U81, U83-U86, U88, U91, U97, U99-U101, U103, U108, U111, U115, U118, U120;
- twenty six (26) trees have Low RVs - Trees U47, U50-U52, U54, U57, U63, U65, U68, U73, U75, U77, U78, U87, U89, U90, U92-U96, U98, U112, U116, U117 and U121;
- two (2) trees are dead with no rating provided – Trees U104 and U109.

2.2 Threatened Species

Street tree number U47 *Eucalyptus scoparia* Wallangarra White Gum is subject to ‘Endangered’ conservation status under State Government legislation (i.e. NSW Threatened Species Conservation Act 1995) and ‘Vulnerable’ under Commonwealth legislation (i.e. Environment Protection and Biodiversity Conservation Act 1999).

However this is pertinent in a natural community only, and not as a planted, individual specimen outside its region.

2.3 Proposed Removal of Prescribed Trees

Forty nine (49) of the eighty (88) prescribed trees are proposed to be removed as they are located within the zone or adjacent to the proposed works and cannot be retained without detriment to the trees. Where trees to be removed are located on or outside the project boundary (third party land), approval must be obtained from the landowner prior to removal.

Sixteen (16) trees determined to have a ‘High’ Retention Value (RV- see Appendix C) are proposed for removal.

Following meeting with CDS (see Appendix D), it is my understanding that the design approval states all electricity is to be underground, the utility locations have been set by the Utility Companies and are out of CDS control.

It was explained that under boring is not a viable option on this occasion along Barwon Park Road, due to existing underground 132Kv power and other services in this area that cannot be damaged.

The proposed bike/shared path is part of the agreed design under the development approval, such paths are required to be free of obstructions.

The drainage swale has been designed to correct current flooding issues in this area and the location is limited by this requirement. Tree U109 -dead tree stem (non-prescribed tree) is located where under-ground electricity is proposed. This tree will require removal to accommodate works.

Table 2 below details prescribed trees proposed for removal, reason and Retention Value (RV- see Appendix C):

Tree No.	Common Name	Reason	RV
U33	Brushbox	Outside RMS boundary. Underground electricity to existing pole and communications within SRZ.	M
U34	Broad-leaved P/bark	Underground electricity to existing pole and communications within SRZ.	M
U35	Broad-leaved P/bark	Underground electricity to existing pole and communications within SRZ.	H
U36	Broad-leaved P/bark	Underground electricity to existing pole and communications within SRZ.	M
U39	Broad-leaved P/bark	Adjacent to design approved 4m wide shared pathway footprint, additional under-ground services (electrical & communications) within TPZ and SRZ.	H
U40	Broad-leaved P/bark	Within design approved 4m wide shared pathway footprint, additional under-ground services (electrical) with TPZ and SRZ.	H
U42	Broad-leaved P/bark	Within design approved 4m wide shared pathway footprint, additional under-ground services (electrical) with TPZ and SRZ.	M
U43	Broad-leaved P/bark	Within design approved 4m wide shared pathway footprint, additional under-ground services (electrical) with TPZ and SRZ.	H
U46	Broad-leaved P/bark	Within design approved 4m wide shared pathway footprint, additional under-ground services (electrical) with TPZ and SRZ.	H
U47	Wallangarra White Gum	Within design approved 4m wide shared pathway footprint, additional under-ground services (electrical) with TPZ and SRZ.	L
U49	Broad-leaved P/bark	Within design approved 4m wide shared pathway footprint, additional under-ground services (electrical) with TPZ and SRZ.	H
U50	Broad-leaved P/bark	Within design approved 4m wide shared pathway footprint, additional under-ground services (electrical) with TPZ and SRZ.	L
U51	Broad-leaved P/bark	Within design approved 4m wide shared pathway footprint, additional under-ground services (electrical) with TPZ and SRZ.	L
U54	Sydney Blue Gum	Within design approved 4m wide shared pathway footprint, additional under-ground services (electrical) with TPZ and SRZ.	L
U56	Broad-leaved P/bark	Within design approved 4m wide shared pathway footprint, additional under-ground services (electrical) with TPZ and SRZ.	H
U57	Sydney Red Gum	Within design approved 4m wide shared pathway footprint, additional under-ground services (electrical) with TPZ and SRZ.	L
U60	Broad-leaved P/bark	Within design approved 4m wide shared pathway footprint, additional under-ground services (electrical) with TPZ and SRZ.	H
U63	Broad-leaved P/bark	Within design approved 4m wide shared pathway footprint, additional under-ground services (electrical) with TPZ and SRZ.	L
U65	Broad-leaved P/bark	Within design approved 4m wide shared pathway footprint, additional under-ground services (electrical) with TPZ and SRZ.	L
U68	Broad-leaved P/bark	Within design approved 4m wide shared pathway footprint, additional under-ground services (electrical) with TPZ and SRZ.	L
U71	Broad-leaved P/bark	Within design approved 4m wide shared pathway footprint, additional under-ground services (electrical) with TPZ and SRZ.	H
U73	Broad-leaved P/bark	Within design approved 4m wide shared pathway footprint, additional under-ground services (electrical) with TPZ and SRZ.	L
U75	Broad-leaved P/bark	Within design approved 4m wide shared pathway footprint, additional under-ground services (electrical) with TPZ and SRZ.	L
U78	Sydney Red Gum	Within design approved 4m wide shared pathway footprint, additional under-ground services (electrical) with TPZ and SRZ.	L
U80	Broad-leaved P/bark	Within design approved 4m wide shared pathway footprint, additional under-ground services (electrical) with TPZ and SRZ.	H

Tree No.	Common Name	Reason	RV
U81	Conifer	Adjacent (in TPZ) to design approved 4m wide shared pathway and electrical under-ground services, neighbouring trees being removed, poor species tolerance to recent exposure.	M
U82	Broad-leaved P/bark	Within design approved 4m wide shared pathway footprint, additional under-ground services (electrical) with TPZ and SRZ.	H
U83	Conifer	Design approval states all Electricity is to be underground, this requires trenching in SRZ.	M
U84	Conifer	Design approval states all Electricity is to be underground, this requires trenching in SRZ.	M
U85	Broad-leaved P/bark	Within design approved 4m wide shared pathway footprint, additional under-ground services (electrical) with TPZ and SRZ.	M
U86	Broad-leaved P/bark	Within design approved 4m wide shared pathway footprint, additional under-ground services (electrical) with TPZ and SRZ.	M
U87	Weeping Bottlebrush	Within design approved 4m wide shared pathway footprint, additional under-ground services (electrical) with TPZ and SRZ.	L
U88	Broad-leaved P/bark	Within design approved 4m wide shared pathway footprint, additional under-ground services (electrical) with TPZ and SRZ.	M
U90	Bottlebrush	Within design approved 4m wide shared pathway footprint, additional under-ground services (electrical) with TPZ and SRZ.	L
U92	Bottlebrush	Within design approved 4m wide shared pathway footprint, additional under-ground services (electrical) with TPZ and SRZ.	L
U93	Bottlebrush	Within design approved 4m wide shared pathway footprint, additional under-ground services (electrical) with TPZ and SRZ.	L
U94	Bottlebrush	Within design approved 4m wide shared pathway footprint, additional under-ground services (electrical) with TPZ and SRZ.	L
U95	Unknown species	Within design approved 4m wide shared pathway footprint, additional under-ground services (electrical) with TPZ and SRZ.	L
U96	Bottlebrush	Within design approved 4m wide shared pathway footprint, additional under-ground services (electrical) with TPZ and SRZ.	L
U97	Broad-leaved P/bark	Within design approved 4m wide shared pathway footprint, additional under-ground services (electrical) with TPZ and SRZ.	M
U98	Swamp She-Oak	Within design approved 4m wide shared pathway footprint, additional under-ground services (electrical) with TPZ and SRZ.	L
U99	Broad-leaved P/bark	Within design approved 4m wide shared pathway footprint, additional under-ground services (electrical) with TPZ and SRZ.	M
U102	Yellow Bloodwood	Adjacent to design approved/required drainage swale, additional under-ground services (electrical) within TPZ	H
U103	WA Peppermint tree	Within design approved/required drainage swale, additional under-ground services (electrical) with TPZ and SRZ.	M
U105	Broad-leaved P/bark	Within design approved/required drainage swale, additional under-ground services (electrical) with TPZ and SRZ.	H
U106	Broad-leaved P/bark	Within design approved/required drainage swale, additional under-ground services (electrical) with TPZ and SRZ..	H
U108	Broad-leaved P/bark	Within design approved/required drainage swale, additional under-ground services (electrical) with TPZ and SRZ.	M
U110	Broad-leaved P/bark	Within design approved/required drainage swale, additional under-ground services (electrical) with TPZ and SRZ.	H
U113	Broad-leaved P/bark	Within design approved/required drainage swale, additional under-ground services (electrical) with TPZ and SRZ.	H

Table 2—Trees proposed to be removed to facilitate works.

2.4 Proposed Tree Retention

The following trees outside the works footprint, but partially within project boundary are proposed/recommended to be retained:

- Tree U37, U38, U41, U45, U48, U53, U55, U58, U59, U61, U62, U64, U66, U67, U69, U70, U72, U74, U76, U79 – *Melaleuca quinquenervia* (Broad-leaved Paperbark);
- Tree U89 – *Leptospermum scoparium* (Tea-tree);
- Tree U91 – *Harpullia pendula* (Tulipwood);
- Tree U100 - *Brachychiton acerifolius* (Illawarra Flame Tree)-;
- Tree U101 – *Cupaniopsis anacardioides* (Tuckeroo);
- Tree U107 – *Corymbia eximia* (Yellow Bloodwood);
- Tree U111 – *Eucalyptus* sp. (Gum);

The following trees outside the works footprint and project boundary are proposed/recommended to be retained:

- Tree U44, U77 – *Melaleuca quinquenervia* (Broad-leaved Paperbark);
- Tree U52 – *Acacia* sp. (Wattle);
- Tree U112 – *Melaleuca* (formerly *Callistemon*) *viminalis* (Weeping Bottlebrush);
- Tree U114 - *Corymbia eximia* (Yellow Bloodwood);
- Tree U115 - *Eucalyptus* sp. (Gum);
- Tree U116 - *Melaleuca* (formerly *Callistemon*) *viminalis* (Weeping Bottlebrush);
- Tree U117 – *Angophora costata* (Sydney Red Gum);
- Tree U118 - *Eucalyptus* sp. (Gum);
- Tree U119, U120 - *Eucalyptus microcorys* (Tallowwood);
- Tree U121 – *Angophora costata* (Sydney Red Gum) and
- Tree U122 - *Corymbia eximia* (Yellow Bloodwood).

The following trees have a *High* Retention Value (RV- see Appendix C) and thus will be retained if deemed feasible during the works, however based on the current design, and available construction methodologies are recommended for removal:

- Tree U102 - *Corymbia eximia* (Yellow Bloodwood) and
- Tree U113 - *Melaleuca quinquenervia* (Broad-leaved Paperbark).

2.5 Potential Impacts on Trees Proposed for Retention

Under the Australian Standard 4970-2009 Protection of trees on development sites (“AS4970-2009”), encroachments of less than 10% of the Tree Protection Zone (TPZ) are considered to be minor. No specifications are provided in AS4970 for potential impacts of 10% or greater. This 10% is taken as the threshold figure, beyond which arboricultural investigations (as set out in Clause 3.3.4 of AS 4970-2009 Protection of trees on development sites) need to be considered.

Trees have been surveyed and estimates have been provided via the marked up aerial mapping to determine likely disturbance within the Structural Root Zone (SRZ), and into the TPZs of protected trees to be retained (Tree U102, U113 listed for removal), these are summarised in Table 3, below.

Tree No.	Tree Common name	SRZ affected	TPZ area (m ²)	TPZ encroachment (approx m ²)	TPZ encroachment (approx %)
U37	Broad-leaved P/bark	✗	41	2.8	6.8
U38	Broad-leaved P/bark	✗	308	19.95	6.5
U41	Broad-leaved P/bark	✗	222	16.8	7.5
U44	Broad-leaved P/bark	✗	41	0	0
U45	Broad-leaved P/bark	✗	137	16.9	12.3
U48	Broad-leaved P/bark	✗	104	1.4	1.3
U52	Wattle	✗	7	0	0
U53	Broad-leaved P/bark	✗	137	14.5	10.5
U55	Broad-leaved P/bark	✗	104	.32	0.3
U58	Broad-leaved P/bark	✗	163	10.5	6.4
U59	Broad-leaved P/bark	✗	180	24.3	13.5
U61	Broad-leaved P/bark	✗	163	4.5	2.7
U62	Broad-leaved P/bark	✗	272	41.7	15.3
U64	Broad-leaved P/bark	✗	191	36.3	19
U66	Broad-leaved P/bark	✗	104	1.2	1.15
U67	Broad-leaved P/bark	✗	113	12.4	11
U69	Broad-leaved P/bark	✗	92	0.3	0.3
U70	Broad-leaved P/bark	✗	408	82.1	20
U72	Broad-leaved P/bark	✗	327	37.2	11.4
U74	Broad-leaved P/bark	✗	547	120.7	22
U76	Broad-leaved P/bark	✗	408	57.7	14.1
U77	Sweet Pittosporum	✗	72	0	0
U79	Broad-leaved P/bark	✗	255	36.7	14.4
U89	Tea-tree	✓	7	1.35	14.3
U91	Tulipwood	✓	28	5.8	20.7
U100	Illawarra Flame Tree	✓	41	7.8	19
U101	Tuckeroo	✗	41	0	0
U102	Yellow Bloodwood Should site investigation find tree retainable	✗	191	84.75	44.37
U107	Yellow Bloodwood	✗	55	7.2	13
U111	Gum	✗	92	1.8	2
U112	Weeping Bottlebrush	✗	35	0	0
U113	Broad-leaved P/bark Should site investigation find tree retainable	✓	180	51.7	28.7

Tree No.	Tree Common name	SRZ affected	TPZ area (m2)	TPZ encroachment (approx m2)	TPZ encroachment (approx %)
U114	Yellow Bloodwood	×	18	0	0
U115	Gum	×	48	0	0
U116	Bottlebrush	×	18	0	0
U117	Sydney Red Gum	×	7	0	0
U118	Gum	×	35	0	0
U119	Tallowwood	×	137	0	0
U120	Tallowwood	×	137	0	0
U121	Sydney Red Gum	×	7	0	0
U122	Yellow Bloodwood	×	72	0	0

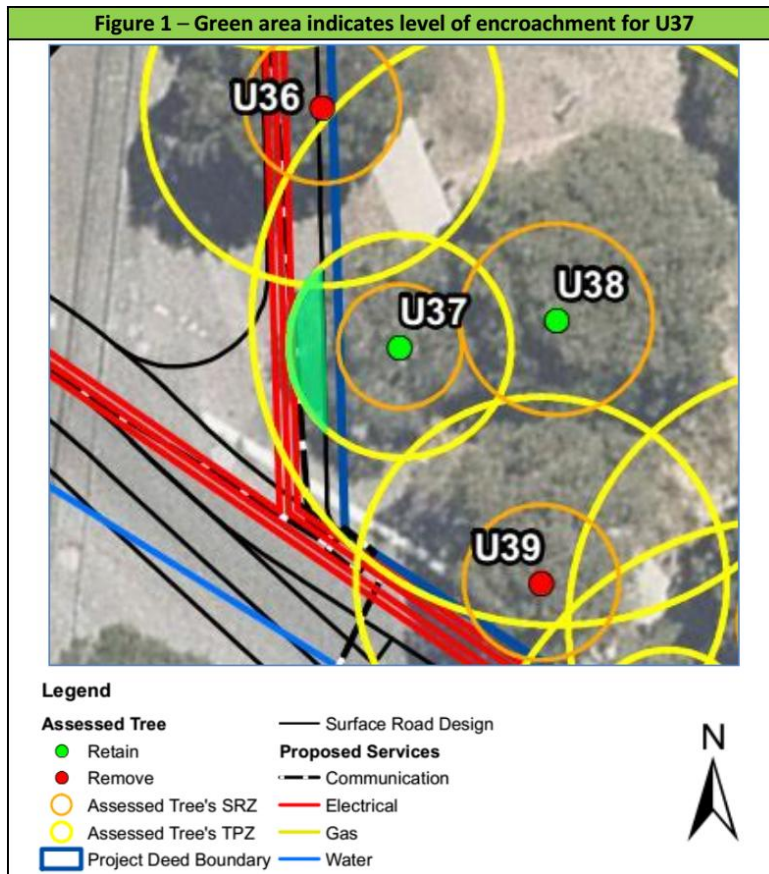
Table 3 – Estimated encroachments into the SRZ and TPZ of trees proposed for retention. Please note site-specific constraints will heavily influence the location. The type of construction materials and methods used, and/or extent of change to soil/grade conditions during works may result in encroachment impacts lower or higher than estimated at the time of preparing this tree impact assessment.

Tree U37- Broad-leaved Paperbark.

The notional TPZ encroachment is less than 10% at 6.8% and thus considered *minor*, the proposed works are outside the SRZ (see Figure 1 below) however with a branch spread of 7m, pruning is likely to be required.

The existing gutter/kerb line is currently less than 0.5m from the stem with no obvious signs of cracking or recent replacement so it is highly likely the roots are running laterally within the current nature reserve for this early mature specimen.

Consideration of machinery height and Arboricultural supervision will be required to ensure this tree is only minimally impacted, and health and condition are not affected.



Tree U38, U41, and U58 - Broad-leaved Paperbark.

These trees have notional TPZ encroachments of 6.5%, 7.5% and 6.4% retrospectively. Under the Australian Standard 4970-2009 Protection of trees on development sites ("AS4970") under 10% is considered *minor* encroachment. The SRZ of these trees will not be affected.

Additionally, between the proposed works and subject trees is an existing pathway and other trees which will have likely restricted root development and branch growth into the proposed works site.

In my opinion the subject trees health and condition will remain largely unaffected in light of the proposed works.

Tree U44, U48 - Broad-leaved Paperbark, **Tree U52** - Wattle, **Tree U55, U61, U66, U69** - Broad-leaved Paperbark, **Tree U77** - Sweet Pittosporum, **Tree U111** -Gum, **Tree U112** - Weeping Bottlebrush, **Tree U114** - Yellow Bloodwood, **Tree U115** - Gum, **Tree U116** - Bottlebrush, **Tree U117** - Sydney Red Gum, **Tree U118** - Gum, **Tree U119, U120** - Tallowwood, **Tree U121** - Sydney Red Gum and **Tree U122** - Yellow Bloodwood.

These trees have a *minor* notional encroachment percentage (0%-2.7%) calculated and it is not expected that these trees would be affected by the proposed works.

These trees currently have neighbouring trees located to the south of them, between them and the proposed works thus limiting the spread of branches and pruning should not be required.

Tree numbers U115 & U119 tree stems are well clear of works but should equipment be working within the branch spread of these trees it should be noted that they currently have low branches over the pathway and appropriate pruning should be carried out to avoid tree damage (see Section 3.2 for pruning specifications/recommendations).

Tree U45, U53, U59, U62, U64, U67, U70, U72, U74, U76, U79, - Broad-leaved Paperbark

These trees are located in Sydney Park. The TPZ percentage encroachment varies from 10.5% to 22% (see Table 3 for specific tree percentages) but species and site factors are similar, so have been discussed as a group.

Any encroachment over 10% is considered *major* under the Australian Standard 4970-2009 Protection of trees on development sites ("AS4970"), Part 3.3.4 of the Standard discusses TPZ encroachment considerations as below:

a) *Location/distribution of roots to be determined via non-destructive investigation methods, b) potential loss of root mass from encroachment* – given the project design is set with limited options for variation, the species tolerance to site disturbance (see point c) and site factors (see point f & g) in my opinion the determination of root location is impractical given the heavy planting of the species on both sides of the pathway. Determining whether a particular Broad Leaved Paperbark root is from a particular tree will be extremely time consuming, costly and potentially traumatic for the subject trees.

Hand digging or limited mechanical methods should be employed under suitability qualified Arborist supervision (minimal AQF Level 5) to ensure roots are not torn or damaged on the closest edge of the excavation to the retained tree, prior to further excavation.

c) *Tree species and tolerance to root disturbance* – All the subject trees are Broad-leaved Paperbarks, their natural environment is within typically anaerobic conditions lending this species to a higher tolerance to root disturbance.

d) *Age, vigour and size of the tree* – The subject trees vary from mature to late mature. However they all appeared to be actively growing with vigorous new growth. Late mature is not typically ideal for tolerance to site disturbance however given the particular site conditions (see point *f* and *g*) I believe the trees ability to manage the site disturbance is adequate.

e) *Lean & stability of the tree* – All the assessed trees have a relatively balanced canopy with no signs of ground heave or instability.

f) *Soil characteristics/volume, topography & drainage* – The subject trees are located on the base of a slope facing south. The trees are quite protected from the north, east and west but exposed to the south. Following removal of neighbouring trees for the proposed works, the subject trees will be further exposed to the south, however the subject trees are regularly more mature or larger than the street trees thus the impact should not be too significant (see Photo 1 below). Some minor branch failures may occur in the first few months of exposure on the southern side of the tree canopies.

g) *The presence of existing/past structures or obstacles affecting root growth* – A footpath and neighbouring trees are located to the south of the existing trees. Though it is common for tree roots to graft, this will limit root expansion into the proposed works area. Concrete pathways, can limit to some degree, root growth.

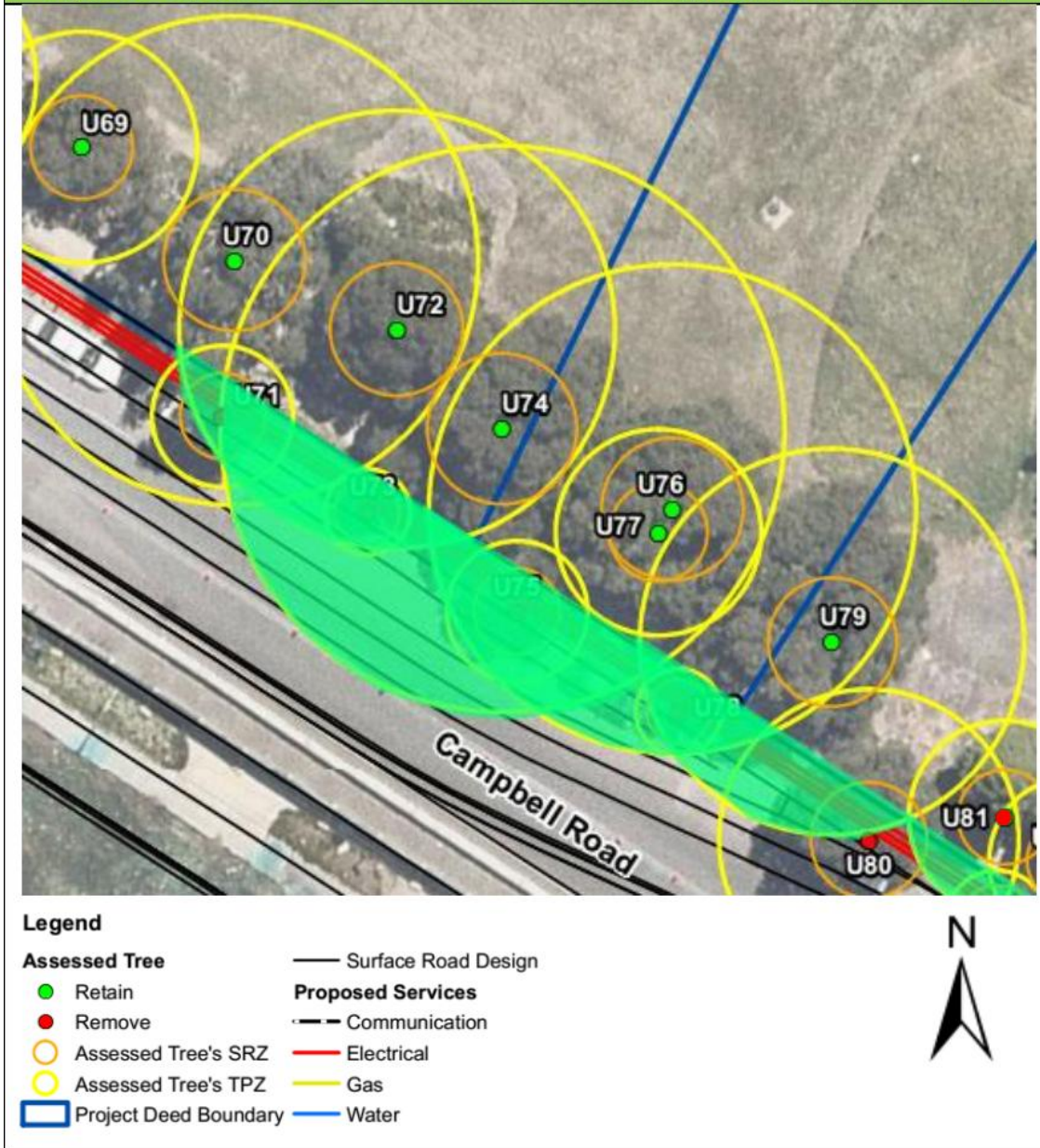
Additionally an existing kerb and road constitutes a large proportion of the notional TPZ for these trees, both are an undesirable environment for root expansion. This is particularly so, when, to the north, east and west unimpeded, highly desirable conditions (the parkland) are freely available for the trees (see figure 2).

h) *Design factors* – In my understanding no flexibility in design of the pathway or location of services is available at this time.



Photo 1 – Subject trees are slightly protected from the existing street trees but their canopies extend over & above.

Figure 2 – Green area indicates level of encroachment, note it is mainly roadway



Tree U89 & U91 - Tea-tree & Tulipwood

Given both these tree locations within private, fenced properties the stem diameters were only estimated (by holding a measuring tape at distance, which most likely over estimated DBH). While the notional SRZ and TPZ have been calculated at 14.3% and 20.7% retrospectively in my opinion these trees root systems are highly unlikely to be impacted upon.

Solid, unbroken footings for property boundary brick walls are present at both properties. Currently the concrete pathway is against the property boundary walls (limiting root growth) with no sign of damage. Additionally it is unknown if the ground level matches that of the pathway/proposed work site.

The Tulipwood will require a low branch over the pathway to be removed to allow access for works and for bike-rider clearance once shared pathway is completed.

Tree U100- Illawarra Flame Tree

The notional encroachment percentage has been estimated at 19% however this specimen is in a raised garden bed roughly 300mm above the existing pathway/proposed works zone. A very old looking solid brick/concrete wall is located between the tree specimen and the proposed works site.

Given the ample, unimpeded growing area to the east, north-east of the tree I do not believe the SRZ or TPZ would be represented in perfect circle. In my opinion this specimen will remain minimally affected from the proposed works.

Tree U101- Tuckeroo

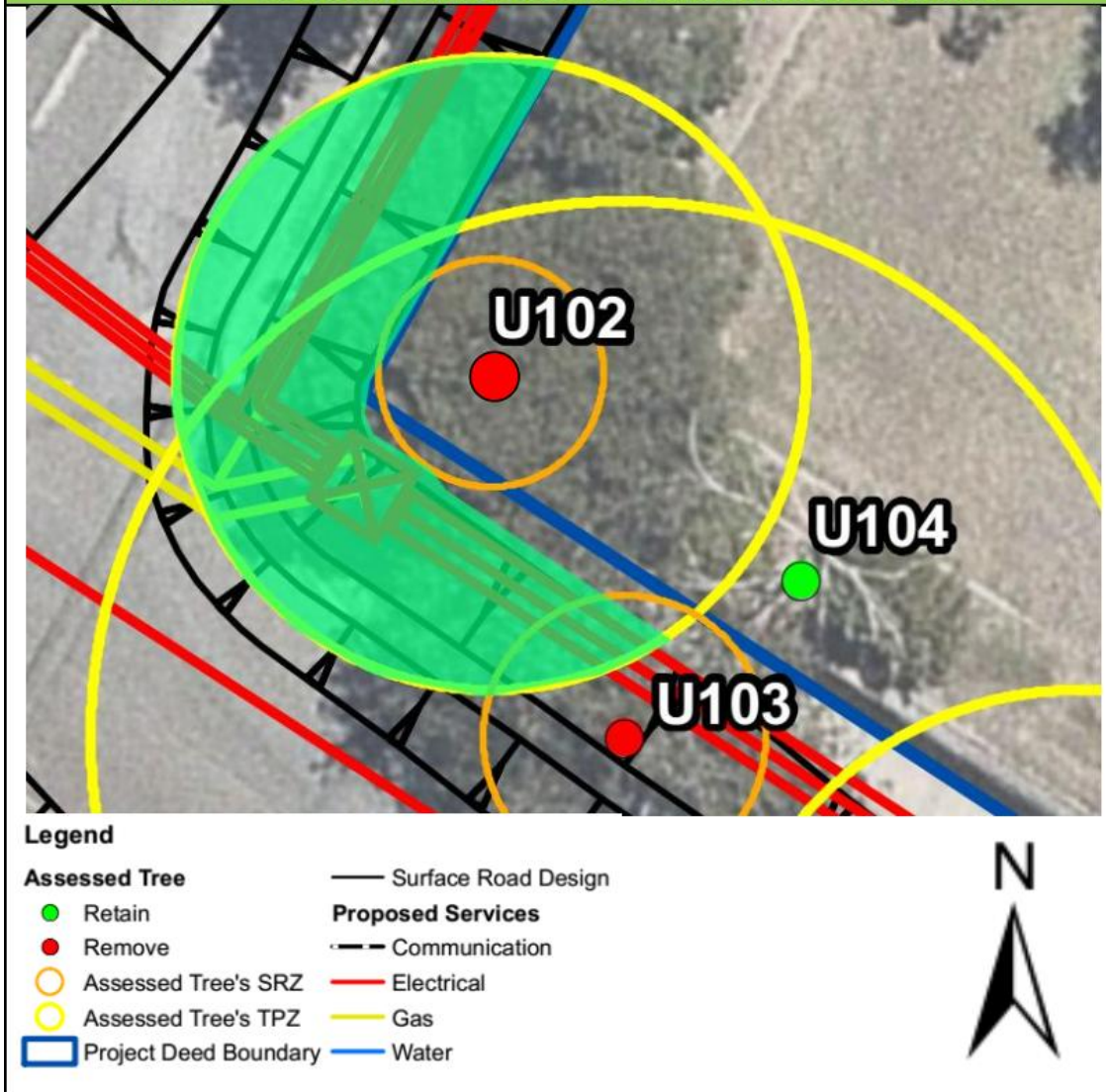
All proposed works are outside the TPZ and SRZ so this is not an issue. The tree has a low, sprawling branch habit and some minor pruning may be necessary to accommodate works.

Tree U102 – Yellow Bloodwood

This tree has been assigned a 'High' Retention Value (RV- see Appendix C) and will be retained if feasible. However based on current design and required construction removal is recommended. The proposed work encroach an estimated 44.37% into the TPZ and just within the SRZ to the west of the tree (see figure 3) so obviously a *major* level of notional encroachment. However the tree has unimpeded growth area to the north-east, east and south-east of the tree. A brick footing stands between the tree and the proposed works. It is my understanding these footings will remain in situ.

If non-destructive investigation methods were employed and a root maps constructed it is likely this tree can remain despite the proposed works. Final assessment would not be determined until Root mapping is carried out. Minor pruning would be required over the proposed works area.

Figure 3 – Green area indicates level of encroachment if retained



Tree U107 - Yellow Bloodwood

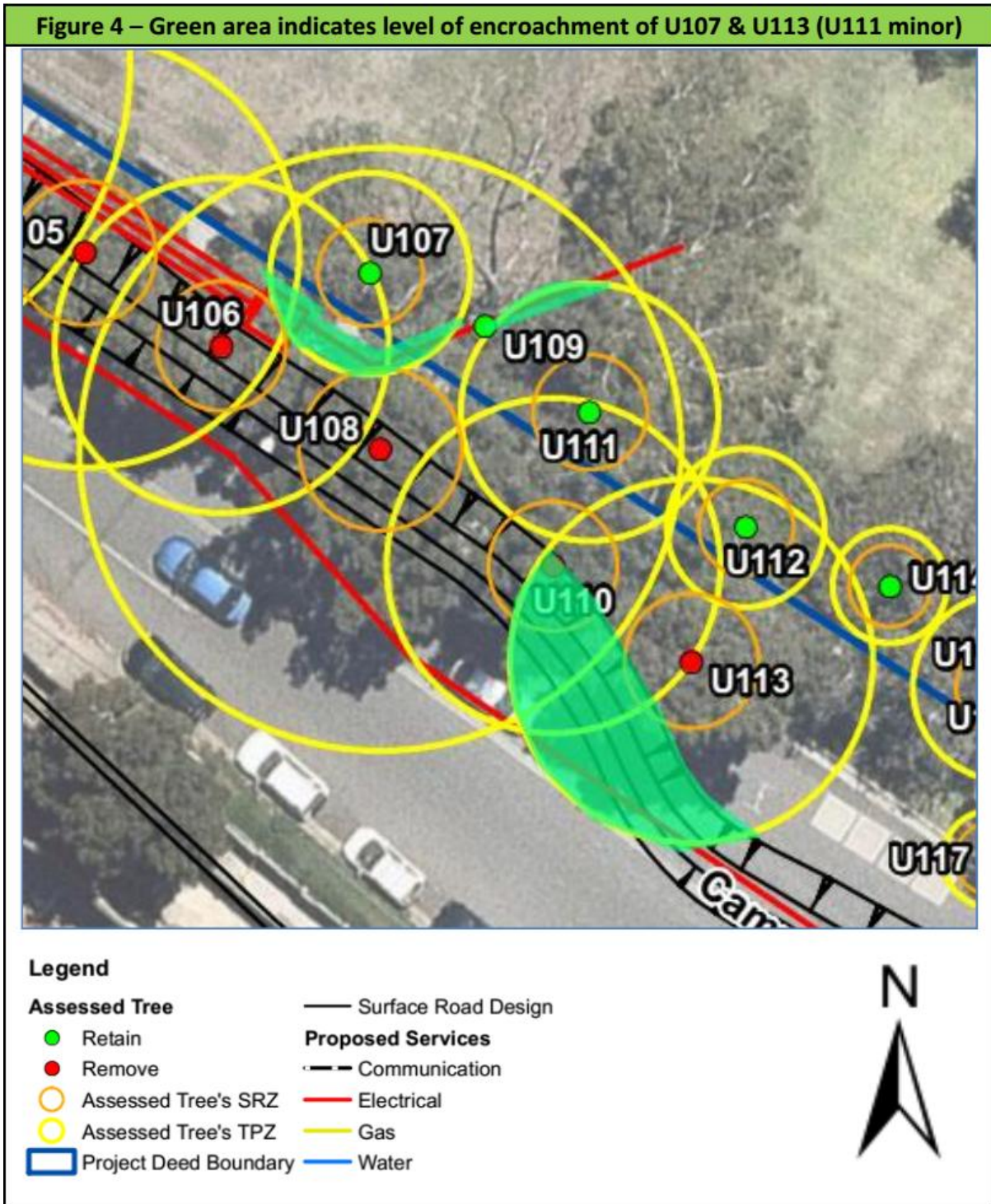
This tree is outside the zone of the drainage swale but under-ground power is proposed within the TPZ, an encroachment of 13% has been estimated (see figure 4 below).

An existing dead tree is located within the trees TPZ which may have limited root growth within this area for the subject tree.

Should non-destructive excavation methods be utilised to carry out trenching for power lines, this tree should be minimally affected.

Tree U113- Broad-leaved Paperbark

This tree will be retained if feasible. However based on current design and required construction removal is recommended. Currently this tree has a calculated 28.7% encroachment and incursion into the SRZ (see Figure 4 below).



Recommendations

3.1 Tree Removal

Forty nine (49) prescribed trees required to be removed to accommodate the proposed works. Replanting will be undertaken in accordance with the condition B63 of the Compliance Table.

Potentially two (2) trees may be retained from this number should site factors find trees still viable and be able to be retained without detriment. One non-prescribed tree will require removal in addition to this number.

Tree removal work shall be carried out by minimally qualified AQF Level 2 Arborist in compliance with the NSW Workcover Code of Practice for the Amenity Tree Industry, these contractors shall be advised of trees in close proximity being retained and instructed to avoid damage to such.

Stumps to be removed within the TPZ of trees to be retained, shall be removed in a manner that avoids damaging or disturbing roots.

3.2 Minimising Impacts on Trees to be Retained - General for all subject trees

Direct and continued liaison between CDS staff and the project arboriculturist or Council is highly recommended.

Project arboriculturist or Council is to advise on all aspects of tree protection prior to and during proposed works.

The tree protection devices cannot be relocated, removed or altered in any way without the project arboriculturist or Council approval.

The retention existing site features where possible – i.e existing walls/kerbs/vegetation protecting trees is strongly recommended.

The use of track vehicles is far more desirable than wheeled equipment though tight turning is not recommended. Vehicles are not to be parked within defined TPZ of trees to be retained.

Where practical, tree protection fencing should be continuous and unbroken to include groups of trees.

Any required pruning for equipment access must be carried prior to any works commencing, and if in excess of 10%, as advised by the project arboriculturist or Council. All work is to be to Australian Standard 4373-2007 Pruning of Amenity Trees and requires by a minimally qualified AQF Level 2 Arborist.

3.3 Specific Tree Retention Methods for subject trees to be retained -

Tree U37 - Broad-leaved Paperbark

- Any ground-level change within 3m of the tree is to be directly supervised by an arboriculturist with a minimum AQF5 in arboriculture or equivalent.
- Crown-lift pruning to Australian Standard 4373-2007 Pruning of Amenity Trees will be required by a minimally qualified AQF Level 3 Arborist prior to works commencing. Given the

pruning is in excess of 10% of the total live canopy, this pruning shall be as advised by the project arboriculturist or Council.

- Tree protection devices are to be placed as advised by the project arboriculturist and prior to any site works commencing.
- Guidelines as per Tree Protection Measures Part 4.1 below, prior to and during works. Compensatory 10% TPZ protection is to be extended to the north and east for the encroachment to the west/south in the TPZ.
- Stem protection is required during construction works that occur within the TPZ, this shall be padding placed against the stem and battens strapped together over this padding (not fixed in any way into the tree stem). A minimum height of 2m is recommended.
- Retention of the existing kerb is required due to the location to the tree stem.
- Refer to Sections 4.2 – 5.3 for additional recommendations that may require adoption during works.
- The project arboriculturist must advise on all aspects of tree protection prior to and during works. This may include the use of Track mat or wide timber sheeting placed on ground should vehicles be accessing the TPZ.

Tree U38, U41, and U58 - Broad-leaved Paperbark.

- Any ground-level change within 10m of the tree is to be directly supervised by an arboriculturist with a minimum AQF5 in arboriculture or equivalent.
- Tree protection devices are to be placed as advised by the project arboriculturist and prior to any site works commencing.
- Stem protection is required during construction works that occur within the TPZ, this shall be padding placed against the stem and battens strapped together over this padding (not fixed in any way into the tree stem). A minimum height of 2m is recommended.
- Refer to Sections 4.2 – 5.3 for additional recommendations that may require adoption during works.
- The project arboriculturist must advise on all aspects of tree protection prior to and during works. This may include the use of Track mat or wide timber sheeting placed on ground should vehicles be accessing the TPZ.

Tree U41 - Broad-leaved Paperbark

- Any ground-level change within 8.5m of the tree is to be directly supervised by an arboriculturist with a minimum AQF5 in arboriculture or equivalent.
- Tree protection devices are to be placed as advised by the project arboriculturist and prior to any site works commencing.
- Stem protection is required during construction works that occur within the TPZ, this shall be padding placed against the stem and battens strapped together over this padding (not fixed in any way into the tree stem). A minimum height of 2m is recommended.
- Refer to Sections 4.2 – 5.3 for additional recommendations that may require adoption during works.
- The project arboriculturist must advise on all aspects of tree protection prior to and during works. This may include the use of Track mat or wide timber sheeting placed on ground should vehicles be accessing the TPZ.

Tree U58 - Broad-leaved Paperbark

- Any ground-level change within 8.5m of the tree is to be directly supervised by an arboriculturist with a minimum AQF5 in arboriculture or equivalent.
- Tree protection devices are to be placed as advised by the project arboriculturist and prior to any site works commencing.
- Stem protection is required during construction works that occur within the TPZ, this shall be padding placed against the stem and battens strapped together over this padding (not fixed in any way into the tree stem). A minimum height of 2m is recommended.
- Refer to Sections 4.2 – 5.3 for additional recommendations that may require adoption during works.
- The project arboriculturist must advise on all aspects of tree protection prior to and during works. This may include the use of Track mat or wide timber sheeting placed on ground should vehicles be accessing the TPZ.

Tree U52 – Wattle, U114 Yellow Bloodwood, U116 - Weeping Bottlebrush, U117 & U121 –Sydney Red Gum

- Any ground-level change within 2m of the tree is to be directly supervised by an arboriculturist with a minimum AQF5 in arboriculture or equivalent.
- Tree protection devices are to be placed as advised by the project arboriculturist and prior to any site works commencing.
- Refer to Sections 4.2 – 5.3 for additional recommendations that may require adoption during works.
- The project arboriculturist must advise on all aspects of tree protection prior to and during works.

Tree U44, U48, U55, U66, U69 - Broad Leaved Paperbark, Tree U77 – Sweet Pittosporum, Tree U111, U118 & U122 – Gum & Tree U112 – Weeping Bottlebrush

- Any ground-level change within 5m of the tree is to be directly supervised by an arboriculturist with a minimum AQF5 in arboriculture or equivalent.
- Tree protection devices are to be placed as advised by the project arboriculturist and prior to any site works commencing.
- Stem protection is required for Trees U48, U55, U66, U69 and U111 during construction works that occur within the TPZ, this shall be padding placed against the stem and battens strapped together over this padding (not fixed in any way into the tree stem). A minimum height of 2m is recommended.
- Refer to Sections 4.2 – 5.3 for additional recommendations that may require adoption during works.
- The project arboriculturist must advise on all aspects of tree protection prior to and during works. This may include the use of Track mat or wide timber sheeting placed on ground should vehicles be accessing the TPZ.

Tree U45, U53, U59, U61, U64 & U67 – Broad Leaved Paperbark

- Any ground-level change within 6.5m of the tree is to be directly supervised by an arboriculturist with a minimum AQF5 in arboriculture or equivalent.
- Tree protection devices are to be placed as advised by the project arboriculturist and prior to any site works commencing.
- Stem protection is required during construction works that occur within the TPZ, this shall be padding placed against the stem and battens strapped together over this padding (not fixed in any way into the tree stem). A minimum height of 2m is recommended.
- Refer to Sections 4.2 – 5.3 for additional recommendations that may require adoption during works.
- The project arboriculturist must advise on all aspects of tree protection prior to and during works. This may include the use of Track mat or wide timber sheeting placed on ground should vehicles be accessing the TPZ.

Tree U62 – Broad Leaved Paperbark

- Any ground-level change within 9m of the tree is to be directly supervised by an arboriculturist with a minimum AQF5 in arboriculture or equivalent.
- Tree protection devices are to be placed as advised by the project arboriculturist and prior to any site works commencing.
- Stem protection is required during construction works that occur within the TPZ, this shall be padding placed against the stem and battens strapped together over this padding (not fixed in any way into the tree stem).
- A minimum height of 2m is recommended.
- Refer to Sections 4.2 – 5.3 for additional recommendations that may require adoption during works.
- The project arboriculturist must advise on all aspects of tree protection prior to and during works. This may include the use of Track mat or wide timber sheeting placed on ground should vehicles be accessing the TPZ.

Tree U70 & U76 - Broad Leaved Paperbark

- Any ground-level change within 11m of the tree is to be directly supervised by an arboriculturist with a minimum AQF5 in arboriculture or equivalent.
- Tree protection devices are to be placed as advised by the project arboriculturist and prior to any site works commencing.
- Stem protection is required during construction works that occur within the TPZ, this shall be padding placed against the stem and battens strapped together over this padding (not fixed in any way into the tree stem). A minimum height of 2m is recommended.
- Refer to Sections 4.2 – 5.3 for additional recommendations that may require adoption during works. The project arboriculturist must advise on all aspects of tree protection prior to and during works.

Tree U79 - Broad Leaved Paperbark

- Any ground-level change within 13m of the tree is to be directly supervised by an arboriculturist with a minimum AQF5 in arboriculture or equivalent.
- Tree protection devices are to be placed as advised by the project arboriculturist and prior to any site works commencing.
- Stem protection is required during construction works that occur within the TPZ, this shall be padding placed against the stem and battens strapped together over this padding (not fixed in any way into the tree stem). A minimum height of 2m is recommended.
- Refer to Sections 4.2 – 5.3 for additional recommendations that may require adoption during works.
- The project arboriculturist must advise on all aspects of tree protection prior to and during works. This may include the use of Track mat or wide timber sheeting placed on ground should vehicles be accessing the TPZ.

Tree U91 – Tulipwood –private property

- Any ground-level change within 3m of the tree is to be directly supervised by an arboriculturist with a minimum AQF5 in arboriculture or equivalent.
- Crown-lift pruning to Australian Standard 4373-2007 Pruning of Amenity Trees will be required by a minimally qualified AQF Level 3 Arborist prior to works commencing.
- Existing boundary footing/wall shall be retained.

Tree U100 – Illawarra Flame Tree

- Any ground-level change within 3.5m of the tree is to be directly supervised by an arboriculturist with a minimum AQF5 in arboriculture or equivalent.
- Crown-lift pruning to Australian Standard 4373-2007 Pruning of Amenity Trees will be required by a minimally qualified AQF Level 3 Arborist prior to works commencing. Given the pruning may be in excess of 10% of the total live canopy, this pruning shall be as advised by the project arboriculturist or equivalent.
- Tree protection devices are to be placed as advised by the project arboriculturist and prior to any site works commencing.
- Stem protection is required given works are required with the TPZ, this shall be padding placed against the stem and battens strapped together over this padding (not fixed in any way into the tree stem). A minimum height of 2m is recommended.
- Retention of the existing wall is required due to the location to the tree stem.
- Refer to Sections 4.2 – 5.3 for additional recommendations that may require adoption during works.
- The project arboriculturist must advise on all aspects of tree protection prior to and during works. This may include the use of Track mat or wide timber sheeting placed on ground should vehicles be accessing the TPZ.

Tree U101 - Tuckeroo

- Any ground-level change within 3.5m of the tree is to be directly supervised by an arboriculturist with a minimum AQF5 in arboriculture or equivalent.
- Crown-lift pruning to Australian Standard 4373-2007 Pruning of Amenity Trees will be required by a minimally qualified AQF Level 3 Arborist prior to works commencing. Given the pruning may be in excess of 10% of the total live canopy, this pruning shall be as advised by the project arboriculturist or equivalent.
- Tree protection devices are to be placed as advised by the project arboriculturist and prior to any site works commencing.
- Retention of the existing wall is required.
- Refer to Sections 4.2 – 5.3 for additional recommendations that may require adoption during works. The project arboriculturist must advise on all aspects of tree protection prior to and during works.

Tree U102 - Yellow Bloodwood – Tree recommended for removal but n the event site investigation finds tree retainable.

- Any ground-level change within 7.5m of the tree is to be directly supervised by an arboriculturist with a minimum AQF5 in arboriculture or equivalent.
- Crown-lift pruning to Australian Standard 4373-2007 Pruning of Amenity Trees will be required by a minimally qualified AQF Level 3 Arborist prior to works commencing. Given the pruning may be in excess of 10% of the total live canopy, this pruning shall be as advised by the project arboriculturist or equivalent.
- Tree protection devices are to be placed as advised by the project arboriculturist and prior to any site works commencing.
- Stem protection is required during construction works that occur within the TPZ, this shall be padding placed against the stem and battens strapped together over this padding (not fixed in any way into the tree stem). A minimum height of 2m is recommended.
- Retention of the existing walls/footings is required due to the location to the tree stem.
- Refer to Sections 4.2 – 5.3 for additional recommendations that may require adoption during works.
- The project arboriculturist must advise on all aspects of tree protection prior to and during works. This may include the use of Track mat or wide timber sheeting placed on ground should vehicles be accessing the TPZ.

Tree U107 – Yellow Bloodwood

- Any ground-level change within 4m of the tree is to be directly supervised by an arboriculturist with a minimum AQF5 in arboriculture or equivalent.
- Tree protection devices are to be placed as advised by the project arboriculturist and prior to any site works commencing.
- Stem protection is required during construction works that occur within the TPZ,, this shall be padding placed against the stem and battens strapped together over this padding (not fixed in any way into the tree stem). A minimum height of 2m is recommended.
- Retention of the existing wall/footing is required due to the location to the tree stem.
- Refer to Sections 4.2 – 5.3 for additional recommendations that may require adoption during works.

- The project arboriculturist must advise on all aspects of tree protection prior to and during works. This may include the use of Track mat or wide timber sheeting placed on ground should vehicles be accessing the TPZ.

Tree U113 – Broad Leaved Paperbark - Tree recommended for removal but in the event site investigation finds tree retainable.

- Any ground-level change within 7.5m of the tree is to be directly supervised by an arboriculturist with a minimum AQF5 in arboriculture or equivalent.
- Crown-lift pruning to Australian Standard 4373-2007 Pruning of Amenity Trees will be required by a minimally qualified AQF Level 3 Arborist prior to works commencing. Given the pruning may be in excess of 10% of the total live canopy, this pruning shall be as advised by the project arboriculturist or equivalent.
- Tree protection devices are to be placed as advised by the project arboriculturist and prior to any site works commencing.
- Stem protection is required during construction works that occur within the TPZ,, this shall be padding placed against the stem and battens strapped together over this padding (not fixed in any way into the tree stem). A minimum height of 2m is recommended.
- Retention of the existing kerb is required due to the location to the tree stem.
- Refer to Sections 4.2 – 5.3 for additional recommendations that may require adoption during works.
- The project arboriculturist must advise on all aspects of tree protection prior to and during works. This may include the use of Track mat or wide timber sheeting placed on ground should vehicles be accessing the TPZ.

Tree U115 &U 119 – Gum & Tallowwood

- Any ground-level change within 4m of U115 and 6.5m of U119 is to be directly supervised by an arboriculturist with a minimum AQF5 in arboriculture or equivalent.
- Crown-lift pruning to Australian Standard 4373-2007 Pruning of Amenity Trees will be required by a minimally qualified AQF Level 3 Arborist prior to works commencing. Given the pruning is in excess of 10% of the total live canopy, this pruning shall be as advised by the project arboriculturist or equivalent.
- Tree protection devices are to be placed as advised by the project arboriculturist and prior to any site works commencing.
- Retention of the existing boundary wall/footing is required due to the location to the trees.
- Refer to Sections 4.2 – 5.3 for additional recommendations that may require adoption during works.
- The project arboriculturist must advise on all aspects of tree protection prior to and during works. This may include the use of Track mat or wide timber sheeting placed on ground should vehicles be accessing the area.

Tree U120 – Tallowwood

- Any ground-level change within 6.5m of the tree is to be directly supervised by an arboriculturist with a minimum AQF5 in arboriculture or equivalent.
- Tree protection devices are to be placed as advised by the project arboriculturist and prior to any site works commencing.
- Refer to Sections 4.2 – 5.3 for additional recommendations that may require adoption during works.
- The project arboriculturist must advise on all aspects of tree protection prior to and during works.

Tree Protection Measures

4.1 Tree Protection Devices

The tree protection is to be in accordance with the following:

- Tree Protection Devices (TPD) may include mulching, tree guards and other devices other than fencing.
- The TPD must be in place prior to any site works commencing, including clearing, demolition or grading.
- The most appropriate fencing for tree protection is 1.8m chainlink with 50mm metal pole supports. During installation, care must be taken to avoid damage to significant roots. The practicality of providing this fencing on this site must be addressed by the arboriculturist.
- Locate large primary roots by careful removal of soil within the fencing area. Do not drive any posts or pickets into tree roots. Replace soil back over tree roots.
- Nothing should occur inside the tree protection fenced areas, so therefore all access is prohibited for personnel and machinery, storage of fuel, chemicals, cement and site sheds.
- Signage should explain exclusion from the area defined by TPD and carry a contact name for access or advice).
- The TPD cannot be removed, altered, or relocated without the project arborist's prior assessment and approval.

4.2 Stockpiling and Location of Site Sheds

- Any ground identified for proposed stockpiling that is within the TPZ of trees to be retained shall be covered with thick, coarse mulch, placement of wooden pallets over the mulch, covering of the pallets with a tarpaulin (or similar), and the placement of materials on top of this device to prevent loose or potentially contaminating materials from moving into the soil profile.

4.3 Fill Material

- Placement of fill material within the TPZ of trees to be retained should be avoided where possible. Where placement of fill cannot be avoided, the material should be a coarse, gap graded material such as 20 — 50mm crushed basalt or equivalent to provide some aeration to the root zone. Note that roadbase or crushed sandstone or other material containing a high percentage of fines is unacceptable for this purpose.
- The fill material should be consolidated with a non-vibrating roller to minimise compaction of the underlying soil.

- A permeable geotextile may be used beneath the sub-base to prevent migration of the stone into the sub-grade. No fill material should be placed in direct contact with the trunk.

4.4 Fencing and Walls within the SRZ and TPZ of Retained Trees.

- Where fencing and/or masonry walls are to be constructed along site boundaries, they must provide for the presence of any living woody tree roots greater than 50mm diameter.
- Hand digging must occur within the SRZ of trees to be retained.
- For masonry walls or fences it may be acceptable to replace continuous concrete strip footings with suspended in-fill panels (e.g. steel or timber pickets, lattice etc) fixed to pillars.

4.5 Pavements

- Where possible (new) pavements should be avoided within the TPZ of trees to be retained.
- Proposed paved areas within the TPZ of trees to be retained are to be placed above grade to minimise excavations within the root zone, avoiding root severance and damage.

4.6 Landscaping within Tree Root Zones.

- The level of introduced planting media into any proposed landscaped areas within the TPZ is not to be greater than 75mm depth, and be of a coarse, sandy material to avoid development of soil layers that may impede water infiltration.
- Container size of proposed plants within the SRZ of trees should be determined prior to purchase of plants. This is to identify planting locations, and container size of plants at the time of planting. Otherwise, any proposed landscaping within the SRZ must consist of tubestock only. This is required to ensure that damage to tree roots is avoided.
- Mattocks and similar digging instruments must not be used within the TPZ of the trees. Planting holes should be dug carefully by hand with a garden trowel, or similar small tool.
- Where possible, do not plant canopy trees beneath, or within 6 - 8m of, overhead power lines.

4.7 Hygiene Practices

- No washing or rinsing of tools or other equipment, preparation of any mortars, cement mixing, or brick cutting is to occur within 8m up slope of any palms/trees to be retained.

Post Construction Tree Care Measures

5.1 Mulching

The removal of mulch after construction to remove any contaminants and its replacement with a good quality mulch and addition of 10% organic matter will improve beneficial soil micro-organisms, retain moisture and improve aeration and water infiltration.

5.2 Irrigation

An arboriculturist should determine whether irrigation should be carried out during extended periods of drought.

5.3 Pest Management

Monitoring is required, as trees under stress are more prone to insect attack.

References

Credit to [REDACTED] for general report layout and several areas of text.

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Hadlington, P. & Johnston, J. (1988) *Australian Trees: Their Care & Repair*. University of NSW Press, Kensington.

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[REDACTED]

[REDACTED]

Appendices

7.1 Appendix A - Terms and Definitions

Age classes

- Y** Young refers to an established but juvenile tree.
- SM** Semi-mature refers to a tree at growth stages between immaturity and full size.
- EM** Early-mature refers to a tree close to full sized still actively growing.
- M** Mature refers to a full sized tree with some capacity for further growth.
- LM** Late-Mature refers to a full sized tree with little capacity for growth that is not yet about to enter decline.
- OM** Over-Mature refers to a full sized tree with little capacity for growth that is entering or has entered decline.

Co-dominant: refers to stems or branches equal in size and relative importance.

Condition/Structure: refers to the tree's form and growth habit, as modified by its environment (aspect, suppression by other trees, soils) and the state of the scaffold (i.e. trunk and major branches), including structural defects such as cavities, crooked trunks or weak trunk/branch junctions. These are not directly connected with health and it is possible for a tree to be healthy but in poor condition/structure.

Deadwood: refers to any whole limb that no longer contains living tissues (e.g. live leaves and/or bark). Some dead wood is common in a number of tree species.

Diameter at Breast Height (DBH): Refers to the tree trunk diameter at breast height (1.4 metres above ground level).

Epicormic growth: adventitious branches that are considered to be a weak attachment in the short term due to minimal wood formation. There are generally formed following storm-related branch breakage or poor pruning practices. Should sufficient holding wood form in the long-term this growth is less of an issue.

Hazard: refers to anything with the potential to harm health, life or property.

Health: Refers to the tree's vigour as exhibited by the crown density, leaf colour, presence of epicormic shoots, ability to withstand disease invasion, and the degree of dieback.

Inclusion stem/bark: the pattern of development at branch or stem junctions where bark is turned inward rather than pushed out. This fault is located at the point where the stems/branches meet. This is normally a genetic fault and potentially a weak point of attachment as the bark obstructs healthy tissue from joining together to strengthen the joint.

Secondary Stem: refers to stems or branches with one of unequal size and relative importance.

SRZ: refers to the Structural Root Zone of the tree, this is the area required for tree stability.

TPZ: refers to the Tree Protection Zone of the tree, this is the primary method of protecting trees, it is a combination of the root area and the canopy and the SRZ is located within it.

Visual Tree Assessment (VTA): a procedure of defect analysis developed by Mattheck and Breloer (1994) that uses the growth response and form of trees to detect defects.

7.2 Appendix B - ULE Guide

ULE categories (after Barrell 1996, Updated 01/04/01)

The five categories and their sub-groups are as follows:

1. Long ULE - tree appeared retainable at the time of assessment for over 40 years with an acceptable degree of risk, assuming reasonable maintenance:
 - a) Structurally sound trees located in positions that can accommodate future growth
 - b) Trees which could be made suitable for long term retention by remedial care
 - c) Trees of special significance which would warrant extraordinary efforts to secure their long term retention
2. Medium ULE - tree appeared to be retainable at the time of assessment for 15 to 40 years with an acceptable degree of risk, assuming reasonable maintenance:
 - a) Trees which may only live from 15 to 40 years
 - b) Trees which may live for more than 40 years but would be removed for safety or nuisance reasons
 - c) Trees which may live for more than 15 years but would be removed to prevent interference with more suitable individuals or to provide space for new planting
 - d) Trees which could be made suitable for retention in the medium term by remedial care
3. Short ULE - tree appeared to be retainable at the time of assessment for 5 to 15 years with an acceptable degree of risk, assuming reasonable maintenance:
 - a) Trees which may only live from 5 to 15 years
 - b) Trees which may live for more than 15 years but would be removed for safety or nuisance reasons
 - c) Trees which may live for more than 15 years but would be removed to prevent interference with more suitable individuals or to provide space for new planting
 - d) Trees which require substantial remediation and are only suitable for retention in the short term.
4. Removal - trees which should be removed within the next 5 years:
 - a) Dead, dying, suppressed or declining trees because of disease or inhospitable conditions
 - b) dangerous trees through instability or recent loss of adjacent trees
 - c) Dangerous trees because of structural defects including cavities, decay, included bark, wounds or poor form
 - d) Damaged trees that are clearly not safe to retain
 - e) Trees which may live for more than 5 years but would be removed to prevent interference with more suitable individuals or to provide space for new planting
 - f) Trees which are damaging or may cause damage to existing structures within the next 5 years
 - g) Trees that will become dangerous after removal of other trees for the reasons given in (a) to (f)
 - h) Trees in categories (a) to (g) that have a high wildlife habitat value and, with appropriate treatment, could be retained subject to regular review
5. Small, young or regularly pruned - Trees that can be reliably moved or replaced:
 - a) small trees less than 5m in height
 - b) young trees less than 15 years old but over 5m in height
 - c) formal hedges and trees intended for regular pruning to artificially control growth

The landscape significance of a tree is an essential criterion for establishing 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 qualitative criteria to assist in determining the retention value for a tree.

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 and *Useful Life Expectancy* 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 Councils 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 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 dimension 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 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 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 designed for individual trees only, but can be applied to a monocultural stand in its entirety e.g. hedge.

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 and Andrew Morton in June 2001.


		Significance				
		1. High	2. Medium	3. Low		
		Significance in Landscape	Significance in Landscape	Significance in Landscape	Environmental Pest / Noxious Weed Species	Hazardous / Irreversible Decline
Estimated Life Expectancy	1. Long >40 years					
	2. Medium 15-40 Years					
	3. Short <1-15 Years					
	Dead					
<p><u>Legend for Matrix Assessment</u></p> 						
	<p>Priority for Retention (High) -These trees are considered important for retention and should be retained and protected. Design modification or re-location of building/s should be considered to accommodate the setbacks as prescribed by the Australian Standard AS4970 <i>Protection of trees on development sites</i>. Tree sensitive construction measures must be implemented e.g. pier and beam etc if works are to proceed within the Tree Protection Zone.</p>					
	<p>Consider for Retention (Medium) -These trees may be retained and protected. These are considered less critical; however their retention should remain priority with removal considered only if adversely affecting the proposed building/works and all other alternatives have been considered and exhausted.</p>					
	<p>Consider for Removal (Low) -These trees are not considered important for retention, nor require special works or design modification to be implemented for their retention.</p>					
	<p>Priority for Removal -These trees are considered hazardous, or in irreversible decline, or weeds and should be removed irrespective of development.</p>					

Table 1 - Tree Retention Value - Priority Matrix.

IACA, 2010, *IACA Significance of a Tree, Assessment Rating System (STARS)*, Institute of Australian Consulting Arboriculturists, Australia, www.iaca.org.au

7.4 Appendix D – Record of Meeting

A meeting with the design, landscape architect, construction teams and myself was carried out on 4 April 2017. Representatives that provided input to the meeting include:

- CDS-JV Construction Project Manager, Local Road Works
- CDS-JV Senior Environment Advisor, Local Road Works
- CDS-JV Design Coordinator, Local Road Works
- [REDACTED] Landscape Architect.

The CDS-JV GIS and maps were used to review the design of the project services and civil works, as well as an initial screen of trees in the study area.

Options to amend the State Significant Infrastructure (SSI) for this area were considered. Utilities (low voltage, high voltage and 132kv power, drainage and communications) are all required to be placed in the specified service allocations in the study area. The services cannot be relocated into the roadway as maintenance will attract the opening of the new road.

Pruning, non-destructive digging techniques and changes to design have been considered so as to maximise opportunities to retain as many trees as possible.

The urban design and landscape plan will address the planting of trees, where feasible and reasonable, within the SSI boundary in accordance with the Conditions of Approval.

This report incorporates the input from the design, urban landscape and construction, identifies both trees to be retained and those needed to be removed in order to deliver the pieces of infrastructure required by the project and are based on Australian Standard AS 4970-2009: Protection of Trees on Development Sites.

Tree Survey and TPZ Barwin Park Road - Campbell Road



Map 1 – Campbell St corner of Barwon Park Rd

Tree Survey and TPZ

Woodley Street - Campbell Road



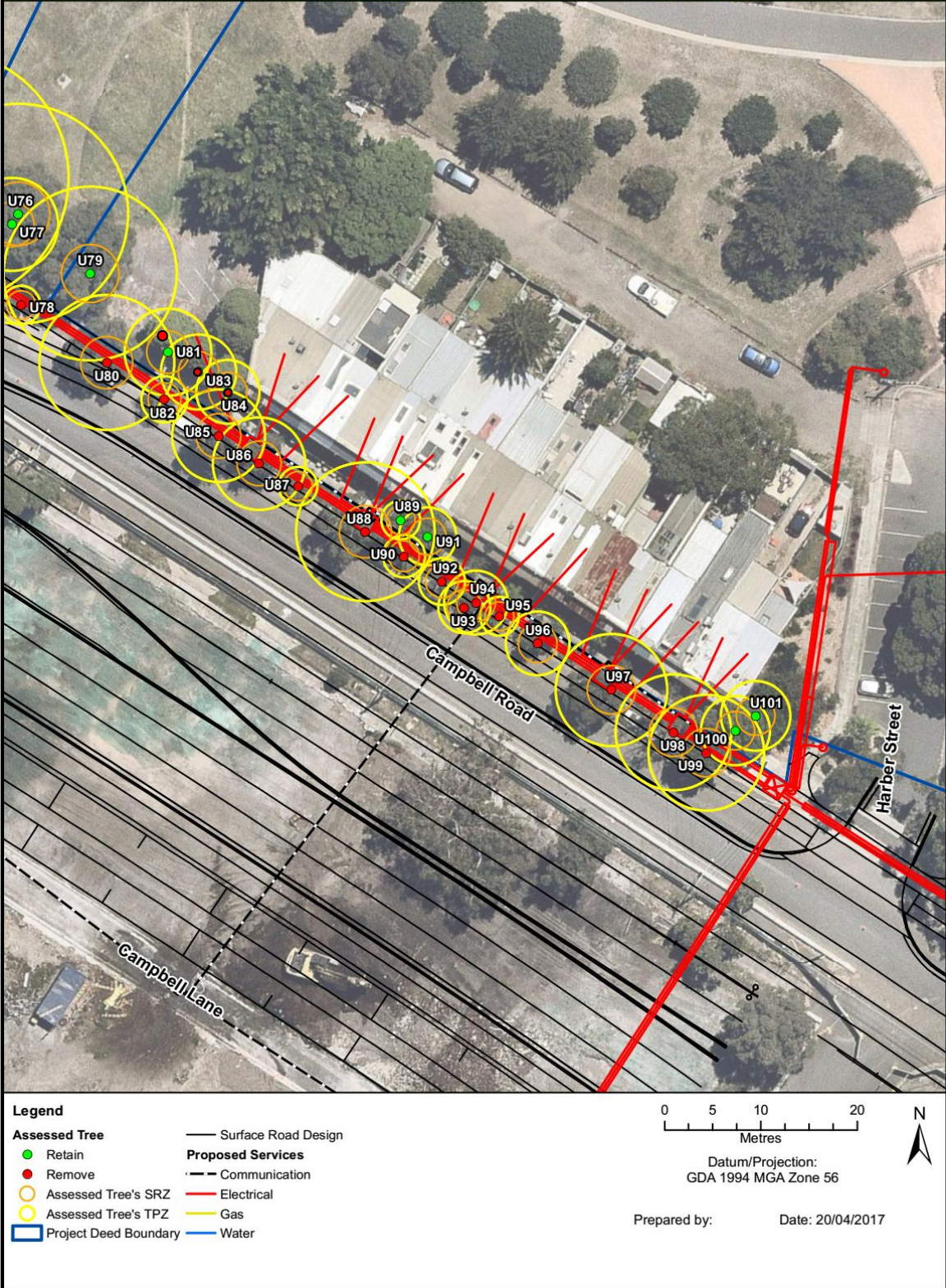
Map 2 – Campbell St opposite Woodley St.

Tree Survey and TPZ **Campbell Road**



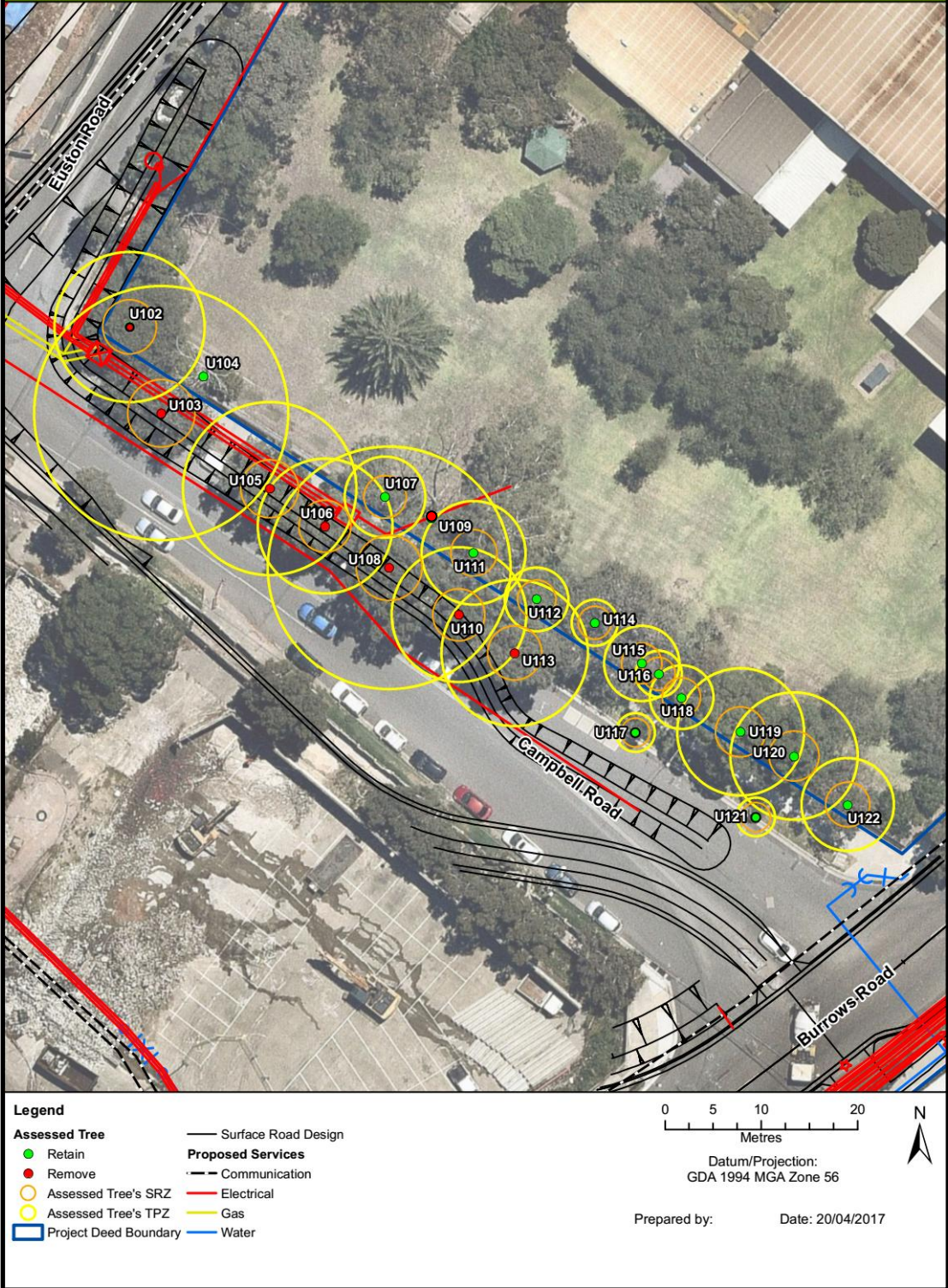
Legend		0 5 10 20 Metres	N ↑
Assessed Tree	— Surface Road Design	Datum/Projection: GDA 1994 MGA Zone 56	
● Retain	Proposed Services		
● Remove	--- Communication	Prepared by: Date: 20/04/2017	
○ Assessed Tree's SRZ	— Electrical		
○ Assessed Tree's TPZ	— Gas		
□ Project Deed Boundary	— Water		

Map 3 – Campbell St.



Map 4 – Campbell St corner of Harber St.

Tree Survey and TPZ **Euston Road - Campbell Road**



Map 5 – Campbell St corner of Euston Rd.

7.6 Appendix F – Schedule of Assessed Trees - Campbell St, St Peters.

Tree No.	Genus & species Common Name	Ht (m)	Sp (m)	DBH (mm)	Age	V	C	Comments	ULE	TSR	RV	SRZ (m)	TPZ (m)	TPZ (area)
U33	<i>Lophostemon confertus</i> Brushbox	8.5	10	425	EM	G	G-F	Introduced native species. Located along Barwin Park Rd outside RMS boundary. Multi-stemmed @ 2m AGL, previously lopped.	2A	M	M	2.4	5.1	84
U34	<i>Melaleuca quinquenervia</i> Broad-leaved Paperbark	8.5	13	375/ 300/ 175	M	G	G-F	Locally native species. Located along Barwin Park Rd outside RMS boundary. Included stem to east has failed and laying in park, remaining stems trifurcate @ GL.	2A	M	M	2.5	6.0	113
U35	<i>Melaleuca quinquenervia</i> Broad-leaved Paperbark	10	12	500	M	G	G	Locally native species. Located along Barwin Park Rd. No special problems noted at time of assessment. Shallow roots.	1A	M	H	2.5	6.0	113
U36	<i>Melaleuca quinquenervia</i> Broad-leaved Paperbark	10	9	475	M	G	G-F	Locally native species. Located along Barwin Park Rd. Shallow roots with mower damage. Included, multiple stems @ 2.5m AGL.	2A	M	M	2.5	5.8	104
U37	<i>Melaleuca quinquenervia</i> Broad-leaved Paperbark	6.5	7	@ 1M AGL 300	EM	G	F	Locally native species. Located along Barwin Park Rd outside RMS boundary. Co-dominant @ 1.2m AGL. Squeezing included stems.	2A	M	M	2.0	3.6	41
U38	<i>Melaleuca quinquenervia</i> Broad-leaved Paperbark	9	11	AB 825	LM	G	G-F	Locally native species. Located along Campbell Street outside RMS boundary. Multiple stems @ 1m AGL. Metal stake at base of tree stem.	1A	M	H	3.1	9.9	308
U39	<i>Melaleuca quinquenervia</i> Broad-leaved Paperbark	9	8	500	M	G	G	Locally native species. Located along Campbell Street outside RMS boundary. No special problems noted at time of assessment. Shallow roots.	1A	M	H	2.5	6.0	113
U40	<i>Melaleuca quinquenervia</i> Broad-leaved Paperbark	6	6	225	EM	G	G	Locally native species. Located along Campbell Street outside RMS boundary. No special problems noted at time of assessment.	1A	M	H	1.8	2.7	23

Tree No.	Genus & species Common Name	Ht (m)	Sp (m)	DBH (mm)	Age	V	C	Comments	ULE	TSR	RV	SRZ (m)	TPZ (m)	TPZ (area)
U41	<i>Melaleuca quinquenervia</i> Broad-leaved Paperbark	10	12	700	LM	G	G	Locally native species. Located along Campbell Street outside RMS boundary. No special problems noted at time of assessment. Multiple stems @ .4m AGL.	1A	H	H	2.9	8.4	222
U42	<i>Melaleuca quinquenervia</i> Broad-leaved Paperbark	11	10	875	M	G	G-F	Locally native species. Located along Campbell Street. Multiple, squeezing stems @ 1.5m AGL. Deadwood up to 45mm, previous failure at base of stem.	2A	M	M	3.2	10.6	350
U43	<i>Melaleuca quinquenervia</i> Broad-leaved Paperbark	5.2	4	200	EM	G	G	Locally native species. Located along Campbell Street. No special problems noted at time of assessment.	1A	M	H	1.7	2.4	18
U44	<i>Melaleuca quinquenervia</i> Broad-leaved Paperbark	6.5	6	175/ 250	EM	G	G-F	Locally native species. Located along Campbell Street outside RMS boundary. Secondary stem at ground level.	1A	M	H	2.0	3.6	41
U45	<i>Melaleuca quinquenervia</i> Broad-leaved Paperbark	9	10	400/ 375	M	G	G	Locally native species. Located along Campbell Street outside RMS boundary. Included, Co-dominant @ 1m AGL, decay pockets noted.	2A	H	H	2.6	6.6	137
U46	<i>Melaleuca quinquenervia</i> Broad-leaved Paperbark	11	10	500	M	G	G	Locally native species. Located along Campbell Street. No special problems noted at time of assessment.	1A	M	H	2.5	6.0	113
U47	<i>Eucalyptus scoparia</i> Wallangarra White Gum	8	5	150	Y	F	P	Introduced native species. Located along Campbell Street. 90% epicormic growth, whipper snipper damage to base of stem.	4E	L	L	1.5	2	10
U48	<i>Melaleuca quinquenervia</i> Broad-leaved Paperbark	8	6	475	M	G	G	Locally native species. Located along Campbell Street outside RMS boundary. Sprawling habit, secondary stem @ .5m AGL.	1A	H	H	2.5	5.8	104
U49	<i>Melaleuca quinquenervia</i> Broad-leaved Paperbark	7.5	8	475	M	G	G	Locally native species. Located along Campbell Street. No special problems noted at time of assessment. Fire at base of stem previously.	1A	M	H	2.5	5.8	104
U50	<i>Melaleuca quinquenervia</i> Broad-leaved Paperbark	5	8	@ .8M AGL 225	EM	G	G	Locally native species. Located along Campbell Street. Decay noted on top of branch to the east, trifurcate @ 1m AGL.	5B	L	L	1.8	2.7	23

Tree No.	Genus & species Common Name	Ht (m)	Sp (m)	DBH (mm)	Age	V	C	Comments	ULE	TSR	RV	SRZ (m)	TPZ (m)	TPZ (area)
U51	<i>Melaleuca quinquenervia</i> Broad-leaved Paperbark	5.5	8	325	M	G	G	Locally native species. Located along Campbell Street. Lean to east, self corrected.	3C	L	L	2.1	3.9	48
U52	<i>Acacia</i> sp. Wattle	4.5	2	75 (100)	Y	G	G	Native species. Located along Campbell Street outside RMS boundary. Self-sown specimen, suppressed.	3C	L	L	1.5	2	7
U53	<i>Melaleuca quinquenervia</i> Broad-leaved Paperbark	9	12	550 AB	M	G	G	Locally native species. Located along Campbell Street outside RMS boundary. No special problems noted at time of assessment. Multiple stems @ 1.4m AGL.	1A	H	H	2.6	6.6	137
U54	<i>Eucalyptus saligna</i> Sydney Blue Gum	6.5	6	200	EM	F	F	Locally native species. Located along Campbell Street. Lots of twiggy deadwood, epicormic branches and thinning canopy. Heavily crown lifted over pathway.	5B	L	L	1.7	2.4	18
U55	<i>Melaleuca quinquenervia</i> Broad-leaved Paperbark	6.5	6	AB 475	M	G	F	Locally native species. Located along Campbell Street outside RMS boundary. Trifurcate @ ground level, poor unions noted.	2A	M	M	2.5	5.8	104
U56	<i>Melaleuca quinquenervia</i> Broad-leaved Paperbark	6	10	@ .8m AGL 425	M	G	G	Locally native species. Located along Campbell Street. Multiple stems @ 1m AGL. No special problems noted at time of assessment.	1A	M	H	2.4	5.1	84
U57	<i>Angophora costata</i> Sydney Red Gum	4.5	3	100	Y	G	G	Locally native species. Located along Campbell Street. Upper stem sweeps to south, self corrected.	5A	L	L	1.5	2	7
U58	<i>Melaleuca quinquenervia</i> Broad-leaved Paperbark	9	11	AB 600	M	G	F	Locally native species. Located along Campbell Street outside RMS boundary. Co-dominant @ .6m AGL, several inclusions throughout stems.	2A	M	M	2.7	7.2	163
U59	<i>Melaleuca quinquenervia</i> Broad-leaved Paperbark	11	10	625 AB	M	G	F	Locally native species. Located along Campbell Street outside RMS boundary. Co-dominant stems fused and twisted around each other, twiggy deadwood present.	2A	M	M	2.8	7.6	180

Tree No.	Genus & species Common Name	Ht (m)	Sp (m)	DBH (mm)	Age	V	C	Comments	ULE	TSR	RV	SRZ (m)	TPZ (m)	TPZ (area)
U60	<i>Melaleuca quinquenervia</i> Broad-leaved Paperbark	6.5	10	500	M	G	G	Locally native species. Located along Campbell Street. Tear out on low limb to east, occluding well.	1A	M	H	2.5	6.0	113
U61	<i>Melaleuca quinquenervia</i> Broad-leaved Paperbark	11	6	AB 600	M	G	G	Locally native species. Located along Campbell Street outside RMS boundary. Suppressed, set back in park further than other trees.	1A	H	H	2.7	7.2	163
U62	<i>Melaleuca quinquenervia</i> Broad-leaved Paperbark	12	10	AB 775	LM	G	G-F	Locally native species. Located along Campbell Street outside RMS boundary. Squeezing stems noted.	2A	M	M	3.0	9.3	272
U63	<i>Melaleuca quinquenervia</i> Broad-leaved Paperbark	5	4	@ .8m AGL 275	EM	G	G-F	Locally native species. Located along Campbell Street. Large diameter limb removed over road, Co-dominant and sprawling habit.	5B	L	L	2.0	3.3	35
U64	<i>Melaleuca quinquenervia</i> Broad-leaved Paperbark	12	10	375/ 525	LM	G	G-F	Locally native species. Located along Campbell Street outside RMS boundary. Co-dominant @ .1m AGL. Included & squeezing stems, previous failures noted from inclusions.	2D	M	M	2.8	7.8	191
U65	<i>Melaleuca quinquenervia</i> Broad-leaved Paperbark	6	All to E 4.5	325	EM	G	F	Locally native species. Located along Campbell Street. Twisted habit, prolific epicormic growth off stem. Main leader lost and heavily pruned over roadway.	5B	L	L	2.1	3.9	48
U66	<i>Melaleuca quinquenervia</i> Broad-leaved Paperbark	12	7	475	M	G	F	Locally native species. Located along Campbell Street outside RMS boundary. Girdled roots noted at base of stem, Inclusions and twiggy deadwood.	2A	M	M	2.5	5.8	104
U67	<i>Melaleuca quinquenervia</i> Broad-leaved Paperbark	10	12	500	M	G	G	Locally native species. Located along Campbell Street outside RMS boundary. No special problems noted at time of assessment.	1A	H	H	2.5	6.0	113
U68	<i>Melaleuca quinquenervia</i> Broad-leaved Paperbark	5	5	225	EM	G	G-F	Locally native species. Located along Campbell Street. Lost limbs over roadway, damage deep into cambium.	5B	L	L	1.8	2.7	23

Tree No.	Genus & species Common Name	Ht (m)	Sp (m)	DBH (mm)	Age	V	C	Comments	ULE	TSR	RV	SRZ (m)	TPZ (m)	TPZ (area)
U69	<i>Melaleuca quinquenervia</i> Broad-leaved Paperbark	7	9	450	M	G	F	Locally native species. Located along Campbell Street outside RMS boundary. Multiple stems, included.	1A	M	H	2.4	5.4	92
U70	<i>Melaleuca quinquenervia</i> Broad-leaved Paperbark	12	12	700/ 625	LM	G	G	Locally native species. Located along Campbell Street outside RMS boundary. Young aerial roots extending down between branch/stem unions.	1A	H	H	3.3	11.4	408
U71	<i>Melaleuca quinquenervia</i> Broad-leaved Paperbark	7	8	@ 1m AGL 275	EM	G	G	Locally native species. Located along Campbell Street. Co-dominant @ 1m AGL.	1A	M	H	2.0	3.3	35
U72	<i>Melaleuca quinquenervia</i> Broad-leaved Paperbark	10	7	AB 850	LM	G	G-F	Locally native species. Located along Campbell Street outside RMS boundary. Multiple, included stems.	2A	M	M	3.1	10.2	327
U73	<i>Angophora costata</i> Sydney Red Gum	3	2	75 (100)	Y	G	G	Locally native species. Located along Campbell Street. No special problems noted at time of assessment.	5A	L	L	1.5	2	7
U74	<i>Melaleuca quinquenervia</i> Broad-leaved Paperbark	13	12	AB 1100	LM	G	G	Locally native species. Located along Campbell Street outside RMS boundary. Co-dominant @ 1.4m AGL.	1A	H	H	3.5	13.2	547
U75	<i>Melaleuca quinquenervia</i> Broad-leaved Paperbark	8.5	5	275	EM	G	F	Locally native species. Located along Campbell Street. Co-dominant stems with one torn out over roadway @ .3m AGL, damage deep into cambium.	3C	M	L	2.0	3.3	35
U76	<i>Melaleuca quinquenervia</i> Broad-leaved Paperbark	12	10	AB 950	LM	G	F	Locally native species. Located along Campbell Street. Co-dominant @ .3m AGL, squeezing stems/branches.	2A	M	M	3.3	11.4	408
U77	<i>Pittosporum undulatum</i> Sweet Pittosporum	7	7	AB 400	M	G	F	Locally native though generally considered an environmental weed species. Located along Campbell Street. Poor form, low sprawling branches.	3B	L	L	2.3	4.8	72

Tree No.	Genus & species Common Name	Ht (m)	Sp (m)	DBH (mm)	Age	V	C	Comments	ULE	TSR	RV	SRZ (m)	TPZ (m)	TPZ (area)
U78	<i>Angophora costata</i> Sydney Red Gum	4	2.5	100	Y	G	G	Locally native species. Located along Campbell Street. Mechanical wound to base of stem roadside.	5A	L	L	1.5	2	7
U79	<i>Melaleuca quinquenervia</i> Broad-leaved Paperbark	11	12	AB 750	M	G	G	Locally native species. Located along Campbell Street outside RMS boundary. No special problems noted at time of assessment.	1A	H	H	3.0	9.0	255
U80	<i>Melaleuca quinquenervia</i> Broad-leaved Paperbark	8	10	575	M	G	G	Locally native species. Located along Campbell Street. No special problems noted at time of assessment.	1A	H	H	2.7	7.0	152
U81	<i>Cupressus sp.</i> Conifer	10	6	375	M	G	G	Introduced exotic species Located along Campbell Street outside RMS boundary. No special problems noted at time of assessment.	2A	M	M	2.2	4.5	64
U82	<i>Melaleuca quinquenervia</i> Broad-leaved Paperbark	7	4.5	200	M	G	G	Locally native species. Located along Campbell Street. Co-dominant @ 3m AGL, union sound.	2A	H	H	1.7	2.4	18
U83	<i>Cupressus sp.</i> Conifer	10.5	5	325	M	G	G	Introduced exotic species. Located along Campbell Street outside RMS boundary. Lean to north, self corrected. Steel pole engulfed by base of stem.	2A	M	M	2.1	3.9	48
U84	<i>Cupressus sp.</i> Conifer	11	6	275	M	G	G	Introduced exotic species. Located along Campbell Street outside RMS boundary. Branches in contact with terrace.	2A	M	M	2.0	3.3	35
U85	<i>Melaleuca quinquenervia</i> Broad-leaved Paperbark	9	7	400	EM	G	G	Locally native species. Located along Campbell Street. Shallow roots noted, service lines through upper canopy.	2A	M	M	2.3	4.8	72
U86	<i>Melaleuca quinquenervia</i> Broad-leaved Paperbark	8	7	400	EM	G	G	Locally native species. Located along Campbell Street. Co-dominant @ 3.5m AGL.	2A	M	M	2.3	4.8	72
U87	<i>Melaleuca (nee Callistemon) viminalis</i> Weeping Bottlebrush	4.5	6	AB 125	M	G	G	Introduced native species. Located along Campbell Street. Sprawling specimen, in slightly raised garden bed.	5B	L	L	1.5	2	8

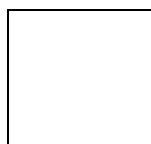
Tree No.	Genus & species Common Name	Ht (m)	Sp (m)	DBH (mm)	Age	V	C	Comments	ULE	TSR	RV	SRZ (m)	TPZ (m)	TPZ (area)
U88	<i>Melaleuca quinquenervia</i> Broad-leaved Paperbark	11	9.5	@ 1m AGL 600	M	G	G	Locally native species. Located along Campbell Street. Lost/torn out limb to the north. Co-dominant @ 1.2m AGL.	2A	M	M	2.7	7.2	163
U89	<i>Leptospermum scoparium</i> Tea-Tree	*6	4	*100	M	G	G	Locally native species. Located along Campbell Street <u>within private property</u> no. 12. Assessment limited, clear stem.	3A?	L	L	1.5	2	7
U90	<i>Callistemon/Melaleuca</i> sp. Bottlebrush	4.5	4	AB 175	M	G	F	Introduced native species? Located along Campbell Street. Lopped, suppressed, canopy orientated to the west.	3C	L	L	1.6	2.2	15
U91	<i>Harpullia pendula</i> Tulipwood	*9	7	*250	EM	G	G	Introduced native species. Located along Campbell Street <u>within private property</u> no. 14. Heavily pruned, low limb (approx 2-2.5m AGL) extends over footpath and roadway.	2A?	M	M	1.9	3.0	28
U92	<i>Callistemon/Melaleuca</i> sp. Bottlebrush	6.5	6	200	M	G	F	Introduced native species? Located along Campbell Street. Lopped for service lines, stubs left. Heavily crown raised, exposed roots.	3C	L	L	1.7	2.4	18
U93	<i>Callistemon/Melaleuca</i> sp. Bottlebrush	6	7	AB 225	M	G	P	Introduced native species? Located along Campbell Street. Co-dominant @ .1m AGL, included stems. Lopped and mechanical damage noted, heavily crown raised.	3C	L	L	1.8	2.7	23
U94	<i>Callistemon/Melaleuca</i> sp. Bottlebrush	5	5	AB 275	M	G	F	Introduced native species? Located along Campbell Street. Lopped, under service lines, epicormic growth noted.	2C	L	L	2.0	3.3	35
U95	Unknown rainforest species	6	6	AB 100	EM	G	F-G	Possibly an introduced native species? Located along Campbell Street. Very low limbs over path and roadway, prolific epicormic growth.	5B?	L?	L?	1.5	2	7
U96	<i>Callistemon/Melaleuca</i> sp. Bottlebrush	9	6	AB 275	LM	G	G	Introduced native species? Located along Campbell Street. Within raised garden bed (200mm above footpath).	3C	L	L	2.0	3.3	35

Tree No.	Genus & species Common Name	Ht (m)	Sp (m)	DBH (mm)	Age	V	C	Comments	ULE	TSR	RV	SRZ (m)	TPZ (m)	TPZ (area)
U97	<i>Melaleuca quinquenervia</i> Broad-leaved Paperbark	9	8	475	M	G	G-F	Introduced native species. Located along Campbell Street. Cavity/wound to SW, deep into cambium.	2A	M	M	2.5	5.8	104
U98	<i>Casuarina glauca</i> Swamp She-Oak	13	10	500	M	F-P	P	Locally native species. Located along Campbell Street. Poor form, large dead sections over road/parking lane. In spiral of decline.	4A	L	L	2.5	6.0	113
U99	<i>Melaleuca quinquenervia</i> Broad-leaved Paperbark	11.5	8	@ 1m AGL 500	M	G	G-F	Introduced native species. Located along Campbell Street. Co-dominant @ 1.5m AGL, included. Large limbs removed over roadway and pathway.	2A	M	M	2.5	6.0	113
U100	<i>Brachychiton acerifolius</i> Illawarra Flame Tree	10	8	300	EM	G	G-F	Introduced native species. Located along Campbell Street outside RMS boundary. Branches overhang terrace house, crown raised extensively. One low damaged limb with decay on top at branch union.	2A	M	M	2.0	3.6	41
U101	<i>Cupaniopsis anacardioides</i> Tuckaroo	7	8	*AB 300	M	G	G-F	Locally native species. Located on corner of Campbell Street and Haber Street – outside RMS boundary. Low, lateral limbs from ground level, hard to access stem.	2A	M	M	2.0	3.6	41
U102	<i>Corymbia eximia</i> Yellow Bloodwood	13	15	*AB 650	LM	G	G	Locally native species. Located <u>within private property</u> on the corner of Campbell Street and Euston Rd. Low limbs over pathway. No special problems noted at time of assessment.	1A	H	H	2.8	7.8	191
U103	<i>Agonis flexuosa</i> Willow Myrtle	13	17	AB 1100	LM	G	G-F	Introduced native species. Located on the corner of Campbell Street and Euston Rd. Low limbs over pathway, good condition for older specimen.	2A	M	M	3.5	13.2	547
U104	DEAD	-	-	-	-	-	-	Located on private property.	-	-	-	-	-	-

Tree No.	Genus & species Common Name	Ht (m)	Sp (m)	DBH (mm)	Age	V	C	Comments	ULE	TSR	RV	SRZ (m)	TPZ (m)	TPZ (area)
U105	<i>Melaleuca quinquenervia</i> Broad-leaved Paperbark	12	11	750	LM	G	G	Locally native species. Located along Campbell Street. Minor low limbs over pathway, multiple stems @ 2.2m AGL.	2A	H	H	3.0	9.0	255
U106	<i>Melaleuca quinquenervia</i> Broad-leaved Paperbark	12	8	575	LM	G	G	Locally native species. Located along Campbell Street. Co-dominant @ 3m AGL. Low limb over pathway.	2A	H	H	2.7	7.0	152
U107	<i>Corymbia eximia</i> Yellow Bloodwood	8.5	8	* 350	M	G	G	Locally native species. Located <u>within private property</u> . No special problems noted.	1A	H	H	2.2	4.2	55
U108	<i>Melaleuca quinquenervia</i> Broad-leaved Paperbark	12	15	AB 1025	LM	G	G-F	Locally native species. Located along Campbell Street. Multiple stems @ 1m AGL, aerial roots growing into unions.	2A	M	M	3.4	12.6	499
U109	DEAD GUM	-	-	-	-	-	-	Located on private property.	-	-	-	-	-	-
U110	<i>Melaleuca quinquenervia</i> Broad-leaved Paperbark	12	9	575	M	G	G	Locally native species. Located along Campbell Street. No special problems noted at time of assessment. Multiple stems @ 2m AGL.	2A	H	H	2.7	7.0	152
U111	<i>Eucalyptus</i> sp. Gum	12.5	14	*AB 450	M	G	G	Native species. Located <u>within private property</u> . Leans away from pathway.	2A	M?	M	2.4	5.4	92
U112	<i>Melaleuca</i> (formerly <i>Callistemon</i>) <i>viminalis</i> Weeping Bottlebrush	4.5	5	*AB 275	M	G	G	Introduced native species. Located <u>within private property</u> . Sprawling specimen.	5B	L	L	2.0	3.3	35
U113	<i>Melaleuca quinquenervia</i> Broad-leaved Paperbark	12	10	625	M	G	G	Locally native species. Located along Campbell Street. Co-dominant @ 2m AGL, slightly included union. Previous fire at base of stem.	2A	H	H	2.8	7.6	180
U114	<i>Corymbia eximia</i> Yellow Bloodwood	9	10	*AB 200	M	G	G	Locally native species. Located <u>within private property</u> . Low limb over pathway.	1A	H	H	1.7	2.4	18
U115	<i>Eucalyptus</i> sp. Gum	14	11	*325	M	G	G-F	Native species. Located <u>within private property</u> . Low limb over pathway.	2A	M?	M	2.1	3.9	48

Tree No.	Genus & species Common Name	Ht (m)	Sp (m)	DBH (mm)	Age	V	C	Comments	ULE	TSR	RV	SRZ (m)	TPZ (m)	TPZ (area)
U116	<i>Callistemon/Melaleuca</i> sp. Bottlebrush	4.5	6	*AB 200	M	G	F	Introduced native species. Multiple, included stems at ground level.	3D	L	L	1.7	2.4	18
U117	<i>Angophora costata</i> Sydney Red Gum	4.2	2	100	Y	G	G	Locally native species. Located along Campbell Street. No special problems noted at time of assessment.	5	L	L	1.5	2	7
U118	<i>Eucalyptus</i> sp. Gum	9	8	*200/ 200	M	G	G	Native species. Located <u>within private property</u> . Co-dominant at ground level. Thin canopy, epicormic branches noted.	2A	M	M	2.0	3.3	35
U119	<i>Eucalyptus microcorys</i> Tallowwood	14.5	12	*550	M	G	G	Introduced native species. Located <u>within private property</u> . Low branch over footpath.	1A	M	H	2.6	6.6	137
U120	<i>Eucalyptus microcorys</i> Tallowwood	14.5	10	*550	M	G	G	Introduced native species. Located <u>within private property</u> . Unable to clearly assess due to lack of access/clear vision.	2A?	M?	M	2.6	6.6	137
U121	<i>Angophora costata</i> Sydney Red Gum	3	2	75 (100)	Y	G	G	Locally native species. Located corner of Campbell Street and Burrows Rd. No special problems noted at time of assessment.	5A	L	L	1.5	2	7
U122	<i>Corymbia eximia</i> Yellow Bloodwood	*12	8	*AB 400	M	G	G?	Locally native species. Located <u>within private property</u> . Unable to inspect due to lack of access and dense covering on fence.	1A?	H?	H	2.3	4.8	72

KEY



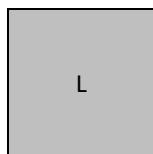
Tree to be retained.



Not classed as 'a tree' under DPE conditions (see Part 1.3).



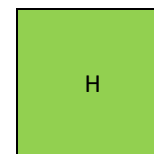
Tree proposed to be removed.



Low Retention Value-These trees are not considered important for retention.



Medium Retention Value-These trees may be retained & protected.



High Retention Value -These trees are considered important for retention and should be retained and protected.

* DBH is visually estimated (usually adjoining trees or those that are hard to access). AB – above *buttress roots*. AGL - above ground level.

** Determined by the largest number found (i.e. broadest branch spread or highest DBH) within a tree group to ensure ample tree protection zone.

H refers to the approximate height of a tree in metres, from base of stem to top of tree crown.

Sp refers to the approximate and average spread in metres of branches/canopy (the 'crown') of a tree.

DBH refers to the approximate diameter of tree stem at breast height i.e. 1.4 metres above ground (unless otherwise noted), and expressed in millimetres.

Age refer to Appendix A -Terms and Definitions for more detail.

V refers to the tree's vigour (health) Refer to Appendix A -Terms and Definitions for more detail.

C refers to the tree's structural condition. Refer to Appendix A -Terms and Definitions for more detail.

ULE refers to the estimated *Useful Life Expectancy* of a tree. Refer to Appendices A and B for details.

TSR The *Tree Significance Rating* considers the importance of the tree as a result of its prominence in the landscape and its amenity value, from the point of view of public benefit. Refer to Appendix C – Significance of a Tree Assessment Rating for more detail.

RV Refers to the retention value of a tree, based on the tree's ULE *and* Tree Significance. Refer to Appendix C – Significance of a Tree Assessment Rating for more detail.

SRZ Structural Root Zone (SRZ) refers to the critical area required to maintain stability of the tree and is noted in the above tree schedule in radial metres. Refer to Appendix A - Terms and Definitions for more detail.

TPZ Tree Protection Zone (TPZ) refers to the *tree protection zones* for trees to be retained and is noted in the above tree schedule in radial metres. Refer to Appendix A -Terms and Definitions for more detail.

7.7 Appendix G - Photographs



Photo 2 – Broad Leaved Paperbarks in narrow verge on Barwon Park Rd
Red arrow points to Tree U36 that will require removal to accommodate works.



Photo 3 – Broad Leaved Paperbarks in Sydney Park in garden beds (U41 & U44).



Photo 4 – Broad Leaved Paperbarks in Sydney Park afforded unrestricted growth conditions to the north. All trees right of footpath require removal, those on left retained.



Photo 5 – Tree U91 within private property with low branch within works zone.



Photo 6 – Tree U101 - Low branching on tree outside works zone that may require pruning, tree proposed for retention.



Photo 7 – Late mature Willow Peppermint (U103) that will require removal.

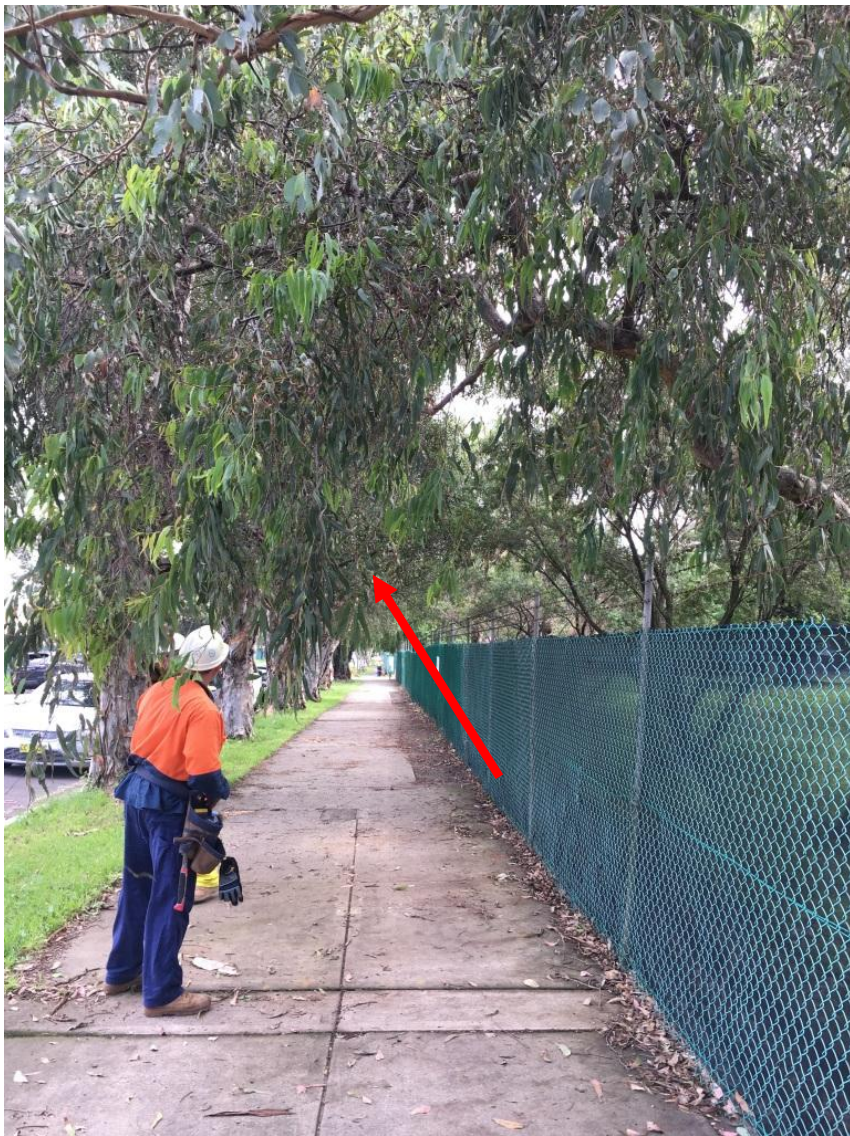


Photo 8 –Tree U114 - Low branching on tree in private property likely to require pruning but is being retained.



Photo 9 –Unrestricted and optimal growth conditions to north of trees in private Property. Branch of U114 and Tree U112 can just be seen, both trees will be retained.

7.8 Appendix H –Site Location Plan

