

Tree Risk Assessment

Prepared by



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INTRODUCTION

The Facilities Manager of BCS Mr. Matthew Young has commissioned a Tree Risk Assessment Report relating to trees at BCS Carlingford.

McArdle Arboricultural Consultancy Pty Ltd prepared the report. AQF level 5 Consulting Arborist James McArdle conducted the evaluation using Visual Tree Assessment (VTA) method. The systems are in accordance with industry best practice (ISA) and impact assessments are based upon the Australian Standards AS4793-2009, Risk Management AS/NZS ISO 3100-2009 and American National Standard ANSI A300(Part9) Tree Risk Assessment.

AIMS

The Tree Risk Assessment report is developed to assess the trees at the above address for health and status. It is a tree risk assessment according to ISA guidelines and the purpose is to identify trees that pose an unacceptable risk potential and extreme safety risk because of their location and condition.

The aim of this report is to:

- To inspect trees in and around buildings and in areas where staff and public access.
- To give recommendation to the facilities manager of trees that poses a risk to human health and safety with professional opinion and management of these trees.

METHODOLOGY

An ISA risk assessment uses a ground Visual Tree Assessment (VTA) method employed in this report. The VTA system is based on the theory of tree biology, physiology and tree architecture and structure and is a method used to identify visible signs on trees that indicate health and potential hazards. The tree risk assessment matrix is developed using AS/NZ ISO 31000:2009 Risk management and principles and translates similar information from these documents.

The collection of data is performed in the field by an AQF Level 5 arborist. The assessment summaries the species, height and diameter, the trees health and structural condition for each trees, hazards, and retention categories were assigned to each tree.

Testing on site may include:

Mallet sounding, non invasive testing for hollows, probing cavities, white ant infestation. Invasive tests will determine depth of decay around cavities.

All testing is ground based. It should be noted that this Tree Assessment Report cannot be considered final until all aerial inspections have been completed, as these may reveal further defects.

This data was recorded in a Tree Survey Table and various assessment methods were used including:

1. *Tree Useful Life Expectancy. (TULE) Adapted from Jeremy Burell (SULE)*

Gives extra assessment life expectancy categories range to no potential for life expectancy.

2. *Health & Structural Condition of Tree Assessment.* This describes the vigour and vitality of the tree.

3. *Tree Hazard & Site Assessment.* This assessment identifies structural defects that predispose a tree to failure located near a target. It is a useful OH&S requirement.

4. *Tree Risk Assessment Matrix adopted for TCAA from B.Sullivan*

Positions a trees assessment into foreseeable risk statements.

5. *Some trees have special restrictions including cultural, scientific, historical or threatened category and may be reviewed as part of this report or further reporting.*

PLANNING GUIDELINES AND SPECIFIC LEGISLATION

A search of Local and State heritage registers, tree registers and determination of landscape significance were carried out for tree species identified in the survey.

In addition, trees are subject to the following legislation:

- *Threatened Species Conservation Act 1995* (NSW) (TSC Act) – The TSC Act provides a number of provisions for conserving threatened species, populations and ecological communities of animals and plants as well as managing key threatening processes. A list of species, populations and communities considered to be endangered or vulnerable are provided in the schedules to the TSC Act. Where identified, threatened tree species are considered in this report.
- *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) – The EPBC Act provides provisions to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places. This is defined in the EPBC Act as matters of national environmental significance. A list of species and ecological communities considered to be vulnerable, endangered or critically endangered are listed in the EPBC Act. Where identified, threatened tree species are considered in this report.
- *Noxious Weeds Act 1993* (NSW) (NWA) – The NWA provides provisions for the control and management of noxious plants and pest species. The Minister is granted powers to issue an Order declaring a plant noxious.

THE SITE

The BCS Carlingford village is located adjacent to BCS Hayfield Village, number 268 Pennant Hills road, Carlingford. The topography of the area is gently undulating and the native vegetation is characterized by the Cumberland Plain Woodland, which is an endangered ecological community, listed under the TSC Act. As Carlingford is an urban area, scattered trees are likely to remain but with no native understorey. There are approximately 200 trees on this site, and trees are in areas, which generally have a lower occupation rate. All trees have been inspected with only trees appearing with high fail potential assessed being investigated with further inspections including Aerial Inspection.. A probability of class 5 Acid Sulfate Soils exists for the site.

The collection of survey data was limited and an inspection was conducted on the 13th March, 2014 to the site.

SCALED SITE MAP



Site: **BCS Hayfield Village 268 Pennant hills Road, Carlingford.**

The satellite picture locates the site, within the property. (pre 2013)

The scale is approximately 16mm: 20m

TREE SURVEY TABLE

Tree No.	Location	Common & Scientific Name	Crown Spread m	Height (m)	Diam (cm)	Health & Structural Condition of Tree	TULE	TRA	MAINTENANCE
1.	Baptist Community Services Carlingford	<i>Eucalyptus saligna</i> Blue gum	12	20	52	Semi-matured tree, dieback is more than 10 per cent with Epicormics. Tree is leaning, previously heavily pruned.	3C	2c	Prune deadwood annually and mulch.
2.	"	<i>Cinnamomum Camphora</i> <i>Camphor Laurel</i>	12	18	65	Mature tree, dieback is more than 10 per cent, epicormics and inclusions at 2.5 meters.	3C	2c	Prune deadwood annually.
3.		<i>Eucalyptus saligna</i> Blue gum	10	30	57	Mature tree, dieback is more than 20 per cent with sparse foliage. Inclusions	3D	2c	Prune deadwood annually, aerial inspection and drill test is required.
4.		<i>Eucalyptus saligna</i> Blue gum	12	30	55	Mature tree, dieback is more than 10 per cent, physical damage at 70 meters.	3C	2c	Prune deadwood annually.
5.		<i>Eucalyptus saligna</i> Blue gum	10	27	78	Mature tree, dieback is more than 10 per cent with epicormics. Tree has a sparse foliage crown, unbalanced canopy, physical and insect damage. Tree has suffered from fungal attack, has a cavity, termite damage. Tree lean, has been heavily pruned, has a parasitic vine present and there are inclusions.	5c	2a	Remove. This tree has dropped a major limb since the initial inspection of 8 metres in length and 300cm in diameter.
6.		<i>Quercus Palustris</i> She Oak	15	18	49	Semi Matured tree with dieback more than 10 per cent, also physical damage to roots.	3C	2b	Prune deadwood annually and mulch.
7.		<i>Eucalyptus saligna</i> Blue gum	14	35	80	Mature tree with dieback more than 10 per cent, Epicormics and sparse foliage crown to West. Physical damage to tree from borers, fungal attack, termite damage and cavity in tree. Tree has previously been heavily pruned and has inclusions at 13 meters. Large crack at base.	5D	2a	Remove
8.		<i>Eucalyptus saligna</i> Blue gum	18	35	82	Mature tree with dieback more than 10 per cent, epicormics and physical damage to roots.	4C	2c	Aerial Inspection. Prune deadwood annually.
9.		<i>Eucalyptus saligna</i> Blue gum	14	40	60	Mature tree, dieback is more than 20 per cent, epicormics, and insect damage due to termites, habitat at 8 meters.	3D	2c	Prune deadwood annually. Drill root test and aerial inspection required. Termite treatment.
10.		<i>Eucalyptus saligna</i> Blue gum	18	40	60/70	Mature tree with dieback more than 10 per cent, epicormics unbalanced to the west and leaning west. Heavily pruned with inclusions at base.	3D	2c	Prune deadwood, aerial inspection, Drill test at base of tree.
11.		<i>Syagrus romanzoffiana</i> Cocos Palms 3x	3	10	28	Mature tree in good condition with poor development.	2D	2d	Annual inspection.

12.		<i>Eucalyptus saligna</i> Blue gum	20	35	85	Mature tree, dieback is more than 20 per cent, Epicormics with a sparse foliage crown. Tree is unbalanced canopy to the east with physical and insect damage caused by borers. Tree has a cavity and termite damage. Tree has been heavily pruned previously and has inclusions.	4D	2a	Remove
13.		<i>Eucalyptus saligna</i> Blue gum	19	35	80	Mature tree dieback is more than 10 per cent. Inclusions at 2 meters.	3D	2c	Prune deadwood annually. Requires aerial inspection
14.		13x C conifer sp.	3	12	30	Semi-mature tree in good condition but with poor development.	3B	2d	Annual (EM) Monitoring of tree.
15.			5	4	18	Immature tree in good condition but with poor development.	2D	2d	Annual Monitoring of tree.
16.		<i>Jacaranda mimosifolia</i> Jacaranda	5	6	26/9	Immature north leaning tree and includes insect damage and damage also, to the roots of the tree.	3D	2d	Prune deadwood, cut big branch. Drill test is necessary.
17.		<i>Jacaranda mimosifolia</i> Jacaranda	5	6	18	Immature tree with dieback more than 10 percent, leaning north, includes insect damage to the roots.	3D	2d	Prune northern most stem. Prune deadwood. Drill Test with annual monitoring (EM).
18.		<i>Eucalyptus saligna</i> Blue gum	15	30	66	Mature tree with dieback more than 10%, epicormics, a lot of physical damage, heavily pruned with inclusions.	3D	3c	Aerial inspection required. Prune deadwood, EM and annual monitoring.
19.		<i>Eucalyptus saligna</i> Blue gum	18	35	63	Mature tree in good condition, but with poor development, physical damage and inclusions.	3D	3b	Aerial inspection.
20.		<i>Jacaranda mimosifolia</i> Jacaranda	8	10	28/2 2	Semi-matured tree containing borers, inclusions at base.	3D	3d	(FI) Inspection. Annual monitoring.
21.		Liquidambar styraciflua	10	8	35	Semi-matured tree in good condition but poor development due to damage to the roots.	2D	3c	Root Test to determine anchorage with excavation within the structural root zone to a depth of 30-40cm and check on the quality of the roots.. Annual Monitoring.
22.		<i>Syagrus romanzoffiana</i> Cocos Palms 3x	2	6	30	Mature tree in good condition but poor development.	2D	3d	Annual Monitoring.
23.			4	12	30	Mature tree with a sparse foliage crown damage to the roots and leaning west.	3C	3b	Remove west stem. Annual Monitoring. [E]
24.			3	10	30	Mature tree in good condition, but poor development with a sparse foliage canopy.	2D	3d	Annual monitoring.
25.		<i>Eucalyptus saligna</i> Blue gum	20	35	83	Mature tree with physical damage, fungal attack, heavily pruned with inclusions	3D	3b	Aerial inspection. [E].
26.		<i>Eucalyptus saligna</i> Blue gum	23	35	95	Mature tree with Epicormics, physical damage, heavily pruned with inclusions.	3D	3b	Aerial inspection Drill Test. [E]
27.		<i>Cupressus</i> species Conifer	9	18	60	Mature tree with Epicormics, dieback is more than 30% with sparse foliage crown. This leaning tree has an unbalanced canopy; physical damage and dehydrated	5D	3b	Removal [E]

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28.		<i>Cupressus species</i> Conifer 3x	3	10	30	Semi-matured tree in good condition but poor development.	2a	3d	Annual Monitoring.
29.		<i>Acacia species</i> Wattle	1.5	3	10	Immature leaning tree on the embankment.	4D	3a	Remove
30.		<i>Cupressus species</i> Conifer	2.4	1.8	20	Semi-matured tree in good condition but poor development. Inclusions.	3D	3c	
31.		<i>Cupressus species</i> Conifer	4	12	35	Semi-matured tree in good condition but with poor development.	2D	3d	
32.		<i>Eucalyptus resinifera</i> Red Mahogany	15	25	68	Mature tree with dieback more than 10%, Epicormics at 8 meters, heavily pruned and dying at 8 meters.	3D	3d	Remove the eastern leader rubbing at 8m. Prune deadwood to a diameter of 40mm or decayed timber that is poorly attached.
33.	Council tree requires further assessment from council.	<i>Eucalyptus saligna</i> Blue gum	16	30	82	Mature tree with dieback more than 10%, Epicormics, physical and insect damage, borers. This tree is under Fungal attack and has a cavity. Inclusion 7 meters in length.	Nd 3D+4C	3b	Further information required with drill test in cavity to a depth of 41cm. Council may need to be informed of works as part of a significant tree in this forest community.
34.		<i>Eucalyptus microcorys</i> Tallowood	12	20	46	Semi-matured tree dieback is more than 10%, borers, physical damage, heavily pruned to the north with damage to the roots.	3C	3c	Root Test for quality of roots with excavation of 40-60cm within the srz (2meters).
35.		<i>Schleffera actinophylla</i> Umbrella Tree	5	9	50	Immature exempt from tree protection order as it is not desirable.	3A	3d	Thin out.
36.		<i>Liquidambar styraciflua</i> Liquid Amber	8	8	12	Immature cavity at 5 metres, exudations increase towards the base. Minor root damage.	3A	3c	Prune deadwood. Root Test required for root quality to be determined..
37.		<i>Eucalyptus saligna</i> Blue Gum	22	32	85	Mature tree with cavity at 5 meters.	3A	3b	Further information required. Aerial inspection and Drill Test at 5 metres. Drill depth to determine extent of cavity/decay to a depth of 42cm.
38.		<i>Liquidambar styraciflua</i> Liquid Amber	8	13	32	Immature tree in good condition but poor development with sparse foliage crown and unbalanced canopy.	3A	3c	Prune out included leader to allow a single dominant stem.
39.		<i>Corymbia citriodora</i> Lemon Scented Gum	16	15	48	Immature tree in good condition but poor development.	2A	3d	Prune deadwood
40.	X7	<i>Syagrus romanzoffiana</i> Cocos Palms 3x	3.7	8.15	23-30	Immature tree in good condition but poor development.	2A	3d	Biannually prune.

41.	X4 Adjacent Waldock	Archontophoenix cunninghamiana Bangalow Palm	6	7	110- 20	Immature tree in good condition but poor development.	3A	3e	Trim pods out.
42.		Gleditsia tricanthos Honey locust	14	13	60	Mature tree with insect damage at base. Cavity on both sides at base with a 80cm depth, high fail at anchorage near roots.	4C	3a	Remove tree in high target area with structural issue and cavity decay at base.
43.		Ulmus species Elm	8	14	33	Immature tree with unbalanced canopy to southwest.	3A	3d	Aerial Inspection required determining the quality of branch attachments. Prune out 5% of canopy on the weighted side.
44.		Gleditsia tricanthos Golden Robinia	8	8	15	Immature tree in good condition but poor development. Inclusions at 1 meter	3A	3d	Remove south leader and mulch. Prune deadwood.
45.		Plumeria sp. Australian Frangipani	5	6	15+1 5	Immature tree in good condition but poor development	ND 3A	Est 3d	Prune for thinning, and anchorage –pull test required to determine stability.
46.		Sapium sebiferum Chinese Tallowood	12	16	34	Mature tree in good condition but poor development.	3A	3d	Thin over roof 8% and prune deadwood.
47.		Melia azederach White Cedar	15	14	45	Mature tree in poor structural condition with poor development.	5C	3a	Remove tree.
48.		Corymbia citriodora Lemon Scented Gum	3	7	8	Immature tree with insect damage (borers) at base of tree and damage to the roots>	4C	3a	Remove tree.
49.		Ornamental species	5	7	10?	Immature tree with sparse foliage crown and damage to the roots.	3D	3d	Physical damage. Prune on south.
50.		Cupressus species Pine	1	12	12	Immature tree with dieback more than 20 %.-Top leaders are is dead.	4C	3b	Remove tree.
51.		Cupressus species Pine	2	12	15	Immature tree with dieback 50%-dead.	4A	3b	Remove tree.
52.		15x Cupressus species Pine	2	13	15- 18	Immature tree in good condition but poor development.	3A	3d	Annual (EM) Monitoring.
53.		Sapium sebiferum Chinese Tallow Tree 3x	10	15	37- 48	Mature tree in good condition but with poor development	3D	3c	Prune deadwood and epicormics.
54.		Eucalyptus haemastoma Scribbly Gum	9	12	12?	Immature tree with dieback more than 20%, Epicormics With sparse foliage crown, fungal attack throughout.	3D	3c	Fertilise, prune deadwood- Remedial prune 20%.
55.		Cotton Palm	3	7	38	Immature tree in good condition but poor development.	2A	3d	Prune dead fronds.
56.		Eucalyptus robusta Swamp Mahogany	1.4	20	52	Immature tree in good condition but poor development.	2D	3d	Prune deadwood and 10% of tree, prune lower lateral East at 6 meters.

57.		<i>Eucalyptus nicholli</i> Narrow leafed peppermint	17	20	780 at1m	Mature tree with borers, Epicormics unbalanced canopy,, Cavity at 5meters.	2D	3c	Remove, dead diseased wood and Epicormics (EM monitoring).
58.		<i>E.elata</i> Willow peppermint	20	24	790	Over matured tree with cavity west at 5 meters 30%, fungal attack	3d	3b	Aerial Inspection required. for damaged tree at 5 meters. Root test and drill.
59.		<i>Sapium sebiferum</i> Chinese Tallowood	8	18	30	Immature tree, fungal attack.	3D	3d	Prune dead wood
60.		<i>Syagrus romanzoffiana</i> Cocos Palms species 3x	5	6	14	Immature tree in good condition but poor development.	2D	3d	Prune deadwoods and pods biannually
61.		Tea Tree	6	7	27/2 0/24	Over mature tree with a sparse foliage crown. Strict over reaction 20% rods were exposed south. Cavity at 1 meter	5C	3a	Remove tree South
62.		<i>Syagrus romanzoffiana</i> Cocos Palms species	6	10	25	Immature tree in good condition but with poor development, damage to roots.	3D	3d	Prune biannually after Root Test. Annual Monitoring EM Monitoring.
63.	Damage by climbing plants 15	6x8 <i>Syagrus romanzoffiana</i> Cocos Palms species 6 Alder?	4-6	6.8	10- 20	Immature tree in good condition but with poor development	3D	3d	Prune annually.
64.		<i>Acer palmatum</i> Japanese maple	7	6	20	Immature tree adjacent house. With sparse foliage crown and unbalanced canopy, damage to the tree roots.	5C	3a	Remove tree.
65.	2x	2x <i>Cypress species</i> Pine	0.5	7	20	Immature tree in good condition but with poor development and physical damage to gutters.	3A	3b	Prune deadwood.
66.		<i>Eucalyptus Elata</i> Willow Peppermint	10	16	50	Immature tree under fungal attack.	2D	3d	Aerial Inspection. Prune 10% of dead or dying.
67.		<i>Ulmus species</i> Elm Tree	14	14	42	Mature tree in good condition, but poor development, minor borer damage.	2D	3d	Prune epicormics.
68.		<i>Ulmus species</i> Elm Tree	10	13	40	Mature tree in good condition, but poor development. Minor attack of borers.	3A	3d	Prune deadwood
69.		<i>Ulmus species</i> Elm Tree	5	8	11	Immature tree in good conditioner.	3A	3d	Prune dead wood
70.	Neighbours tree	9x <i>Camphor laurel</i> (1 neighbours tree 1 Grevillea Robusta	5-15	16-12	20- 50	Mature tree with dieback more than 20% and with insect damage.	3A	3d	Prune dead wood and remove diseased wood.
71.	North Adjacent to Highway	<i>Melia azederach</i> White cedar	8	7	28	Immature tree with sparse foliage head and physical damage to center and minor damage to roots.	3D	3d	Further information. Root Test and prune deadwood.
72.		<i>Cypresses species</i> Pine	5	6	12/1 4	Immature tree with sparse foliage crown opening with exudations. Inclusions at one meter.	5C	3a	Remove tree.
73.		<i>Cypresses species</i> Pine	5	6	15	Immature tree with a sparse foliage crown.	3D	3c	Event monitored

74.		3x <i>Cypresses species</i> Pine	5	6	28	Immature tree with dieback is more than 20% on west. Fungal development in leaders	4C	3d	Remove tree.
75.		4x <i>Cypresses species</i> Pine	1-2	8-10	10-15	Mature tree in good condition but poor development	3D	3d	Monitor tree for dehydration.
76.		3x <i>Cuppressus sempervirens</i> Pine	6	12	25-40	Mature tree with minor fungal attack. Inclusions at base of the tree.	3D	3d	Fertilise and Annually Monitor tree
77.		<i>Pinus radiata</i> Pine	8	11	30	Immature tree in good condition with poor development.	3D	3d	Prune deadwood
78.		<i>Jacaranda mimosifolia</i> Jacaranda	8	10	20/22	Immature tree twin trunk minor cavity. Minor borer at base.	3D	3c	Prune Epicormics and Annually Monitor.
79.		<i>Populus italic</i> Lombardy Poplar	5	17	68	Mature tree dieback is more than 20% , major deadwood and borers with damage to roots.	4C	3d	Remove tree
80.		<i>Populus italic</i> Lombardy Poplar	7	18	570cm	Mature tree	3D	3c	Drill test and prune deadwood.
81.	Walking	4x <i>Cuppressus species</i> Pine	2-4	6-14	10-20	Immature tree in good condition but poor development.	3D	3c	
82.		<i>Cypresses species</i> Pine	2	8	22	Immature tree with dieback more than 20% and dying.	4A	3b	Remove Tree.
83.		<i>Cypresses species</i> Pine	5	10	16 at base	Immature tree with dieback at 30% . Physical damage ...	4A	3b	Remove tree.
84.		<i>Populus species</i>	2	6	15	Immature tree in excellent condition.	2A	3d	Prune off gutter.
85.		<i>Acacia species</i>	5	6	15 at base	Immature tree with physical damage near roof with Insect damage.	3D	3d	Prune off roof.
86.	X25	<i>Cuppressus species</i> Pine	2-4	6-13	10-35	Immature tree in good condition but poor development.	3D	3d	Prune deadwood.
87.		<i>Liquidambar styraciflua</i> <i>Liquid amber</i>	16	18	74	Mature tree with physical damage lower at 12 meters and tail at 14 meters some minor borers	3A	3a	Aerial Inspection, Prune dead piece 8 meters south. Remove hanging branch.
88.	High Target area	<i>Araucaria heterophylla</i> <i>Norfolk Island Pine</i>	5	18	40	Immature tree in good condition but poor development.	3A	3c	Further investigation and root test.
89.	X3	<i>Pinus radiata</i> <i>Alnus species/Cuppressus sp.</i>	4-6	6-8	15-25	Immature tree in good condition but poor development.	3A	3d	Annual Monitoring.
90.	Front/North X2	<i>Cuppressus species</i> Pine	2+3	6+12	15-25	Immature tree in good condition but poor development.	3A	2d	Annual Monitoring.
91.	Assembly Point	<i>E.nicholli</i> Narrow leafed peppermint	7	6	40	Immature tree, mallet test indicates hollow cavity at base, damage to roots at South East. Hollow is indicative of less than 50% holding wood.	5C	4b	Remove.

92.		<i>E. microcorys</i> Tallowood	15	22	64	Mature tree, Physical damage birds -from this tree, damage to roots.	3D	3c	Aerial Inspection Prune diseased branches out 5% of canopy.
93.	Council	<i>Melaluca species</i> Paperbark	9	11	26/3 1	Immature tree, Sparse foliage crown Termite damage.	3D	3d	Drill test to determine wood quality of trunk, light prune 10 % Termite treatment.
94.	Adj. road	<i>Melaluca species</i> Paperbark	3	5	4	Immature tree in good condition but poor development.	2A	3e	Annual Monitoring.
95.		<i>Cuppressus species</i> Pine	3	8	15	Immature tree in excellent condition.	2A	3d	Annual Monitoring.
96.		<i>Corymbia citriodora</i> Lemon Scented Gum	17	21	40	Mature tree in good condition.	3A	3b	Prune deadwood.
97.		<i>Melaluca species</i> Paperback	6	10	54	Mature tree with reaction wood to 1m a cavity at the base and termite infestation and damage. An inclusion at the north side exists. Anchorage failure from embankment location imminent. Retained wall within the structural rootzone and drainage does not allow for stability. Located adjacent a sewer manhole with high target potential.	5c	5b	Remove. High target potential.
98.	X7	<i>Cuppressus species</i> Pine	1-4	5-7	10- 30	Immature tree in good condition but poor development tree	3A	3c	Mulch and add seasoll solution before new season's growth at applicable rate.
99.	Adj. road	<i>E. microcorys</i> Tallowood	11	20	45	Mature tree cavity at seven meters 1.5 meters along Southside.	3D	3c	Root test, Aerial Inspection, Drill test at 9m to determine holding wood/decay at cavity. Prune deadwood.
100		<i>E. microcorys</i> Tallowood	16	24	67	Mature tree damage by climbing plant in north. Minor fungal attack damage to roots-south.	3D	3c	Aerial Inspection and termite treatment or bait.
101		<i>Cedrus deodara</i> Himalayan Cedar	6	14	23	Immature, tree is leaning west with physical damage, suppressed crown and heavily pruned	3D	3b	Prune broken bough. Root test. Event Monitoring.

#Note: With the abbreviated terms **ND** in the TULE column meaning Not determined. **EST** is an estimation in the TRA column both assessments require more information which could be given from further investigation and testing.

ANALYSIS

TREE NO.	SPECIES	Intervention according to assessment
5	<i>Eucalyptus saligna</i> Blue gum	Urgent and immediate Removal. Priority 1
7	<i>Eucalyptus saligna</i> Blue gum	Urgent and immediate Remove. Priority 1.
12	<i>Eucalyptus saligna</i> Blue gum	Remove priority 3.
19	<i>Eucalyptus saligna</i> Blue gum	Aerial inspection & assessment
23	<i>Cupressus sp.</i> Pine	Remove west stem
25	<i>Eucalyptus saligna</i> Blue gum	Aerial inspection & assessment-(Specified pruning see aerial inspection report).
26	<i>Eucalyptus saligna</i> Blue gum	Aerial inspection & assessment-(Specified pruning see aerial inspection report).
27	<i>Cupressus sp.</i> Pine	Remove priority 2.
29	<i>Acacia baileyana</i> Wattle	Remove priority 3.
33	<i>Eucalyptus saligna</i> Blue gum	Further investigation Possible Non Urgent Removal
47	<i>Gleditsia Tricanthos</i> Honey locust	Removal priority 2.
48	<i>Corymbia citriodora</i> lemon scented gum	Non Urgent Removal priority 3.
50	<i>Cupressus sp.</i> Pine	Non Urgent Removal priority 3.
51	<i>Cupressus sp.</i> Pine	Non Urgent Removal priority 3.
61	<i>Leptospermum sp.</i> Tea tree	Removal priority 2.
64	<i>Acer palmatum</i> Japanese maple	Removal priority 2.
72	<i>Chamaecyprus sp.</i> Pine	Removal priority 2.
74	<i>Cupressus sp.</i> Pine	Non Urgent Removal priority 3.
79	<i>Populus sp.</i> Lombardy poplar	Non Urgent Removal priority 3.
82	<i>Cupressus sp.</i> Pine	Non Urgent Removal priority 3.
83	<i>Cupressus sp.</i> Pine	Non Urgent Removal priority 3.
97	<i>Melaleuca sp.</i> Paperbark	Removal priority 2.

CONCLUSION

Immediate action is required for the safety of student, teacher and parent's and general public for trees on this list. The analysis lists tree removals which are "**Non Eur**" or not categorised as emergency. Because the trees require immediate action (*removal or specified pruning*) they must be cordoned off with barriers installed to prevent and restrict access. The barrier distance from the trunk should be maintained and the forestry department state two times the trees height. The height is listed in the tree survey assessment schedule/table.

Signage must be placed on the barriers at a visible location and marked "RISK ZONE; DO NOT ENTER." This should assist in preventing access to the trees felling zone at two times the height. (*A minimum exclusion zone around the dripline of the trees, to prevent access would be suitable if the exclusion zones are not achieved on this site, provided trees are maintained within specified timeframes*).

Trees to be **immediately removed** are numbered: 5.7.27.47.61.64.72.91&97.

Priority one removals are numbered 5&7. Priority two tree removals are 27.47.61.64.72.91&97.

Tress to be **immediately pruned** are numbered: 23.25.26.32&57. Priority 1 are trees numbered 25&26. :
Priority 2 are trees numbered 23. 32&57

Trees to be **removed within 6 weeks** to 6 months or as soon as practicably possible are numbered:12.29.42.48.50.51.74.79.82&83.These are Priority three trees.

Trees to be pruned as specified in the tree survey assessment **within 6 weeks to 6 months or as soon as practicable** are numbered: 1-9,13.16.17.18.38-41.43-46.49.53-56.59.60.62.63.65.66-71.77.78.80.84-87.96.99&101.

Trees to be **Further Investigated** with AERIAL Inspection are numbered: 3.8.9.1013.19.25.26.37.43.58.66.87.92.99&100. Of these six aerial inspections are urgent including trees numbered 10,18,19,25,26&37and these have been inspected on the report dated 4th of July, 2014.

Trees to be **Further Investigated** with DRILL TEST Inspection are numbered: 9.10.16.17.26.33.58.80.93&100.

Trees to be **Further Investigated** with ROOT TEST Inspection are numbered: 21.34.36.37.45.58.62.71.88.99.100&101.

Trees to be **Further treated with termite bait** are numbered: 9.93&100.

These investigations to the assessed tree should be made within 90 days by a competent Level 5 arborist.

No heritage listed trees were found on site. There were no individual tree species identified on site that are listed as endangered, critically endangered or vulnerable under the TSC Act and EPBC Act. There is a significant group of E.saligna trees on this site towards the southern boundary, which may constitute Blue gum high forest. These do not appear on the local Parramatta LEP 2011 plan as biodiversity. These are protected and would require further application to the department of land and water conservation for approved works in intervention and reduction of risk. The trees in this area are scattered remnants including trees numbered1-26, excluding introduced species within this range to be removed as soon as

practicable. Note trees numbered 5,7&12 for removal may require further notes and specific reporting including photographic analysis.

An option to preserve this remnant and reduce the loss of trees with scientific value could be to restrict access and occupancy rates in this area. These trees could be fenced with 1.8metre fencing as an option to restrict access and keep the biodiversity remnant preserved. Soils are classified as acid sulfates class 5 according to the Parramatta Local environment plan 2011(LEP).

RECOMMENDATION

1. The trees to be removed and pruned immediately according to specification are numbered in the conclusion. An option to preserve the trees from removal with fencing to maintain the High Blue Gum Forest community is remnant and an advisable option is to retain this area in context with the act and make it inaccessible to the general public. To preserve the stand of trees at the south-west corner of the site, it is recommended that this area is fenced it off. A biodiversity area can be created with pedestrian access.
2. The facilities manager should make application to remove and prune treesto the Parramatta council as specified in the conclusion. Further information may be required to the department Urban affairs and planning for a section 96 application proposal for E.saligna trees (numbered;) intervention works or removal.
3. In the event that the removal are not completed immediately or within the specified timeframe, then the school principal must ensure the trees are to be immediately cordoned off with visible signage to prevent access. These trees are written in the list of trees requiring *Essential Urgent Repair*. The exclusion zones be implemented and maintained as a priority.
4. Trees to be pruned must be pruned according to AS 4373-2007 is numbered in the conclusion. The time frame is specified in the conclusion.
5. Further Investigation and aerial inspections must be carried out within 90 days or as soon as practically possible will be required as specified in the EUR list or the tree survey schedule from this investigation. Further reporting with a report will be sent to the principal of this additional inspection and investigation.
6. Replenish removed trees with one-year old stock trees at a ratio of 1:1. Replenish trees that are to be removed with 50 litre volume pots of indigenous stock selected from councils desirables species list found on their website. Replant trees within fifty metres of the original location in low target areas. *(An example may be on the border buffering a nature strip, away from access areas)*

7. A project arborist should supervise the habitat tree removal, modification and creation procedure to ensure the transition of fauna within 40 metres of its original habitat. Nesting boxes at a ratio of 1:1 should be placed at minimum of 5m height in a suitable tree located in the riparian zones. Sensitive dismantling of the habitat trees are required to be done using a crane or similar lowering device. *(see Appendices G Habitat Tree Data sheet must be lodged if trees with hollows are to be removed)*

To assist in the trees being managed competently the following recommendation is given:

8. In maintaining the quality of the contractor selected to maintain the work in accordance with As 4790-2009-Protection of Trees in Development Sites, As4743-2007 Pruning of Amenity Trees and Work safe Australia Code of Practice. The principal should engage a contractor from the following associations; the works must be completed by a registered current member of TCAA Tree Contractors Association Australia or Arborists Australia. The further investigations may also be completed by IACA association member.
9. The tree contractors must liaise with the consultant of this report to ensure intervention work is completed to specification. A register of this intervention work will be supplied at the end of this contract to ensure correct pruning and other investigative measures are completed.
10. All retained trees require annual monitoring and high target trees require event monitoring which constitutes a walk around and identification of failed branches or stems by a competent certificate 3 or 5 arborist. Trees also require mulching as stated in the tree survey assessment table

GLOSSARY

Crown: The width of the foliage in the upper canopy of the assessed tree to the four cardinal points.

Crown lifting means the removal of the lower branches of the tree

Crown thinning means the portion of the tree consisting of branches and leaves and any part of the stem from which branches arise.

Drip line: Where the canopy releases water shed from the foliage during precipitation.

DBH/Diameter: Diameter of trunk at 1.4meters in height of assessed tree.

Dead wooding means the removal dead branches from a tree.

Dieback: Tree deterioration where the branches and leaves die.

Flush cut: A cut that damages or removes the branch collar or removes the branch and stem tissue and is inconsistent with the branch attachment as indicated by the bark branch ridge.

Genus/ Species: The Genus and species of each tree has been identified using its scientific name. Where the species name is not known the letters species is used. The common name for trees may vary considerably in each area of geographical differences and so will not be used in the field survey.

Height: Height has been estimated to + / - 2 metres.

ISA: International Society of Arboriculture.

Maturity: Tree maturity has been assessed as over mature (last one third of life expectancy), mature (one third to two thirds life expectancy) and semi mature (less than one third life expectancy).

Remedial (restorative) pruning: includes: Removing damaged, deadwood; trimming diseased or infested branches. Trimming branches back to undamaged tissue in order to induce the production of shoots from latent or adventitious buds, from which a new crown will be established.

SRZ- Structural Root Zone: An area within the trees root zone in which roots stabilize the tree. Roots cut in this zone can cause instability and lead to anchorage loss.

Structural Integrity: Describes the internal supporting timber. (Substantial to frail)

TULE- Tree Useful Life Expectancy: An estimation of the trees useful life expectancy using appropriate industry methods and an inspection regime. *Adapted with permission from J.Barrell, 2014.*

TPZ- Tree Protective Zone: This zone should be considered as optimal for tree growth and sustainability however the size of the zone is subjective and should be reassessed when individual design and construction methods are being discussed.

Tree Age: Trees have either been assessed as mature, immature or semi-mature.

Tree Numbering: All trees listed in the tree survey have been numbered and plotted

Vigor: This is an indication of the tree health. Trees have either been assessed as Good Vigor, Normal Vigor or Low Vigor.

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SECTION II

APPENDIX A TULE – TREE USEFUL LIFE EXPECTANCY

McArdle Arboricultural Consultancy Pty Ltd Revised 14.4.14

Categories and Sub-Categories ADAPTED FOR TCAA CLIMBING CONSULTANT ARBORISTS FROM JEREMY BARREL (SULE)

	1 Long TULE	2 Medium TULE	3 Short TULE	4 Remove	5 No Potential for Retention REMOVE IMMEDIATELY	6 Small, Young or regularly clipped:
	Trees that appeared to be retainable at the time of assessment for more than 40 years with low level of risk	Trees that appeared to be retainable at the time of assessment for 15 to 40 years with and with low to medium level risk	Trees that appeared to be retainable at the time of assessment for 5 to 15 years with medium to high level of risk	Trees that should be removed within the next 5 years High to Very high level of risk	Trees that must be removed immediately. Very high to Extreme level of risk	Trees that can be easily transplanted or replaced.
A	Structurally sound trees located in positions that can accommodate future growth	Trees that may only live for between 15 and 40 more years	Trees that may only live for between 5 and 15 more years	Dead, dying, suppressed or declining trees through disease or inhospitable conditions.	Dead, dying or declining trees diseased or inhospitable conditions.	Small trees less than 5 meters in height
B	Trees that could be made suitable for retention in the long term by Intervention Works.	Trees that may live for more than 40 years, but would need to be removed for safety or Nuisance reasons	Trees that may live for more than 15 years, but would need to be removed for safety or nuisance reasons	Dangerous trees through instability or recent loss of adjacent trees	Dangerous trees through instability or recent loss of adjacent trees	Young trees less than 15 years old but over 5 meters in height
C	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 should 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	Dangerous trees through structural defects including cavities, decay, included bark, wounds or poor form	Dangerous trees through structural defects including cavities, decay, included bark, wounds or poor form	Trees that have been regularly pruned to artificially control growth
D		Trees that could be made suitable for retention in the medium term by Intervention Works.	Trees that require substantial Intervention Works, and are only suitable for retention in the short term	Damaged trees that are clearly not safe to retain	Damaged trees that are clearly not safe to retain and must be removed immediately	
E				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 planting	High Toxicity Allegan trees, asthmatic and poisonous trees and must be removed immediately.	
F				Trees that may cause damage to existing structures within 5 years	OTHER with legitimate explanation to be removed immediately	
G				Trees that will become dangerous after removal of other trees for reasons given in 1A-1F		
INSPECTION FREQUENCY	Inspection frequency 1-5 Years by competent inspector unless event monitored.	Inspection frequency 1-5 Years by competent inspector unless event monitored.	Inspection frequency 1-3 years by competent inspector unless event monitored.	Inspection frequency to 1 year by competent inspector unless event monitored.	1-7 days by competent inspector and event monitored	Inspection frequency Biannually by competent inspector

APPENDIX B HEALTH & STRUCTURAL CONDITION OF TREE- Visual

McArdle Arboricultural Consultancy Pty Ltd

Health & Structural Condition of Tree	
1.	<i>J- Juvenile; im- Immature; SM-Semi- Mature; M-Mature</i>
2.	Excellent Condition
3.	Good Condition but Poor Development / Habit
4.	Dieback is more than 20%. 4b Epicormics
5.	Sparse Foliage Crown 5b Unbalanced Canopy
6.	Physical Damage
7.	Cavity
8.	Lean
9.	Heavily Pruned
10.	Inclusions
11.	Damage to roots
12.	Insect Damage 12b Borers
13.	Termite Damage
14.	Fungal Attack
15.	Parasitic Vine Present
16.	Damage by Climbing Plant
17.	Habitat Tree
18.	Endangered Species
19.	Endangered community

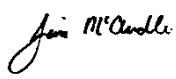
Developed by Claus Mattheck in: *The Body Language of Trees* (1994) which have adapted versions from Hornsby Shire Council.

APPENDIX C TREE HAZARD & SITE ASSESSMENT for Preserved trees- Visual

McArdle Arboricultural Consultancy Pty Ltd

This evaluation tool is used to reinforce the risk matrix, as a general statement of the overall site hazards and tree health/conditions.

Adapted from ISA Hazard Checklist

SIGNED: 	SITE: BCS Carlingford-268 Pennant Hills road.	DATE:-18.3.14
1. SITE		
Underground service, Overhead power lines, High / low voltage, winds direction, Building within 3m, Uneven terrain, Electrical lines to property, Telephone and cable lines, Streetlights, Vehicle & Pedestrian traffic.		
2. ROOT ZONE		
Compaction, Damaged Roots, Exposed Roots, Girdling, Close to kerb, Soil Level Raised/ Lowered, In Garden Bed /Mulched Paving/ Concrete/ Bitumen, Roots Pruned, Fungal Growths At Base		
3. TRUNK		
○ Severe decline(<20% deadwood) ○ Declining (20-60% twig & branch dieback) ○		
4. BRANCH		
Lean, Cavities / cracks, Splits / cracks, Physical damage, Insects/ parasites/ borers / termites, Hangers, Condition of bark, Disease, Decay, Previous failures, Inclusion.		
5. BRANCH UNIONS		
Dead branches, Branch clusters, Pockets of decay, Leaves colour		
6. VIGOUR & VITALITY - Crown		
Branch unions, Storm damage, Heavily pruned		

APPENDIX D TREE PLANTING SPECIFICATIONS AND MAINTENANCE

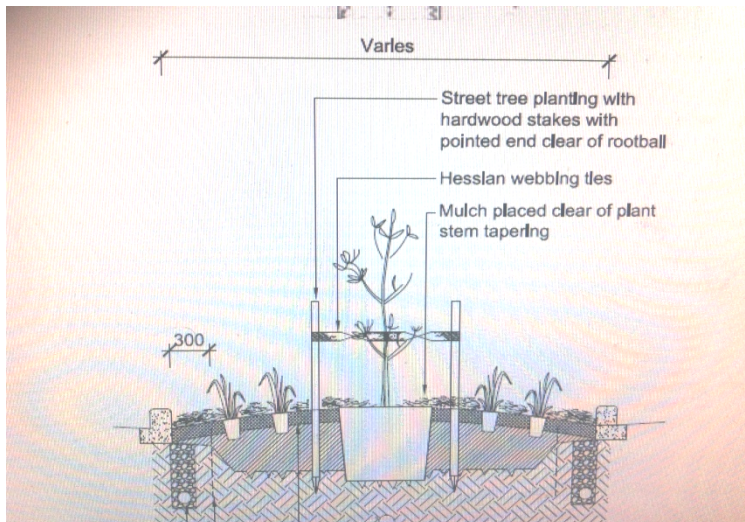
McArdle Arboricultural Consultancy Pty Ltd

Before planting, careful consideration should be given to the location of trees and shrubs to minimise future problems. A basic guide for planting follows:

1. Don't plant too close to buildings or in-ground pools or plant large trees too close together: Determine the height and canopy of trees when fully grown. Allow room for root growth (at least twice the height of the tree). Large trees should be planted at least three metres from buildings.
2. Check when planting under wires or over drainage lines: Determine the mature size of the tree and the size and nature of its root system.
3. Consider your neighbours when choosing plants: Consider the effect on neighbouring properties (i.e. shading, loss of views, impact on foundations, fences and services).
4. Use trees to provide your home with summer shade and/or winter sun: Plant deciduous trees (suitable to the climate and soils of this Shire). Consider the summer and winter shadows of evergreen trees.
5. Don't grow climbers on trees: Climbers can strangle trees, leading to the tree's eventual death.
6. Retain and protect as many trees as possible when building or extending your home. (This will be a Council requirement).
7. Use locally native and non-invasive species in your garden: Increase the success rate of your garden. Attract native fauna to your garden. Reduce the amount of watering required.
8. Don't excavate or alter the ground level around trees: Can cause root damage or starving of the roots. Can cause limb drop, instability or tree death. Substantially altering soil level within three metres of the trunk is in breach of the Tree Preservation Order.
9. When buying plants, check their characteristics: Check on mature size, shade characteristics, potential for roots to cause damage, flowers, fruits and pollen, to determine their suitability.

Mature trees do need maintenance: Remove or trim misshapen branches. Check for fungal rots or other diseases. If in doubt, contact Council for a tree inspection or contact an experienced Arborist. Indiscriminate lopping can be dangerous to your safety and the health of the tree.

Staking of trees should be carried out similar to the diagram opposite.



APPENDIX E INDIGENOUS TREE REPLENISHMENT

McArdle Arboricultural Consultancy Pty Ltd

Indigenous trees are found on councils website.

Replacement Tree Species	Recommended Replacement Species
Low Allergy Trees	
Acmena smithii Lilly Pilly	Acmena smithii Lilly Pilly
Agonis flexuosa Willow Myrtle	Tristania laurina Water Gum
Araucaria heterophylla Norfolk Is. Pine	Corymbia eximia Yellow Bloodwood
Bauhinia blakeana Butterfly Tree	Backhousia citriodora Lemon Scented Myrtle
Eucalyptus spp. Eucalyptus Trees	Elaeocarpus reticulatus Blueberry Ash
Hakea laurina Pincushion Plant	Waterhousia floribunda Weeping Lilly Pilly
H. salicifolia Willow Leaved Hakea	Syzygium leuhmannii Riberry
Magnolia grandiflora Bull Bay	Hymenosporum flavum Native Frangipani
Malus floribunda Crab Apple	E. paniculata Grey ironbark
Melaleuca quinquinervia Broad Leaved Paperbark	Eucalyptus microcorys Tallowwood
Nyssa sylvatica Tupelo	Eucalyptus leucoxylon Yellow Gum
Pistacia chinensis Pistachio	Eucalyptus crebra Narrow Leaved Ironbark
Prunus x blireana Flowering Plum	Syncarpia glomulifera Turpentine
	Lophostemon confertus Brush Box

Trees suitable for this site are indicated, more information can be gathered by emailing info@mcardlearborists.com.au

APPENDIX F TREE RISK ASSESSMENT MATRIX

McArdle Arboricultural Consultancy Pty Ltd REDRAFTED 14.4.14

Categories and Sub-Categories

Failure Potential		1.Occasional use	2.Intermittent use	3.Frequent use	4.Constant use	5.High constant use
	A.Very Likely Almost certainly likely to occur in most circumstances	Medium	High	High	Very High	Extreme
	B.Likely May occur frequently	Medium	Medium	High	Very High	Very High
	C.Somewhat likely Possible and likely to occur at some time	Low	Medium	High	High	Very High
	D.Unlikely Not likely to occur but could happen	Low	Low	Medium	Medium	High
	E.Highly unlikely May occur in rare and exceptional circumstances	Low	Low	Low	Medium	High

The risk rating score is determined after assessing the Failure Potential and Target Rating of an identified hazard tree. The determination of these calculations will indicate a priority and course of action when implementing the risk reduction measures.

Failure Potential x Target Rating=Risk Assessment.

Legend

Failure Potential

A.Very Likely

Partial or whole tree failure is imminent e.g. cavity in excess of 50% of the trunk. Major bark inclusions, dead limbs, leaning tree with lifting root plate, roots/trunk decayed or damaged, Toxins, HOSTING BEES (other).

B.Likely

Defects that could cause structural failure of the tree within the next 6 months.

C.Somewhat likely

Defects present that could cause portions of the tree to fail.

D.Unlikely

Defects are minor and not likely to cause significant harm.

E.Highly unlikely

Tree is healthy with no obvious defects. Poses no immediate threat.

TARGET RATING

1.Occasional use

Out of bounds area, Restricted and inducted areas.

2.Intermittent use

Parking lot, Ovals.

3.Frequent use

Busy street adjacent, school yard, child care center.

4.Constant use

Occupied classrooms and buildings, residences, offices, canteen and sit down lunch areas.

5.High constant use

Access paths and gateways, where students congregate in numbers, assembly areas.

Adapted from B.Sullivan FOR USE BY TCAA CLIMBING CONSULTANT ARBORISTS

APPENDIX F LIMITED RISK EVALUATION

EVALUATION SCHEDULE

SITE: BCS-Carlingford

Adapted from the ISA Tree Hazard Evaluation Form

TREE CHARACTERISTICS			
Species: NOTED IN TREE SURVEY TABLE			
TREE HEALTH			
Foliage: NOTED IN TREE SURVEY TABLE		Wound-wood: NOTED IN TREE SURVEY TABLE	
Vigour: NOTED IN TREE SURVEY TABLE		Deadwood %: NOTED IN TREE SURVEY TABLE	
Form: NOTED IN TREE SURVEY TABLE		In Decline: NOTED IN TREE SURVEY TABLE	
Dead Tree: NOTED IN TREE SURVEY TABLE		Age Class: NOTED IN TREE SURVEY TABLE	
ROOT ZONE		TRUNK DEFECT	CROWN DEFECT
NOTED IN TREE SURVEY TABLE		NOTED IN TREE SURVEY TABLE	NOTED IN TREE SURVEY TABLE
TARGET RATING			
Type: NOTED IN TREE SURVEY TABLE	Location: NOTED IN MAP Target Rating: NOTED IN TREE SURVEY TABLE-TRA Column		
TREE CONDITIONS-Summarised as TULE			
Tree Defects: NOTED IN TREE SURVEY TABLE Stem Lean: NOTED IN TREE SURVEY TABLE Decay: NOTED IN TREE SURVEY TABLE			
HAZARD ABATEMENT		TULE CATEGORY	
Remove Tree: Stated	Prune: Stated	Needs further inspection: Stated	By: Time frame specified

APPENDIX G TREE HABITAT DATA

McArdle Arboricultural Consultancy Pty Ltd

This page must be specified by a level 5 Arborist if application is made to remove trees with hollows.

SITE:BCS carlingford						DATE:TBA
Tree No.	Scientific & Common Name	Height (m)/ DBH(cm) / Spread(m)	Vigour (%) SULE	Size of Hollows	Reason	Retain/ Removal

SIZE OF HOLLOWES

Large – >50 cm

Medium – 10 - 30 cm

nil- hollow bearing trees recorded to date.

X____ hollow bearing trees will be removed (See Schedule 2 for habitat tree data). Hollows could be replaced with artificial boxes for arboreal mammals and birds, and micro bat boxes. These boxes are to be installed on retained trees within the BGHF Riparian area. *Note: The replacement of hollows within the conservation areas of the site at a ratio of at least 1:1 is recommended to supplement the loss of natural hollows.*

REMOVAL REASON

A – Poor SULE rating

B – Within development footprint

C – Within the critical root zone or 5m of building edge

D – Within roads

E – To allow for landscaping

Required method of removing a habitat tree should be done with a wires representative on site.

1. Tree dismantling with crane.
2. Each piece must be surveyed for scratching markings to determine if hollows or habitat are present.
3. If habitats are present remove with a wires representative or trained personal.
4. Relocate habitat to designated areas.
5. Dismantle tree and allow an hour for habitat to locate if found, or remove and place in designated habitat hollow.

APPENDIX H TREE MANAGEMENT NOTES

McArdle Arboricultural Consultancy Pty Ltd

It is important to **minimize compaction of the soil** around the drip line. We recommend no heavy machinery operate within the three metres area of the preserved trees. For smaller machines we recommend restricted access within the Tree Protection Zone and also limit movement in this area with smaller type machines.

Rooting hormone is recommended at the prescribed rate around the excavated area and inside the affected trees drip line to promote healthy recovery. Continue the use treatments associated with root growth and vigor. Apply hessian bagging over excavated areas inside the TPZ where roots are encountered.

Weed Removal To reduce competition with the tree the area within the *TPZ* is to be kept free of weeds. These are best removed by the application of foliar herbicide with Glyphosate as the active constituent. This is the preferred method rather than removal by cultivation of the soil within the drip-line, to minimise root disturbance to the tree. The removal of woody weeds such as Privet should use the cut and paint method of herbicide application. Weeds are to be controlled within the *TPZ* for the duration of the project.

Mulching inside the Tree Protection Zone at the applicable depth of 50-100 mm with organic material being 75% leaf litter and 25% wood, and this being composted material preferably from the same genus and species of tree as that to where the mulch is to be applied, i.e. species specific mulch. The depth and type of mulch is to be maintained for the duration of the project.

Watering In the event of prolonged dry periods, or where a tree has been transplanted, or where excavation nearby, especially up slope, leads to drying out of a soil profile, or modification to ground water flow, or flows across an existing ground surface to the tree and its growing environment; deep root watering thoroughly at least twice a week is to be undertaken to irrigate the tree. The need for such watering is determined readily by observing the dryness of the soil surface within the drip-line of the tree by scraping back some mulch. Mulch is to be reinstated afterwards. In the event of disrupted ground or surface water flows to the tree due to excavation, filling or construction, a reticulated irrigation system may be required to be installed within the *TPZ*. If an irrigation system is to be installed, consideration must be given to volume, frequency, and drainage of water delivered, and this should be in consultation with a qualified Consulting Arborist.

Pruning the tree; including deadwood and crown thin to council regulations and in accordance with AS4373-2007 'Pruning Amenity of Trees'. Australian Standards

Fertilising A tree will not be fertilised during its protection within the *TPZ*. If a tree is to be fertilised this should be in consultation with a qualified Consulting Arborist.

Regular monitoring of tree protection in adherence with the approved tree protection plan throughout the development process must be undertaken in consultation with the Consulting Arborist for the project to ensure that tree protection measures are maintained. Inspections are to be carried out monthly reports until completion of construction. Any problems will be rectified that may occur. A Qualified Arborist with appropriate qualifications and experience will be on site if any excavation work within the Critical Root Zone is required and will provide notes in the final report. Maintenance will continue after three months of completion.

APPENDIX I

DISCLAIMER

McArdle Arboricultural Consultancy Pty Ltd

McArdle Arboricultural Consulting Pty Ltd does not assume responsibility for liability associated with the tree on or adjacent to this project site, their future demise and/or any damage, which may result therefrom.

Any legal description provided to McArdle Arboricultural Consultancy Pty Ltd is assumed to be correct. Any titles and ownerships to any property are assumed to be good and sound. McArdle Arboricultural Consultancy Pty Ltd takes care to obtain all information from reliable sources. All data has been verified insofar as possible; however, the consultant can neither guarantee nor be responsible for the accuracy of information provided by others.

McArdle Arboricultural Consultancy's reports and recommendations shall not be viewed by others or for any other reason outside its intended target, either partially or whole, without the prior written consent of the consultant. Unauthorised alteration or separate use of any section of the report invalidates the whole report. McArdle Arboricultural Consultancy Pty Ltd cannot be held responsible for any consequences as a result of work carried out outside specifications, not in compliance with Australian Standards or by inappropriately qualified staff.

Sketches, diagrams, graphs, and photographs in this report, being intended as visual aids, are not necessarily to scale. All recommendations contained within this report represent the current industry best practice methods of inspection. McArdle Arboricultural Consultancy Pty Ltd shall not be required to give testimony or to attend court by reason of this report unless subsequent contractual arrangements are made, including payment of an additional fee for such services.

LIMITS OF OBSERVATION

McArdle Arboricultural Consultancy Pty Ltd makes every effort to accurately identify current tree health and safety issues. Results may or may not correlate to actual tree structural integrity. There are many factors that may contribute to limb or total tree failure. Not all these symptoms are visible. There can be hidden defects that may result in a failure even though it would seem that other, more obvious defects would be the likely cause of failure.

All standing trees have an element of unpredictable risk. McArdle Arboricultural Consultancy Pty Ltd endeavors to identify the risk that the tree represents; however a level of risk associated with every tree will remain. McArdle Arboricultural Consultancy Pty Ltd does not provide any warranty or guarantee that problems, deficiencies or failures with regard to the plant/s, property or building/s will not arise in the future.

Ongoing monitoring may foresee deterioration of a tree and allow remedial action to be taken to prevent injury or damage. The timing for re-inspection on individual trees is subjective and will vary however an annual inspection is advisable for trees in subsequent years.

FURTHER RESEARCH The report does not cover threatened, heritage or existing trees in relation to remnant forest. Further reporting may be considered as part of the relevant RISK ASSESSMENT.

LIMIT OF OBSERVATIONS BY RODNEY M. PAGE

"There are many factors that may contribute to limb or total tree failure. Factors include, decay (in the trunk, crown or branch junctions), external damage to branches leading to decay, poor branch taper, included bark, root rot/ decay. Not all these symptoms are visible i.e. internal decay; of these some external symptoms may indicate the presence of deadwood but not the extent of decay. The most solid looking piece of timber may be riddled with breaks in continuity of growth caused by insect damage or poor pruning practices or other physical damage caused many years previous. Trees don't heal; they simply box in the damaged area ((CODIT) Compartmentalization of Decay In Trees.) and continue to expand in girth, completely disguising the fact that the branch or trunk has a hollow or decayed section. Having said this, not all areas, of decay past or present suggest a point of failure."

In addition to this information, other variables that can contribute to limb or total tree failure are tree species, wood densities, weight, age, location, exposure to the elements, soil types, disease and pests, birds using trees as habitat and food sources, termites causing structural problems and human influences such as, altered drainage, compaction or leaching of minerals.

