

Arboricultural Assessment Report



Prepared 28th February 2017

Site Location

71 Park Avenue
Kingswood NSW 2747

Client

Pam Cornersone P/L

DISCLAIMER

The author and Tree & Landscape Consultants take no responsibility for actions taken and their consequences, contrary to those expert and professional instructions given as recommendations pertaining to safety by way of exercising our responsibility to our client and the public as our duty of care commitment, to mitigate or prevent hazards from arising, from a failure moment in full or part, from a structurally deficient or unsound tree or a tree likely to be rendered thus by its retention and subsequent modification/s to its growing environment either above or below ground contrary to our advice.

Peter Richards

Tree & Landscape Consultants

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TREE & LANDSCAPE CONSULTANTS

Site Analysis, Arboricultural Assessments



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Our reference: 4086

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1. INTRODUCTION

This report has been prepared by Tree & Landscape Consultants for Pam Cornersone Pty Ltd. The site was inspected by the author and the subject trees and their general growing environment evaluated on the 15th December, 2016.

The tree locations are indicated in Appendix C and this report details their current health & condition and determines from the site and tree assessment, recommendations for retention or removal.

2.0 AIMS & OBJECTIVES

Aims

Provide as an outcome of the assessment, the following: a description of the trees, observations made, and make recommendations required for remedial or other works to the trees, if and where appropriate or identify the benefits of removal and replacement if appropriate for the medium to long-term safety and amenity of the site.

Objectives

Assess the condition of the subject trees.

Provide recommendations for removal or management of the subject trees.

3. METHODOLOGY

- 3.1 The method of assessment of tree/s is applied from the ongoing knowledge and development of the author and considers but is not confined to:
 - Tree health and subsequent stability, both long and short term
 - Sustainable Retention Index Value (S.R.I.V.)© IACA 2009)
 - Amenity values
 - Significance – Rating System for Tree Significance - IACA (2009) ©
- 3.2 This assessment is undertaken using a standard tree assessment criteria for each tree based on the values above and is implemented as a result of at least one comprehensive and detailed site inspection.
- 3.3 In this report the dimensions of the tree recorded by the author for the trunk *diameter at breast height* (DBH) measurement is calculated at 1.4m above ground from the base of the tree. Where a tree is trunkless or branches at or near ground such as a mallee formed tree, an average diameter is determined by recording the radial extent of the stem mass at its narrowest and widest dimensions, adding the two dimensions together and dividing them by 2 to record an average.
- 3.4 Crown spreads are expressed as length by breadth measurements to accurately record their dimensions. Where appropriate, *crown spread orientation* is described along the length of the crown spread e.g. North/South, or as *radial* if the crown is distributed at an approximately even radius from the trunk e.g. 6x6m.
- 3.5 The Australian Standard AS 4970-2009 “Protection of trees on development sites, where applicable is applied to trees to be retained in this report as a point of reference and guide for the recommended minimum clearances from the centre of tree trunks to development works and is applied as a generalised benchmark and the distances may be increased or decreased by the author as a result of other factors providing mitigating circumstances or constraints as indicated by but not restricted to the following:
 - *Tolerance of individual species to disturbance,*
 - *Geology e.g. physical barriers in soil, floaters, bedrock to surface*
 - *Topography e.g. slope, drainage,*
 - *Soil e.g. depth, drainage, fertility, structure,*
 - *Microclimate e.g. due to landform, exposure to dominant wind,*
 - *Engineering e.g. techniques to ameliorate impact on trees such as structural soil, lateral boring,*
 - *Construction e.g. techniques to ameliorate impact on trees such as pier and beam, bridge footings, suspended slabs*
 - *Arboriculture e.g. exploration trenches to map location of roots,*
 - *Physical limitations - existing modifications to the environment and any impact to tree/s by development e.g. property boundaries, road reserves, previous impact by excavation in other directions, soil level changes by cutting or filling, existing landscaping works within close proximity, modified drainage patterns.*

4. TREE ASSESSMENTS

Table 1

Tree No.	Genus & Species Common Name	Age Y = Young M = Mature O = Overmature	Condition G = Good F = Fair P = Poor D = Dead	Pest & Diseases	Branch Bark Included	Canopy Orientation Sy = Symmetrical N,S,E,W = North South East West	Trunk Diameter (1.4m above ground in mm)	Height (m)	Spread (m)	Tree Vigour L = Low G = Good A = Abnormal	Trunk Lean X = Straight or Slightly Leaning A = Acaulescent M = Moderate	SRV (Age, Vigour, Condition, Index Rating)
1	Eucalyptus moluccana Grey box / Gum-topped box	M	P	No	No	Sy	500	20	8x8	G	X	MGVP6
	Comments: Crown previously lifted with foliage appearing free of insect predation or disease.											
2	Eucalyptus moluccana Grey box / Gum-topped box	M	P	No	No	Sy	700	20	8x8	G	X	MGVP6
	Comments: Crown previously lifted with foliage appearing free of insect predation or disease.											
3	Eucalyptus moluccana Grey box / Gum-topped box	M	F	No	No	Sy	400	17	8x8	G	X	MGVF9
	Comments: Dual leader specimen with broken detached leader present within the crown.											
4	Eucalyptus moluccana Grey box / Gum-topped box	M	F	No	No	Sy	400	17	8x8	G	X	MGVF9
	Comments: Foliage appeared free of insect predation or disease.											
5	Eucalyptus moluccana Grey box / Gum-topped box	M	F	No	No	A/S	400	17	8x8	G	X	MGVF9
	Comments: Foliage appeared free of insect predation or disease.											
6	Eucalyptus moluccana Grey box / Gum-topped box	M	F	No	No	A/N	400	17	8x8	G	X	MGVF9
	Comments: Foliage appeared free of insect predation or disease.											
7	Eucalyptus moluccana Grey box / Gum-topped box	M	F	No	No	Sy	300	12	6x6	G	X	MGVF9
	Comments: Foliage appeared free of insect predation or disease. Smaller slender specimen											
8	Eucalyptus moluccana Grey box / Gum-topped box	M	F	No	No	A/S	400	15	6x6	G	X	MGVF9
	Comments: Foliage appeared free of insect predation or disease.											
9	Eucalyptus moluccana Grey box / Gum-topped box	M	F	No	No	A/N	400	15	6x6	G	X	MGVF9
	Comments: Foliage appeared free of insect predation or disease.											
10	Eucalyptus moluccana Grey box / Gum-topped box	M	F	No	No	Sy	200	10	6x6	G	X	MGVF9
	Comments: Dual leader specimen appearing free of insect predation or disease.											
11	Eucalyptus moluccana Grey box / Gum-topped box	M	F	No	No	Sy	400	15	6x6	G	X	MGVF9
	Comments: Foliage appeared free of insect predation or disease.											
12	Eucalyptus tereticornis Forest Red Gum	M	F	No	No	Sy	500	20	8x8	G	X	MGVF9
	Comments: Crown thinning supporting dieback of lower order leaders.											
13	Eucalyptus moluccana Grey box / Gum-topped box	M	F	No	No	Sy	400	15	8x8	G	X	MGVF9
	Comments: Foliage appeared free of insect predation or disease.											
14	Robinia pseudocacia 'Frisia' Robinia	M	F	No	No	Sy	200	7	4x4	G	A	MGVF9
	Comments: Smaller specimen with foliage appearing free of insect predation or disease.											
15	Robinia pseudocacia 'Frisia' Robinia	M	F	No	No	Sy	200	7	4x4	G	A	MGVF9
	Comments: Smaller specimen with foliage appearing free of insect predation or disease.											
16	Robinia pseudocacia 'Frisia' Robinia	M	F	No	No	Sy	200	7	4x4	G	A	MGVF9
	Comments: Smaller specimen with foliage appearing free of insect predation or disease.											
17	Robinia pseudocacia 'Frisia' Robinia	M	F	No	No	Sy	200	7	4x4	G	A	MGVF9
	Comments: Smaller specimen with foliage appearing free of insect predation or disease.											

Tree Significance

4.1 See Appendix E for Assessment Criteria (IACA, 2009).

Significant Trees as established by the Rating System for Tree Significance – (IACA, 2009), Appendix E.

Significant Scale

- 1 – High
- 2 – Medium
- 3 – Low

Significance Scale	1	2	3
TALC Tree No. / stand No.		1,2,3,4,5,6,7,8,9, 10,11,12,13	14,15,16,17

Table 2 Setbacks for Tree Protection Zones

A	B	C	D	E	F	G	H
Tree No.	Trunk Diameter (1.4m above root buttress in mm)	Trunk Diameter (above root buttress)	Tree Vigour L = Low G= Good A= Abnormal	Age of Tree Y = Young M = Mature O = Over-Mature (Senescent)	Calculated Structural Root Zone (SRZ) (radius in meters)	Distance of Tree Protection Zone (TPZ) (radius in meters)	Recommended Distance of Tree Protection Fence/Zone (radius in meters)
11	400	420	G	M	2.3	4.8	4.32
12	500	520	G	M	2.6	6	5.4
13	400	420	G	M	2.3	4.8	4.32
14	200	220	G	M	1.8	2.4	2.16
15	200	220	G	M	1.8	2.4	2.16
16	200	220	G	M	1.8	2.4	2.16
17	200	220	G	M	1.8	2.4	2.16

5. Discussion

The trees assessed are mature in age exhibiting relatively good vigour with numbers 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 & 13 being naturally occurring specimens and numbers 14, 15, 16 & 17 being smaller planted exotic specimens. An Ecological Assessment has been prepared to support the application by Eco-Logical Ref: 16WOL-5648 dated 9th November 2016 which found the study area being highly degraded containing predominately exotic grasses and no hollow bearing trees.

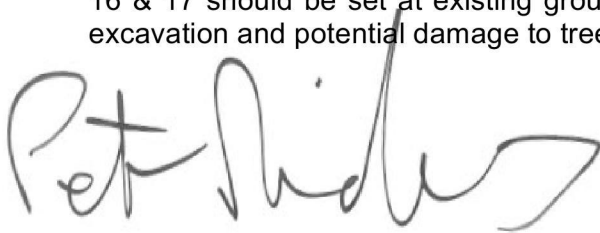
The proposed changes to the land will necessitate the removal of trees numbered 1, 2, 3, 4, 5, 6, 7, 8, 9 & 10 as they are directly affected by the design in its current format. Removal of these trees is to be compensated for through the replanting of replacement plantings within the property boundary as part of final works.

Trees numbered 11, 12, 13, 14, 15, 16 & 17 adjoining the land are to be retained and protected as follows:

6. RECOMMENDATIONS

- a. That trees 1, 2, 3, 4, 5, 6, 7, 8, 9 & 10 be removed and replaced with alternate plantings as part of final works.
- b. That removal works be undertaken by a qualified Arborist with appropriate competencies recognised within the Australian Qualification Framework, with a minimum of 5 years of continual experience within the industry of operational amenity arboriculture, and covered by appropriate and current types of insurance to undertake such works and in accordance with Work Cover NSW 2007, Code of Practice Tree
- c. That trees 11, 12, 13, 14, 15, 16 & 17 be retained.
- d. Ground protection to enable site movement within the tree protection zones (TPZs) of trees 11, 12, 13, 14, 15, 16 & 17 is to include a permeable membrane such as geotextile fabric beneath a layer of mulch or crushed rock below rumble boards where appropriate. These measures may be applied to root zones beyond the TPZ where required. Any modification to the TPZ to enable site access is to be certified by the project Arborist. (See Tree Protection Plan Appendix F).

- e. That a physical barrier be erected to provide protection for trees 12,13,14,15,16 & 17 to be retained in the form of chainwire link fencing prior to commencement of any site works.
- f. All initial excavation for the proposed building footings and basement near to trees 11,12,13,14,15,16 & 17 is to be undertaken by hand to depths of 700mm. Any roots that may be encountered are to be cut cleanly with final cuts to undamaged woody tissue. This will prevent tearing damage to the roots from excavation equipment which can extend beyond the point of excavation back towards the tree. Below this depth mechanical means can be utilised.
- g. Removal of any site trees within 6m radius of a tree 11,12,13,14,15,16 & 17 to be retained should be undertaken only by cutting down such a tree without damaging the trees to be retained, and by grinding out its stump. Where possible the roots of 20mm diameter or greater of the tree to be cut down should not be removed, to minimise soil disturbance and to reduce the impact on the roots of any tree to be retained nearby.
- h. All proposed landscape treatment within the prescribed TPZs of trees 11, 12, 13, 14, 15, 16 & 17 should be set at existing ground level so as to avoid the need for excessive excavation and potential damage to tree root system.



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Appendix A

Matrix - Sustainable Retention Index Value (S.R.I.V.)©

Developed by IACA – Institute of Australian Consulting Arboriculturists www.iaca.org.au (2009)

To be used with the values defined in the Glossary.
An Index value as indicated where ten (10) is the highest value.

Age Class	Vigour Class and Condition Class					
	Good Vigour & Good Condition (GVG)	Good Vigour & Fair Condition (GVF)	Good Vigour & Poor Condition (GVP)	Low Vigour & Good Condition (LVG)	Low Vigour & Fair Condition (LVF)	Low Vigour & Poor Condition (LVP)
	Able to be retained if sufficient space available above and below ground for future growth. No remedial work or improvement to growing environment required. May be subject to high vigour. Retention potential - Medium – Long Term.	Able to be retained if sufficient space available above and below ground for future growth. Remedial work may be required or improvement to growing environment may assist. Retention potential - Medium Term. Potential for longer with remediation or favourable environmental conditions.	Able to be retained if sufficient space available above and below ground for future growth. Remedial work unlikely to assist condition, improvement to growing environment may assist. Retention potential - Short Term. Potential for longer with remediation or favourable environmental conditions.	May be able to be retained if sufficient space available above and below ground for future growth. No remedial work required, but improvement to growing environment may assist vigour. Retention potential - Short Term. Potential for longer with remediation or favourable environmental conditions.	May be able to be retained if sufficient space available above and below ground for future growth. Remedial work or improvement to growing environment may assist condition and vigour. Retention potential - Short Term. Potential for longer with remediation or favourable environmental conditions.	Unlikely to be able to be retained if sufficient space available above and below ground for future growth. Remedial work or improvement to growing environment unlikely to assist condition or vigour. Retention potential - Likely to be removed immediately or retained for Short Term. Potential for longer with remediation or favourable environmental conditions.
Young (Y)	Index Value 9 Retention potential - Long Term. Likely to provide minimal contribution to local amenity if height <5m. High potential for future growth and adaptability. Retain, move or replace.	Index Value 8 Retention potential - Short – Medium Term. Potential for longer with improved growing conditions. Likely to provide minimal contribution to local amenity if height <5m. Medium-high potential for future growth and adaptability. Retain, move or replace.	Index Value 5 Retention potential - Short Term. Potential for longer with improved growing conditions. Likely to provide minimal contribution to local amenity if height <5m. Low-medium potential for future growth and adaptability. Retain, move or replace.	Index Value 4 Retention potential - Short Term. Potential for longer with improved growing conditions. Likely to provide minimal contribution to local amenity if height <5m. Medium potential for future growth and adaptability. Retain, move or replace.	Index Value 3 Retention potential - Short Term. Potential for longer with improved growing conditions. Likely to provide minimal contribution to local amenity if height <5m. Low-medium potential for future growth and adaptability. Retain, move or replace.	Index Value 1 Retention potential - Likely to be removed immediately or retained for Short Term. Likely to provide minimal contribution to local amenity if height <5m. Low potential for future growth and adaptability.
Mature (M)	Index Value 10 Retention potential - Medium - Long Term.	Index Value 9 Retention potential - Medium Term. Potential for longer with improved growing conditions.	Index Value 6 Retention potential - Short Term. Potential for longer with improved growing conditions.	Index Value 5 Retention potential - Short Term. Potential for longer with improved growing conditions.	Index Value 4 Retention potential - Short Term. Potential for longer with improved growing conditions.	Index Value 2 Retention potential - Likely to be removed immediately or retained for Short Term.
Over-mature (O)	Index Value 6 Retention potential - Medium - Long Term.	Index Value 5 Retention potential - Medium Term.	Index Value 4 Retention potential - Short Term.	Index Value 3 Retention potential - Short Term. Potential for longer with improved growing conditions.	Index Value 2 Retention potential - Short Term.	Index Value 0 Retention potential - Likely to be removed immediately or retained for Short Term.

Appendix B

Definitions & Terminology

From
Dictionary for Managing Trees in Urban Environments
Institute of Australian Consulting Arboriculturists (IACA) 2009.

Condition of trees

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

Good Condition Tree is of good habit, with *crown form* not severely restricted for space and light, physically free from the adverse effects of *predation* by pests and diseases, obvious instability or structural weaknesses, fungal, bacterial or insect infestation and is expected to continue to live in much the same condition as at the time of inspection provided conditions around it for its basic survival do not alter greatly. This may be independent from, or contributed to by *vigour*.

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

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

Dead Tree is no longer capable of performing any of the following processes or is exhibiting any of the following symptoms;

Processes

Photosynthesis via its foliage crown (as indicated by the presence of moist, green or other coloured leaves);

Osmosis (the ability of the root system to take up water);

Turgidity (the ability of the plant to sustain moisture pressure in its cells);

Epicormic shoots or *epicormic strands* in Eucalypts (the production of new shoots as a response to stress, generated from latent or adventitious buds or from a *lignotuber*);

Symptoms

Permanent leaf loss;

Permanent wilting (the loss of turgidity which is marked by desiccation of stems leaves and roots);

Abscission of the *epidermis* (bark desiccates and peels off to the beginning of the sapwood).

Removed No longer present, or tree not able to be located or having been cut down and retained on a site, or having been taken away from a site prior to site inspection.

Description of Tree Dimensions

Height The distance measured vertically between the horizontal plane at the lowest point at the base of a tree, which is immediately above ground, and the horizontal plane immediately above the uppermost point of a tree.

Spread The furthest expanse of the crown when measured horizontally from one side of the tree to the other, generally through the centre of the trunk. Where the crown is not circular a measurement should be an average of the narrowest and widest diameters and this is dependent upon crown form and to a lesser extent its symmetry.

Crown Cover Percent of the homogenous distribution of foliage across the entire crown based upon that expected for a specimen of that species in good condition and of normal *vigour*, depending on form in situ, e.g. this may be influenced by crown die-back, proximity to other trees or structures, moisture stress, or overshadowing.

Vigour

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

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

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

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

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

Poor Vigour See low vigour

Good Vigour See Normal Vigour

Age of Trees

Age of Trees Most trees have a stable biomass for the major proportion of their life. The estimation of the age of a tree is based on the knowledge of the expected lifespan of the taxa in situ divided into three distinct stages of measurable biomass, when the exact age of the tree from its date of cultivation or planting is unknown. These increments are Young, Mature and Overmature.

Young Tree aged less than 20% of life expectancy.

Mature Tree aged 20-80% of life expectancy.

Over-mature Tree aged greater than 80% of life expectancy tending to senescent with or without reduced vigour, and declining gradually or rapidly but irreversibly to death.

Sapling A young tree, early in its development with small dimensions.

Senescent Advanced old age, over-mature.

General Terms

Significant Important, weighty or more than ordinary.

Significant Tree A tree considered important, weighty or more than ordinary. Example: due to prominence of location, or in situ, or contribution as a component of the overall landscape for *amenity* or aesthetic qualities, or *curtilage* to structures, or importance due to uniqueness of taxa for species, subspecies, variety, form, or as an historical or cultural planting, or for age, or substantial dimensions, or habit, or as remnant vegetation, or habitat potential, or a rare or threatened species, or uncommon in cultivation, or of aboriginal cultural importance, or is a commemorative planting.

Substantial A tree with large dimensions or proportions in relation to its place in the landscape.

Excurrent Tree where the crown is comprised of one (1) dominant first order structural branch which is usually an extension of the trunk, erect, straight and continuous, tapering gradually, with the main *axis* clear from base to apex, e.g. *Araucaria heterophylla* - Norfolk Island Pine. Note: some tree species of *typical* excurrent habit may be altered to deliquescent by physical damage of the *apical meristem*, or from top lopping, or from the propagation of inferior quality stock. However, *formative pruning* may be able to correct a *crown* to excurrent if undertaken when a tree is *young*.

Sustainable Retention Index Value (SRIV) A visual method of rating the viability of urban trees for development sites and management, based on general tree and landscape assessment criteria. SRIV© is for the professional manager of urban trees to consider the tree in situ with an assumed knowledge of the taxa and its growing environment and is based on the physical attributes of the tree and its response to its environment considering its age class, vigour class, condition class and its sustainable retention with regard to the safety of people or damage to property and the ability to retain the tree with remedial work or beneficial modifications to its growing environment or removal and replacement. (IACA 2005)

Diameter at Breast Height (DBH) Measurement of trunk width calculated at a given distance above ground from the base of the tree often measured at 1.4 m. The trunk of a tree is usually not a circle when viewed in cross section, due to the presence of *reaction wood* or *adaptive wood*, therefore an average diameter is determined with a *diameter tape* or by recording the trunk along its narrowest and widest axes, adding the two dimensions together and dividing them by 2 to record an average and allowing the orientation of the longest axis of the trunk to also be recorded. Where a tree is growing on a lean the distance along the top of the trunk is measured to 1.4m and the diameter then recorded from that point perpendicular to the edge of the trunk. Where a *leaning* trunk is *crooked* a vertical distance of 1.4m is measured from the ground. Where a tree branches from a trunk that is less than 1.4m above ground, the trunk diameter is recorded perpendicular to the length of the *trunk* from the point immediately below the base of the flange of the *branch collar* extending the furthest down the trunk, and the distance of this point above ground recorded as *trunk* length. Where a tree is located on sloping ground the DBH should be measured at half way along the side of the tree to average out the angle of slope. Where a tree is *acaulescent* or *trunkless* branching at or near ground an average diameter is determined by recording the radial extent of the trunk at or near ground and noting where the measurement was recorded e.g. at ground.

Tree Management Planned protection, conservation, maintenance and enhancement of a population of trees. Usually achieved by recognizing trees as a dynamic natural resource and, through professional arboricultural personnel and a multidisciplinary approach, gaining an ongoing understanding of diverse aspects of the population: age class; maintenance, removal/replacement cycles and costs; additional new planting opportunities and costs; sustainability; safety constraints; community concerns; budgetary constraints; ecological, *amenity* and utility values; suitability and appropriateness of tree maintenance, removal and replacement or retention. See also *Tree Preservation*, *Appropriate Tree Management* and *Inappropriate Tree Management*.

Appropriate Tree Management The management of trees as a resource based on sound professional judgement and a competent understanding of what tree to plant where and when, or when to remove or retain a tree. Examples: 1. The planting or retention of a tree in a position that causes minimal or no conflict with people or property or disturbance of the built environment, or services or infrastructure, due to such a decision having been founded upon a competent knowledge of the characteristics of the trees growth pattern and ultimate dimensions above and below ground at maturity, and the suitability of the space available into which it will develop. 2. The removal of a tree that will grow to be in conflict with the constraints of its growing *environment* either above or below ground at its ultimate dimensions at maturity, and especially where replanting could be undertaken with an advanced specimen of a species of more suitable growth characteristics and mature dimensions. 3. The removal of a vigorous tree in a *poor* condition, in a prominent position where its potential failure in full or part poses a risk of hazard to the safety of people, or damage to property. See also *Inappropriate Tree Management* and *Tree Management*.

Inappropriate Tree Management The planting or retention of a tree where it is known that the tree will outgrow the space available for its growth above or below ground before or at maturity, and is likely to cause disruption or damage to built structures, or retention of a tree when it is known to be potentially hazardous to people or property. See also *Appropriate Tree Management*, *Tree Preservation* and *Tree Management*.

Sudden Branch Drop The *failure and collapse* of live, usually horizontal branches, seemingly without any noticeable cause in calm hot, dry weather conditions generally after rain. Theorised to be caused by altered moisture content in the branch disturbing the longitudinal *prestressing* of the wood that normally helps support the load as formed by *reaction wood* in branches tending to horizontal (Lonsdale 1999, p. 30), or *incipient failure* from the lengthening of existing internal cracks as the wood cools (Shigo 1986, p. 248), or influenced by *branch creep* under its own weight and by wind (Mattheck & Breloer 1994, p. 126), or fractures to *vascular rays* if pulled at right angles to their longitudinal orientation forming from *subsidence cracks* (Mattheck & Breloer 1994, p. 169) or a combination of these factors. Such branch breakages usually occur at some distance from the branch collar leaving a stub. See also *Branch Tear Out* p. 109.

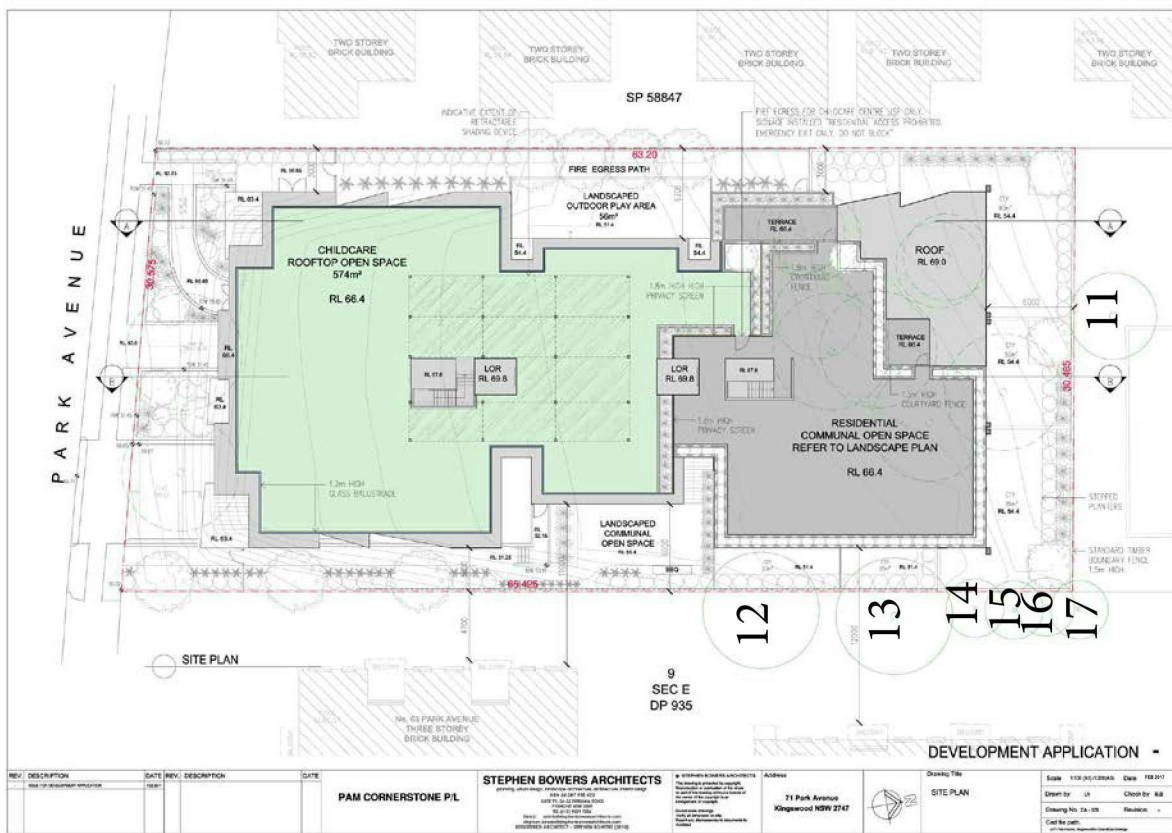
Root Plate The entire root system of a tree generally occupying the top 300-600mm of soil including roots at or above ground and may extend laterally for distances exceeding twice the height of the tree (Perry 1982, pp. 197-221). Development and extent is dependent on water availability, soil type, *soil depth* and the physical characteristics of the surrounding landscape.

Aberrant Not representative of normal *form*, *atypical*, unusual and not indicative.

Misshapen *Atypical habit* or disfigured shape of a tree or tree part caused by wounding, decay, pruning, injury, wind, insect damage, loading from snow or from restrictions to its requirements for space or light or topography such as sloping ground.

Remnant Vegetation A plant or plants of any taxa and their progeny as part of the floristics of the recognized endemic ecological community remaining in a given location (e.g. seeds in seed bank, trees) after alteration of the site or its modification or fragmentation by activities on that land or on adjacent land e.g. trees and *bushland* isolated after land clearing for rural or urban development.

Appendix D Site Plan/Tree to be Retained



Appendix E

IACA Rating System for Tree Significance (IACA) 2009 ©

Note: In the development of this system IACA acknowledges the contribution and original concept of the Footprint Green Tree Significance & Retention Value Matrix, developed by Footprint Green Pty Ltd in June 2001.

Tree Significance - Assessment Criteria

Tree Significance - Assessment Criteria

1. High Significance in landscape

- The tree is in good condition and good vigour;
- The tree has a form typical for the species;
- The tree is a remnant or is a planted locally indigenous specimen and/or is rare or uncommon in the local area or of botanical interest or of significant age;
- The tree is listed as a Heritage Item, Threatened Species or part of an Endangered ecological community or listed on Councils significant Tree Register;
- The tree is visually prominent and visible from a considerable distance when viewed from most directions within the landscape due to its size and scale and makes a positive contribution to the local amenity;
- The tree supports social and cultural sentiments or spiritual associations, reflected by the broader population or community group or has commemorative values;
- The growing environment supports the tree to its full dimensions above and below ground without conflict or constraint.

2. Medium Significance in landscape

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

3. Low Significance in landscape

- The tree is in fair-poor condition and good or low vigour;
- The tree has form atypical of the species;
- The tree is not visible or is partly visible from surrounding properties as obstructed by other vegetation or buildings,
- The tree provides a minor contribution or has a negative impact on the visual character and amenity of the area,
- The tree is a young specimen which may or may not have reached dimension to be protected by local Tree Preservation orders or similar protection mechanisms and can easily be replaced with a suitable specimen,
- The tree is severely constrained by above or below ground influences of the built or natural environment and therefore will not reach full dimensions - tree is inappropriate to the site conditions,
- The tree is listed as exempt under the provisions of the local Council Tree Preservation Order or similar protection mechanisms,
- The tree has a wound or defect that has potential to become structurally unsound.

Environmental Pest / Noxious Weed Species

- The tree is an Environmental Pest Species due to its invasiveness or poisonous/ allergenic properties,
- The tree is a declared noxious weed by legislation.

Hazardous/Irreversible Decline

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

Note: The assessment criteria are for individual trees only, however it can be applied to a monocultural stand in its entirety e.g. hedge. The tree is to have a minimum of three (3) criteria in a category to be classified in that group. Note: The assessment criteria are for individual trees only, however, can be applied to a monocultural stand in its entirety e.g.

Appendix F

References

REFERENCES

1. IACA (2009), Sustainable Retention Index Value, Institute of Australian Consulting Arboriculturists, www.iaca.org.au .
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3. Work Cover NSW 2007, *Code of Practice Tree Work*, New South Wales Government, Australia.