Arboricultural Assessment Report



Prepared 18th February, 2019

Site Location

159 Jamison Road, Penrith NSW 2750

Client

Alpha Engineering & Development

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: 4720

Arboricultural Assessment Report:

159 Jamison Road, Penrith NSW 2750

1. INTRODUCTION

This report has been prepared by Tree & Landscape Consultants for Alpha Engineering & Development. The site was inspected by the author and the subject trees and their general growing environment evaluated on the 15th February 2019.

The location of the trees is indicated in Appendix C and this report has relied upon the following plans as a point of reference:

Plan Set, Project Number-18-030 -Dated 18/12/2018 by , Platform 5 Design.

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2.0 AIMS & OBJECTIVES

Aims

Detail the condition of the tree/s on the site or on adjoining sites where such tree/s may be affected by the proposed works, by assessment of individual specimens or stands, and indicate remedial works or protection measures for their retention in a safe and healthy condition, or a condition not less than that at the time of initial inspection for this report, or in a reduced but sustainable condition due to the impact of the development but ameliorated through tree protection measures able to be applied, and will consider the location and condition of the trees in relation to the proposed building works, or recommend removal and replacement where appropriate.

Provide as an outcome of the assessment, the following: a description of the tree/s, observations made, discussion of the effects the location of the proposed building works may have on the tree/s, and make recommendations required for remedial or other works to the trees, if and where appropriate.

Determine from the assessment a description of the works or measures required to ameliorate the impact upon the tree/s to be retained, by the proposed building works or future impacts the trees may have upon the new building works if and where appropriate, or 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.

Determine impact of development on 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
- 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	SRIV (Age. Vigour, Condition, Index Rating)
1	Eucalyptus moluccana	М	Р	No	No	Sy	800	30	8	G	Х	MGVP6
	Grey box / Gum-topped box	Comments: Lower crown modified to raise crown and clear utility wires.										
2	Callistemon viminalis	M	F	No	No	Sy	100	3	2	G	A	MGVF9
2	Bottlebrush	Comments: Smaller tree appearing free of insect predation or disease.										
2	Duranta erecta	M	Р	No	No	Sy	100	3	1	G	A	MGVP6
3	Golden Dewdrop	Comments: Urban weed species covered in extraneous vine growth.										
4	Duranta erecta	М	Р	No	No	Sy	100	3	1	G	А	MGVP6
4	Golden Dewdrop	Comments: Urban weed species covered in extraneous vine growth.										
5	Duranta erecta	М	Р	No	No	Sy	100	3	1	G	А	MGVP6
,	Golden Dewdrop	Comments: Urban weed species covered in extraneous vine growth.										
6	Lagerstroemia indica	М	F	No	No	Sy	200	4	4	G	A	MGVF9
0	Crepe Myrtle	Comments:	Smaller tree	appear	ing free	of insect preda	tion or disea	se.		I		
7	Eucalyptus saligna	Y	F	No	No	Sy	200	3	1	G	Х	YGVF8
'	Sydney Blue Gum	Comments: Younger tree appearing free of insect predation or disease.										
8	Callistemon viminalis	М	F	No	No	Sy	300	4	4	G	Х	MGVF9
0	Bottlebrush	Comments: Tree appearing free of insect predation or disease.										
9	Callistemon viminalis	М	F	No	No	Sy	200	3	2	G	Х	MGVF9
	Bottlebrush	Comments: Tree appearing free of insect predation or disease.										
10	Lonicera maackii	М	F	No	No	Sy	200	3	2	G	Х	MGVF9
	Bhonetsuckle Tree	Comments: Tree appearing free of insect predation or disease.										

5. Discussion

Of the ten trees assessed most are of smaller dimensions with the most substantial tree in regards to height being tree 1. Tree 1 has been subject to modification of its crown in the form of crown lifting and through pruning to clear adjoining utility services. The proposed changes to the land are within its structural and tree protection zone and the tree is not retainable with the design in its current format.

All trees with the exception of tree 10 are to be removed to accommodate the proposed boarding house and associated infrastructure. Removal of these trees should be subject to the introduction of new trees shrubs and ground covers as part of final landscape works utilising some species typically found within the plant assemblage of the immediate area.

Tree 10 located within the neighbouring land is to be retained and protected. This tree is prescribed a Tree Protection Zone (TPZ) of 2.4 metres radius and is to be subject to protection in accordance with the Australian Standard AS4970-2009 as follows:

5.1 (3.2 DETERMINING THE TPZ -Extract from AS4970-2009)

The radius of the TPZ is calculated for each tree by multiplying its DBH x 12. TPZ = DBH x 12 where DBH = trunk diameter measured at 1.4 m above ground. Radius is measured from the centre of the stem at ground level. A TPZ should not be less than 2m nor greater than 15 m (except where crown protection is required). The TPZ of palms, other monocots, cycads and tree ferns should not be less than 1 m outside the crown projection. All **Response:T10-** TPZ 2.4 metres radius /SRZ 1.8 metres radius.

5.2 (4.3 PROTECTIVE FENCING- Extract from AS4970-2009)

Fencing should be erected before any machinery or materials are brought onto the site and before the commencement of works including demolition. Once erected, protective fencing must not be removed or altered without approval by the project arborist. The TPZ should be secured to restrict access. AS 4687 specifies applicable fencing requirements. Shade cloth or similar should be attached to reduce the transport of dust, other particulate matter and liquids

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into the protected area. Fence posts and supports should have a diameter greater than 20 mm and be located clear of roots. Existing perimeter fencing and other structures may be suitable as part of the protective fencing.

Response: Fencing for tree 10 within the property boundary at the prescribed radius setback from the trunk centre utilising approved fencing is to be erected prior to works commencing in accordance with AS4970-2009 section 4.3.

5.3 (4.4 SIGNS - Extract from AS4970-2009)

Signs identifying the TPZ should be placed around the edge of the TPZ and be visible from within the development site. The lettering on the sign should comply with AS 1319. **Response:** TPZ signage will need to be installed to fencing for tree 10 (See Appendix E-Example TPZ signage)

5.4 (4.5.5 Installing underground services within TPZ - Extract from AS4970-2009)

All services should be routed outside the TPZ. If underground services must be routed within the TPZ, they should be installed by directional drilling or in manually excavated trenches. The directional drilling bore should be at least 600 mm deep. The project arborist should assess the likely impacts of boring and bore pits on retained trees. For manual excavation of trenches the project arborist should advise on roots to be retained and should monitor the works. Manual excavation may include the use of pneumatic and hydraulic tools. **Response:** Any services with the prescribed TPZs of tree 10 are to be installed through use of underground directional drilling equipment located greater then 600mm in depth. All access bore pits are to be located outside the prescribed TPZs of the tree.

5.5 (4.6.1 Mulching – Extract from AS4970-2009)

The area within the TPZ should be mulched. The mulch must be maintained to a depth of 50–100 mm using material that complies with AS 4454. Where the existing landscape within the TPZ is to remain unaltered (e.g. garden beds or turf) mulch may not be required. **Response:** Mulching needs to be installed within the TPZ of trees 10 within the property boundary.

5.6 (4.6.2 Watering- Extract from AS4970-2009)

Soil moisture levels should be regularly monitored by the project arborist. Temporary irrigation or watering may be required within the TPZ. An above-ground irrigation system should be installed and maintained by a competent individual. **Response:** Some type of irrigation system needs to be in place within the TPZ during building works either temporary or permanent to be approved by the project arborist for trees 10.

6. **RECOMMENDATIONS**

- a. That tree 10 be retained.
- b. That protection for tree 10 be in accordance with sections 5.1 to 5.10 of this report.
- c. That trees 1,2,3,4,5,6,7,8 & 9 be removed and replaced with trees shrubs and ground covers as part of final landscape works

Peter Richards Tree & Landscape Consultants

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

Developed by IACA – Institute of Australian Consulting Arboriculturists www.iaca.org.au Version 4, 2010

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

Class		Vi	gour Class and	Condition Cla	\$ \$	INSTITUTE OF AUSTRALIAN CONSULTING ARBORICULTURISTS MANAGING URBAN TREES ®
Age	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.
(X)	YGVG - 9	YGVF - 8	YGVP - 5	YLVG - 4	YLVF - 3	YLVP - 1
с) билод	Index Value 9 Retention potential - Long Term. Likely to provide minimal contribution to local amenity if height <5 m. 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 <5 m. 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 <5 m. 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 <5 m. 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 <5 m. Low potential for future growth and adaptability.
(M)	MGVG - 10	MGVF - 9	MGVP - 6	MLVG - 5	MLVF - 4	MLVP - 2
Mature	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.
(0)	OGVG - 6	OGVF - 5	OGVP - 4	OLVG - 3	OLVF - 2	OLVP - 0
Over-mature	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 (1^{st}) and possibly second (2^{nd}) 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 with the taxa and its growing environment and its response to its environment considering its age class, vigour class, condition class and its growing environment and its growing environment and its growing environment considering its age class, vigour class, condition class and its growing environment en

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)

Crown Spread Orientation Direction of the axis of crown spread which can be categorized as Orientation Radial and Orientation Non-radial.

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.

Structural Root Zone (SRZ) The minimal area around the base of a tree, generally circular, required for its *stability* in the ground. The section of *root plate* within this area and subsequent soil cohesion necessary to hold the tree upright against *wind throw*, therefore the entire depth of the *root zone* must be included.

Appendix C Survey Plan/Tree Locations



Appendix D Basement Plan /Protection Constraints T10



TREE PROTECTION ZONE "NO ACCESS"

No access permitted within this fenced area without prior approval from the Site Arborist / Project Manager. This fenced area is set aside for the management of the tree/s to protect growing environments above and below ground and is an exclusion zone for all works unless approved. Any encroachment/works outside of the approved consent into the TPZ area will require additional Tree Management in consultation with the Site Arborist.

Site Arborist Details: Tree Number/s: _____

Tree Protection Zone (TPZ) Radius: Structural Root Zone (SRZ) Radius

Signage provided by TREEPACS "Tree Protection And Certification Services" info@treepacs.com Contact : Brad 0414804049 Peter 0418277379

Document Set ID: 8644719 Version: 1, Version Date: 04/04/2019

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Appendix F References

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