



## **Arboricultural Impact Assessment Report**

### **For the site address**

Budawang School  
(SSD-8845345)  
Lot 200, D.P 1192140  
No. 17 Croobyar Road  
MILTON, NSW

### **Prepared for**

NSW Department of Education  
Level 8, 259 George Street  
SYDNEY, NSW

### **AUTHOR**

Warwick Varley and Geoff Beisler

### **STATUS**

Draft	November 2020
Draft 2	February 2021
Draft 3	March 2021
Final	March 2021

### **REFERENCE**

D4327

### **OFFICE**

**A** PO Box 456, WOLLONGONG NSW 2520  
**P** 1300 767 414  
**E** [admin@alliedtrees.com.au](mailto:admin@alliedtrees.com.au)  
**W** [www.alliedtrees.com.au](http://www.alliedtrees.com.au)

## **TABLE OF CONTENTS**

<b>1.0 INTRODUCTION .....</b>	<b>1</b>
<b>2.0 STANDARDS .....</b>	<b>1</b>
<b>3.0 DISCLOSURE STATEMENT.....</b>	<b>2</b>
<b>4.0 METHODOLOGY .....</b>	<b>2</b>
<b>5.0 PLAN 1 - TREE LOCATION .....</b>	<b>6</b>
<b>6.0 TABLE 1 – TREE SPECIES DATA.....</b>	<b>11</b>
<b>7.0 TREE PROTECTION .....</b>	<b>12</b>
<b>8.0 PROTECTION SPECIFICATION .....</b>	<b>31</b>
<b>9.0 SUMMARY OF TREE IMPACT .....</b>	<b>33</b>
<b>10.0 APPENDIX A- DEFINITIONS.....</b>	<b>34</b>
<b>APPENDIX B- PROTECTION MEASURES.....</b>	<b>41</b>

**THE USE OF THIS REPORT IS RESTRICTED FOR THOSE TREES MENTIONED WITHIN FOR  
WHICH THE REPORT WAS ISSUED.**

## **COPYRIGHT**

**©ALLIED TREE CONSULTANCY, 2021**

All Intellectual Property & Copyright Reserve

**Subject to the *Copyright Act 1968*;**

The use of any or all Sections of this report in any documentation relating to this site is permissible so long as the copyright is noted at the completion of any and all Sections.

Any other use of this report, or any part because of that for any other purpose or in the documentation for any other site, is strictly prohibited. No part of this report may be reproduced, transmitted, stored in a retrieval system, or updated in any form or by any means (electronic, photocopying, recording, or otherwise) without written permission

## 1.0 Introduction

**1.1** *Allied Tree Consultancy* (ATC) has been commissioned by the *NSW Department of Education* to prepare an Arboricultural Impact Assessment for the State Significant Development proposal for the Budawang School (SSD-8845345), is located at No. 17 Croobyar Road, Milton. This proposal includes the construction of a buildings and related infrastructure as part of a school. This report includes eighty-one trees located on and adjacent to the lot and discusses the viability of these trees based on the proposed works.

**1.2** This report will address these trees, the:

- species' identification, location, dimensions, and condition;
- SULE (Safe Useful Life Expectancy) and STARS (Significance of a Tree Assessment Rating System) rating;
- discussion and impact of the proposed works on each tree;
- tree protection zones and protection specifications for trees recommended for retention.

## 2.0 Standards

**2.1** Allied Tree Consultancy provides an ethical and unbiased approach to all assignments, possessing no association with private utility arboriculture or organisations that may reflect a conflict of interest.

**2.2** This report must be made available to all contractors during the tendering process so that any cost associated with the required works for the protection of trees can be accommodated.

**2.3** **It is the responsibility of the project manager to provide the requirements outlined in this report relative to the Protection Zones, Measures (Section 7.0) and Specifications (Section 8.0) to all contractors associated with the project before the initiation of work.**

**2.4** All tree-related work outlined in this report is to be conducted in accordance with the:

- Australian Standard – AS4373; Pruning of Amenity Trees.
- Guide to Managing Risks of Tree Trimming and Removal Work<sup>1</sup>.
- All tree works must be carried out at a tertiary level (minimum Certificate-level 3) qualified and experienced (minimum five years) arboriculturist.

---

<sup>1</sup> Safe Work Australia; July 2016; Guide to Managing Risks of Tree Trimming and Removal Work, Australia

- For any works in the vicinity of electrical lines, the arboriculturist must possess the ISSC26 endorsement (Interim guide for operating cranes and plant in proximity to overhead powerlines).

**2.5** As a minimum requirement, all trees recommended for retention in this report must have removed all dead, diseased, and crossing limbs and branch stubs to be pruned to the branch collar. This work must comply with the local government tree policy (Shoalhaven City Council) and Section 2.4.

**2.6** Any tree stock subject to conditions for works carried out in this report must be supplied by a registered Nursery that adheres to the AS 2303; 2015<sup>2</sup>.

- All tree stock must be of at least 'Advanced' size (minimum 75lt) unless otherwise requested.
- All tree stock requested must be planted with adequate protection. This may include tree guards (protect stem and crown) and if planted in a lawn area, a suitable barrier (planter ring) of an area, at least 1m<sup>2</sup> to prevent grass from growing within the area adjacent to the stem.

### **3.0 Disclosure Statement**

Trees are living organisms and, for this reason, possess natural variability. This cannot be controlled. However, risks associated with trees can be managed. An arborist cannot guarantee that a tree will be safe under all circumstances nor predict the time when a tree will fail. To live or work near a tree involves some degree of risk, and this evaluation does not preclude all the possibilities of failure.

### **4.0 Methodology**

**4.1** The following tree assessment was undertaken using criteria based on the guidelines laid down by the International Society of Arboriculture.

**4.2** The format of the report is summarised below;

**4.2.1 Plan 1;** Tree Location Relative to Site: This is an unscaled plan reproduced from the Survey Plan as referenced in Section 4.4.1, depicting the area of assessment.

**4.2.2 Table 1;** This table compiles the tree species, dimensions, brief assessment (history, structure, pest, disease or any other variables subject to the tree), significance, allocation of the zones of

---

<sup>2</sup> Australian Standard; 2015, AS2303, Tree stock for landscape use, Australia

protection (i.e., Tree Protection Zone<sup>3</sup> ;TPZ and Structural Root Zone; SRZ) for each tree illustrated in Plan 1, Section 5.0. All measurements are in metres.

#### **4.2.3 Discussion relating to the site assessment and proposed works regarding the trees.**

#### **4.2.4 Protection Specification;** Section 8.0 details the requirements for that area designated as the Tree Protection Zone (TPZ), for those trees recommended for retention.

### **4.3** The opinions expressed in this report, and the material, upon which they are based were obtained from the following process and data supplied:

**4.3.1** Site assessment on the 17<sup>th</sup> October 2020, and the 1<sup>st</sup> February 2021 using the method of the Visual Tree Assessment<sup>4</sup>. This has included a Level 2 risk assessment, being a *Basic Assessment*<sup>5</sup>. The assessment has been conducted by Geoff Beisler<sup>6</sup> on behalf of *Allied Tree Consultancy*.

**4.3.2** Trees included in this report are those that conform to the description of a prescribed tree by the local government policy.

**4.3.3** All measurements, unless specified otherwise, are taken from the tree centre.

**4.3.4** Tagging of trees with scribed aluminium tags nailed to the trees at chest level and facing the centre of the site. Trees No. 43 and 65-72 are neighbouring trees; therefore, no tags were installed. Tree No. 43 has a tag on the mesh fence adjacent. Trees No. 65-72 have the corresponding number written on the colour bond fence adjacent each tree for the use of the surveyors.

**4.3.5** Raw data from the preliminary assessment, including the specimen's dimensions was compiled by the use of a diameter tape, height clinometer, angle finder, compass, steel probes, Teflon hammer, binoculars and recording instruments.

---

<sup>3</sup> Australian Standard, 4970; 2009 – Protection of Trees on Development Sites, Australia

<sup>4</sup> Mattheck, C. Breloer, H.,1994, The Body Language of Trees – A handbook for failure analysis  
The Stationary Office, London

<sup>5</sup> Dunster J.A., 2013, Tree Risk Assessment Manual, International Society of Arboriculture, 2013, USA

<sup>6</sup> Consulting Arborist, Diploma of Arboriculture (level 5)

#### **4.4 Documentation provided**

The following documentation has been provided to Allied Tree Consultancy and utilised within the report.

##### **4.4.1 Surveyor**

Drawn by *Phillip Brown Land Surveyors*

Overall Site (without trees)

Date: 11 June 2013

Reference: 4172.2

Drawing No: 4172.DWG

Partial Site; Four drawings (including trees)

Date: 10 November 2020

Reference: 5647.SITE1, 5647.SITE2, 5647.SITE3, 5647.SITE4

Drawing No: 5647CONT1.DWG

Note 1: See Section 4.5.1

##### **4.4.2 Design**

Drawn by *Group GSA*

Date: 11 May 2020

Reference: 190941

Drawing No: A2000, Issue J

Note 2: See Section 4.5.2

##### **4.4.3 Engineering (Stormwater)**

Drawn by *Henry and Hymas*

Date: 18 December 2020

Reference: not referenced

Drawing No: 20971\_DA\_C101, revision 02

Note 2: See Section 4.5.2

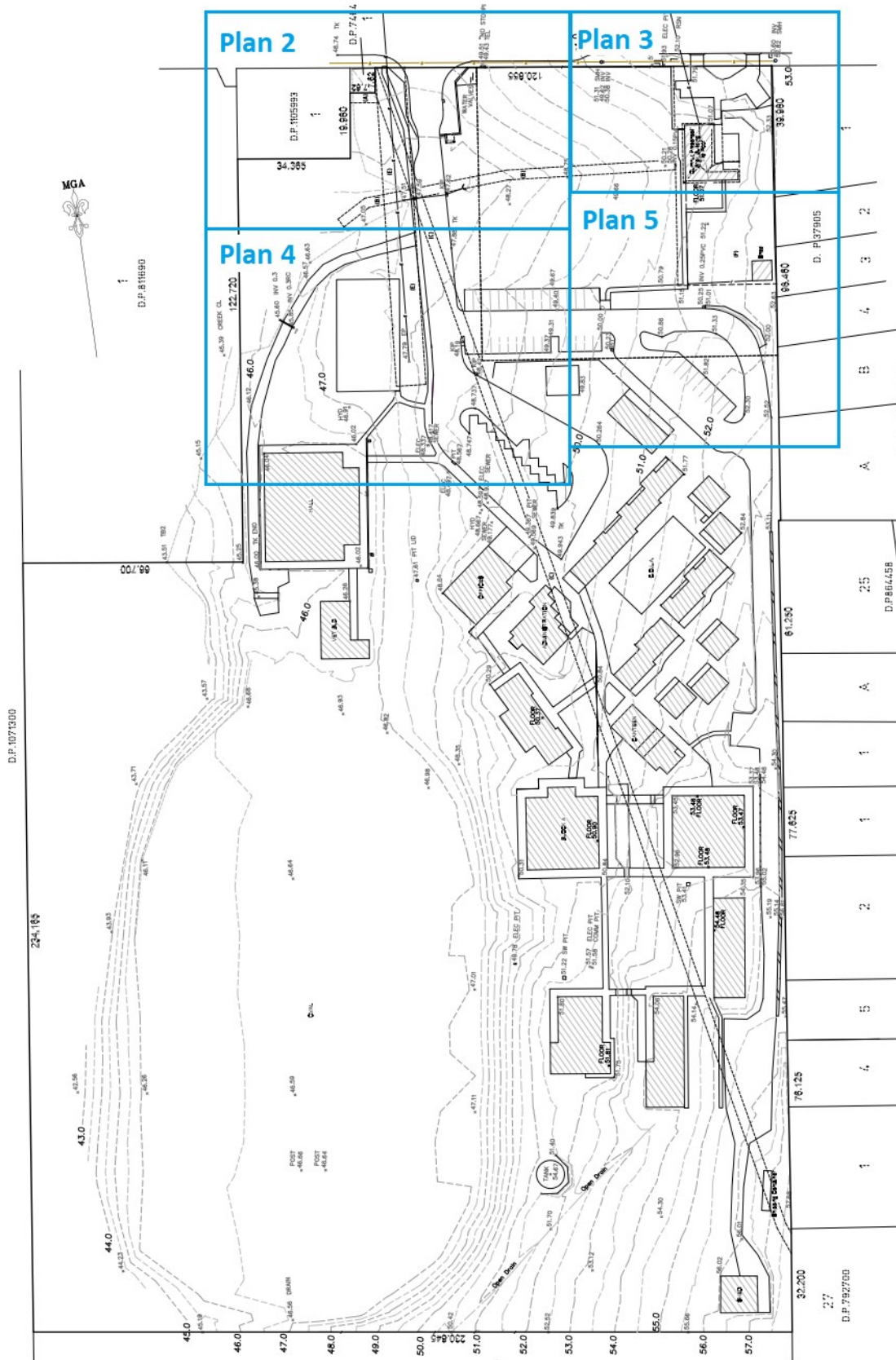
#### **4.5 Limitations of the assessment/discussion process**

**4.5.1** Trees No. 34 and 81 have not been included within this drawing, therefore have been transposed by Allied Tree Consultancy. The tree location was established by scaling from the survey drawing. Therefore discrepancies that can affect the actual impact on the trees can exist.

**4.5.2** Trees No. 22, 34, 43, 45-47, 73, and 79 have not been include within this drawing, therefore, have been transposed by Allied Tree Consultancy. The tree location was established by scaling from the survey drawing. Therefore discrepancies that can affect the actual impact on the trees can exist.

- 4.5.3** The assessment has considered only those target zones that are apparent to the author and the visually apparent tree conditions during the time of assessment.
- 4.5.4** Any tree, regardless of apparent defects, would fail if the forces applied to exceed the strength of the tree or its parts, for example, extreme storm conditions.
- 4.5.5** The assessment has been limited to that part of the tree, which is visible, existing from the ground level to the crown. Root decay can exist and, in some circumstances, provide no symptoms of the presence. This assessment responds to all the symptoms provided by a tree, however, cannot provide a conclusive recommendation regarding any tree that may have extensive root decay that leads to windthrow without the appropriate symptoms.

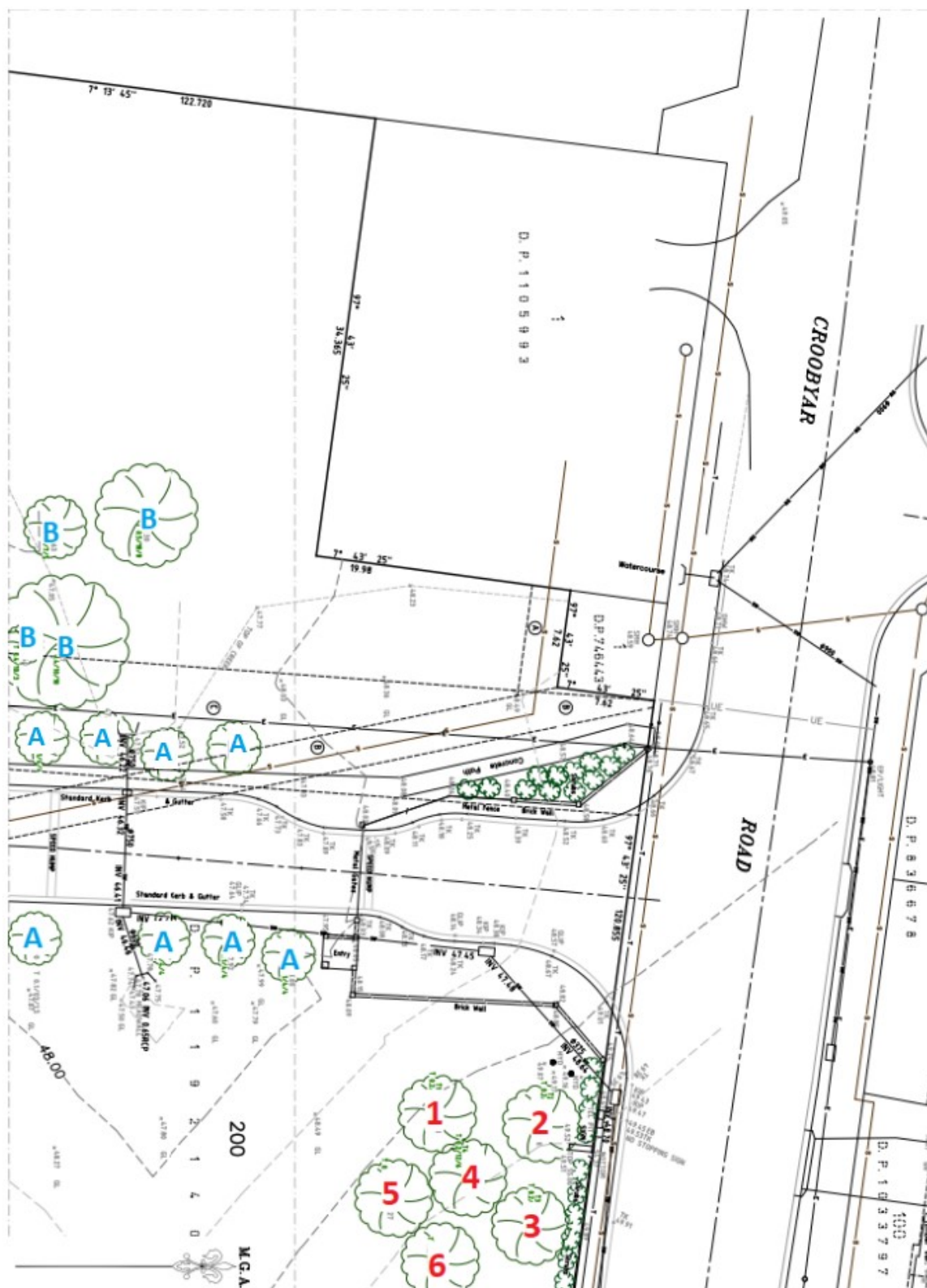
## 5.0 Plan 1; Area of assessment



Not to scale

Source: Adapted from Phillip Brown Surveys P/L, see Section 4.4.1



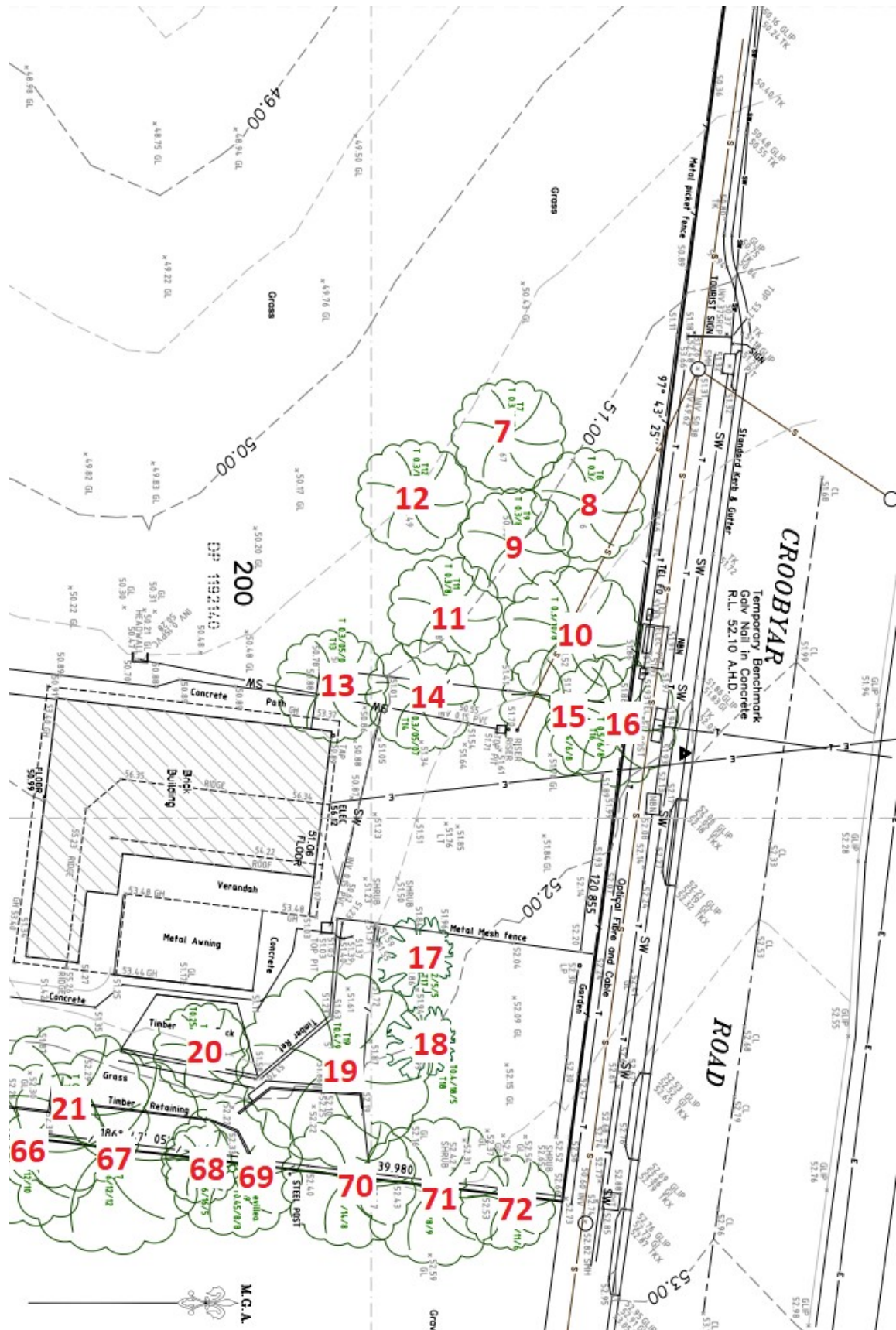
**5.1 Plan 2; Area of assessment illustrating tree location**

Not to scale

Trees labelled A, are <5m. Trees labelled b are outside the scope of works, see Section 7.0.

Source: Adapted from Phillip Brown Surveys P/L, see Section 4.4.1

## 5.2 Plan 3; Area of assessment illustrating tree location



Not to scale

Source: Adapted from Phillip Brown Surveys P/L, see Section 4.4.1

**5.3 Plan 4; Area of assessment illustrating tree location**

Not to scale

Trees labelled A, are <5m. Trees labelled B are outside the scope of works, see Section 7.0.

Source: Adapted from Phillip Brown Surveys P/L, see Section 4.4.1



**5.4 Plan 5; Area of assessment illustrating tree location**

Not to scale

Trees labelled A, are <5m. Trees labelled B are outside the scope of works, see Section 7.0.

Source: Adapted from *Phillip Brown Surveys P/L*, see Section 4.4.1

## 6.0 Table 1 – Tree Species Data

Terminology/references provided in Appendix A.

Tree No.	Botanical Name Common Name	Height (m)	DBH (m)	Crown Spread (m)	Age	Crown Class	Crown Aspect	Vitality Rating	SULE Rating	STARS Rating	TPZ	SRZ
1	<i>Lophostemon confertus</i> Brush Box	7	0.16	4 x 4	M	D	Sym.	A	1B	Medium	1.92	1.53
<b>Assessment</b> This tree presents as typical for the species.											<b>Development Impact</b> See Section 7.1.3	
2	<i>Lophostemon confertus</i> Brush Box	7	0.16	4 x 4	M	D	Sym.	A	1B	Medium	1.92	1.53
<b>Assessment</b> This tree presents as typical for the species.											<b>Development Impact</b> See Section 7.1.3	
3	<i>Lophostemon confertus</i> Brush Box	8	0.22	5 x 5	M	D	Sym.	A	1B	Medium	2.64	1.75
<b>Assessment</b> This tree presents as typical for the species.											<b>Development Impact</b> See Section 7.1.5	
4	<i>Lophostemon confertus</i> Brush Box	9	0.18	4 x 5	M	D	Sym.	A	1B	Medium	2.16	1.61
<b>Assessment</b> This tree presents as typical for the species.											<b>Development Impact</b> See Section 7.1.3	
5	<i>Lophostemon confertus</i> Brush Box	7	0.16	4 x 4	M	D	Sym.	A	1B	Medium	1.92	1.53
<b>Assessment</b> This tree presents as typical for the species.											<b>Development Impact</b> See Section 7.1.3	
6	<i>Lophostemon confertus</i> Brush Box	6	0.17	5 x 5	M	D	Sym.	A	1B	Medium	2.04	1.57
<b>Assessment</b> This tree presents as typical for the species.											<b>Development Impact</b> See Section 7.1.3	

Tree No.	Botanical Name Common Name	Height (m)	DBH (m)	Crown Spread (m)	Age	Crown Class	Crown Aspect	Vitality Rating	SULE Rating	STARS Rating	TPZ	SRZ
7	<i>Lophostemon confertus</i> Brush Box	6	0.17	5 x 5	M	D	Sym.	A	1B	Medium	2.04	1.57
<b>Assessment</b> This tree presents as typical for the species.											<b>Development Impact</b> See Section 7.1.3	
8	<i>Lophostemon confertus</i> Brush Box	8	0.23	6 x 6	M	C	Sym.	A	1B	Medium	2.76	1.79
<b>Assessment</b> This tree presents as typical for the species.											<b>Development Impact</b> See Section 7.1.5	
9	<i>Lophostemon confertus</i> Brush Box	8	0.20	6 x 6	M	C	Sym.	A	1B	Medium	2.40	1.68
<b>Assessment</b> This tree presents as typical for the species.											<b>Development Impact</b> See Section 7.1.3	
10	<i>Lophostemon confertus</i> Brush Box	9	0.21	5 x 5	M	C	Sym.	A	1B	Medium	2.52	1.72
<b>Assessment</b> This tree presents as typical for the species.											<b>Development Impact</b> See Section 7.1.3	
11	<i>Lophostemon confertus</i> Brush Box	8	0.19	5 x 6	M	D	Sym.	A	1B	Medium	2.28	1.65
<b>Assessment</b> This tree presents as typical for the species.											<b>Development Impact</b> See Section 7.1.3	
12	<i>Lophostemon confertus</i> Brush Box	7	0.20	5 x 6	M	D	Sym.	A	1B	Medium	2.40	1.68
<b>Assessment</b> This tree presents as typical for the species.											<b>Development Impact</b> See Section 7.1.3	
13	<i>Leptospermum petersonii</i> Lemon-scented Tea Tree	7	0.43 <sup>B,C</sup>	7 x 8	M	C	Sym.	A	2A	Medium	5.16	2.32
<b>Assessment</b> This tree presents as typical for the species.											<b>Development Impact</b> See Section 7.1.3	

Tree No.	Botanical Name Common Name	Height (m)	DBH (m)	Crown Spread (m)	Age	Crown Class	Crown Aspect	Vitality Rating	SULE Rating	STARS Rating	TPZ	SRZ
14	<i>Leptospermum petersonii</i> Lemon-scented Tea Tree	6	0.41 <sup>B,C</sup>	5 x 6	M	C	E	B	2D/C4	Medium	4.92	2.28
<b>Assessment</b> This tree presents as typical for the species, however decline is evident in the western crown. A fungal fruiting body ( <i>Phellinus</i> ) is located on the western stem.											<b>Development Impact</b> See Section 7.1.2 and 7.1.3	
15	<i>Leptospermum petersonii</i> Lemon-scented Tea Tree	8	0.58 <sup>B,C</sup>	8 x 8	M	C	E	A	2A	Medium	6.96	2.63
<b>Assessment</b> This tree presents as typical for the species.											<b>Development Impact</b> See Section 7.1.3	
16	<i>Hakea spp.</i> <sup>A</sup> Hakea	6	0.55 <sup>B,C</sup>	6 x 5	O	I	N	B	4C	Low	6.60	2.57
<b>Assessment</b> This tree appears to be senescing. Actively (albeit slowly) failing inclusions are located at the base (two) and also at 1.2m											<b>Development Impact</b> See Section 7.1.2 and 7.1.3	
17	<i>Melaleuca rigidus</i> Stiff Bottlebrush	5	0.23 <sup>B</sup>	6 x 6	M	C	W	A	2A	Medium	2.76	1.79
<b>Assessment</b> This tree presents as typical for the species.											<b>Development Impact</b> See Section 7.1.3	
18	<i>Hakea spp.</i> <sup>A</sup> Hakea	6	0.44 <sup>B,C</sup>	5 x 6	O	C	Sym.	B	3A	Low	5.28	2.34
<b>Assessment</b> This tree presents decline in the lower crown. A basal cavity is evident on the west side.											<b>Development Impact</b> See Section 7.1.2 and 7.1.3	
19	<i>Fraxinus angustifolia</i> Raywood' Claret Ash	10	0.37 0.29	12 x 12	M	D	W	A	2A	Medium	5.64	2.41
<b>Assessment</b> This tree presents as typical for the species.											<b>Development Impact</b> See Section 7.1.5	

Tree No.	Botanical Name Common Name	Height (m)	DBH (m)	Crown Spread (m)	Age	Crown Class	Crown Aspect	Vitality Rating	SULE Rating	STARS Rating	TPZ	SRZ
20	<i>Fraxinus griffithii</i> Evergreen Ash	5	0.21 <sup>B</sup>	5 x 5	M	C	Sym.	A	2A	Low	2.52	1.72
<b>Assessment</b> This tree presents as typical for the species.											<b>Development Impact</b> See Section 7.1.5	
21	<i>Fraxinus angustifolia</i> Raywood' Claret Ash	12	0.37	8 x 5	M	C	W	C	4A	Low	4.44	2.18
<b>Assessment</b> This tree presents excessive decline, the upper half is dead.											<b>Development Impact</b> See Section 7.1.2 and 7.1.1	
22	<i>Fraxinus angustifolia</i> Raywood' Claret Ash	11	0.41	13 x 11	M	C	Sym.	A	2A	Medium	4.92	2.28
<b>Assessment</b> This tree presents as typical for the species.											<b>Development Impact</b> See Section 7.1.4	
23	<i>Melaleuca quinquenervia</i> Broad Leaf Paperbark	8	0.24 0.23	6 x 6	M	C	Sym.	B	2D	Low	3.99	2.08
<b>Assessment</b> Codominant at the base, the southern stem has an open vertical wound (occluding). Decline is evident in the lower crown, north side.											<b>Development Impact</b> See Section 7.1.3	
24	<i>Syzygium paniculatum</i> Magenta Lilly Pilly	8	0.10 0.10	2 x 2	M	S	N	A	2A	Medium	1.70	1.46
<b>Assessment</b> Codominant at the base.											<b>Development Impact</b> See Section 7.1.3	
25	<i>Melaleuca styphelioides</i> Prickly-leaved Paperbark	9	0.38	7 x 7	M	C	Sym.	A	1B	High	4.56	2.20
<b>Assessment</b> This tree presents as typical for the species.											<b>Development Impact</b> See Section 7.1.3	



Tree No.	Botanical Name Common Name	Height (m)	DBH (m)	Crown Spread (m)	Age	Crown Class	Crown Aspect	Vitality Rating	SULE Rating	STARS Rating	TPZ	SRZ
26	<i>Tristaniaopsis laurina</i> Water Gum	7	0.27 0.15 <sup>B</sup>	6 x 5	M	I	W	A	2A	Medium	3.71	2.02
<b>Assessment</b> This tree presents as typical for the species.											<b>Development Impact</b> See Section 7.1.3	
27	<i>Lophostemon confertus</i> Brush Box	10	0.20	4 x 5	M	C	E	B	2D	Low	2.40	1.68
<b>Assessment</b> This tree presents decline in lower crown.											<b>Development Impact</b> See Section 7.1.3	
28	<i>Melaleuca quinquenervia</i> Broad Leaf Paperbark	10	0.41 <sup>B</sup>	4 x 7	M	C	Sym.	A	2A	Medium	4.92	2.28
<b>Assessment</b> This tree presents as typical for the species.											<b>Development Impact</b> See Section 7.1.3	
29	<i>Lophostemon confertus</i> Brush Box	10	0.38	7 x 7	M	C	S	A	1B	High	4.56	2.20
<b>Assessment</b> This tree presents as typical for the species. Codominant at 1m, the bark is included.											<b>Development Impact</b> See Section 7.1.3	
30	<i>Syzygium spp.</i> <sup>A</sup> Lilly Pilly	6	0.15 <sup>B,C</sup>	5 x 5	M	C	SW	A	2A	Low	1.80	1.49
<b>Assessment</b> The tree presents as a typical Syzygium. No fruits nor flowers were present to aid in the identification.											<b>Development Impact</b> See Section 7.1.3	
31	<i>Syzygium spp.</i> <sup>A</sup> Lilly Pilly	6	0.14 <sup>B,C</sup>	6 x 3	M	C	S	A	2A	Low	1.68	1.45
<b>Assessment</b> The tree presents as a typical Syzygium. No fruits nor flowers were present to aid in the identification.											<b>Development Impact</b> See Section 7.1.3	

Tree No.	Botanical Name Common Name	Height (m)	DBH (m)	Crown Spread (m)	Age	Crown Class	Crown Aspect	Vitality Rating	SULE Rating	STARS Rating	TPZ	SRZ
32	<i>Melaleuca viminalis</i> Weeping Red Bottlebrush	6	0.35 <sup>B,C</sup>	4 x 4	M	I	SW	A	2A	Medium	4.20	2.13
<b>Assessment</b> Multi-stemmed at base.											<b>Development Impact</b> See Section 7.1.5	
33	<i>Tristaniaopsis laurina</i> Water Gum	7	0.26 <sup>B</sup>	5 x 4	M	C	E	A	2A	Medium	3.12	1.88
<b>Assessment</b> This tree presents as typical for the species.											<b>Development Impact</b> See Section 7.1.4	
34	<i>Harpephyllum caffrum</i> Kaffir Plum	4	0.16	4 x 4	Y	D	Sym.	A	1B	Low	1.92	1.53
<b>Assessment</b> This tree presents as typical for the species.											<b>Development Impact</b> See Section 7.1.3	
35	<i>Melaleuca spp.</i> <sup>A</sup> Bottlebrush	5	0.37 <sup>B</sup>	4 x 4	M	C	Sym.	A-B	2D	Low	4.44	2.18
<b>Assessment</b> This tree presents as typical for the species, however exhibits partial crown density, lower crown.											<b>Development Impact</b> See Section 7.1.3	
36	<i>Melaleuca pallidus</i> <sup>A</sup> Yellow Bottlebrush	6	0.30 <sup>B</sup>	5 x 5	M	C	Sym.	A	2A	Medium	3.60	2.00
<b>Assessment</b> This tree presents as typical for the species.											<b>Development Impact</b> See Section 7.1.3	
37	<i>Acacia spp.</i> <sup>A</sup> Wattle	7	0.17 0.06	5 x 5	M	D	Sym.	A	2A	Medium	2.16	1.61
<b>Assessment</b> This tree presents as typical for the species.											<b>Development Impact</b> See Section 7.1.3	
38	<i>Melaleuca pallidus</i> <sup>A</sup> Yellow Bottlebrush	8	0.18 0.18	4 x 4	M	C	Sym.	A	2A	Medium	3.05	1.86
<b>Assessment</b> This tree presents as typical for the species.											<b>Development Impact</b> See Section 7.1.1	

Tree No.	Botanical Name Common Name	Height (m)	DBH (m)	Crown Spread (m)	Age	Crown Class	Crown Aspect	Vitality Rating	SULE Rating	STARS Rating	TPZ	SRZ
39	<i>Melaleuca pallidus</i> <sup>A</sup> Yellow Bottlebrush	7	0.18 <sup>B</sup>	4 x 4	M	C	W	A	2A	Medium	2.16	1.61
<b>Assessment</b> This tree presents as typical for the species.											<b>Development Impact</b> See Section 7.1.1	
40	<i>Casuarina glauca</i> <sup>A</sup> Swamp Sheoak	8	0.14	4 x 3	M	C	E	A	1B	Low	1.68	1.45
<b>Assessment</b> This tree received limited assess due to surrounding vegetation.											<b>Development Impact</b> See Section 7.1.1	
41	<i>Melaleuca pallidus</i> <sup>A</sup> Yellow Bottlebrush	8	0.24 <sup>B,C</sup>	3 x 3	M	C	Sym.	A	2A	Low	2.88	1.82
<b>Assessment</b> This tree presents as typical for the species.											<b>Development Impact</b> See Section 7.1.1	
42	<i>Leptospermum petersonii</i> Lemon-scented Tea Tree	5	0.21 <sup>B,C</sup>	5 x 4	M	C	W	A	2A	Low	2.52	1.72
<b>Assessment</b> This tree received limited assess due to surrounding vegetation.											<b>Development Impact</b> See Section 7.1.1	
43	<i>Quercus palustris</i> Pin Oak	8 <sup>C</sup>	0.46 <sup>C</sup>	5 x 5 <sup>C</sup>	M	C	Sym.	A	2D <sup>C</sup>	Low	5.52	2.39
<b>Assessment</b> This is neighbouring tree. Limited assessment due to surrounding vegetation, vines and lack of access. This tree appears to have been completely lopped at 4m, all growth is epicormic. The metallic tree tag was installed on the fence.											<b>Development Impact</b> See Section 7.1.1	
44	<i>Casuarina glauca</i> Swamp Sheoak	8	0.30 <sup>B,C</sup>	4 x 4	M	I	W	A	3B	Low	3.60	2.00
<b>Assessment</b> This tree appears to be coppiced regrowth in the edge of the internal bitumen road. This may be a sucker from the root system from one of the mature <i>Casuarinas</i> located to the east.											<b>Development Impact</b> See Section 7.1.2 and 7.1.4	

Tree No.	Botanical Name Common Name	Height (m)	DBH (m)	Crown Spread (m)	Age	Crown Class	Crown Aspect	Vitality Rating	SULE Rating	STARS Rating	TPZ	SRZ
45	<i>Casuarina glauca</i> Swamp Sheoak	13	0.37	7 x 6	O	C	N	A	1B <sup>c</sup>	High	4.44	2.18
<b>Assessment</b> Vine is encroaching upon this tree. This tree received limited assess due to surrounding vegetation.											<b>Development Impact</b> See Section 7.1.1	
46	<i>Casuarina glauca</i> Swamp Sheoak	10 <sup>c</sup>	0.14 <sup>c</sup>	2 x 3 <sup>c</sup>	M	I	E	A	2A <sup>c</sup>	Medium	1.68	1.45
<b>Assessment</b> This tree received very limited assessment due to surrounding vegetation, vine encroaching, and lack of access to the neighbouring lot.											<b>Development Impact</b> See Section 7.1.1	
47	<i>Eucalyptus botryoides</i> Bangalay <sup>A</sup>	5	0.12 <sup>B,C</sup>	1 x 1	Y	S	W	A	1B	Low	1.44	1.36
<b>Assessment</b> This juvenile tree is too young to confirm the identification											<b>Development Impact</b> See Section 7.1.1	
48	<i>Casuarina glauca</i> Swamp Sheoak	15	0.24 <sup>c</sup>	4 x 4	M	C	Sym.	A	1B <sup>c</sup>	High	2.88	1.82
<b>Assessment</b> Codominant at 4m, the bark is included. Vine encroaching; limited assessment.											<b>Development Impact</b> See Section 7.1.1	
49	<i>Casuarina glauca</i> Swamp Sheoak	15	0.28	5 x 7	M	C	Sym.	A	1B <sup>c</sup>	High	3.36	1.94
<b>Assessment</b> This tree received limited assessment due to surrounding vegetation, vine encroaching, and lack of access to the neighbouring lot.											<b>Development Impact</b> See Section 7.1.1	

Tree No.	Botanical Name Common Name	Height (m)	DBH (m)	Crown Spread (m)	Age	Crown Class	Crown Aspect	Vitality Rating	SULE Rating	STARS Rating	TPZ	SRZ
50	<i>Eucalyptus longifolia</i> Woollybutt	23	0.40	8 x 8	M	C	E	A	1B <sup>c</sup>	High	4.80	2.25
<b>Assessment</b> This tree presents as typical for the species.											<b>Development Impact</b> See Section 7.1.3	
51	<i>Acacia spp.</i> Wattle <sup>A</sup>	17	0.27	3 x 3	O	I	N	C	4A	Low	3.24	1.91
<b>Assessment</b> This tree is senescing. Vine is encroaching.											<b>Development Impact</b> See Section 7.1.2 and 7.1.3	
52	<i>Eucalyptus saligna</i> Sydney Blue Gum	27	0.60	10 x 10	M	C	Sym.	A	1B <sup>c</sup>	High	7.20	2.67
<b>Assessment</b> This tree presents as typical for the species, however the assessment was limited by surrounding vegetation.											<b>Development Impact</b> See Section 7.1.3	
53	<i>Corymbia maculata</i> Spotted Gum <sup>A</sup>	22	0.28	5 x 5	M	S	Sym.	A	1B <sup>c</sup>	High	3.36	1.94
<b>Assessment</b> This tree presents as typical for the species, however the assessment was greatly limited by surrounding vegetation.											<b>Development Impact</b> See Section 7.1.3	
54	<i>Eucalyptus scoparia</i> Wallangarra White Gum <sup>A</sup>	9	0.27	8 x 7	M	I	S	A	2A	Medium	3.24	1.91
<b>Assessment</b> This tree presents as typical for the species. Vine is encroaching.											<b>Development Impact</b> See Section 7.1.3	
55	<i>Eucalyptus saligna</i> Sydney Blue Gum	26	0.49	10 x 9	M	C	S	A	1B <sup>c</sup>	High	5.88	2.45
<b>Assessment</b> This tree presents as typical for the species, however the assessment was limited by surrounding vegetation.											<b>Development Impact</b> See Section 7.1.3	

Tree No.	Botanical Name Common Name	Height (m)	DBH (m)	Crown Spread (m)	Age	Crown Class	Crown Aspect	Vitality Rating	SULE Rating	STARS Rating	TPZ	SRZ
56	<i>Eucalyptus longifolia</i> Woollybutt	21	0.30	6 x 6	M	I	W	A	1B <sup>C</sup>	High	3.60	2.00
<b>Assessment</b> This tree presents as typical for the species, however the assessment was limited by surrounding vegetation.											<b>Development Impact</b> See Section 7.1.3	
57	<i>Eucalyptus saligna</i> Sydney Blue Gum	27	0.53	9 x 8	M	C	N	A	1B <sup>C</sup>	High	6.36	2.53
<b>Assessment</b> This tree presents as typical for the species, however the assessment was limited by surrounding vegetation.											<b>Development Impact</b> See Section 7.1.3	
58	<i>Eucalyptus punctata</i> Grey Gum	12	0.39	8 x 8	M	I	W	A	2D <sup>E</sup>	Medium	4.68	2.23
<b>Assessment</b> An open wound and a jagged stub from past failure are located at 2m. An aged wound on the stem, east side is occluding, however this is the tension side. Some apparent swelling is evident below the stub; this tree would require level 3 assessment (internal diagnostics) to provide further details of structural integrity and retention value.											<b>Development Impact</b> See Section 7.1.3	
59	<i>Cupaniopsis anacardioides</i> Tuckeroo	5	0.25 <sup>B</sup>	5 x 5	M	D	Sym.	A	1B	Medium	3.00	1.85
<b>Assessment</b> This tree presents as typical for the species. Multi stemmed at the base.											<b>Development Impact</b> See Section 7.1.3	
60	<i>Acacia spp.</i> <sup>A</sup> Wattle	8	0.13 0.12	5 x 5	M	D	Sym.	A	2A	Medium	2.12	1.60
<b>Assessment</b> This tree offered no seeds nor flowers to aid in the identification.											<b>Development Impact</b> See Section 7.1.3	
61	<i>Eucalyptus punctata</i> Grey Gum	18	0.61	14 x 12	M	C	E	A	1B <sup>E</sup>	High	7.32	2.69
<b>Assessment</b> This tree presents as typical for the species. Some apparent swelling is evident in the stem at 3m, beneath an aged pruning wound. This tree would require level 3 assessment (internal diagnostics) to provide further details of structural integrity and retention value.											<b>Development Impact</b> See Section 7.1.3	

Tree No.	Botanical Name Common Name	Height (m)	DBH (m)	Crown Spread (m)	Age	Crown Class	Crown Aspect	Vitality Rating	SULE Rating	STARS Rating	TPZ	SRZ
62	<i>Eucalyptus punctata</i> Grey Gum	18	0.42	10 x 10	M	C	Sym.	A	1B	High	5.04	2.30
<b>Assessment</b> This tree presents as typical for the species.											<b>Development Impact</b> See Section 7.1.3	
63	<i>Lophostemon confertus</i> Brush Box	11	0.19	6 x 6	M	I	Sym.	A	1B	High	2.28	1.65
<b>Assessment</b> This tree presents as typical for the species.											<b>Development Impact</b> See Section 7.1.5	
64	<i>Lophostemon confertus</i> Brush Box	11	0.28	8 x 7	M	C	Sym.	A	1B	High	3.36	1.94
<b>Assessment</b> This tree presents as typical for the species.											<b>Development Impact</b> See Section 7.1.3	
65	<i>Melaleuca quinquenervia</i> Broad Leaf Paperbark	11	0.89 <sup>B,C</sup>	8 x 10	M	C	E	A	1B <sup>C</sup>	High	10.68	3.15
<b>Assessment</b> This is a neighbouring tree, limited assessment due to lack of access and surrounding vegetation.											<b>Development Impact</b> See Section 7.1.4	
66	<i>Melaleuca quinquenervia</i> Broad Leaf Paperbark	11	0.75 <sup>B,C</sup>	8 x 8	M	C	E	A	1B <sup>C</sup>	High	9.00	2.93
<b>Assessment</b> This is a neighbouring tree, limited assessment due to lack of access and surrounding vegetation.											<b>Development Impact</b> See Section 7.1.4	
67	<i>Melaleuca quinquenervia</i> Broad Leaf Paperbark	10	0.47 <sup>B,C</sup>	7 x 7	M	C	E	A	1B <sup>C</sup>	High	5.64	2.41
<b>Assessment</b> This is a neighbouring tree, limited assessment due to lack of access and surrounding vegetation.											<b>Development Impact</b> See Section 7.1.1	

Tree No.	Botanical Name Common Name	Height (m)	DBH (m)	Crown Spread (m)	Age	Crown Class	Crown Aspect	Vitality Rating	SULE Rating	STARS Rating	TPZ	SRZ
68	<i>Populus nigra</i> Lombardy Poplar	25	0.60 <sup>C,B</sup>	5 x 5	M	D	Sym.	A	2D <sup>C</sup>	Medium	7.20	2.67
<b>Assessment</b> This is a neighbouring tree, limited assessment due to lack of access and surrounding vegetation.											<b>Development Impact</b> See Section 7.1.1	
69	<i>Callistemon viminalis</i> Weeping Red Bottlebrush	9	0.47 <sup>B,C</sup>	6 x 9	M	I	Sym.	A	2A <sup>C</sup>	High	5.64	2.41
<b>Assessment</b> This is a neighbouring tree, limited assessment due to lack of access and surrounding vegetation.											<b>Development Impact</b> See Section 7.1.1	
70	<i>Melaleuca quinquenervia</i> Broad Leaf Paperbark	14	0.48 <sup>C</sup>	6 x 6	M	D	Sym.	A	1A <sup>C</sup>	High	5.76	2.43
<b>Assessment</b> This is a neighbouring tree, limited assessment due to lack of access and surrounding vegetation.											<b>Development Impact</b> See Section 7.1.1	
71	<i>Melaleuca quinquenervia</i> Broad Leaf Paperbark	13	0.45 <sup>C</sup>	7 x 7	M	C	Sym.	A	1B <sup>C</sup>	High	5.40	2.37
<b>Assessment</b> This is a neighbouring tree, limited assessment due to lack of access and surrounding vegetation.											<b>Development Impact</b> See Section 7.1.1	
72	<i>Melaleuca quinquenervia</i> Broad Leaf Paperbark	15	0.45 <sup>C</sup>	7 x 8	M	C	Sym.	A	1B <sup>C</sup>	High	5.40	2.37
<b>Assessment</b> This is a neighbouring tree, limited assessment due to lack of access and surrounding vegetation.											<b>Development Impact</b> See Section 7.1.1	
73	<i>Lophostemon confertus</i> Brush Box	12	0.37	5 x 5	M	D	Sym.	A	1B	High	4.44	2.18
<b>Assessment</b> This tree presents as typical for the species. May have future conflicts with adjacent tree.											<b>Development Impact</b> See Section 7.1.3	



Tree No.	Botanical Name Common Name	Height (m)	DBH (m)	Crown Spread (m)	Age	Crown Class	Crown Aspect	Vitality Rating	SULE Rating	STARS Rating	TPZ	SRZ
74	<i>Melaleuca salignus</i> Willow Bottlebrush <sup>A</sup>	7	0.47 <sup>B,C</sup>	6 x 6	M	C	Sym.	A	1B	Medium	5.64	2.41
<b>Assessment</b> This tree contains inclusions typical of the species. Minor conflict is evident with the adjacent shade sail. An aged wound from a failed co-dominant union is located at 2.3m, centre of tree.											<b>Development Impact</b> See Section 7.1.5	
75	<i>Melaleuca linariifolia</i> Narrow Leafed Paperbark	5	0.30 <sup>B</sup>	5 x 5	M	C	Sym.	A	1B	Medium	3.60	2.00
<b>Assessment</b> This tree presents as typical for the species. Experiencing minor conflict with the adjacent tree. Vine is encroaching.											<b>Development Impact</b> See Section 7.1.4	
76	<i>Melaleuca linariifolia</i> <sup>A</sup> Flax-leaved Paperbark	6	0.48 <sup>C</sup>	6 x 5	M	D	Sym.	A	1B	Low	5.76	2.43
<b>Assessment</b> This tree is experiencing minor conflict with light post to the west; lopping in lower crown appears to be due to the proximity of the light post.											<b>Development Impact</b> See Section 7.1.4	
77	<i>Melaleuca linariifolia</i> Narrow Leafed Paperbark	6	0.29 0.22	6 x 6	M	D	SW	A	2A	Medium	4.37	2.16
<b>Assessment</b> This tree presents as typical, however a suggestion of very minor twiggy decline exists in the lower crown, northern side.											<b>Development Impact</b> See Section 7.1.4	
78	<i>Liquidambar styraciflua</i> Sweet Gum	8	0.31	6 x 7	M	D	Sym.	A	1B	Medium	3.72	2.02
<b>Assessment</b> This tree is typical of the species, however is experiencing conflict with the light post located in the SRZ, southern side.											<b>Development Impact</b> See Section 7.1.4	
79	<i>Melaleuca styphelioides</i> Prickly-leaved Paperbark	5	0.40 <sup>B,C</sup>	5 x 5	M	D	Sym.	A	1B	Medium	4.80	2.25

Tree No.	Botanical Name Common Name	Height (m)	DBH (m)	Crown Spread (m)	Age	Crown Class	Crown Aspect	Vitality Rating	SULE Rating	STARS Rating	TPZ	SRZ
<b>Assessment</b> Typical of the species, multi-stemmed at the base.											<b>Development Impact</b> See Section 7.1.4	
80	<i>Platanus × acerifolia</i> London Plane	10	0.29	7 x 7	M	D	N	A	1B	Medium	3.48	1.97
<b>Assessment</b> This tree presents as typical of the species, however will require crown lift pruning to avoid conflict with adjacent structures.											<b>Development Impact</b> See Section 7.1.3	
81	<i>Grevillia robusta</i> Silky Oak	8	0.17 <sup>c</sup>	4 x 5	M	D	Sym.	A	3B	Low	1.92	1.53
<b>Assessment</b> This tree presents as typical for the species, however appears to be poorly suited to its position immediately adjacent a structure.											<b>Development Impact</b> See Section 7.1.2 and 7.1.3	

- A. Incomplete identification of species due to insufficiently available plant material
- B. Diameter taken below 1.4m due to low stem bifurcation
- C. Estimate due to the overgrown area and/or limited access
- D. Deciduous species, void of foliage at the time of assessment
- E. Level 3 assessment required to determine the accurate rating

## 7.0 Site Assessment

The area of assessment comprises the northern portion of the greater Shoalhaven Anglican School grounds (not currently in use). This area is predominantly open, maintained sports field; however, various buildings are located in the southern and eastern portions of the area of assessment. Internal roads service these, and multiple car park areas are located throughout the area. The area has a slight gradient, westerly aspect; groundwater drainage of the lot is via a shallow depression running east-west across the centre of the sports field- this drains into a culvert/ subterranean drainage system. The trees are deliberate plantings; the stand of (predominantly) *Eucalypts* in the southern portion of the area of assessment received minimal assessment due to the trees proximity to each other (trees No. 50-58). Several of these trees are believed to be located outside of the nominated area of assessment; however, potentially have a portion of the TPZ within the area of assessment. Neighbouring trees (trees No. 43 and 65-72) to the east also received limited assessment due to lack of access and surrounding vegetation. Small trees (however over 5m) occur in the area of trees No. 65-72; however, these have not been included as their small individual TPZ's, combined with the required setbacks, indicate limited root mass with the lot. Furthermore, these smaller trees have TPZ's entirely consumed by those of the larger trees surrounding them. Multiple trees of differing heights and species are located within the grounds of the school to the south and west; however, these are outside the scope of works and therefore have not been included. Multiple trees less than 5m in height are located within the area of assessment; these have not been included. The extreme southeastern periphery of the area of assessment contains several mature *Melaleuca* trees not located on the survey. These appear to be outside (however adjacent) the proposed works.

The trees labeled as A and B have been included on the survey drawing (Plan 1), however, excluded from this report because of the failure to conform to the description of a prescribed tree based on the Shoalhaven City Councils Development Control Plan.

Tree A: trees below 5m in height or less than 100mm in diameter

Tree B: trees outside the scope of works, that is area of assessment nominated to ATC.

## 7.1 Proposed development

The proposed development consists of the demolition of existing site structures and construction of the Budawang School. This includes excavation to facilitate the grades, multiple structures with associated pedestrian access, parking, drive access, and drainage infrastructure.

### Neighbours trees

Trees No. 43, 65, 66, 67, 68, 69, 70, 71, and 72 are located in the neighbouring lots, therefore constitute ownership by a second party. Any proposed works within the zones of protection for these trees must not adversely impact these zones, and the trees shall be retained and protected from any site works unless permission for removal is granted by the tree owner and Shoalhaven City Council.

### Additional encroachments not considered

The calculations included in the following discussion have not considered;

- subsurface utilities that have not been included in the design,
- Work methods related to subsurface utilities, for example concrete encasing or replacement of existing lines
- or work methods related to construction (stockpiling, site sheds, scaffolding) unless otherwise specified.

These may also increase the encroachment and tree impact and, therefore the opportunity for tree retention.

Assumption 1: An excavation is required for an assumed retaining wall to extend north-south and adjacent to the eastern boundary to accommodate the changes between the proposed RL of 50.00 to 50.10. This will need to be further from the outside edge of the proposed wall to allow for construction of the wall, waterproofing, and drainage. Therefore, the actual cut has been assumed within this report to be up to 500mm from the line indicating the location assumed to be the retaining wall. All calculations for the encroachment of any zone of protection (TPZ, SRZ) have been based on this assumption.

This report discusses the impact of the proposed design on the trees. Eight-one (81) trees have been listed within this report based upon the vicinity of the proposed works. This has included any tree where any part of the zones of protection; Tree Protection Zone (TPZ) and Structural Root Zone (SRZ), encroach into the area proposed for work. Recommendations based on the tree significance and condition, together with the impact on these trees regarding the proposed development (based on the documents contained in Section 4.4) and mitigation where available follow.

#### **7.1.1 Trees and zones of protection (TPZ/SRZ) outside of the proposed design**

##### Trees No. 21, 38-43, 45-49 and 67-72

None of the proposed works conflict with the location of these trees or respective zones of protection. These trees can be retained without impact by the proposed design.

### **7.1.2 Trees providing a limited useful life expectancy**

#### Trees No. 14, 16, 18, 21, 44, 51 and 81

These trees provide low significance based on the species, habit, and rating and could be removed due to the low amenity value and limited useful life expectancy, and irrespective of the proposed works.

### **7.1.3 Trees directly conflicting with the design**

#### Trees No. 1, 2, 4-7, 9-18, 23-31, 34, 35, 36, 37, 50-62, 64, 73, 74, 80 and 81

These trees are located in the footprint of the proposed design and would require removal based on this premise alone. The conflict is summarised as follows;

Trees No. 1, 2, 4-7, 9, 11 and 12; within the footprint of the proposed parking/ internal road.

Tree No. 10; within the footprint of the proposed removal of the existing sewer line. This tree provides sufficient significance for retention, although alternative measures would be required to the removal of the sewer line.

Trees No. 13-16; within the footprint of the proposed pedestrian ramp adjacent to the hydrotherapy.

Tree No. 17; within the footprint of the proposed hydrotherapy building.

Tree No. 18; within the footprint of the proposed swale.

Trees No. 23-31; within the footprint of the proposed batter cut/ excavation. These trees provide sufficient significance for retention, although a design modification would be required to remove the excavation in the SRZ's.

Tree No. 34; within the footprint of the proposed block A.

Trees No. 35, 37, and 50-60; within the footprint of the proposed block C.

Tree No. 36; within the footprint of the proposed stormwater service.

Trees No. 64 and 73; within the footprint of the proposed block B.

Tree No. 80; within the footprint of the proposed internal road.

Tree No. 81; within the footprint of the proposed footpath.

Trees No. 61, 62, and 74; within the footprint of the proposed play area. These trees appear to have been nominated in the drawing A2000 for retention. Although the proposed change of grades will not allow for tree retention. That is, the proposed grade of 49.58 will require a cut throughout the area containing these trees of between 220-430mm. This will remove the predominant root zone as well as the tree. These trees provide sufficient significance and useful life expectancy to retain, and the area containing the TPZ should be retained at natural grade to allow for tree retention.

In addition, Tree No. 74 is encroached upon by a footpath including both the root zone (TPZ and SRZ) pending grades of this structure, and the crown mass. This tree provides sufficient significance for retention,

although a design modification would be required to remove the work in the SRZ.

Tree No. 75; this tree is subject to the same impact as trees No. 61, 62, and 74, although with an addition of a pathway extending through the SRZ. Based on this extent of impact, the design will not allow for this tree without amendment.

#### **7.1.4 Trees subject to a minor encroachment**

##### Trees No. 22, 33, 44, 65, 66 and 75-79

These trees are not directly located in the footprint of the proposed design, however, are subject to a *minor encroachment*. That is, the proportion (<10%) of encroachment provided by design will not adversely impact the tree. These trees could be retained relative to the design.

Tree No. 76 is subject to further potential encroachment by the proposed bike track. The grades and surfaces are unknown, as will the potential tree impact. Based on this premise and tree significance, the potential for tree retention exists, and the design should conform to the following conditions. Any works within the TPZ shall be guided by the following conditions;

1. The existing grade within the TPZ must be retained and any surface constructed over this grade.
2. No design/construction can occur within the SRZ.
3. The path surface shall be a flexible material.

#### **7.1.5 Trees subject to a major encroachment**

##### Trees No. 3, 8, 19, 20, 32 and 63

These trees are not directly located in the footprint of the proposed design, however, are located close and adjacent to the design footprint and subject to a *major encroachment*, that is, in excess of 10% of the TPZ. The extent and type of encroachment for each tree are discussed and the relative implications.

Tree No. 3: Encroachment: 13%; based on drawing 20971\_DA\_C101, revision 2. The encroachment consists of the parking bays. This is three percentage points over a minor encroachment and, whilst may instigate some minor loss of vitality in the short term, allows for tree retention.

Tree No. 8: Encroachment: 33%; based on drawing 20971\_DA\_C101, revision 2. The encroachment consists of the installation of the parking bays (twenty-nine percentage points) and the removal of the existing sewer line (four percentage points). This will remove excessive root zone

that will adversely impact the tree. This tree cannot be sustained based on this design.

Tree No. 19: Encroachment: 35%; and allowing for Assumption 1 the encroachment consists of the excavation for a retaining wall. This will remove excessive root zone (TPZ and SRZ) that will adversely impact the tree. This tree cannot be sustained based on this design.

Tree No. 20: Encroachment: 18%; and allowing for Assumption 1 the encroachment consists of the excavation for a retaining wall. This will impact the root zone (TPZ and SRZ) and will impact the vitality, although the tree can be retained.

Tree No. 32: Encroachment: 33%; based on drawing 20971\_DA\_C101, revision 2. The encroachment consists of the installation of the retaining wall (twelve percentage points) and the batter cut (twenty-one percentage points). This will remove excessive root zone (TPZ and SRZ) that will adversely impact the tree. This tree cannot be sustained based on this design.

Tree No. 63: Encroachment: 21%; based on drawing 20971\_DA\_C101, revision 2. The encroachment consists of installation of the proposed stormwater service. This will adversely impact the vitality, although allow for tree retention. The useful life expectancy may be impacted by these works.

#### **7.1.6 Excavation**

Based on the Drawing titles 'Bulk earthworks cut and fill plan, (Drawing No. 20971\_DA\_BE01, Revision 2), the entire site is subject to varying amounts of cut and fill. Although several trees have the ability to be retained based on the lack of impact imposed by structures, the earthworks provide an opportunity for either removing or adversely affecting these trees. For this reason, the trees nominated for retention will require this design to be amended and to remove areas of earthworks from the zones of protection, that is, the TPZ/SRZ.

## **7.2 Sub-surface utilities**

No drawings have been provided for the proposed route of sub-surface utilities other than stormwater. Any trenching other than what has been allowed for should be avoided within the area of the TPZ. Any proposed route shall be re-routed outside of the TPZ. Under boring may be required if a limitation for the route of a service is restricted to an area that falls within the TPZ. Any excavation in the area of a TPZ must be authorised and conditioned by the project arborist.

### 7.3 Protection measures

Tree protection measures will be required during the demolition and construction stage. However, the design of these will be pending the work methodology and final design. The project arborist shall be contracted after the completion/confirmation of design work for the instruction of the protection measures implementation, that is, the Arboricultural Method Statement. Examples of the protection measures are contained in Appendix B.

#### 7.3.1 Conditions for compliance

The following conditions are required before any works proceed on site.

Site induction; All workers related to the construction process and before entering the site must be briefed about the requirements/conditions outlined in this report relative to the zone of protection, measures, and specifications before the initiation of work. This is required as part of the site induction process.

Project Arborist; A project arborist who conforms to the requirements of the AS 4970 is required to be nominated immediately after a *Notice of Determination* is issued, and they are to be provided with all related site documents.

### 7.4 Compliance Documentation

The following stages will require assessment and documentation (report, letter, certification) by the project arborist or person responsible for the specific work type, and the related documentation is to be issued to the principal certifying agent.

#### 7.4.1 Table 2; Assessment/Certification stages

Hold Points	Work type	Document required
Pre-demolition	Installation of the protection measures, Section 7.3	Certificate
During construction	Any <u>further works</u> required within the area of the TPZ, or decline related to the trees that have not been covered by this report.	Report Brief
During construction	Any crown modification including pruning or root disturbance.	Report Brief

**Construction** refers to the time between the initiation of demolition and until an occupation certificate is issued.

**Project Arborist** person nominated as responsible for the provision of the tree assessment, arborist report, consultation with stakeholders, and certification for the



development project. This person will be adequately experienced and qualified with a minimum of a level 5 (AQF); Diploma in Horticulture (Arboriculture)<sup>7</sup>.

## 8.0 Protection Specification

The retention and protection of these trees requires the remaining Tree Protection Zone (TPZ) not subject to encroachment to conform to the conditions outlined below. These conditions provide the limitations of work permitted within the area of the Tree Protection Zone (TPZ) and must be adhered to unless otherwise stated.

1. Soil levels within the TPZ must remain the same. Any excavation within the TPZ must have been previously specified and allowed for by the project arborist:
  - a) So it does not alter the drainage to the tree.
  - b) Under specified circumstances,
    - Added fill soil does not exceed 100mm in depth over the natural grade. Construction methodologies exist that can allow grade increases in excess of 100mm, via the use of an impervious cover, an approved permeable material or permanent aeration system or other approved methods.
    - Excavation cannot exceed a depth of more than 50mm within the area of the TPZ, not including the SRZ. The grade within the SRZ cannot be reduced without the consent from a project arborist.
2. No form of material or structure, solid or liquid, is to be stored or disposed of within the TPZ.
3. No lighting of fires is permitted within the TPZ.
4. All drainage runoff, sediment, concrete, mortar slurry, paints, washings, toilet effluent, petroleum products, and any other toxic wastes must be prevented from entering the TPZ.
5. No activity that will cause excessive soil compaction is permitted within the TPZ. That is, machinery, excavators, etc. must refrain from entering the area of the TPZ unless measures have been taken, and with consultation with the project, arborist to protect the root zone.
6. No site sheds, amenities or similar site structures are permitted to be located or extend into the area of the TPZ unless the project arborist provides prior consent.

---

<sup>7</sup> Based upon the definition of a 'consulting arborist' from the AS 4970; Protection of trees on development sites; 2009, Section 1.4.4, p 6.

7. No form of construction work or related activity such as the mixing of concrete, cutting, grinding, generator storage or cleaning of tools is permitted within the TPZ.
8. No part of any tree may be used as an anchorage point, nor should any noticeboard, telephone cable, rope, guy, framework, etc. be attached to any part of a tree.
9.
  - (a) All excavation work within the TPZ will utilise methods to preserve root systems intact and undamaged. Examples of methods permitted are by hand tools, hydraulic, or pneumatic air excavation technology.
  - (b) Any root unearthed which is less than 50mm in diameter must be cleanly cut and dusted with a fungicide, and not allowed to dry out, with minimum exposure to the air as possible.
  - (c) Any root unearthed which is greater than 50mm in diameter must be located regarding their directional spread and potential impact. A project arborist will be required to assess the situation and determine future action regarding retaining the tree in a healthy state.

## **9.0 Summary of tree impact by design**

Based on the design supplied, the following summary provides the impacts imposed on the trees included in this report and potential mitigation for retaining some trees relative to design changes that do not impact the overall design.

### **9.1 Trees No. 3, 20, 22, 33, 38-43, 45-49, 63, 65-72 and 75-79**

These trees are not adversely impacted by the design; that is, they conform to an acceptable encroachment based on the nominated zones of protection (TPZ, SRZ) where the areas outside of the encroachment shall conform to the Protection Specification Section 8.0. The proposed design does not adversely affect these trees. The following conditions are required to allow for the retention of the following trees.

#### **9.1.1 Tree No. 76**

Subject to potential encroachment by the proposed bike track. Any works within the TPZ shall be guided by the following conditions.

1. The existing grade within the TPZ must be retained and any surface constructed over this grade.
2. No design/construction can occur within the SRZ.
3. The path surface shall be a flexible material.

### **9.2 Trees No. 1, 2, 4-19, 21, 23-32, 34-37, 44, 50-62, 64, 73, 74, 80 and 81**

The proposed design will impact adversely on these trees (or are of poor form and do not warrant retention) and are unable to be retained based on the design. Some trees provide for sufficient significance to retain and amend the design. The trees and mitigation are summarised as follows.

#### **9.2.1 Tree No. 10**

Retain the portion of sewer line (nominated for removal) within the TPZ.

#### **9.2.2 Tree No. 23-31**

Remove excavation proposed in the SRZ's nominated for the batter/cut.

#### **9.2.3 Tree No. 61, 62 and 74**

The area containing the TPZ's should be retained at natural grade and the pathway extending through the SRZ of Tree No. 75 routed outside of the TPZ.

## **9.3 Proposed Excavation**

Based on the Drawing titles 'Bulk earthworks cut and fill plan, (Drawing No. 20971\_DA\_BE01, Revision 2), the entire site is subject to varying amounts of cut and fill. Although several trees have the ability to be retained based on the lack of impact imposed by structures (Section 9.1), the earthworks provide an opportunity for either removing or adversely affecting these

trees. For this reason, the trees nominated for retention will require this design to be amended and to remove areas of earthworks from the zones of protection, that is, the TPZ/SRZ.

#### **9.4 Sub-surface utilities**

No drawings have been provided for the proposed route of sub-surface utilities. Any trenching other than what has been allowed for should be avoided within the area of the TPZ's for any tree nominated for retention. Any proposed route shall be re-routed outside of the TPZ. Under boring may be required if a limitation for the route of a service is restricted to an area that falls within the TPZ from any tree. Any excavation in the area of a TPZ must be authorised and conditioned by the project arborist.

#### **9.5 Protection measures**

Protection measures (outlined in Section 7.3 and 7.4) are required to be implemented for the trees nominated for retention (referenced in Section 9.1) and installed before initiation of site works (including demolition/excavation) and retained until the landscaping works are required unless otherwise specified.

All workers related to the construction process and before entering the site must be briefed about the requirements/conditions outlined in this report relative to the zone of protection, measures, and specifications before the initiation of work.

A project arborist is required to be nominated, and the stages and related certification or similar documentation is to be issued to the principal certifying agent.

**The opinions expressed in this report by the author have been provided within the capacity of a Consulting Arborist. Any further explanation or details can be provided by contacting the author.**

Assessed and Prepared by Geoff Beisler

Consulting Arborist

Level 5 Arborist

ISA Tree Risk Assessment Qualification

Prepared and checked by Warwick Varley

Consulting Arborist; Principal

Level 5 and 8; Arborist

ISA Tree Risk Assessment Qualification

IACA and ISA Member



## 10.0 Appendix A- Terminology Defined

### Height

Is a measure of the vertical distance from the average ground level around the root crown to the top surface of the crown, and on palms - to the apical growth point.

### DBH

Diameter at Breast Height – being the stem diameter in meters, measured at 1.4m from ground level, including the thickness of the bark.; Mult. refers to multiple stems, that is in excess of 4 stems.

### Crown Spread

A two-dimension linear measurement (in metres) of the crown plan. The first figure is the north-south span, the second being the east-west measurement.

### Age

Is the estimate of the specimen's age based upon the expected lifespan of the species. This is divided into three stages.

Young (Y)	Trees less than 20% of life expectancy.
Mature (M)	Trees aged between 20% to 80% life expectancy.
Over-mature (O)	Trees aged over 80% of life expectancy with probable symptoms of senescence.

### Crown Aspect

In relation to the root crown, this refers to the aspect the majority of the crown resides in. This will be either termed Symmetrical (Sym.) where the centre of the crown resides over the root crown or the cardinal direction the centre of the crown is biased towards, being either North (N), South (S), East (E) or West (W).

### Vitality Rating

Is a rating of the health of the tree, irrespective and independent of the structural integrity, and defined by the 'ability for a tree to sustain its life processes' ((Draper, Richards, 2009). This is divided between three variables, and based on the assessment of symptoms including, but not limited to; leaf size, colour, crown density, woundwood development, adaptive growth formation, and epicormic growth.

**A:** Normal vitality, typical for the species

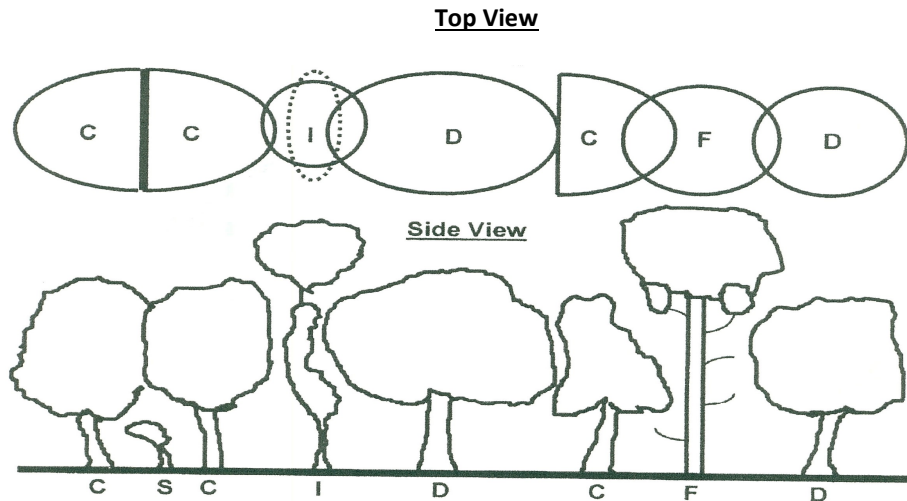
**B:** Below average vitality, possibly temporary loss of health, partial symptoms.

**C:** Poor vitality; obvious decline, potentially irreversible

### Crown Class

Is the differing crown habits as influenced by the external variables within the surrounding environment. They are:

<b>D</b> – <i>Dominant</i>	Crown is receiving uninterrupted light from above and sides, also known as emergent.
<b>C</b> – <i>Codominant</i>	Crown is receiving light from above and one side of the crown.
<b>I</b> – <i>Intermediate</i>	Crown is receiving light from above but not the sides of the crown.
<b>S</b> – <i>Suppressed</i>	Crown has been shadowed by the surrounding elements and receives no light from above or sides.
<b>F</b> – <i>Forest</i>	Characterised by an erect, straight stem (usually excurrent) with little stem taper and virtually no branching over the majority of the stem except for the top of the tree which has a small concentrated branch structure making up the crown.



D C, I & S, and side view, after (Matheny, N. & Clark, J. R. 1998, Trees Development, Published by International Society of Arboriculture, P.O. Box 3129, Champaign IL 61826-3129 USA, p.20, adapted from the Hazard Tree Assessment Program, Recreation and Park Department, City of San Francisco, California).

#### Levels of assessment

**Level 1: Limited visual:** a visual tree assessment to manage large populations of trees within a limited period and in order to identify obvious faults which would be considered imminent.

**Level 2: Basic assessment:** a standard performed assessment providing for a detailed visual assessment including all parts of the tree and surrounding environment and via the use of simple tools.

**Level 3: Advanced assessment:** specific type assessments conducted by either arborist who specialise with specific areas of assessment or via the use of specialised equipment. For example, aerial assessment by use of an EWP or rope/harness, or decay detection equipment.

#### TPZ; Tree Protection Zone

Is an area of protection required for maintaining the trees vitality and long-term viability. Measured in meters as a radius from the trees centre. The requirements of this zone are outlined within the Protection Specification, Section 8.0, and are to be adhered to unless otherwise stated.

The size of the Tree Protection Zone (TPZ) has been calculated from the *Australian Standard, 4970; 2009* – Protection of Trees on Development Sites

The TPZ does not provide the limit of root extension, however, offers an area of the root zone that requires predominate protection from development works. The allocated TPZ can be modified by some circumstances; however will require compensation equivalent to the area loss, elsewhere and adjacent to the TPZ.

#### SRZ; Structural Root Zone

Is the area around the tree containing the woody roots necessary for stability. Measured in meters as a radius from the trees centre. The requirements of this zone are outlined within the Protection Specification, Section 8.0, and are to be adhered to unless otherwise stated.

#### Protection Measures

These are required for the protection of trees during demolition/construction activities.

Protective barriers are required to be installed before the initiation of demolition and/or construction and are to be maintained up to the time of landscaping. Samples of the recommended protection measures are illustrated in Appendix B.

#### All other definitions are referenced from;

Draper D.B., Richards P.A., 2009, Dictionary for Managing Trees in Urban Environments CSIRO Pub., Australia

**Significance Rating**, Significance of a Tree Assessment Rating System (S.T.A.R.S), IACA, 2010<sup>8</sup>

Tree Significance – Assessment Criteria

**1. High Significance in landscape**

- The tree is in good condition and good vitality;
- 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 vitality;
- 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 vitality;
- 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,

---

<sup>8</sup> IACA, 2010, IACA Significance of a Tree, Assessment Rating System (STARS), Institute of Australian Consulting Arboriculturists, Australia, [www.iaca.org.au](http://www.iaca.org.au)



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 for individual trees only, however, can be applied to a monocultural stand in its entirety e.g.

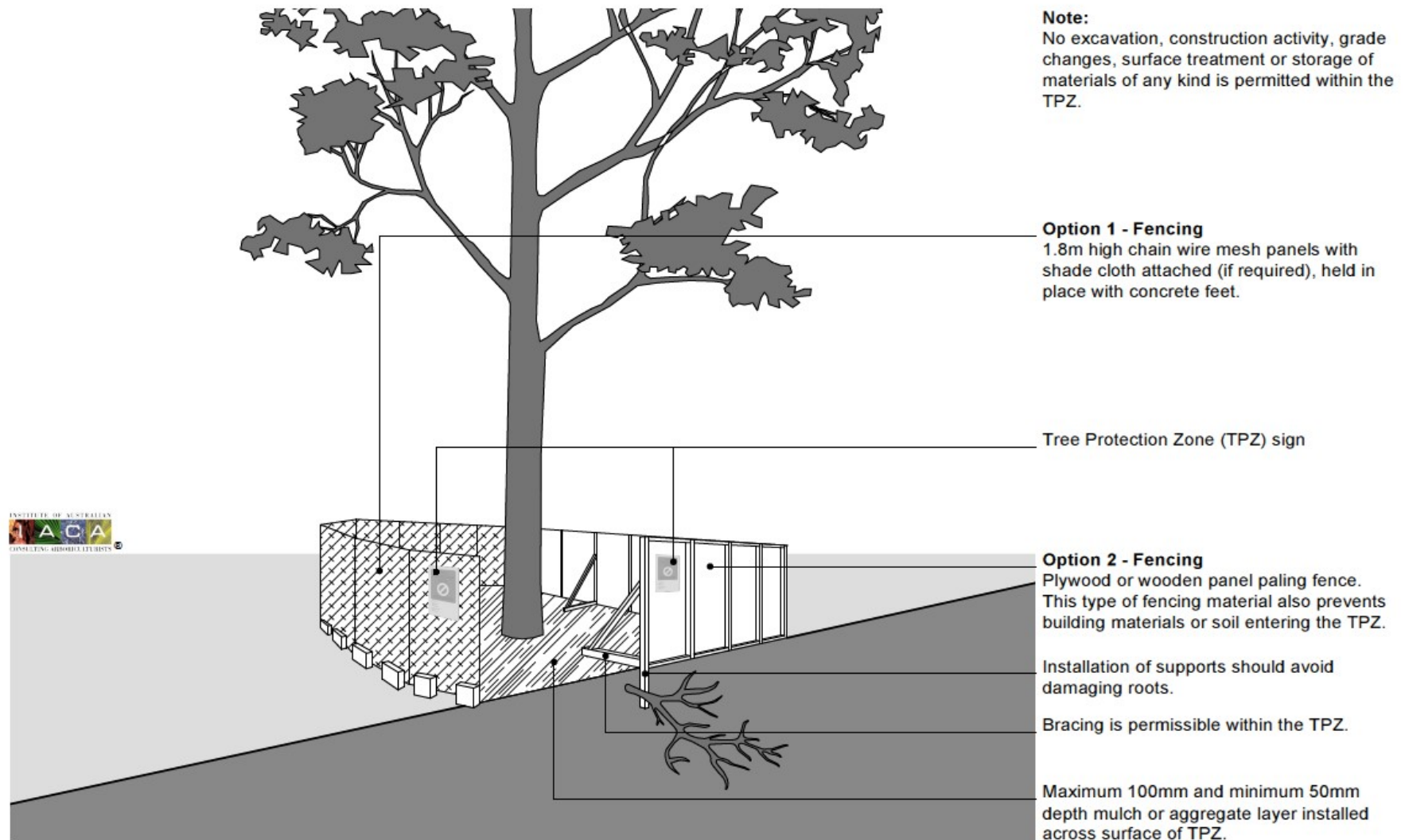
**Table 3; Tree Retention Value – Priority Matrix.**

		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					
Legend for Matrix Assessment 						
		<b>Priority for Retention (High)</b> - 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.				
		<b>Consider for Retention (Medium)</b> - 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.				
		<b>Consider for Removal (Low)</b> - These trees are not considered important for retention, nor require special works or design modification to be implemented for their retention.				
		<b>Priority for Removal</b> - These trees are considered hazardous, or in irreversible decline, or weeds and should be removed irrespective of development.				

**Safe Useful Life Expectancy – S.U.L.E (Barell 1995)**

	<b>1. Long</b>	<b>2. Medium</b>	<b>3. Short</b>	<b>4. Removal</b>	<b>5. Moved or Replaced</b>
	Trees that appeared to be retainable at the time of assessment for more than 40 years with an acceptable level of risk.	Trees that appeared to be retainable at the time of assessment for 15 – 40 years with an acceptable level of risk.	Trees that appeared to be retainable at the time of assessment for 5 – 15 years with an acceptable level of risk.	Trees that should be removed within the next 5 years.	Trees which can be reliably moved or replaced.
<b>A</b>	Structurally sound trees located in positions that can accommodate future growth.	Trees that may only live between 15 and 40 years.	Trees that may only live between 5 and 15 more years.	Dead, dying, suppressed or declining trees through disease or inhospitable conditions.	Small trees less than 5m in height.
<b>B</b>	Trees that could be made suitable for retention in the long term by remedial tree care.	Trees that may live for more than 40 years but would be removed for safety or nuisance reasons.	Trees that may live for more than 15 years but would be removed for safety or nuisance reasons.	Dangerous trees through instability on recent loss of adjacent trees.	Young trees less than 15 years old but over 5m in heights
<b>C</b>	Trees of special significance for historical, commemorative or rarity reasons that would warrant extraordinary efforts to secure their long term retention.	Trees that may live for more than 40 years but would be removed to prevent interference with more suitable individuals or to provide space for new planting.	Trees that may live for more than 15 years but should be removed to prevent interference with more suitable individuals or to provide space for new planting.	Damaged trees through structural defects including cavities, decay, included bark, wounds or poor form.	Trees that have been pruned to artificially control growth.
<b>D</b>		Trees that could be made suitable for retention in the medium term by remedial tree care.	Trees that require substantial remedial tree care and are only suitable for retention in the short term.	Damaged trees that are clearly not safe to retain.	
<b>E</b>				Trees that may live for more than 5 years but should be removed to prevent interference with more suitable individuals or to provide space for new plantings.	
<b>F</b>				Trees that are damaging or may cause damage to existing structures within 5 years.	
<b>G</b>				Trees that will become dangerous after removal of other trees for reasons given in (A) to (F).	

## Appendix B- Protection measures; Protective fence



## Stem and Ground protection

