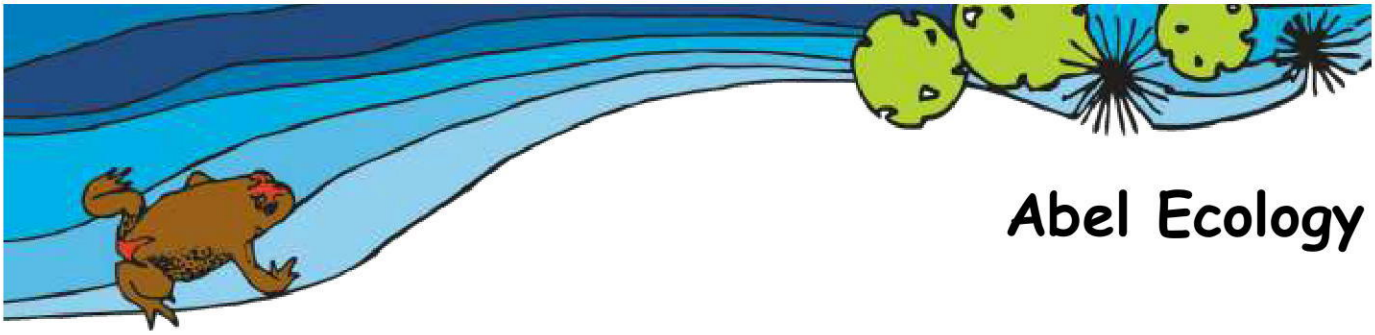

Abel Ecology

Tree assessment and Arborist report

for

94-100 Explorers Way, St Clair
Lot 36, DP 239502

Proposed residential subdivision

Date: 2 June 2015
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Disclaimer

No tree is entirely without hazard potential. No responsibility is accepted for any damage or injury that may be caused by any trees on the site. All measures outlined should minimise damage inflicted on the trees if carefully implemented

Document history

Report	Version	Prepared by	Checked by	Submission	
				Method	Date
Draft report	Draft A	Jesse Tree	Venetia Keane	Email	12 May 15
Final report	Issue 1	Jesse Tree	Venetia Keane	Email	2 Jun 15

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List of Abbreviations

d.b.h.	Diameter at breast height (~1.4 metres)
PDA	Principal Development Area
VTA	Visual Tree Assessment
TPZ	Tree Protection Zone

Note regarding maps in this report

The diagrams/site maps used in this report have been supplied by and are used with the permission of Silky Constructions.

With regard to maps provided by the Land Information Centre, Topographic maps used with the permission of © Land and Property Information, NSW www.lpi.gov.au

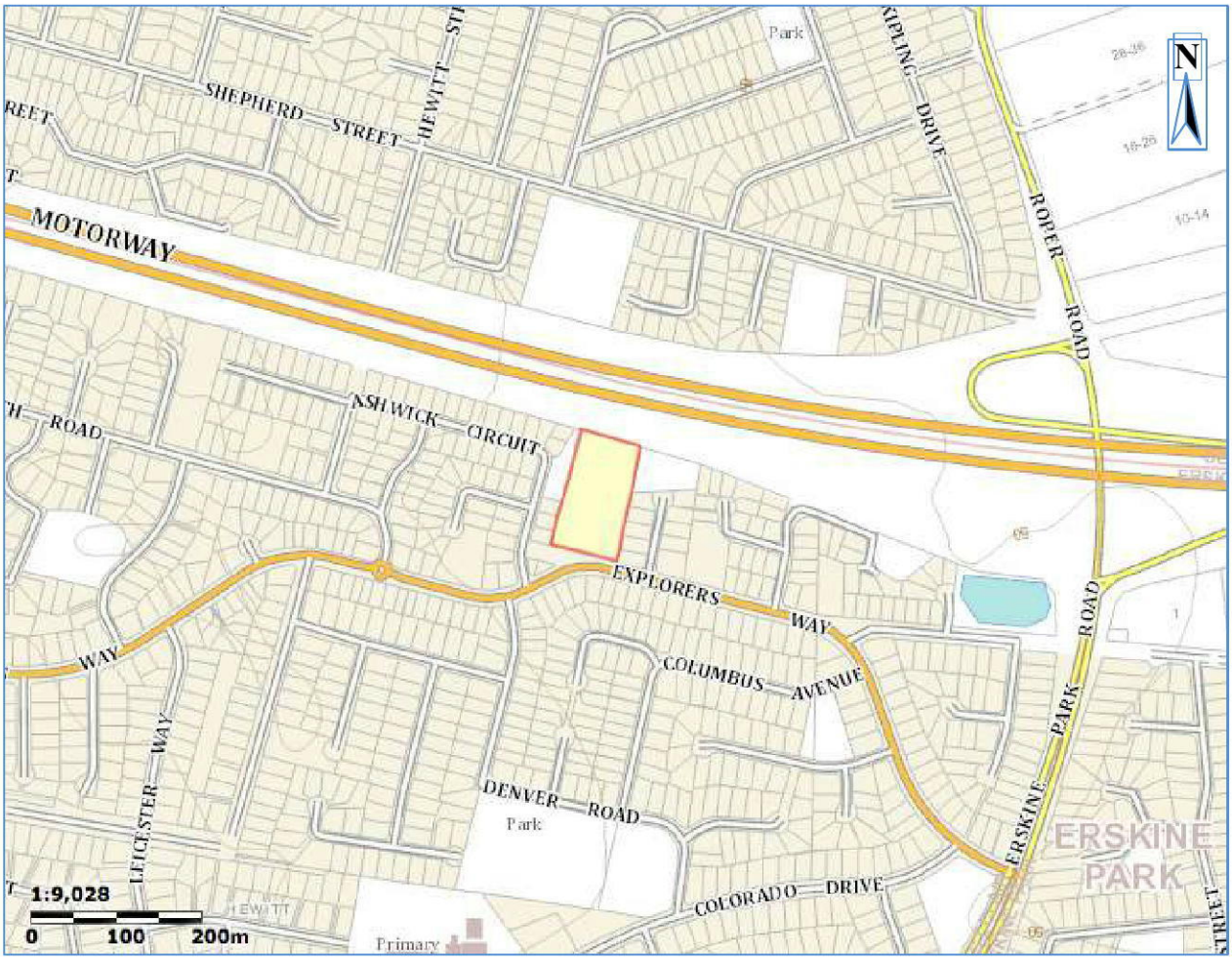


Figure 1. Locality map

Site location

「 Land and Property Information NSW. Spatial Information eXchange (SIX) website 2015.

Figure 2. Site map with numbered trees

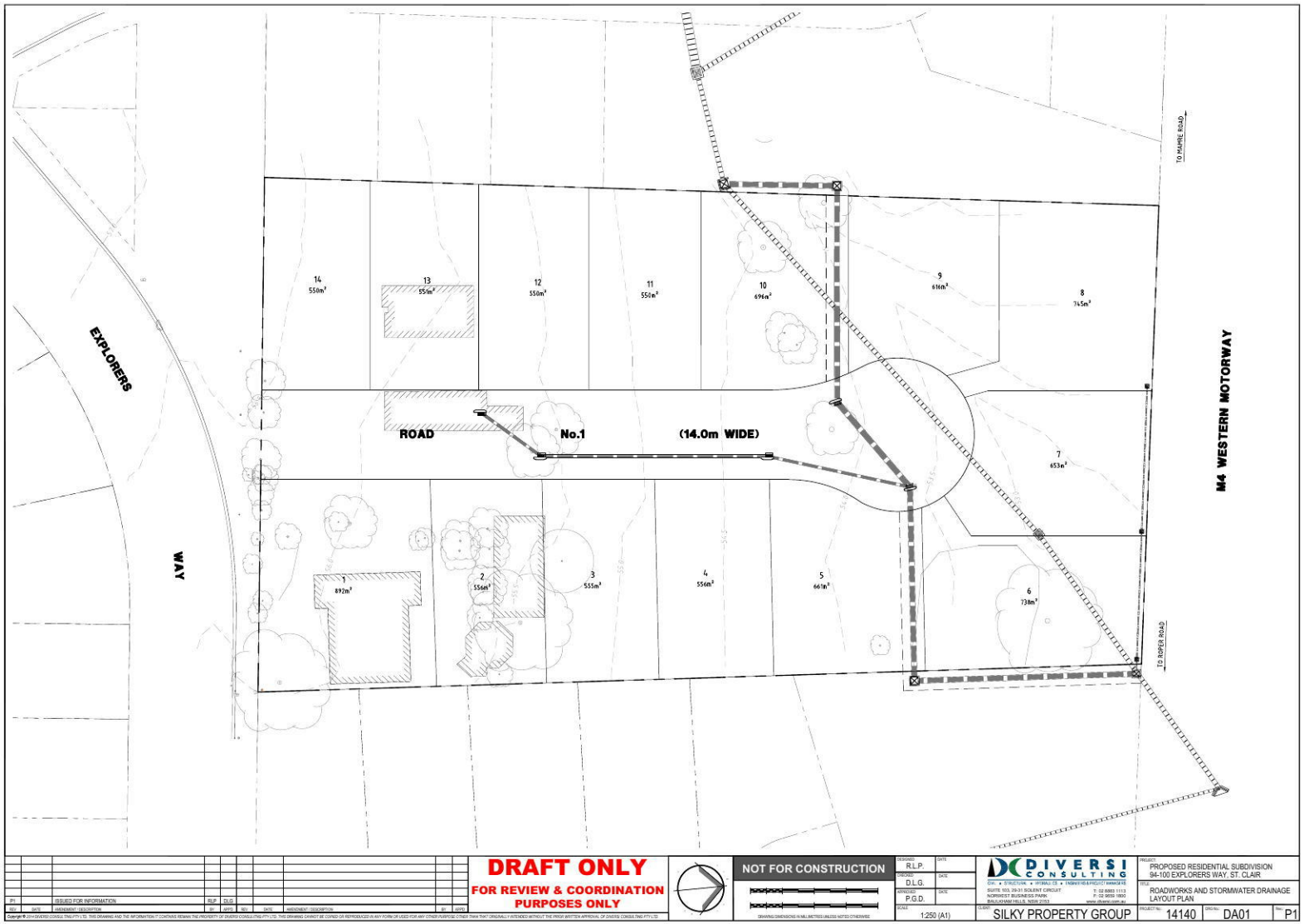


Figure 3. Site proposal plan

Executive Summary

The proposal is to remove trees for a residential subdivision.

A tree assessment was carried out at 94-100 Explorers way Pymble to assess the likely impacts of development on trees on the site, and address the issues pertaining to tree protection.

The trees on site are in variable condition, but typically have good vitality.

Recommendations for this proposal include:

a) There is no impediment to the removal of trees from the site.

1. Introduction

A survey of the proposed development site at 94-100 Explorers Way St Clair ('the site' – Figure 1) was undertaken on 17 and 24 April 2015.

The main aim of this survey was to assess the trees on the site and prepare a report which addresses issues pertaining to the proposal and tree protection.

This report will provide a description of individual trees and assess the anticipated impact of the development to the trees on the site.

1.1 Site description

For the purpose of this report the site is defined as Lot 36, DP 239502, 94-100 Explorers Way, Saint Clair (Figure 1). The Western Motorway is immediately north of the site, and residential properties occur west, east and south. The site is approximately 1.06ha in size and the elevation is approximately 60m above sea level.

1.2 Proposal

The proposal is to subdivide the site for use as multiple low-density residential properties.

2. Methodology

Tree assessments were undertaken on 17 and 24 April 2015.

The vitality and condition of trees were assessed from ground level using the VTA (Visual Tree Assessment) method (Mattheck, 1999). Tree heights were determined by visual estimation using a 5m measuring pole for reference.

Numbers identifying the trees are indicated in Figure 2.

3. Survey Results

3.1 Condition and vitality of trees on site

The vitality of trees is generally good, and the condition of trees is variable. Trees of low vitality and poor structural integrity include the following:

Tree no.	Tree name	Problem (e.g. Prone to failure/ exotic weed sp./internal decay/poor vitality)
54	*Melaleuca decora*	Dead tree.
61	*Melaleuca decora*	Dead tree.
101	*Eucalyptus globoidea*	Poor vitality. Most growth is epicormic growth. Tree has large dead branches. Limited life.

The trees on site are predominantly *Melaleuca decora* interspersed with eucalypts and planted exotics.

Tree species identified within and adjacent to the site include:

Scientific name	Common name	Count
Acacia podalyriifolia	Queensland Silver Wattle	4
Chamaecyparis pisifera	False Cypress	2
Eucalyptus fibrosa	Broad-leaved Ironbark	2
Eucalyptus globoidea	White stringybark	4
Eucalyptus longifolia	Woollybutt	4
Melaleuca decora	White Feather Honeymyrtle	96
Pinus contorta	Contorta Pine	1
Prunus sp (Nectarine?)	Nectarine	2

3.2 Tree Schedule

2 The following tree schedule (Table 1) describes the numbered trees shown in Figure 2.

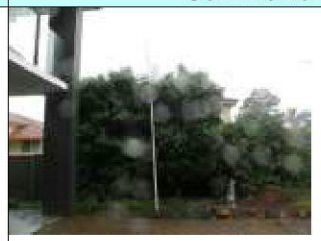
4 **Table 1. Tree schedule**

Tree no.	Species	Age class	Height (m)	d.b.h. (cm)	Diam. at base (cm)	Canopy Radius	Vitality	Condition	TPZ radius (m)	SRZ radius (m)	Comments
1	*Melaleuca decora*	M	7	40, 37	60	N 3 S 3 E 2 W 3	G	G	6.54	2.67	 Pruned for powerline. CD, good form, dw.
2	*Melaleuca decora*	M	7	26, 22, 25	62	N 3 S 2 E 2 W 2	G	F	5.07	2.71	 3 CD, pruned on S side.

Tree no.	Species	Age class	Height (m)	d.b.h. (cm)	Diam. at base (cm)	Canopy Radius	Vitality	Condition	TPZ radius (m)	SRZ radius (m)	Comments
3	*Melaleuca decora*	M	8	34	55	N 3 S 3 E 2 W 3	G	F	4.08	2.57	 Suppressed on E side, pruned S, dieback. Photo shows trees 3, 4, and 5.
4	*Melaleuca decora*	M	9	26	36	N 3 S 1 E 1 W 2	F	F	3.12	2.15	EC, pruned, has no lower branches, CD at 3m, pruned S.
5	*Melaleuca decora*	M	9	22	36	N 3 S 0 E 1 W 2	G	F	2.64	2.15	CB to N, dw, TW at base on S side.
6	*Melaleuca decora*	M	8	46 at 1m	58	N 3 S 1 E 2 W 1	G	G	5.52	2.63	 Multiple stems starting after 1m, lost old twin stem. Pruned on S side.

Tree no.	Species	Age class	Height (m)	d.b.h. (cm)	Diam. at base (cm)	Canopy Radius	Vitality	Condition	TPZ radius (m)	SRZ radius (m)	Comments
7	*Melaleuca decora*	M	8	22, 12	34	N 1 S 1 E 1 W 1	F	F/P	6.54	2.10	 EC, tall and thin, pruned, dw. Photo shows trees 7, 8, 9, 10, 11, 12 and 13.
8	*Melaleuca decora*	SM	6	15	29	N 3 S 0 E 0 W 1	F	P	2.00	1.97	TL to S, arching tree, dw.
9	*Melaleuca decora*	M	7	19, 20, 13, 10	55	N 2 S 2 E 2 W 2	F	F	3.85	2.57	Tall and thin stems, EC, pruned on S side, canopy competition occurs E, N, and W. Few lower branches on the tree.
10	*Melaleuca decora*	M	7	17, 11, 17, 19	55	N 3 S 1 E 1 W 2	G	F	3.91	2.57	CD at base, CB to N.
11	*Melaleuca decora*	M	7	18, 9, 12, 17	45	N 2 S 0 E 1 W 1	F	F	3.47	2.37	4 stems, pruned on S side, CB to N.
12	*Melaleuca decora*	M	7	19, 10, 18	50	N 2 S 0 E 1 W 1	F	F	3.36	2.47	3 stems, CB to N, pruned on S side.

Tree no.	Species	Age class	Height (m)	d.b.h. (cm)	Diam. at base (cm)	Canopy Radius	Vitality	Condition	TPZ radius (m)	SRZ radius (m)	Comments
13	*Melaleuca decora*	M	8	17, 17, 20	48	N 3 S 1 E 1 W 2	G	F	3.75	2.43	Pruned on S side, suppressed E, 3 stems, CB to N.
14	*Melaleuca decora*	M	8	23, 17, 16	56	N 3 S 1 E 1 W 1	G	F	3.93	2.59	 Suppressed on E and W sides, CB to N, pruned on S side. Photo shows trees 14, 15 and 16.
15	*Melaleuca decora*	M	8	22, 18, 23, 13	56	N 3 S 1 E 2 W 1	G	G/F	4.66	2.59	4 stems, pruned on S side, CB to N.
16	*Melaleuca decora*	SM	7	16, 20	40	N 1 S 1 E 1 W 1	G	F	3.07	2.25	2 stems, CB to N, pruned on S side.

Tree no.	Species	Age class	Height (m)	d.b.h. (cm)	Diam. at base (cm)	Canopy Radius	Vitality	Condition	TPZ radius (m)	SRZ radius (m)	Comments
17	*Chamaecyparis pisifera*	M	4	10, 10	20	N 1 S 1 E 1 W 1	G	F	2.00	1.68	 Topped for powerline. Photo shows trees 17 and 18.
18	*Chamaecyparis pisifera*	M	4	18	23	N 1 S 1 E 1 W 1	G	F	2.16	1.79	Topped for powerline.
19	*Eucalyptus longifolia*	M	11	28	31	N 0 S 4 E 4 W 2.5	P	F	3.36	2.02	 CB to S, competition occurs N. Dieback, dw.

Tree no.	Species	Age class	Height (m)	d.b.h. (cm)	Diam. at base (cm)	Canopy Radius	Vitality	Condition	TPZ radius (m)	SRZ radius (m)	Comments
20	*Melaleuca decora*	M	8	29, 38, 21, 21	65	N 2 S 1 E 2 W 2	G	G	6.75	2.76	 4 CD, dw, CB to N.
21	*Melaleuca decora*	M	10	30	42	N 3 S 1 E 3 W 1	F	G	3.60	2.30	 Competition occurs S and W.
22	*Eucalyptus longifolia*	M	12	63 at 1m	60	N 4 S 5 E 3 W 5	G	G	7.56	2.67	 CD at 1m, spreading tree, TW at base on W side, general dw.

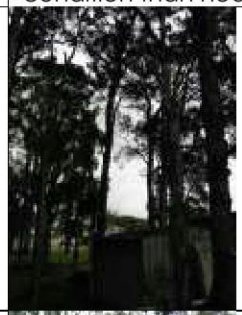
Tree no.	Species	Age class	Height (m)	d.b.h. (cm)	Diam. at base (cm)	Canopy Radius	Vitality	Condition	TPZ radius (m)	SRZ radius (m)	Comments
23	*Melaleuca decora*	M	8	32	45	N 1 S 2 E 2 W 2	G	F	3.84	2.37	 CB toward W, pruned, probably for house. Photo shows trees 23 and 24.
24	*Melaleuca decora*	M	8	22	30	N 1 S 1 E 1 W 3	G	F	2.64	2.00	CB toward W, pruned, probably for house.
25	*Pinus contorta*	M	15	48	55	N 4 S 3 E 4 W 5	F	G	5.76	2.57	 CB to N, 3 stems at 2m.
26	*Melaleuca decora*	M	9	36	46	N 2 S 2 E 2 W 2	F	G	4.32	2.39	 CD at 2m, dw, next to bungalow.

Tree no.	Species	Age class	Height (m)	d.b.h. (cm)	Diam. at base (cm)	Canopy Radius	Vitality	Condition	TPZ radius (m)	SRZ radius (m)	Comments
27	*Melaleuca decora*	M	7	42, 37	70	N 0 S 2 E 1 W 3	P	G	6.72	2.85	 Large dieback, DW, dw, N tree/stem is dead.
28	*Melaleuca decora*	M	8	64	70	N 2.5 S 3 E 2.5 W 2.5	G	G	7.68	2.85	 Dense foliage. Suppressed by dying tree 27.
29	*Melaleuca decora*	M	9	22, 25	50	N 0 S 4 E 2 W 1	F	F	4.00	2.47	 CB to S, 2 CD stems, suppressed on N side, trees 29-33 occur in close stand. Photo shows trees 29-33.

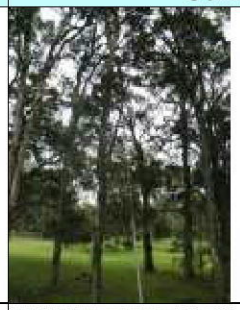
Tree no.	Species	Age class	Height (m)	d.b.h. (cm)	Diam. at base (cm)	Canopy Radius	Vitality	Condition	TPZ radius (m)	SRZ radius (m)	Comments
30	*Melaleuca decora*	SM	6	20	25	N 2 S 1 E 0 W 2	F	F	2.40	1.85	Suppressed on E side, CB to W.
31	*Melaleuca decora*	M	11	40	55	N 4 S 0 E 2 W 3	G	F	4.80	2.57	EC due to lower branches being suppressed by competitors. TW at base on W side. Slight TL to S.
32	*Melaleuca decora*	M	11	47	56	N 2 S 3 E 2 W 2	F	F	5.64	2.59	CD at 2m, EC, BI.
33	*Melaleuca decora*	M	10	40, 47	68	N 3 S 1 E 3 W 0	F	F	7.41	2.81	Twig dieback is frequent on tree. Suppressed on W side, TW on E side at base, CB to E.
34	*Melaleuca decora*	M	8	30	35	N 1.5 S 2 E 1 W 2	G	G	3.60	2.13	 Some dw branches. Less low canopy occurs on N side.

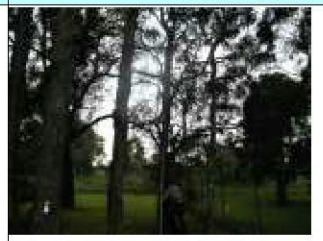
Tree no.	Species	Age class	Height (m)	d.b.h. (cm)	Diam. at base (cm)	Canopy Radius	Vitality	Condition	TPZ radius (m)	SRZ radius (m)	Comments
35	*Melaleuca decora*	M	12	39	56	N 1 S 4 E 2 W 2	G	F	4.68	2.59	 Suppressed on N side, EC, branching mostly toward S. Tree occurs near shed. Area is swampy.
36	*Melaleuca decora*	M	11	28, 24	60	N 2 S 2 E 3 W 4	G	F/P	4.43	2.67	 CD at base Suppressed on N and S sides.
37	*Melaleuca decora*	M	8	19	26	N 1 S 2 E 1 W 1	F/G	F	2.28	1.88	 CB to S, suppressed on N side, dw. Photo shows trees 37 – 40.

Tree no.	Species	Age class	Height (m)	d.b.h. (cm)	Diam. at base (cm)	Canopy Radius	Vitality	Condition	TPZ radius (m)	SRZ radius (m)	Comments
38	*Melaleuca decora*	M	11	29	37	N 1 S 3 E 1 W 1	F	F	3.48	2.18	EC, suppressed on N side.
39	*Melaleuca decora*	M	11	24	35	N 2 S 2 E 3 W 3	F	F	2.88	2.13	EC, dw, several dead branches.
40	*Melaleuca decora*	M	11	23	30	N 2 S 0 E 1 W 4	F	F	2.76	2.00	EC, suppressed on S and N sides, dieback occurring on small branches.
41	*Melaleuca decora*	M	12	18	26	N 0 S 2 E 1 W 1	P	P	2.16	1.88	 Dead branches, EC. Tall and thin tree, suppressed on E side, stem is somewhat bowed and has corrected itself.

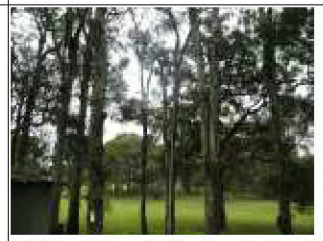
Tree no.	Species	Age class	Height (m)	d.b.h. (cm)	Diam. at base (cm)	Canopy Radius	Vitality	Condition	TPZ radius (m)	SRZ radius (m)	Comments
42	*Melaleuca decora*	SM	11	16	30	N 1 S 1 E 1 W 1	G	F	2.00	2.00	 TW on S side, tall and thin. In better condition than nearby trees.
43	*Melaleuca decora*	M	12	36	40	N 3 S 3 E 2 W 2	F	F	4.32	2.25	 Dead branches, EC, suppressed.
44	*Melaleuca decora*	J	6	10	19	N 0 S 0 E 1 W 1	P	F	2.00	1.65	 Heavily suppressed, dw, dieback, small TW.

Tree no.	Species	Age class	Height (m)	d.b.h. (cm)	Diam. at base (cm)	Canopy Radius	Vitality	Condition	TPZ radius (m)	SRZ radius (m)	Comments
45	*Melaleuca decora*	SM	12	16	27	N 2 S 0 E 2 W 2	P	F	2.00	1.91	 Bare on S side, sparse branching, dieback.
46	*Melaleuca decora*	SM	10	14	20	N 2 S 1 E 1 W 1	P	F	1.68	1.68	 CB to N, dieback, stem not growing in straight direction.
47	*Melaleuca decora*	SM	12	17	28	N 1 S 1 E 1 W 1	F	F	2.04	1.94	 TW to S, EC, dead branches.

Tree no.	Species	Age class	Height (m)	d.b.h. (cm)	Diam. at base (cm)	Canopy Radius	Vitality	Condition	TPZ radius (m)	SRZ radius (m)	Comments
48	*Melaleuca decora*	M	12	20	31	N 1 S 2.5 E 2 W 0.5	G	F	2.40	2.02	 Tall and thin tree. Has lower foliage, extra stem at base, suppressed by T49 on N side.
49	*Melaleuca decora*	M	12	26, 12	40	N 2 S 3 E 2 W 3	G	G	3.44	2.25	 Some ep on higher branches, some dieback on N side.
50	*Melaleuca decora*	M	12	30	40	N 1 S 1 E 2 W 1	F	G/F	3.60	2.25	 Dead branches, EC

Tree no.	Species	Age class	Height (m)	d.b.h. (cm)	Diam. at base (cm)	Canopy Radius	Vitality	Condition	TPZ radius (m)	SRZ radius (m)	Comments
51	*Melaleuca decora*	J	8	14	22	N 1 S 0.5 E 2 W 0	F	G/F	2.00	1.75	 Dieback common on tree, heavily suppressed, dw. Photo shows trees 51 and 52.
52	*Melaleuca decora*	M	12	33, 16	54	N 2 S 0 E 4 W 2	F	G	4.40	2.55	Good form/foliage, extra stem E, suppressed lower canopy on W side.
53	*Melaleuca decora*	SM	9	18	29	N 1 S 2 E 1 W 1	G/F	G	2.16	1.97	 Dieback of upper branches.
54	*Melaleuca decora*										Dead tree

Tree no.	Species	Age class	Height (m)	d.b.h. (cm)	Diam. at base (cm)	Canopy Radius	Vitality	Condition	TPZ radius (m)	SRZ radius (m)	Comments
55	*Melaleuca decora*	SM	9	17	22	N 1 S 0 E 2 W 0	F	F	2.04	1.75	 Pruned, CB to E, some dieback.
56	*Eucalyptus longifolia*	M	16	73	82	N 8 S 5 E 7 W 5	F	G	8.76	3.04	 DW, large branches have broken off. Old ep regrowth evident on tree.
57	*Melaleuca decora*	M	12	35	43	N 2 S 2 E 1 W 2	F	G	4.20	2.32	 EC, dw branches are common.

Tree no.	Species	Age class	Height (m)	d.b.h. (cm)	Diam. at base (cm)	Canopy Radius	Vitality	Condition	TPZ radius (m)	SRZ radius (m)	Comments
58	*Melaleuca decora*	M	9	33	46	N 3 S 1 E 0 W 4	F	F	3.96	2.39	 Strong CB to W, dw. Photo shows trees 58 and 59.
59	*Melaleuca decora*	M	11	23	31	N 2 S 0 E 0 W 1	G	F	2.76	2.02	EC, dw, CB to N.
60	*Melaleuca decora*	M	11	31	44	N 1 S 1 E 2 W 2	F	F	3.72	2.34	 CD at 3m, EC, dw, twin stems leaning N and S. Photo shows trees 60, 61 and 62.
61	*Melaleuca decora*										Dead tree
62	*Melaleuca decora*	M	11	28	36	N 2.5 S 0 E 0 W 3	G	G	3.36	2.15	CB to W, suppressed on E side, CD at 2m.

Tree no.	Species	Age class	Height (m)	d.b.h. (cm)	Diam. at base (cm)	Canopy Radius	Vitality	Condition	TPZ radius (m)	SRZ radius (m)	Comments
63	*Melaleuca decora*	M	10	46	58	N 4 S 1 E 2 W 4	G/E	G	5.52	2.63	 Common dw, CB to N and W, suppressed on E and S sides, some dieback.
64	*Melaleuca decora*	M	11	27	36	N 2 S 1 E 2 W 0	F	F/P	3.24	2.15	 EC, CB to E, suppressed on W side, tree spreading S and E.

Tree no.	Species	Age class	Height (m)	d.b.h. (cm)	Diam. at base (cm)	Canopy Radius	Vitality	Condition	TPZ radius (m)	SRZ radius (m)	Comments
65	*Melaleuca decora*	M	11	31	47	N 1 S 2 E 1 W 3	G	F	3.72	2.41	 Some lower branches on W side. Suppressed on N, S and E sides. Some dieback.
66	*Melaleuca decora*	M	10	36	50	N 1 S 1 E 1 W 3	F	F	4.32	2.47	 3 close trees. EC. Photo shows trees 66-68.
67	*Melaleuca decora*	M	10	23	34	N 2 S 2 E 0 W 3	G	F	2.76	2.10	CB to W, suppressed on E side by stand of trees. Some dw.
68	*Melaleuca decora*	M	10	29	40	N 0 S 3 E 1 W 2	F	F	3.48	2.25	CB/TL to S. Strongly suppressed on N side. Small branch dieback. Tree has ep that has died.

Tree no.	Species	Age class	Height (m)	d.b.h. (cm)	Diam. at base (cm)	Canopy Radius	Vitality	Condition	TPZ radius (m)	SRZ radius (m)	Comments
69	*Melaleuca decora*	M	9	26	35	N 0 S 3 E 0 W 0	F	F	3.12	2.13	 CB toward S, suppressed on N side, stem is somewhat misshapen, dw.
70	*Melaleuca decora*	M	11	46	50	N 3 S 2 E 3 W 3	E	E	5.52	2.47	 Growing in highly favourable conditions – receives access to regular water by growing in drainage line, and has no canopy competitors. Some small twig dieback.
71	*Eucalyptus fibrosa*	J	6	13	18	N 1 S 1 E 1.5 W 1	G/E	E	2.00	1.61	 Somewhat suppressed on W side.

Tree no.	Species	Age class	Height (m)	d.b.h. (cm)	Diam. at base (cm)	Canopy Radius	Vitality	Condition	TPZ radius (m)	SRZ radius (m)	Comments
72	*Eucalyptus longifolia*	SM	6	27	25	N 2 S 1 E 2 W 0	F	G	3.24	1.85	 Suppressed on S side, common dieback, lots of branching.
73	*Eucalyptus globoidea*	M	11	28	34	N 4 S 0 E 3 W 1	G	F/G	3.36	2.10	 CB to N, suppressed on S side, dw through lower canopy, CD at 5m, ep.
74	*Eucalyptus globoidea*	M	14	37	52	N 3 S 4 E 4 W 1	G	G	4.44	2.51	 Dieback occurring on W side, favours growing toward S, dw is common.

Tree no.	Species	Age class	Height (m)	d.b.h. (cm)	Diam. at base (cm)	Canopy Radius	Vitality	Condition	TPZ radius (m)	SRZ radius (m)	Comments
75	*Melaleuca decora*	M	9	23, 19	44	N 1 S 1 E 1 W 1	G	F	3.58	2.34	 CD, mistletoe, suppressed on W side, CB. Photo shows trees 75 and 76.
76	*Melaleuca decora*	M	9	28, 21	55	N 3 S 2 E 1 W 3	G	G	4.20	2.57	 Twin stems at base. Suppressed on E side by tree 75. Some dw branches.
77	*Melaleuca decora*	M	8	20, 22	38	N 1.5 S 1.5 E 1.5 W 1.5	G	E/G	3.57	2.20	 Bl, suppressed and dw on W side.

Tree no.	Species	Age class	Height (m)	d.b.h. (cm)	Diam. at base (cm)	Canopy Radius	Vitality	Condition	TPZ radius (m)	SRZ radius (m)	Comments
78	*Melaleuca decora*	M	10	32	44	N 3 S 3 E 3 W 0.5	F	G	3.84	2.34	 Suppressed + ep + dieback on W side. Many galls on leaves, and wasp nest in tree.
79	*Melaleuca decora*	M	10	24, 27, 18	54	N 3 S 2 E 3 W 2	G	G	4.84	2.55	 Pruned, CD 3 stems from base, suppressed by tree 82.
80	*Melaleuca decora*	SM	7	18, 14	37	N 2 S 1 E 2 W 2	G	G	2.74	2.18	 Many galls on foliage, dw, 2 stems from base, CB to N which is detrimental to tree 81. Photo shows trees 80 and 81.

Tree no.	Species	Age class	Height (m)	d.b.h. (cm)	Diam. at base (cm)	Canopy Radius	Vitality	Condition	TPZ radius (m)	SRZ radius (m)	Comments
81	*Melaleuca decora*	M	7	24	36	N 2 S 0 E 2 W 2	P	F	2.88	2.15	CB to N, dieback on S side, sparse foliage, dead branches are common on tree.
82	*Eucalyptus fibrosa*	M	23	83, 32, 73	136	N 9 S 7 E 10 W 10	G	E	13.81	3.77	 DW, large branch has been removed. Possible remnant tree. Tree has two main stems favouring W and E.
83	*Melaleuca decora*	M	10	28, 35	70	N 3 S 0 E 3 W 3	F	F	5.38	2.85	 Mistletoe, galls, CD at base, favours growing W over fence, dw, used to have a 3rd stem from base. Dieback on N side, suppressed S.

Tree no.	Species	Age class	Height (m)	d.b.h. (cm)	Diam. at base (cm)	Canopy Radius	Vitality	Condition	TPZ radius (m)	SRZ radius (m)	Comments
84	*Melaleuca decora*	M	10	25	35	N 2 S 1 E 3 W 2	F	F	3.00	2.13	 EC, dw is common on tree, galls, suppressed on N and S sides. Photo shows trees 84, 85, 86, 87, 88, 89 and 90.
85	*Melaleuca decora*	J	5	14, 15	32	N 3 S 0 E 3 W 1	F	P	2.46	2.05	CB to NE, no foliage on S side, ep, galls, branch extending to 4m NE.
86	*Melaleuca decora*	M	9	33	53	N 3 S 2 E 3 W 1	P	F	3.96	2.53	EC, favours N, CD at 5m.
87	*Melaleuca decora*	M	9	32	44	N 2 S 1 E 0 W 3	P	F	3.84	2.34	Foliage only toward W, ep, galls, broken branches, would have had good form without competition.
88	*Melaleuca decora*	M	9	21	35	N 0 S 3 E 2 W 1	F/P	P	2.52	2.13	EC, tall and thin tree, favours S, dieback.

Tree no.	Species	Age class	Height (m)	d.b.h. (cm)	Diam. at base (cm)	Canopy Radius	Vitality	Condition	TPZ radius (m)	SRZ radius (m)	Comments
89	*Melaleuca decora*	SM	7	15	23	N 1 S 1 E 3 W 0	F	F	2.00	1.79	TL to E, bare on W side, mistletoe, galls, small branch dieback.
90	*Melaleuca decora*	M	9	22, 24, 37	65	N 1 S 3 E 3.5 W 3	G	G	5.91	2.76	TW to W, 3 stems from base, broken branches, lacks lower branches on E side.
91	*Melaleuca decora*	M	10	25, 34	64	N 2 S 3 E 3 W 3	F	F	5.06	2.74	 2 stems from base, suppressed on E side, CB to W, galls, dw branches, Bl.
92	*Melaleuca decora*	J	7	14, 14	40	N 0 S 1 E 0 W 2	F	G	2.38	2.25	 CD, CB to W, suppressed especially on E side, some dieback.

Tree no.	Species	Age class	Height (m)	d.b.h. (cm)	Diam. at base (cm)	Canopy Radius	Vitality	Condition	TPZ radius (m)	SRZ radius (m)	Comments
93	*Melaleuca decora*	M	9	34	55	N 2 S 3 E 3 W 2	F	G	4.08	2.57	 Dieback, good form, suppressed on N side.
94	*Melaleuca decora*	M	10	28, 16, 14	48	N 2 S 3 E 1 W 3	P	F	4.22	2.43	 3 stems from base, CB to W, growing away from Tree 95, ep, dieback, favours S.

Tree no.	Species	Age class	Height (m)	d.b.h. (cm)	Diam. at base (cm)	Canopy Radius	Vitality	Condition	TPZ radius (m)	SRZ radius (m)	Comments
95	*Melaleuca decora*	M	11	55	70	N 3 S 3 E 4 W 4	G	G	6.60	2.85	 Dominant tree, EC, strong large limbs in upper canopy, dying or small branches on lower trunk, ep, CD at base, dead branches dw-DW.
96	*Melaleuca decora*	M	9	21, 14	44	N 2 S 1 E 2 W 2	F	G	3.03	2.34	 2 stems from base, ep, dw, suppressed on N side, galls.
97	*Melaleuca decora*	M	10	33	41	N 2 S 2 E 3 W 3	F	G	3.96	2.28	 Galls, ep, dw, suppressed on N side by tree 82, pruned.

Tree no.	Species	Age class	Height (m)	d.b.h. (cm)	Diam. at base (cm)	Canopy Radius	Vitality	Condition	TPZ radius (m)	SRZ radius (m)	Comments
98	*Melaleuca decora*	J	6	12	19	N 1 S 1 E 1 W 1	F/P	G	2.00	1.65	 Suppressed on W side, galls, dieback of small branches.
99	*Melaleuca decora*	M	10	28	34	N 2 S 2 E 2 W 1	G	G	3.36	2.10	 Dieback of lower canopy, possible old TW on S side, good form overall.
100	*Eucalyptus globoidea*	M	9	31	47	N 4 S 5 E 3 W 2	F	G	3.72	2.41	 Dieback of lower canopy, spreading E and S, dw.

Tree no.	Species	Age class	Height (m)	d.b.h. (cm)	Diam. at base (cm)	Canopy Radius	Vitality	Condition	TPZ radius (m)	SRZ radius (m)	Comments
101	*Eucalyptus globoidea*	M	10	30	42	N 2.5 S 2 E 2 W 0	P	G	3.60	2.30	 Most foliage is 1-3 year old ep. DW, top half of tree is dying or dead. Bracket fungus at base on S side growing in response to recent rain.
102	*Melaleuca decora*	M	10	44	56	N 3 S 3 E 4 W 4	G	E	5.28	2.59	 Pruned, suppressed + ep on W side, dw.
103	*Melaleuca decora*	M	10	44	51	N 3 S 2 E 3 W 3	F	G	5.28	2.49	 Large TW extending from base to 1.4m on E side, dead secondary stem, ep in higher trunk, dw, galls.

Tree no.	Species	Age class	Height (m)	d.b.h. (cm)	Diam. at base (cm)	Canopy Radius	Vitality	Condition	TPZ radius (m)	SRZ radius (m)	Comments
104	*Melaleuca decora*	M	10	47	53	N 2 S 3 E 3 W 3	E	G	5.64	2.53	 Old TWW on W side at base, dw branches, suppressed on N side, ep, chain around tree that is partly obscured by bark.
105	*Melaleuca decora*	M	10	42, 53	98	N 4 S 4 E 4 W 4	E	E	8.11	3.28	 Galls, wood beams in tree used for climbing, 2 stems from base, common dw in suppressed NW area, mistletoe.

Tree no.	Species	Age class	Height (m)	d.b.h. (cm)	Diam. at base (cm)	Canopy Radius	Vitality	Condition	TPZ radius (m)	SRZ radius (m)	Comments
106	*Melaleuca decora*	M	9	30, 28, 39	69	N 3 S 3 E 3 W 2	E	G	6.79	2.83	 Mistletoe, dw, broken dw branches, suppressed SW by tree 107, no competition occurs for the tree otherwise. BI, metal rods between fork. Photo shows trees 106 and 107.
107	*Melaleuca decora*	M	9	41	51	N 3 S 4 E 3 W 3	E	G	4.92	2.49	Mistletoe, suppressed by tree 106 on lower canopy on NW side, CD at 2m, dw, mistletoe is most likely spread by noisy mynas which frequent several melaleuca trees in particular.
108	*Melaleuca decora*	M	11	81	85	N 4 S 4 E 4 W 3	E	E	9.72	3.09	 Pruned, dw, mistletoe.

Tree no.	Species	Age class	Height (m)	d.b.h. (cm)	Diam. at base (cm)	Canopy Radius	Vitality	Condition	TPZ radius (m)	SRZ radius (m)	Comments
109	*Melaleuca decora*	M	11	100	114	N 4 S 3 E 4 W 4	E	G/E	12.00	3.50	 Old wounds on S and E sides, CD at 1m, mistletoe, galls especially on S side, small twig dieback on S side.
110	*Acacia podalyriifolia*	M	3	16, 17	27	N 2 S 2 E 2 W 2	P	F	2.80	1.91	 Large dieback, foliage only on low canopy.
111	*Acacia podalyriifolia*	M	5	11	15	N 1 S 1 E 1 W 1	P	F	2.00	1.50	 Dieback.

Tree no.	Species	Age class	Height (m)	d.b.h. (cm)	Diam. at base (cm)	Canopy Radius	Vitality	Condition	TPZ radius (m)	SRZ radius (m)	Comments
112	*Acacia podalyriifolia*	M	5	13	16	N 1 S 0 E 2 W 3	F	F	1.56	1.53	 Dieback, TL to W. Photo shows trees 112 and 113
113	*Acacia podalyriifolia*	M	6	8	11	N 1 S 1 E 1 W 2	G	G	2.00	1.50	CB to NW.
114	*Prunus sp.* (nectarine?)	M	4	27	34	N 2 S 1 E 2 W 2	G	G	3.24	2.10	 Ornamental tree.
115	*Pyrus* (apricot?)	M	4	15	27	N 1 S 1 E 1 W 1	G	G	2.00	1.91	 Ornamental tree.

2 KEY

Age Class	Vitality and condition	Comments
J - juvenile	E - excellent	CD - codominant stems
SM - semi-mature	G - good	CB - canopy bias
M - mature	F - fair	TL - trunk lean
	P - poor	EC - elevated crown
		BI - bark inclusion
		TW - trunk wound
		ep - epicormic growth
		dw - small diameter deadwood
d.b.h. - Trunk diameter at 1.4m		DW - large diameter deadwood

4. Anticipated impact of the development to trees on site

4.1 Tree retention

There are no trees that warrant special protection or need to be retained for particular ecological reasons.

The following trees may be retained for the proposal: 14, 15, 16, 17, 18, 19, 20, 21, 22, 23 and 24.

4.2 Tree removal

The proposal (Figure 3) indicates the removal of the following trees: 1, 2, 3, 4, 5, 6, 7, 8, 9, 19, 11, 12, 13, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114 and 115.

No habitat trees were found on the site.

All trees may be removed for the purpose of the development if required.

5. Discussion

The majority of trees on the site occur in stands on the north side of the site. These trees are predominantly *Melaleuca decora*. The overall condition and vitality of these close-growing trees is adversely affected by the canopy competition that occurs between them. Little or no recruitment of new trees within the *Melaluca* stands has occurred due to understory clearing. The trees that were not originally cleared along with the shrub layer have grown tall and thin, typically without branches in the lower canopy.

Solitary trees including natives and exotics occur across the property. These trees are not subjected to competition, and are typically in good condition.

Several large trees have recently been cleared from the site. These trees occur near to the southeast residential dwelling: near to trees 23, 24, and 26, and near to trees 17 and 18. These trees are indicated in the site survey plan SK04 by Diversi Consulting dated 10 March 2015, and are still visible from aerial photographs, however these trees had been removed prior to this tree survey.

There is no impediment to the removal of all assessed trees for the proposal.

6. Recommendations

The following recommendations apply:

a) There is no impediment to the removal of trees from the site.

7. References

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Standards Australia (2010) Protection of trees on development sites (AS 4970-2009 – incorporating Amendment No. 1).

Appendix 1. Tree assessment terminology and rationale

Explanation of terminology

d.b.h. - Acronym for trunk diameter at breast height (1.4m from ground level)

Vitality - Indicates the energy reserves of the tree and is determined by the observed crown colour and density, the percentage of dead/dying branches and epicormic growth. The vitality of the canopy and that of the root system is interdependent; root damage or heavy pruning draws on a tree's energy reserves. The tree's ability to initiate internal defence systems (compartmentalisation of damage) is reduced and it can also become predisposed to attack by insects and pathogens.

Epicormic Growth - The production of epicormic growth from dormant buds is a response to stress. Epicormic growth may be initiated by various causes such as branch loss, excessive pruning, fire damage, drought, defoliation and/or disease.

Mycorrhizae/Rhizosphere - Mycorrhizae are fungi that grow in symbiotic association with tree roots (especially the fine root hairs) and are attributed with increasing the uptake of nutrients, particularly phosphorus, and reducing infection from soil borne pathogens. They greatly increase the surface area of a tree's root system. Mycorrhizae require aerobic soil conditions and are reduced in number by compaction, waterlogging and overuse of soil fertilisers. Forest litter or similar mulch provides ideal conditions for the proliferation of Mycorrhizae. Rhizosphere is a term describing the peripheral area of a tree's root system where this symbiotic association most commonly occurs.

Condition - An evaluation of the structural status of the tree including defects that may affect the useful life of an otherwise healthy specimen. Such influencing factors include cavities and decay, weak unions between scaffolds (major branches) or trunks and faults of form or habit.

Tree Hazard Potential - An assessment of the risks associated with retaining a tree in its existing or proposed surroundings. Factors to consider are the growth characteristics of the species, tree vitality, condition and the frequency and type of potential targets. The impact the proposed works can have on tree vitality can only be assumed.

Appendix 2. Tree protection guidelines

A Pre-construction/Demolition phase

The following methods are to be implemented to minimise potential damage to retained trees, e.g. from soil compaction and site activity. Trees are to be protected at all stages of the development, and growing conditions are to be improved within the Tree Protection Zone (TPZ). These guidelines are consistent with AS4970-2009 *Protection of trees on development sites*.

A 1. All site workers are to be aware of relevant tree protection requirements. Nominated trees will be removed or transplanted as per the tree protection plan. An arborist is to supervise tree removal, pruning and transplanting and certify the completed works.

A 2. All trees not nominated for retention are to be removed prior to any construction activity. Approved tree pruning and removal operations near retained trees are to be carried out in a way that avoids soil compaction and damage to canopy, trunk or roots. Works are to be supervised by an arborist or the person responsible for site management.

A 3. Stumps are to be ground, not dozed or dug out, if in the vicinity of retained trees. Machinery (other than stump machines) is to be kept beyond the nominated protection zones of retained trees during all operations.

A 4. Tree protection fencing is to be in place before the introduction of machinery or other materials to the site and before commencement of works. Fencing is to be located to *at least* the canopy dripline, be of sturdy construction and retained in-situ during works unless altered by the project arborist. All site activities are excluded from this zone. Refer to Appendix 2 for specific minimum setback distances. AS4687 specifies applicable fencing requirements.

A 5 The TPZ is to be mulched using material compatible with 'AS4454-2003 Composts, soil conditioners and mulches', e.g. decomposed leaf litter, and maintained at 50-100 mm depth. Some areas, e.g. turf, may not require mulch. Temporary irrigation may be required. Weeds are to be removed and controlled.

A 6. Pruning is to be undertaken by suitably qualified, skilled and insured people to comply with AS4373-2007, Australian Standard: Pruning of Amenity Trees. Initial pruning provides adequate clearances and general crown maintenance. Flexible branches are to be tied back, not pruned.

B Construction phase (Maintain tree protection fencing)

B 1 Where access is required within a TPZ, temporary ground protection measures will be required (e.g. metal plates, rumble boards or exterior-grade ply over aggregate)

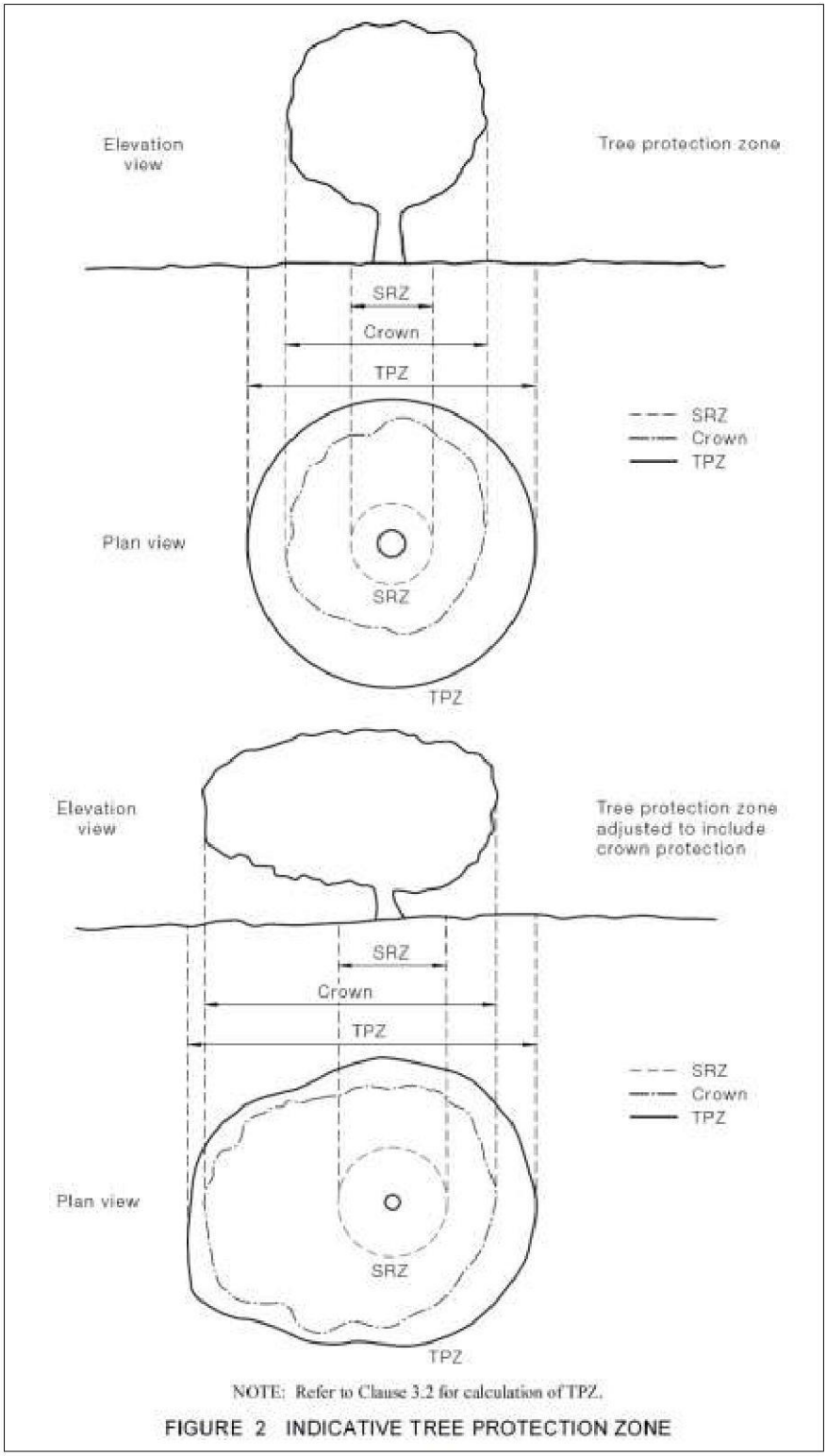
capable of supporting the required load without deflection. Trunk protection may be required, e.g. battens wrapped around the trunk to a height of 2 m.

B 2 Material stockpiles or dumps, parking, excavation, site sheds, preparation of chemicals, fires, wash down areas or similar are to be located clear of TPZs. Areas designated for such requirements are not to divert drainage water into tree protection areas.

B 3 Machine trenching is to be excluded from the TPZ of retained trees. Any required root excavation inside a TPZ is to be done by hand and intact roots >40 mm in diameter are to be retained. Services are to be installed 100 mm clear of such roots. Damaged roots **must** be cut cleanly with sharp implements (backhoe blades and similar are excluded), with no root dressings or paints. Trenches are to be backfilled promptly to minimise soil desiccation. Underbore if no suitable alternative location is possible. All works within the TPZ are to be supervised by an arborist.

Appendix 3. Tree protection zone and structural root zone

2 Extract from Section 3 of AS 4970-2009



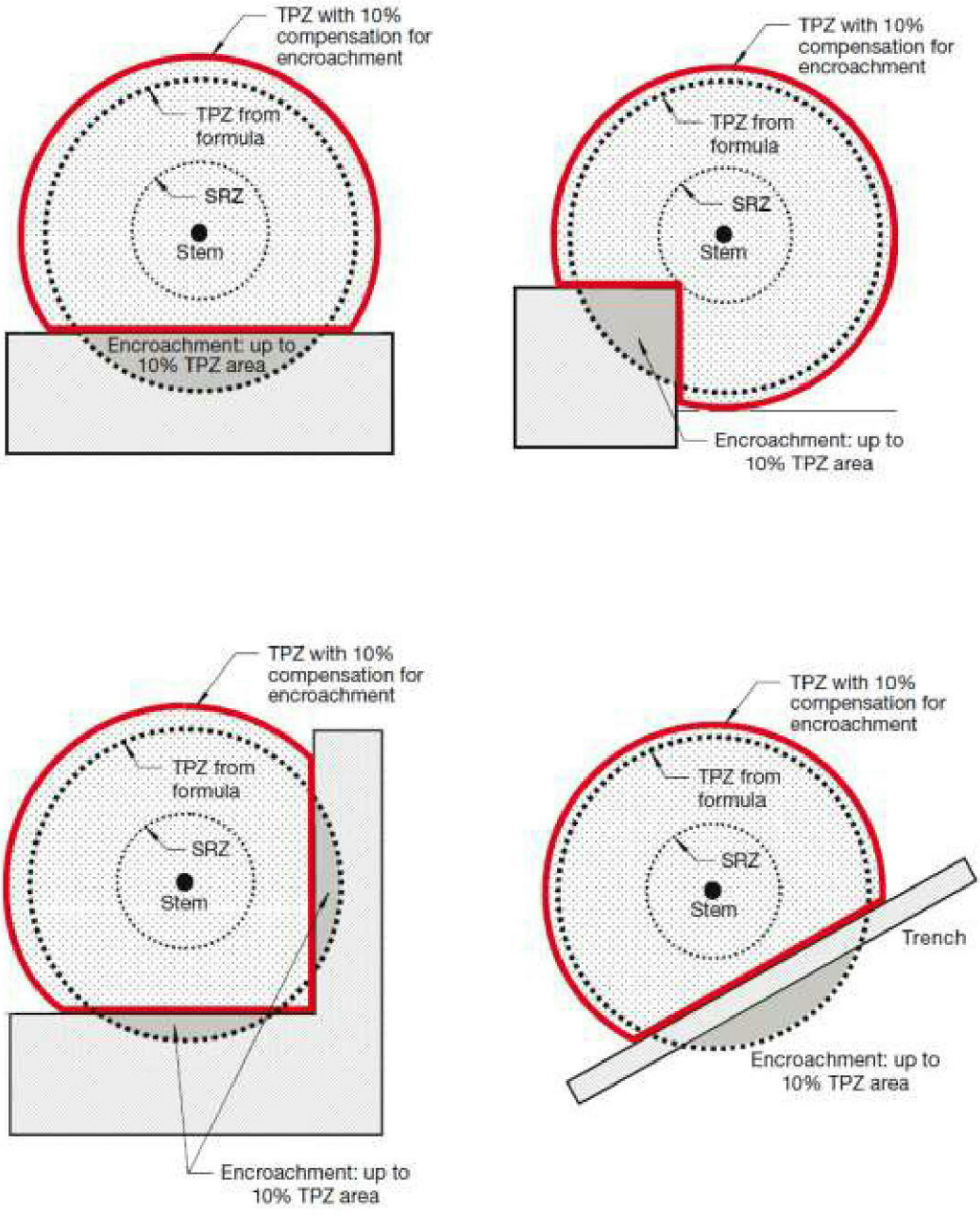
NOTE: Refer to Clause 3.2 for calculation of TPZ.

FIGURE 2 INDICATIVE TREE PROTECTION ZONE

Appendix 4. Encroachment into tree protection zone

2 Extract from Appendix D of AS 4970-2009

Encroachment into the tree protection zone (TPZ) is sometimes unavoidable. Figure D1
4 provides examples of TPZ encroachment by area, to assist in reducing the impact of such incursions.



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

FIGURE D1 EXAMPLES OF MINOR ENCROACHMENT INTO TPZ

Appendix 5. Company Profile

Abel Ecology has been in the flora and fauna consulting business since 1991, starting in the Sydney Region, and progressively more state wide in New South Wales since 1998, and now also in Victoria. During this time extensive expertise has been gained with regard to Master Planning, Environmental Impact assessments including flora and fauna, bushfire reports, Vegetation Management Plans, Management of threatened species, Review of Environmental Factors, Species Impact Statements and as Expert Witness in the Land and Environment Court. We have done consultancy work for industrial and commercial developments, golf courses, civil engineering projects, tourist developments as well as residential and rural projects. This process has also generated many connections with relevant government departments and city councils in NSW. Our team consists of four scientists and two administrative staff, plus casual assistants as required.

Licences

NPWS s132C Scientific licence number is SL100780 expires 30 April 2016
NPWS GIS data licence number is CON95034
DG NSW Dept of Primary Industries Animal Care and Ethics Committee Approval expires 8 December 2015
DG NSW Dept of Primary Industries Animal Research Authority expires 8 December 2015

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