PRELIMINARY ARBORICULTURAL REPORT

Project

University of Newcastle-Central Coast Campus

Site Address

305 Mann Street, Gosford NSW 2250

Date

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Preface

Urban tree planting, tree protection and tree maintenance has a long history and was first documented in ancient Egypt around 4000 years ago. The specific use of trees in urbanized landscapes probably began as early as the 1200s, with the term 'Arborist' first being used formerly in England 1578.

Thus, urban trees have been around for generations, but only recently have they become valued for more than just their aesthetic value. Today communities around the world regard trees and other vegetation as critical urban infrastructure, with this 'Green Infrastructure' considered to be as important to the day to day functionality of an urban locale as the roads, public transport and/or its 'Grey Infrastructure'.

Hence the benefits of urban forests are numerous as they span environmental, economic, cultural and socio-political domains alike. Ergo, any tree that has an assessed 'positive retention value' is an important community asset and worthy of both retention and protection.

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Proposed Central Coast Campus Development Site: 305 Mann Street, Gosford

1 Executive Summary

Active Green Services Pty Ltd (AGS) has been engaged to prepare a Preliminary Arboricultural Report pursuant to *Standards Australia AS4970-2009 Protection of trees on developments sites.* This with regards to trees and a University of Newcastle development that is proposed for 305 Mann Street, Gosford 2250.

Hence on the 2nd of November 2022 twenty-one (21) individual Visual Tree Assessments (VTA) were conducted at the abovementioned property address per internationally recognised arboricultural standards by a suitably qualified and experienced (AQF Level 8) arborist from AGS.

The following Report and its arboricultural recommendations are based on these species-specific, site-specific visual tree assessments which includes tree maturity, dimensions, pedology, useful life expectancy, vitality, ecophysiology, biomechanics and landscape significance *in situ*. On review of this tree assessment data, it was concluded that the identified trees have the following Retention Values per the recognised *Significance of a Tree, Assessment Rating System (STARS)*:

- No (0) trees have an assessed *'High'* Retention Value.
- No (0) trees have an assessed *'Medium'* Value.
- Sixteen (16) trees have an assessed *'Low'* Retention Value.
- Five (5) trees are recommended for *Removal* as they are Listed Weed Species per the NSWDPI.

With regards to tree retention values and the trees that are to be considered for retention on the development site, the above summary data shows that no trees were identified as being of *'Medium'* or *'High'* Retention Value. Therefore, as none of these subject trees are considered important for retention per the *STARS* methodology, they may be removed to facilitate the proposed development. The covenant being that Compensatory Replanting (which can be in the form of a considered landscaping plan) be adopted to offset canopy loss.

For ease of identification all of the twenty-one (21) subject trees have been GPS located, aerial mapped and photographed. A CSV File which includes this data can be provided upon request.

The detail supporting this summary follows.

2 Introduction

i. AGS has been engaged to author a Preliminary Arboricultural Report with regards to the current vitality, ecophysiology and adjudged retention value of the trees growing at the abovementioned location. This Report will:

- Provide all parties with standing an objective and unbiased individualised arboricultural assessment of all the trees *in situ* within the provided survey area; and
- Put forward best management practice recommendations with regards to tree retention and pragmatic tree management both pre and post development.

2.1 Limitations

i. All arboricultural reasonings that have been discussed and provided are based on extensive empirical arboricultural knowledge, the internationally recognised Visual Tree Assessment (VTA) methodology (Lonsdale, 2010), (Dunster et. al, 2017), the recognised *Institute of Australian Consulting Arboriculturists (IACA) Significance of a Tree, Assessment Rating System (STARS)*, and *Standards Australia AS 4970-2009 Protection of trees on development sites*.

ii. Whilst this arboricultural assessment is thorough it should be noted that trees are dynamic living organisms exposed to both unforeseeable biotic and abiotic variables which on occasion can be harsh and severe. Therefore, this arboricultural assessment will consider on the balance of probabilities the most likely outcome(s) as opposed to those which could, may or fancifully occur.

2.2 Report References

i. As a progressive arboricultural company AGS keeps abreast of research data relating to all aspects of arboriculture and urban forestry. Hence the following arboricultural observations, reasonings, conclusions and recommendations are founded on industry standards and extensive empirical arboricultural knowledge. The science-based arboricultural assessment methodologies and references used can be found in the Appendix.

ii. Please note that additional educational material has been appended to promote the urban and peri urban forest through understanding, knowledge and current best management practice both pre and post development.

2.3 Background & Development Site

i. The proposed development site was previously a Mitre 10 store (over 15 years ago), consisting of multiple buildings and a large parking area with the old garden centre/nursery in the middle. The sites buildings have been abandoned and dilapidated, with the vegetation visible in the derelict car park consisting of

self-seeded 'pioneer' species, listed 'weeds', and wildling nursery stock.

ii. The University of Newcastle now proposes to develop this abandoned site into an innovative Central Coast Campus. The design concept plans for this Campus can be made available upon request.

3 Mapping

3.1 Survey Area

Proposed Development Site: 305 Mann Street, Gosford (old Mitre10 site)

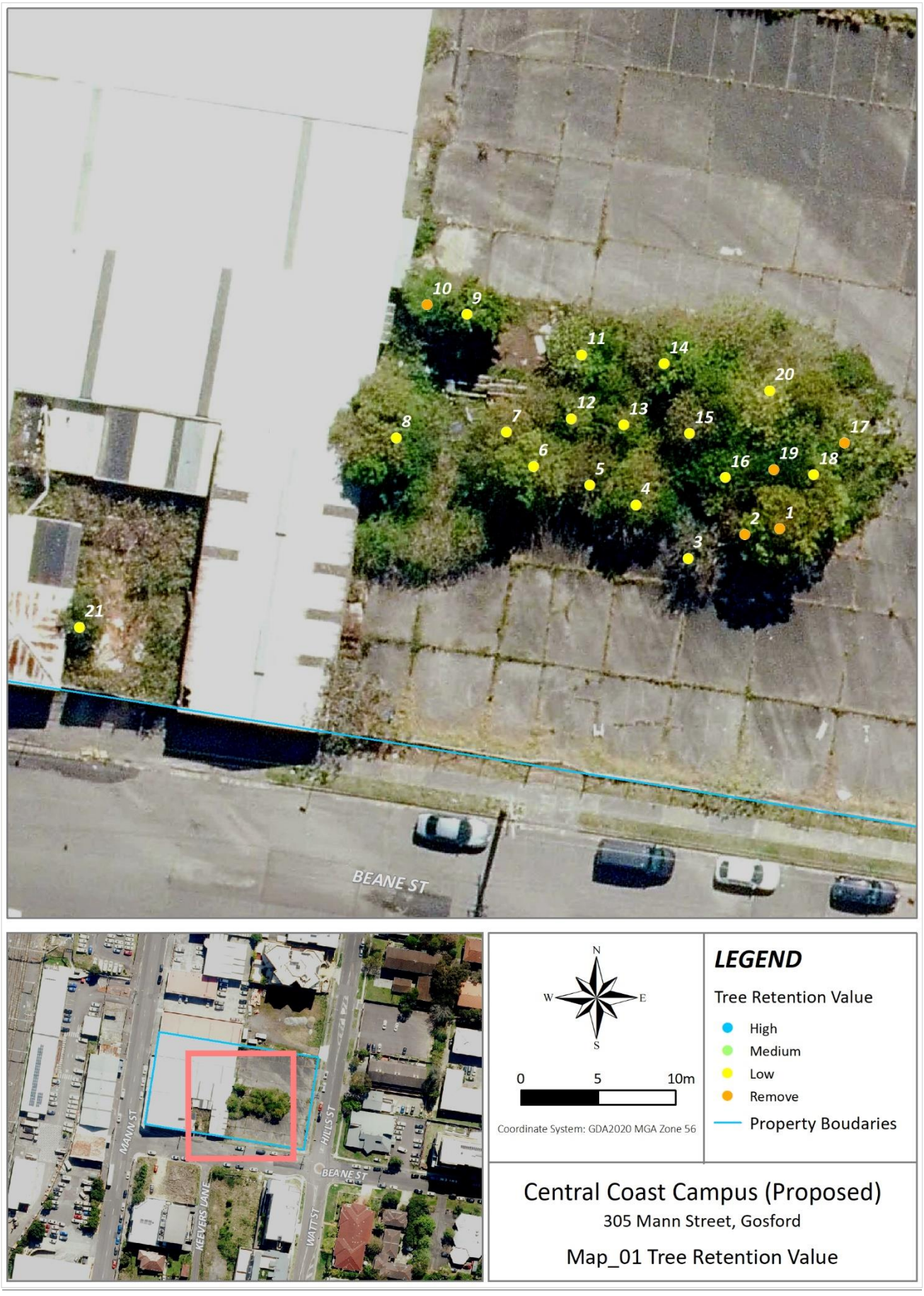
3.2 Mapping Methodology

i. All trees within the survey area that were identified as being of particular interest and/or relevance were GPS located using the Field Maps Esri Application.

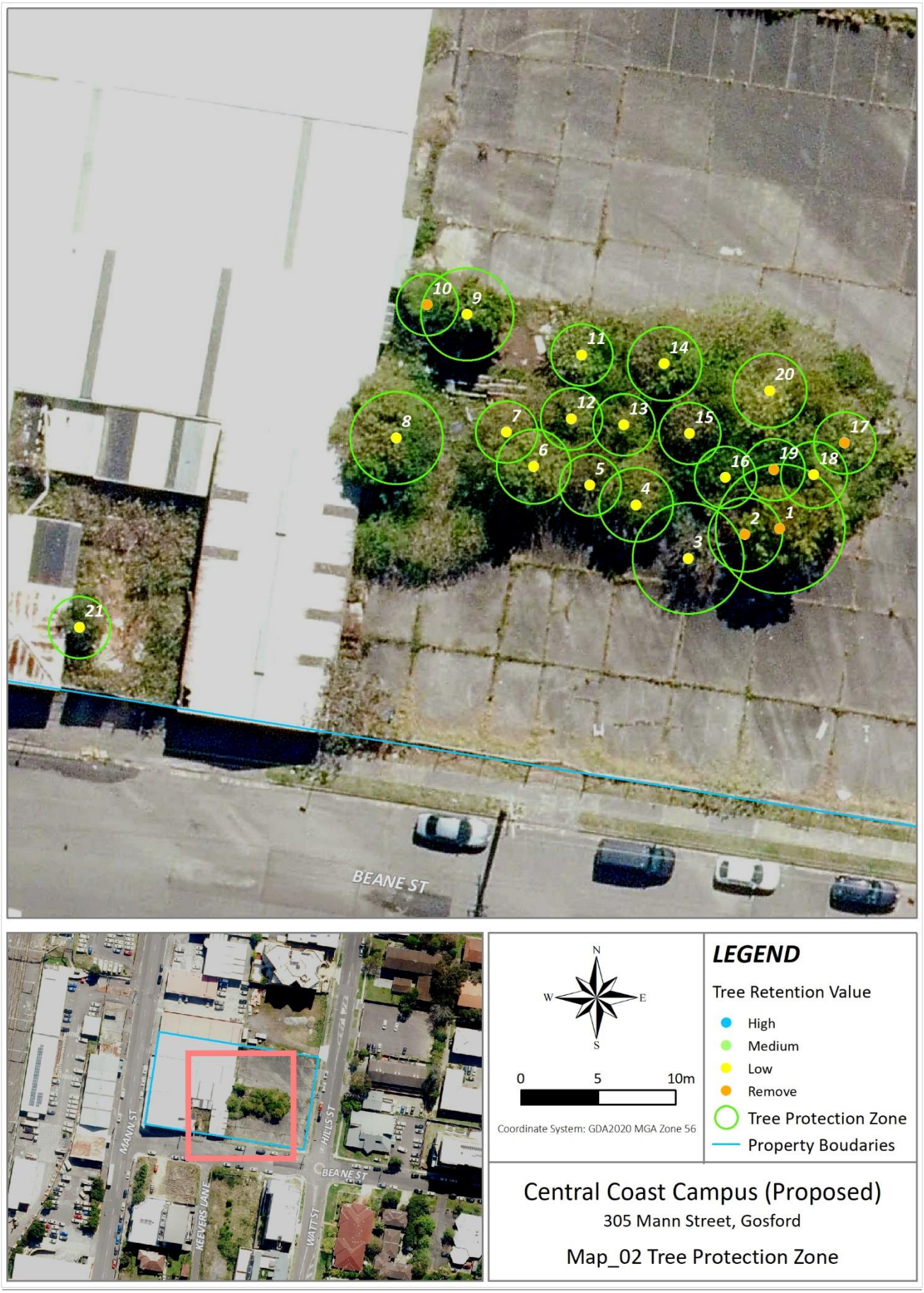
ii. A CSV File with the GPS locations, tabled tree assessment data and hyper-linked photo images can be supplied upon request.

iii. Please find below two (2) satellite maps with the indicative locations of the assessed tree population. In total twenty-one (21) trees were individually assessed and then judiciously assigned a cogent Retention Value per the *Significance of a Tree, Assessment Rating System (STARS)*. Additional Landscape Significance considerations were also factored into the final Retention Value. These considerations included the combination of discernible Social, Amenity, Environmental, Cultural and Heritage elements. These specific categories and their indicia are listed in the Appendix.

3.3 Map 1: Tree Retention Values



3.4 Map 2: Tree Protection Zones



4 Visual Tree Assessments

4.1 Visual Tree Assessment Methodology

i. Visual Tree Assessments (VTA) consistent with modern arboricultural practices and the International Society of Arboriculture standards were conducted by a suitably qualified and experienced AQF Level 5 arborist on the subject tree population. These assessments were conducted at ground level and therefore classified as *Level 2: Basic Assessment* (Dunster et al., 2017).

ii. The tools used onsite to gather the necessary VTA data were a nylon percussion hammer, mobile phone, and an iPad. Tree height and canopy spread were recorded using a digital laser range finder (Nikon Forestry Pro). The trunk diameter and DBH height measurements were made by using a forestry DBH measuring tape. No dendrological diagnostics, soil analysis, tissue sampling and/or geological investigations were conducted at that time. For ease of identification the subject trees were individually GPS located, satellite mapped, photographed and tree tagged.

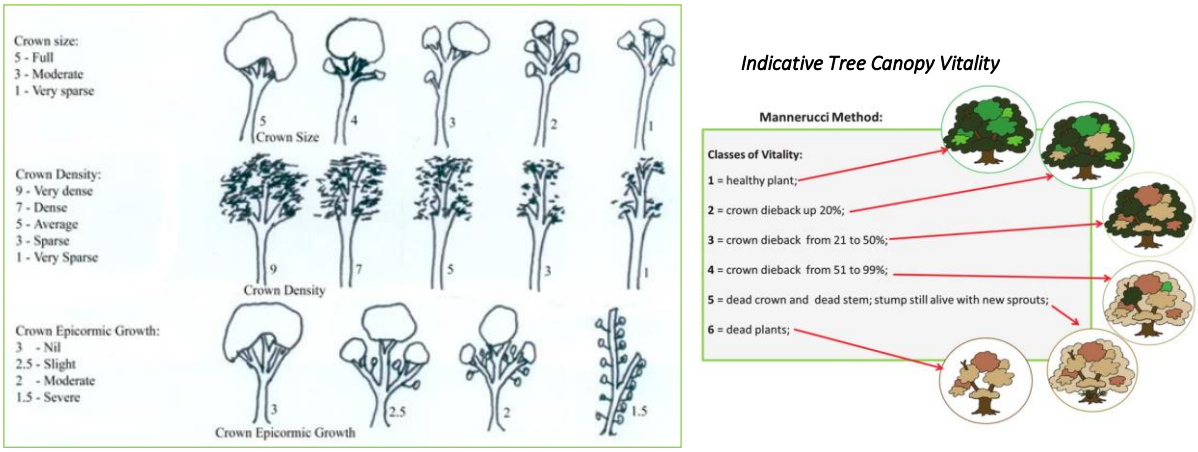
4.2 Visual Tree Assessment Parameters

i. The following information outlines the basic parameters and criterion used to visually assess a tree. These parameters relate to the tabled Visual Tree Assessment data below.

Pedology: a visual assessment of the general health and condition of the soil within the trees root zone. For example, such considerations such as soil porosity, compaction level, topography, hydrology, soil profile and root zone growth frustrations both infrastructural and/or otherwise.

Tree Vitality: is categorised through a visual determination using:

- leaf, twig or needle size, shape, and colour
- seasonal growth rates
- reaction wood development
- foliage density & foliage coverage throughout the crown
- branch-tip dieback
- typical branch senescence.

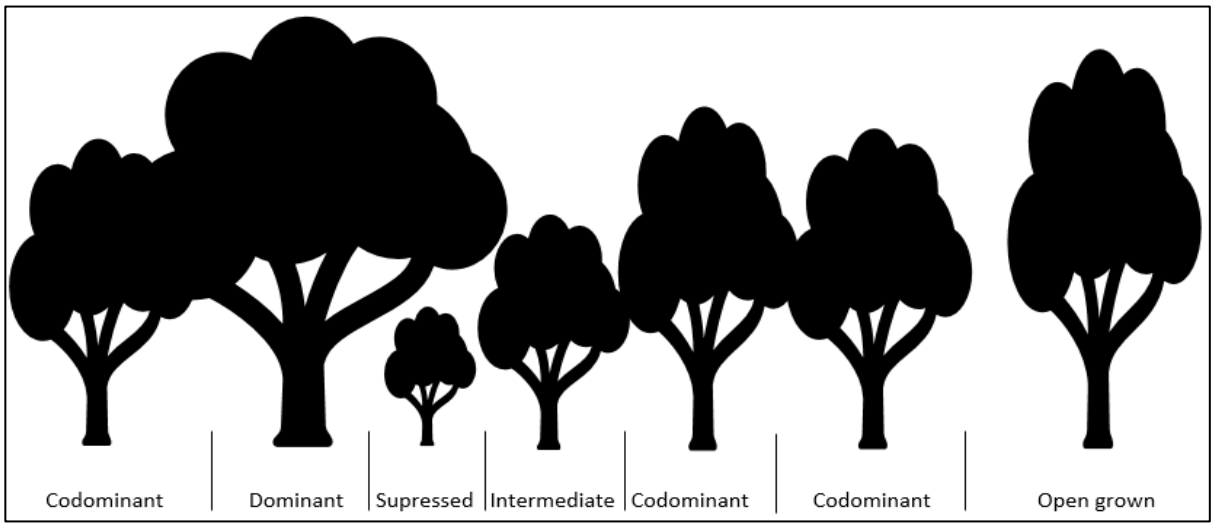


Diagrammatic representation of the visual vitality index for mature trees (Callow, 2018) 2018)

Structure & Biomechanics: a general evaluation of a tree's branch union formation, growth formation and architecture (this may affect branch weight and/or mass damping). This assessment is species-specific as it is derived from the typical structure and branch formation of the subject species.

Form: *'Trunk Form'* is an assessment of the trees basal flare, taper, decay, cavities, formation of multi-stems that develop near and/or at ground level, girdling roots and growing angles. Whilst general *'Tree Form'* is an indication of crown shape. Crown shapes are influenced by their surroundings, light availability and branch loss, which can have varying impacts on their symmetry. A tree is assessed on its individual crown shape. However, as the tree may be growing within a group environment, this could lead to the individual shape being assessed further down the scale. Although a poor rating may be attributed to the tree, the tree's contribution to the setting may be high through association within the group canopy. This can be generally recognised through the Crown Class rating.

Crown Class: this rating provides an indication on the tree's relationship with other trees in the subject environment. The categories used include Dominant, Codominant, Intermediate, Suppressed and Open grown, as shown in the below diagram.



Indicative Crown Class

Function: this assesses the site-specific usefulness of the tree *in situ*. Some examples include soil retention, stormwater attenuation and mitigation of the Urban Heat Island. This is weighed up against any negative issues the tree(s) may be causing regarding persons, utilities and/or infrastructure.

Impediments: (rootzone and canopy) are structures that impede or supress normal tree development and/or function. This can include hard impervious surfaces within the rootzone or powerlines and other structures within or adjacent to the canopy.

Useful Life Expectancy: A Useful Life Expectancy (ULE) rating is determined by using the adapted Safe Useful Life Expectancy (SULE) and Tree AZ methodologies (Barrell. 1996, 2000). The aim of these two systems is to convert what amounts to a relatively complex Arboricultural assessment into a few broad categories that are more logically understood. A ULE rating provides an estimate of a tree's expected remaining lifespan after considering the current condition, vigour, and vitality of the subject tree(s) *in situ*. Ultimately the main aim is the establishment of a tree Retention Value. The objective of a calculated

ULE assessment is to contribute to the relative value of individual trees for the purpose of informing future management options and residual risk. This calculated ULE rating will be inserted into the above-mentioned STARS Matrix (please refer to the Appendix section for further information).

Landscape Significance: The *Significance of a Tree, Assessment Rating System (STARS)* assists in providing the Retention Value of a tree and/or group of trees by balancing a combination of environmental, cultural, physical, amenity and social values. The Landscape Significance of a tree is an essential criterion to establish the importance that a particular tree may have on a site. However, rating the significance of a tree becomes subjective and difficult to ascertain in a consistent and repetitive fashion due to assessor bias. It is therefore necessary to have a rating system utilising structured qualitative criteria to assist in determining the Retention Value for a tree. Therefore, a tree retention assessment is undertaken in accordance with the *Institute of Australian Consulting Aboriculturalists (IACA) Significance of a Tree, Assessment Rating System (STARS)*. The system uses a scale of *High, Medium,* and *Low* significance in the landscape. Once the landscape significance of a tree has been defined, the Retention Value can be determined congruent with the trees' abovementioned Useful Life Expectancy (ULE).

4.3 Visual Tree Assessment Data

Visual Tree Assessment Data (02/11/2022)

Tree No.	Botanical & Common Name	Age Class	Height (m)	Canopy Spread (m)	DBH (m)	TPZ (m)	Structure	Vitality	ULE	Landscape Significance	Retention Value
1	*Cinnamomum camphora* Camphor Laurel	Semi Mature	9	EW:4 NS:4	0.35	4.2	Poor	Fair	Medium	Low	Remove
2	*Cinnamomum camphora* Camphor Laurel	Semi Mature	8	EW:2 NS:2	0.20	2.4	Poor	Fair	Medium	Low	Remove
3	*Lagerstroemia indica* Crepe Myrtle	Semi Mature	6	EW:2 NS:2	0.30	3.6	Poor	Poor	Medium	Low	Low
4	*Glochidion ferdinandi* Cheese Tree	Semi Mature	6	EW:2 NS:2	0.20	2.4	Poor	Poor	Medium	Low	Low
5	*Glochidion ferdinandi* Cheese Tree	Semi Mature	5	EW:2 NS:2	0.15	2.0	Poor	Poor	Short	Low	Low
6	*Syzygium smithii* Lilly Pilly	Semi Mature	8	EW:3 NS:2	0.20	2.4	Fair	Poor	Medium	Low	Low
7	*Syzygium smithii* Lilly Pilly	Semi Mature	6	EW:2 NS:2	0.15	2.0	Poor	Poor	Short	Low	Low
8	*Syzygium smithii* Lilly Pilly	Semi Mature	9	EW:4 NS:4	0.25	3.0	Fair	Fair	Medium	Low	Low
9	*Syzygium smithii* Lilly Pilly	Semi Mature	8	EW:4 NS:3	0.25	3.0	Fair	Fair	Medium	Low	Low

Tree No.	Botanical & Common Name	Age Class	Height (m)	Canopy Spread (m)	DBH (m)	TPZ (m)	Structure	Vitality	ULE	Landscape Significance	Retention Value
10	*Ligustrum sinense* Small-leaved Privet	Semi Mature	4	EW:2 NS:1	0.15	2.0	Poor	Poor	Medium	Low	Remove
11	*Syzygium smithii* Lilly Pilly	Semi Mature	6	EW:2 NS:2	0.15	2.0	Poor	Poor	Short	Low	Low
12	*Glochidion ferdinandi* Cheese Tree	Semi Mature	6	EW:2 NS:2	0.15	2.0	Poor	Poor	Medium	Low	Low
13	*Glochidion ferdinandi* Cheese Tree	Semi Mature	8	EW:2 NS:2	0.15	2.0	Poor	Poor	Short	Low	Low
14	*Glochidion ferdinandi* Cheese Tree	Semi Mature	8	EW:4 NS:5	0.20	2.4	Poor	Fair	Medium	Low	Low
15	*Glochidion ferdinandi* Cheese Tree	Semi Mature	8	EW:3 NS:2	0.15	2.0	Poor	Poor	Short	Low	Low
16	*Glochidion ferdinandi* Cheese Tree	Semi Mature	9	EW:2 NS:2	0.15	2.0	Poor	Poor	Short	Low	Low
17	*Cinnamomum camphora* Camphor Laurel	Semi Mature	9	EW:2 NS:2	0.15	2.0	Poor	Fair	Medium	Low	Remove
18	*Glochidion ferdinandi* Cheese Tree	Semi Mature	9	EW:2 NS:2	0.18	2.2	Poor	Poor	Medium	Low	Low
19	*Ligustrum lucidum* Broad leaved Privet	Semi Mature	8	EW:2 NS:2	0.15	2.0	Poor	Fair	Medium	Low	Remove
20	*Glochidion ferdinandi* Cheese Tree	Semi Mature	8	EW:4 NS:4	0.20	2.4	Poor	Fair	Medium	Low	Low
21	*Callistemon viminalis* Weeping Bottlebrush	Semi Mature	6	EW:2 NS:2	0.12	2.0	Poor	Fair	Medium	Low	Low

KEY

- ***Diameter at Breast Height (DBH):*** per *Standards Australia AS4970-2009 Protection of trees on development sites*.
- ***Tree Protection Zone (TPZ) & Structural Root Zone (SRZ):*** *calculated per QAA & ProofSafe Calculators.*
- ***Canopy Spread****: estimation of canopy spread to the four (4) cardinal points. (North-South) & (East-West).*
- **Structure & Vitality:** per International Society of Arboriculture descriptors & (Coder, 2021)
- ***Useful Life Expectancy (ULE):*** *adapted per (Barrell, 1996) & (Barrell, 2000).*
- ***Landscape Significance & Retention Value:*** *Significance of a Tree, Assessment Rating System (STARS), IACA.*
  - **Remove:** Listed Weed Species per NSWDPI
  - **Low:** These trees are not considered important for retention, nor require special works or design modification to be implemented for their retention.
  - **Medium:** These trees are moderately important for retention. Their removal should only be considered if adversely affecting the proposed building/works and all other alternatives have been considered and exhausted.
  - **High:** These trees are considered important for retention and should be retained and protected. Initial Non-Destructive Root Exploration (Root Mapping) should be implemented. Tree Sensitive Design modification and/or re-location of building/s should be considered to accommodate the setbacks per *AS 4970 Protection of trees on development sites*.

5 Arboricultural Commentary

5.1 Undesirable or Weed Species

i. Various undesirable/weed tree species per the NSWDPI were identified and thus recommended for removal. Weeds are a major threat to the natural environment, threatening the survival of hundreds of native plants and animals in NSW alone. They also impact on the price of food, human health through allergies and asthma, recreational activities, and the NSW economy. Therefore, it is recommended that these identified species be removed per best management practice under the guidance of a suitably qualified Project Arborist to prevent species identification ambiguity.

5.2 Tree Retention

i. As abovementioned specific Landscape Significance considerations are factored into the final Retention Value of a tree *in situ*. These considerations include the combination of discernible Social, Amenity, Environmental, Cultural, Heritage elements and the effects of the Urban Heat Island.

ii. However, no trees within the provided study area were deemed to have an assessed *'Medium'* or '*High'* Retention Value per the above-mentioned *STARS* criteria. Therefore, with regards to tree retention and the proposed development footprint, all of the identified trees can be removed to accommodate the development.

5.3 Tree Removal

i. No visible evidence was found to suggest that any of the subject trees are being regularly used by endangered wildlife considered to be a part of a threatened species or ecological community, and nor is it offering any wildlife habitat opportunities for the same communities.

ii. Excluding listed 'Weed' species, it is recommended that any necessitated tree removal where practicable is carried out in conjunction with considered Compensatory Replanting to offset canopy loss. A no net loss of tree canopy is desirable and is achieved by undertaking compensatory planting per a recognised methodology such as the Revised Burnley Method or the Melbourne Valuation Method.

iii. Please note that tree removal should not always be considered as a negative because it provides the opportunity to replant with often a 'better suited' species for the locale (Hitchmough, 1994). A list of preferred urban tree species for compensatory planting should be provided from a bespoke Urban Tree Selection Matrix that is formulated by a suitably qualified AQF Level 5+ Arborist and/or Urban Forestry Consultant. This science-based 'best' tree species selection palette will provide the necessary guidance for both Landscape Architects and Planners, whilst importantly taking into consideration recommended biodiversity modelling (Santamour, 2010).

6 Summary

6.1 Summary Data

i. The following summary data table shows that no trees were identified as being of *'Medium'* or *'High'* Retention Value. Therefore, all the assessed trees can be removed to accommodate the proposed development. The covenant being that Compensatory Replanting in the form of a considered Landscaping Plan be adopted to offset canopy loss.

ii. Please note that excluding the identified 'weed' species all the trees were considered for transplanting as opposed to removal. However, on the balance of probabilities it is of a reasonable belief that these subject trees will not remain arboriculturally viable. Therefore, the removal of these subject trees concurrent with Compensatory Replanting is the pragmatic recommendation moving downstream.

6.2 Summary Data Table

Assessed Tree Retention Values: 305 Mann Street, Gosford 2250 (02/11/2022)

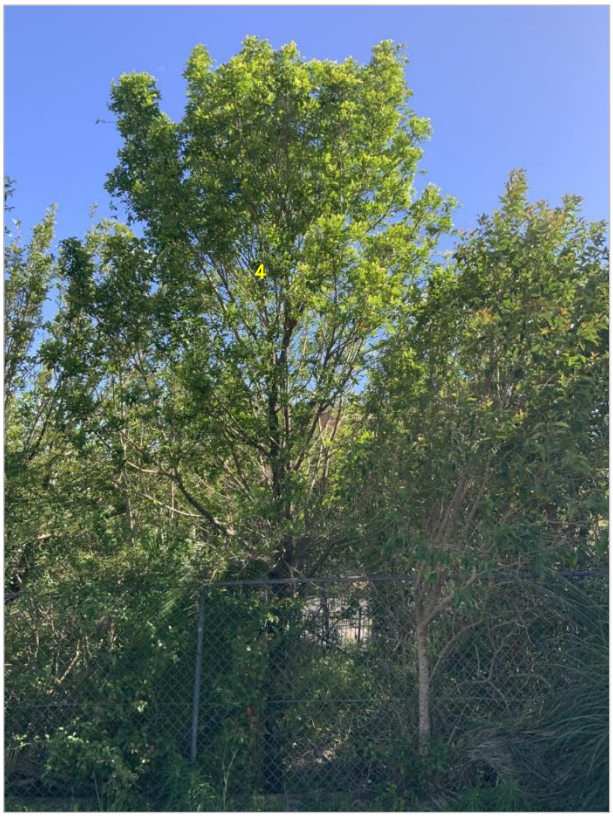
Retention Value	Trees	Description
High	*0*	These trees are considered important for retention and should be retained and protected. Design modification or re-location of building/s should be considered to accommodate the setbacks as prescribed by the *Australian Standard AS4970 Protection of trees on development sites*. Tree sensitive construction measures must be implemented (pier and beam cantilever, Structural Confinement Cells etc. if works are to proceed within the TPZ).
Medium	*0*	These trees may be retained and protected. These are considered less critical; however, their retention should remain a priority with removal considered only if adversely affecting the proposed building/works and all other alternatives have been considered and exhausted.
Low	*16*	These trees are not considered important for retention, nor require special works or design modification to be implemented for their retention.
Remove	**5*	These trees are considered hazardous, or in irreversible decline, or weeds and should be removed irrespective of development. **** Listed 'Weed Species' per the NSW Department of Primary Industries.***
Total	***21***	

7 Photo Sets

Tree 1: Cinnamomum camphora

Tree 2: Cinnamomum camphora

Tree 3: Lagerstroemia indica



Tree 4: Glochidion ferdinandi

Tree 5: Glochidion ferdinandi

Tree 6: Syzygium smithii

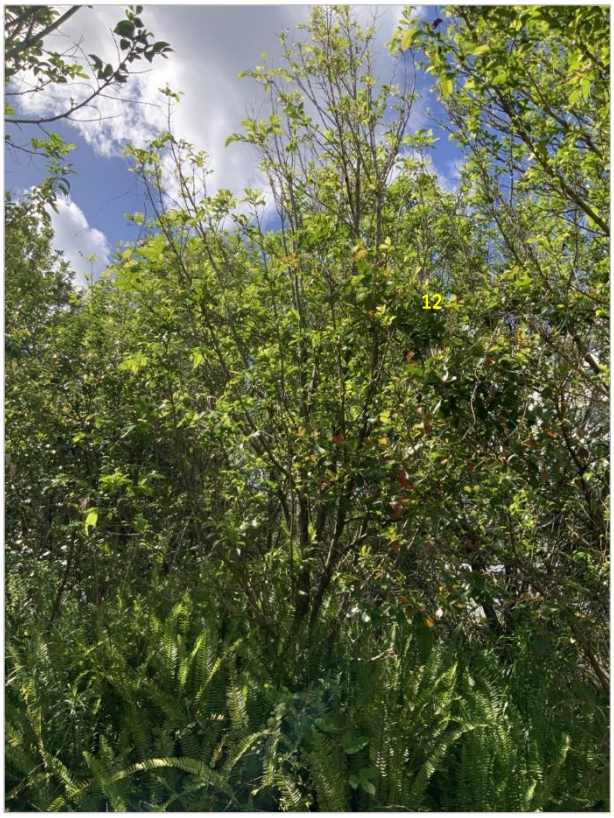
Tree 7: Syzygium smithii

Tree 8: Syzygium smithii

Tree 9: Syzygium smithii

Tree 10: Ligustrum sinense

Tree 11: Syzygium smithii



Tree 12: Glochidion ferdinandi

Tree 13: Glochidion ferdinandi

Tree 14: Glochidion ferdinandi

Tree 15 & 16: Glochidion ferdinandi

Tree 17: Cinnamomum camphora

Tree 18: Glochidion ferdinandi

Tree 19: Ligustrum lucidum

Tree 20: Glochidion ferdinandi

Tree 21: Callistemon viminalis

8 References

Barrell, J.D. (1996). *'Pre-planning Tree Surveys: Safe Useful Life Expectancy (SULE) is the Natural Progression'*. Arboricultural Journal, Vol 17 pp 33-46.

Barrell, J.D. (2009). *'Tree AZ. Detailed guidance on its use'*. Version 10.10 – ANZ. United Kingdom.

Breloer, H. and Mattheck, C. (1994), *'The Body Language of Trees: A Handbook for Failure Analysis'*. Stationary Office Books, London, England, UK.

Boddy, L., and A.D.M Rayner. (1983). 'Origins of Decay in living deciduous trees: The role of moisture content and re-appraisal of the expanded concept of tree decay'. New Phytology 94: 623-641.

Callow, C., May, P. and Johnstone, D. (2018). *'Tree vitality assessment in urban landscapes'*. Forests. 9(5), 279.

Coder, K. (2021). *'The Meaning of Tree Biomechanics to Tree Health Care Providers'*. ISA Conference 2021.

Draper, D. B and Richards, P.A. (2009). *'Dictionary for Managing Trees in Urban Environments'*. CSIRO Publishing, Victoria, Australia.

Dobbertin, M. (2005). *'Tree growth as indicator of tree vitality and of tree reaction to environmental stress: a review'*. European Journal of Forest Research 124: 319-333.

Dunster, J., Smiley, E., Matheny, N. and Lily S. (2017). *'Tree Risk Assessment-Manual'*. International Society of Arboriculture, Champaign, IL.

Eisner, N., Gilman, E.F. Grabosky, J. and Beeson, R.C. (2002). *'Branch morphology affects compartmentalization of pruning wounds'*. Journal of Arboriculture 28:99–105.

Gilman, E. and Lily, S. (2002). *'Best Management Practices Tree Pruning'*. International Society of Arboriculture, Champaign IL. Pp 35.

Harris, R.W., Clark, J.R. and Matheny, N.P. (2004). *'Arboriculture: Integrated management of landscape trees, shrubs and vines, 4th edition'*. Prentice Hall, New Jersey, USA.

Hendrickson, N., Fraedrich, B. and Smiley, E. (2007). *'Tree Risk Management'*. Bartlett Tree Research Laboratories, Charlotte, North Carolina, USA.

Hayes, E. (2001). Evaluating Tree Defects. Safe Trees, Rochester, Minnesota, USA.

Hitchmough, J.D. (1994) *'Urban Landscape Management'*. Inkata Press. Australia.

IACA. (2010). *'Significance of a Tree, Assessment Rating System (STARS)'*. Institute of Australian Consulting Arboriculturists. Australia, www.iaca.org.au

Jim, C.Y. (2003) *'Protection of urban trees from trenching damage in compact city environments*.' Cities 20, 87-94.

Kozlowski, T., Kramer, J., and Pallardy, S. G. (1991) *'The Physiological Ecology of Woody Plants'*, Academic Press, San Diego.

Lily, S., Matheny, N., and Smiley, E. (2017). *'Best Management Practices - Tree Risk Assessment'*. International Society of Arboriculture. Champaign, IL 61826-3129.

Lonsdale, D. (2010). *'Principles of Tree Hazard Assessment and Management'*. 9th impression, TSO, Norwich.

Mattheck, C. and Breloer, H. (1994). *'The Body Language of Trees, Research for Amenity Trees No. 4'.* The Stationery Office, London.

Matheny, N. and Clark, J. (1994*). 'A Photographic guide to Hazard Trees in Urban Areas'*. 2nd Edition. Illinois, USA.

Niklas, K. (1992). *'Plant Biomechanics: An Engineering Approach to Plant Form and Function'.* The University of Chicago Press, Illinois, USA.

Santamour, F. (1990) 'Trees for Urban Planting: Diversity, Uniformity, and Common Sense'. Procedures of 7th Conference of Metropolitan Tree Improvement Alliance (METRIA).

Standards Australia AS 4970-2009 Protection of Trees on Development Sites. Standards Australia, Sydney, Australia.

Standards Australia AS 4373-2007 Pruning of Amenity Trees. Standards Australia, Sydney, Australia.

The University of Melbourne. (2016). *'Burnley Plant Guide'.* The University of Melbourne.

Watson, G., Hewitt, A., Custic, M. and Lo, M. (2014). *'The Management of Tree Root Systems in Urban and Suburban Settings II: A Review of Strategies to Mitigate Human Impacts'*. Arboriculture & Urban Forestry 2014. 40(5): 249–271.

9 Glossary

The following definitions are stated in the Glossary of Arboricultural Terms, International Society of Arboriculture 2011, unless otherwise stated.

Abiotic: plant ailment caused by non-living, environmental, or man-made agents

Adaptive Growth: or Response Growth is new wood produced in response to damage or loads, which compensates for higher strain (deformation) in marginal fibres; it includes reaction wood (compression & tension) and wound wood.

Age class: Described as Young, Semi-Mature, Mature, Over Mature or Veteran. All these dimensions should be determined by species and site factors.

Barrier Zone: chemically defended tissue formed by the still living cambium, after a tree is wounded or invaded by pathogens to inhibit the spread of decay into new annual growth rings. Wall 4 in CODIT model. Contrast with reaction zone

Bifurcation: Natural division of a branch or stem into two or more stems or parts

Biotic: pertaining to non-human living organism/ biotic agent: a living organism capable of causing disease/ biotic disorder: disorder caused by a living organism.

Bracket: British English term for fruiting body of a decay fungus. See *Conk*.

Chlorosis: is a yellowing of leaf tissue due to a lack of chlorophyll. Possible causes of chlorosis include poor drainage, damaged roots, compacted roots, high alkalinity, and nutrient deficiencies in the plant.

Codominant Structure: Stems or trunks of about the same size originating from the same position from the main stem52. When the stem bark ridge turns upward the union is strong; when the ridge turns inward the union is weak, a likely point of failure in storm or windy weather conditions or where increasing weight causes undue stress on the defective union.

CODIT: acronym for Compartmentalisation of Decay/Disease In Trees (refer Compartmentalisation).

Compartmentalisation: Dynamic tree defence process involving protection features that resist the spread of pathogens and decay causing organisms. Natural defence process in trees by which chemical and physical boundaries are created that act to limit the spread of disease and decay organisms.

Compaction: Results from loads or stress forces applied to the soil as well as shear forces. Both foot traffic and vehicle traffic exert both forces on soils. Vehicle traffic may cause significant compaction at depths of 150–200 mm (the area in which most absorbing roots are located). The degree of compaction will depend on weight of vehicles, number of movements, soil moisture levels and clay content. Soil handling, stockpiling, and transporting also tend to lead to the breakdown of soil structure and thus to compaction. Vibration as a result of frequent traffic or adjacent construction activities will also compact soils.

Compression wood: (1) in mechanics, the action of forces to squeeze, crush or push together any material (s) or substance(s): contrast with tension. (2) the ability of an internal combustion engine to contain or pressurized a combustible fuel - air mixture.

Conk: Fruiting body or non-fruiting body (sterile conk) of a fungus. Often associated with decay.

Crown: Portion of the tree consisting of branches and leaves and any part of the trunk from which branches arise.

Crown/Canopy: The main foliage bearing section of the tree, these terms are interchangeable.

Crown damage: The canopy of trees can be directly or indirectly damaged. Incorrect techniques of pruning such as lopping or flush cutting may produce wounds that are susceptible to infection by wood decay organisms. Similarly, mechanical damage to branches by machinery, etc. will also create wounds. Trees automatically respond to wounding and in doing so use stored sugars. Any wound places an additional load on trees that will inevitably be stressed during construction.

Damping: Damping occurs where energy is dissipated. In trees, damping occurs naturally in three main ways with aerodynamic damping of the leaves, internal damping in the wood and root zones, and with mass damping of the branches.

Deadwood: Dead branches within the canopy of tree. Deadwood is a naturally occurring feature of most tree species and comprises dead or decaying branches within the canopy of a tree. Deadwood may have habitat value and require removal only according to the considered risk of its location, i.e. high use pedestrian area or damage to adjacent infrastructure.

Removal of deadwood is generally recommended only where it represents an unacceptable level of hazard. Consideration of the need for deadwood removal should take into account the occupancy of the target zone, i.e. high use pedestrian area or presence of infrastructure, possible damage to the tree during its removal as well as its conservation for habitat value. In some instances, retention of a reduced tree structure for habitat purposes maybe considered appropriate, especially when hollows are present.

Further reference: *Principles of Tree Hazard Assessment. Lonsdale, David. TSO, (2009).*

Dead wooding: **(Crown cleaning)**: The removal of dead branches60. Recommendation to remove deadwood is for removal of all dead branches within tree canopy > 30mm diameter in trees which overhang pedestrian or vehicular areas and removal of all dead branches within tree canopy > 50mm diameter if trees are located in a Parkland or similar area.

Decay: The process of degradation of woody tissues by micro-organisms.

Desiccation: Severe drying out. Dehydration.

Drip Line: Is the imaginary perimeter line at soil surface level which is directly below the outermost edge of the tree's foliage or canopy.

Estimated Life Expectancy (ELE): Assessed on trees of particular species in the urban environment, including health and structural conditions which may exist.

Epicormic bud: Latent or adventitious bud located at the cambium and concealed by the bark.

Epicormic shoots: Shoots produced from epicormic buds at the cambium of trunks or branches.

Field Capacity: Maximum soil moisture content following the drainage of water due to the force of gravity.

Hollow: is a semi-enclosed cavity which has naturally formed in the trunk or branch of a tree.

Included bark: Inwardly formed bark within the junction of branches or codominant stems.

Kino: Dark red to brown resin-like substance produced by trees in the genera *Eucalyptus spp*, *Pterocarpus spp* and *Butea spp* and related genera. Kino forms in the barrier zones. Large kino veins form in some tree in response to injury and infection.

Leaves: The main function of leaves is photosynthesis, that is, the production of sugars and oxygen. The sugars produced by the leaves (and any other green tissue) are the source of chemical energy for all living cells in the entire plant and as such are essential for the normal functioning and survival of the tree. Anything that directly or indirectly damages the leaves will interfere with photosynthesis.

Non-woody part of tree: 'organs that increase the surface area of vascular plants, thereby capturing more solar energy for photosynthesis'. … maybe classified as microphylls (usually spine-shaped leaves with a single vein) or megaphylls (leaves with a highly branched vascular system). Needles and leaves are major energy trapping organs of a tree. Flowers are modified leaves …. as they fit the definition of an organ (*Shigo.2003).*

Macropore: Relatively larger space between soil particles that is usually air-filled and allows for water movement and root penetration. Contrast with micropore.

Mature: Trees are close to their full height and crown size.

Micropore: Space between soil particles that is relatively small and likely to be water filled.

Mortality Spiral: Sequence of stressful events or conditions causing the decline and eventual death of a tree. Once in a mortality spiral trees are more likely to succumb to any further or additional stress factors such as drought, pest infestation or disease.

Necrosis: Localised death of tissue in a living organism.

Occlusion (See wound): Shut in or out. Occlusion is the process of trees forming callus and clear wood over wounds.

Pathogen: A disease-causing organism.

Phototropism: Influence of light on the direction of plant growth. Tendency of plants to grow towards light.

Phloem: Plant vascular tissue that transports photosynthates and growth regulators. Situated on the inside of the bark, just outside the cambium. Is bidirectional (transports up and down). Contrast with xylem.

Photosynthesis: Process in green plants (and in algae and some bacteria) by which light energy is used to form glucose (chemical

energy) from water and carbon dioxide.

Reaction wood: Wood forming in leaning or crooked stems or on lower or upper sides of branches as a means of counteracting the effects of gravity. See compression wood and tension wood.

Semi-mature: Trees are between 1/3 and 2/3 of expected mature height.

Shrub: A woody plant similar to a tree except it is usually several-stemmed and smaller than a tree.

Significance: The quality of being worthy of attention; importance.

Stem / Trunk: Organ which supports branches, leaves, flowers and fruit; may also be referred to as 'the trunk'.

Stress: In Plant Health Care, (1) a factor that negatively affects the health of a plant; a factor that stimulates a response. (2) mechanics, a force per unit area.

Stress – acute: Disorder or disease that occurs suddenly and over a short period of time.

Stress – chronic: Disorder or disease occurring over a longer time.

Structural Root Zone (SRZ): The SRZ is the area of the root system (as defined by *AS 4970-2009*) used for stability, mechanical support, and anchorage of the tree. Severance of structural roots (>50 mm in diameter) within the SRZ is not recommended as it may lead to the destabilisation and/or serious decline of the tree.

Tree: Long lived woody perennial plant greater than (or usually greater than) 3m in height with one or relatively few main stems or trunks. A tree has 3 major organs – roots, stem and leaves.

Tree Protection Zone (TPZ): *Australian Standard AS 4970-2009 – Protection of trees on development sites s1.4.7, Tree Protection Zone (TPZ)*: A specified area above and below ground and at a given distance from the trunk set aside for the protection of a tree's roots and crown to provide for the viability and stability of a tree to be retained where it is potentially subject to damage by development.

Urban Heat Islands: are urbanized areas that experience higher temperatures than outlying areas. As opposed to natural landscapes such as forests and water bodies, hard surfaces in the urban environment such as concrete, brick, glass, asphalt and roofing, have a high thermal mass, collecting the sun's heat during the day and re-radiating it slowly back into the atmosphere. This contributes to a rise in ambient temperature in cities, creating large, stable masses of hot air (urban heat islands), especially during periods of calm, still weather. This increase in heat particularly if combined with low soil moisture contributes to the decline of certain tree species and trees already 'stressed' (McPherson et. al. 2006).

Vigour: Ability of a tree to sustain its life processes. The term 'vigour' in this document is synonymous with commonly used terms such as 'health' and 'vitality'. Inherent genetic capacity of a plant to deal with stress. Physical strength and health. A tree with good vigour has the ability to sustain life processes and synonymous with good health.

Visual Tree Inspection (VTA): Is a detailed visual inspection of a tree and surrounding site.

Vitality: Ability of plant to deal effectively with stress.

Watersprouts/ Epicormic growth (Usually multiple shoots): Shoots produced from epicormic buds at the cambium of trunks or branches. Grows 'from the stub ends and only grows from the outermost living tissue layer of that year's growth. They are weakly attached and prone to falling out or being blown off with the risk increasing markedly as they increase in size. When epicormic shoots arise from stub ends that are decaying, the chances of them falling out are significantly greater'.

Wound: An opening that is created when the bark is cut, removed, or injured.

NOTE: Pruning a live branch always creates a wound, even when the cut is properly made.

Xylem: Main water and mineral-conducting (unidirectional, up only) tissue in trees and other plants. Provides structural support. Arises (inward) from the cambium and becomes wood after lignifying. Contrasted with phloem.

Young: Trees have not yet reached 1/3 of their expected mature height. They are generally growing vigorously and have high apical dominance.

Zone of *Rapid Taper*: The area within 1–2m of the trunk on larger trees is frequently referred to as the *'Zone of Rapid Taper'* because structural roots found there often exhibit considerable secondary thickening- not present on roots farther from the trunk (*Wilson 1964*). *Wilson (1964)* additionally reviews the development of this zone and its relation to mechanical stability.

10 Appendix

10.1 Visual Tree Assessment Methodology

i. In 1994 Claus Mattheck introduced a biomechanically based system of Visual Tree Assessment (VTA), the basis of which is the identification of symptoms produced by a tree in reaction to a weak spot, or area of mechanical stress. The VTA is a non-invasive method of examining the vitality and structural condition of individual trees. It has become the standard approach for surveying trees. By visually examining a tree, an aboriculturalist can gather information on the condition of its roots, trunk, main branch structure, crown, buds and leaves to make an assessment and draw conclusions about general condition and vitality. It is a systematic approach, which directs the aboriculturalist through a procedure from biological and routine observations to analysis, using their understanding of failure criteria.

ii. In any inspection regarding tree vitality or safety, an arborist will look for biological signs, such as undersized leaves, discoloured foliage, dead branches, large or numerous cankers and fungal fruiting bodies. They will be able to recognize the significance of these observations by comparing them with the typical growth patterns and appearance of the tree involved. They will also look at the tree for signs of structural weakness or for a change in growth patterns that may indicate defects. If mechanical weakness is suspected, there may be a need for more investigation using specialist decay detection and measuring equipment such as the Resistograph and/or Sonic Tomograph.

10.2 Tree Sensitive Design

i. Tree sensitive design for both new and existing trees simply aims to provide adequate space for desirable root growth, whilst safeguarding against infrastructure and root damage from potential conflict alike. Therefore, a suitably qualified arborist (AQF Level 5+) should always be consulted post development. This arborist can discuss and/or provide proactive solutions such as:

- Sensitive Construction: Directional-drilling, Screw-Piling, Cantilevers and ‘Build-overs’.
- Irrigation, Tree Root Trenches & Paths, Root Barrier, Root Deflectors and Root Directors and De-Compaction/Compaction to direct root growth.
- Permeable Pavers, Asphalt, Concrete and Resin Bound Aggregates.
- Structural Confinement System installations with structural soil: Some of these include Silva Cell, Strata Vault & Strata Pit, Geo Cell, and Terra Vault. In summary these cells can be installed in an urban scape to provide space for root growth limit soil and root compaction, whilst facilitating necessary infrastructure installations.

ii. Please note that tree roots travel the ‘path of least resistance’ and like most living organisms require oxygen and water (an aerobic soil with good moisture levels). Therefore, one of the easiest techniques to keep tree roots from growing in unwanted areas is to remove these two essential elements by heavily compacting the soil. Alternatively, by providing ideal levels of these essential resources (water, friable aerobic soil and organic nutrients), in an area away from infrastructure, tree roots can be encouraged to grow in that direction.

10.3 Descriptors: Age, Vitality & Structure

(Per International Society of Arboriculture guidelines)

TREE AGE CLASS

Young Juvenile or recently planted approximately 1-7 years.
Semi-mature Tree actively growing in size and yet to achieve the expected size *in situ.*
Maturing Tree is approaching the expected size or has reached the expected size *in situ.*
Senescent Tree is over mature and has started to decline.

TREE VITALITY

Excellent: The tree is demonstrating excellent or exceptional growth. The tree should exhibit a full canopy of foliage and be free of pest and disease problems.
Good: Foliage of tree is entire, with good colour, very little sign of pathogens and of good density. Growth indicators are good i.e., Extension growth of twigs and wound wood development. Minimal or no canopy dieback (deadwood).
Fair: Tree is showing one or more of the following symptoms: <25% dead wood, minor canopy dieback, foliage generally with good colour though some imperfections may be present. Minor pathogen damage present, with growth indicators such as leaf size, canopy density and twig extension growth typical for the species in this location.
Poor: Tree is showing one or more of the following symptoms of decline; >25% deadwood, canopy dieback is observable, discoloured or distorted leaves. Pathogens present, stress symptoms are observable as reduced leaf size, extension growth and canopy density.
Very Poor: The tree appears to be in a state of decline. The tree is not growing to its full capacity. The canopy may be very thin and sparse. A significant volume of deadwood may be present in the canopy and/or pest and disease problems may be causing a severe decline in tree vitality.
Dead or dying: Tree is in severe decline; >55% deadwood, very little foliage, possibly Epicormic shoots and minimal extension growth.
Dead: The tree is completely dead and exhibits no new growth or live tissue.

***Please note that tree vitality cannot be measured directly, hence growth and physiological parameters that indicate tree vitality are used. Health or Vitality of a tree is evidenced by the general appearance of crown density, leaf colour, presence of epicormic shoots, ability to withstand disease invasion including pathogens and presence of dieback in crown at the time of inspection. Vigour may vary according to seasonal weather patterns and rainfall received (Dobbertin, 2005).*

***Tree Condition: The assessment of a tree(s) condition evaluates factors of tree vitality, form and structure. These descriptors of vitality, form and structure attributed to a tree evaluate the individual specimen to what could be reasonably considered by the arborist as typical for that species growing in situ. It is well documented that specific tree species can display inherently poor biomechanics, such as acute branch attachments with included bark, co-dominant leaders and other poor branch and root architecture. Whilst these 'structural defects' may be deemed arboriculturally flawed, they are typical for the species and my not constitute a foreseeable increased risk. These trees may be assigned a 'structural rating' of 'fair-poor' (as opposed to poor) at the arborist's discretion.*

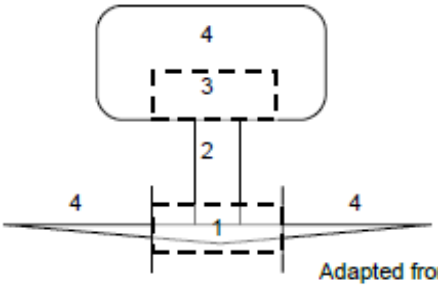
TREE STRUCTURE

Good: Trunk and scaffold branches show good taper and attachment with minor or no structural defects. Tree is a good example of species with well-developed form showing no obvious root problems or pests and diseases.
Fair/Fair-Poor: Tree shows minor structural defects or minor damage to trunk e.g. bark missing, there could be cavities present. Minimal damage to structural roots. Tree could be seen as typical for this species.
Poor/Very Poor: There are major structural defects, damage to trunk or bark missing. Co-dominant stems could be present with likely points of failure. Girdling or damaged roots obvious. Tree is structurally problematic.
Hazardous: Tree is immediate hazard with potential to fail, this should be rectified as soon as possible.

Tree Structure Matrix

Descriptor	Zone 1 - Root plate & lower stem	Zone 2 - Trunk	Zone 3 - Primary branch support	Zone 4 - Outer crown and roots
Good	No damage, disease or decay; obvious basal flare / stable in ground	No damage, disease or decay; well tapered	Well formed, attached, spaced and tapered	No damage, disease, decay or structural defect
Fair	Minor damage or decay. Basal flare present.	Minor damage or decay	Typically formed, attached, spaced and tapered	Minor damage, disease or decay; minor branch end-weight or over-extension
Fair to Poor	Moderate damage or decay; minimal basal flare	Moderate damage or decay; approaching recognised thresholds	Weak, decayed or with acute branch attachments; previous branch failure evidence	Moderate damage, disease or decay; moderate branch end-weight or over-extension
Poor	Major damage, disease or decay; fungal fruiting bodies present. Excessive lean placing pressure on root plate	Major damage, disease or decay; exceeds recognised thresholds; fungal fruiting bodies present. Acute lean. Stump resprout	Decayed, cavities or has acute branch attachments with included bark; excessive compression flaring; failure likely	Major damage, disease or decay; fungal fruiting bodies present; major branch end-weight or over-extension
Very Poor	Excessive damage, disease or decay; unstable / loose in ground; altered exposure; failure probable	Excessive damage, disease or decay; cavities. Excessive lean. Stump resprout	Decayed, cavities or branch attachments with active split; failure imminent	Excessive damage, disease or decay; excessive branch end-weight or over-extension

Diagram 2: Tree structure zones
1. Root plate & lower stem
2. Trunk
3. Primary branch support
4. Outer crown & roots



Adapted from Coder (1996)

Structure ratings will also take into account general tree architecture which considers aspects of stem taper, live crown ratio, branch distribution or crown bias and position such as a tree being suppressed amongst more dominant trees.

10.4 Descriptors: Useful Life Expectancy (ULE)

The ULE is adapted from (*Barrell, 2001)*. The objective of a ULE assessment is to determine the relative value of individual trees for the purpose of informing future management options.

Useful Life Expectancy – Assessment Criteria			
Dead / Serious Decline	Short	Medium	Long
Trees with a high level of risk that would need removing within the next 5 years. Dead trees. Trees that should be removed within the next 5 years. Dying or suppressed or declining trees through disease or inhospitable conditions. Dangerous trees through instability or recent loss of adjacent trees. Dangerous trees through structural defects including cavities, decay, included bark, wounds or poor form. Damaged trees that considered unsafe to retain. Trees that could live for more than 5 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting. Trees that will become dangerous after removal of other trees for the reasons.	Trees that appear to be retainable with an acceptable level of risk for 5-15 years. Trees that may only live between 5 and 15 more years. Trees that may live for more than 15 years but would be removed to allow the safe development of more suitable individuals. Trees that may live for more than 15 years but would be removed during the course of normal management for safety or nuisance reasons. Storm damaged or defective trees that require substantial remedial work to make safe and are only suitable for retention in the short term.	Trees that appear to be retainable with an acceptable level of risk for 15-40 years. Trees that may only live between 15 and 40 more years. Trees that may live for more than 40 years but would be removed to allow the safe development of more suitable individuals. Trees that may live for more than 40 years but would be removed during the course of normal management for safety or nuisance reasons. Storm damaged or defective trees that require substantial remedial work to make safe and are only suitable for retention in the short term.	Trees that appear to be retainable with an acceptable level of risk for more than 40 years. Structurally sound trees located in positions that can accommodate future growth. Storm damaged or defective trees that could be made suitable for retention in the long term by remedial tree surgery. Trees of special significance for historical, commemorative or rarity reasons that would warrant extraordinary efforts to secure their long-term retention

10.5 IACA Significance of Tree, Assessment Rating System (STARS)

Institute of Australian Consulting Arboriculturists (IACA) Significance of a Tree, Assessment Rating System (STARS): Significance criteria *The tree is to have a minimum of 3 criteria in a category to be classified in that group*		
Low	**Medium**	**High**
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 the surrounding properties or obstructed by other vegetation or buildings. The tree provides a minor contribution or has a negative impact on the visual character and amenity of the local area. The tree is a young specimen which may or may not have reached dimensions to be protected by local Tree Preservation Orders or similar protection mechanisms and can easily be replaced with a suitable specimen. The tree's growth is severely restricted by above or below ground influences, unlikely to reach dimensions typical for the taxa in situ – tree is inappropriate to the site conditions. The tree is listed as exempt under the provisions of the local Council Tree Preservation Order or similar protection mechanisms. The tree has a wound or defect that has the potential to become structurally unsound. ENVIRONMENTAL PEST/NOXIOUS WEED The tree is an environmental pest species due to its invasiveness and/or poisonous/allergenic, properties/ declared noxious weed. HAZRADOUS / IRREVERSIBLE DECLINE The tree is structurally unsound unstable and considered potentially dangerous. The tree is dead or in irreversible decline with the potential to fail/collapse.	The tree is in fair to good condition. The tree has form typical or atypical of the species. The tree is a planted locally indigenous or a common species with its taxa commonly planted in the local area. The tree is visible from surrounding properties, although not visually prominent as partially obstructed by other vegetation or buildings when viewed from the street. The tree provides a fair contribution to the visual character and amenity of the local area. The tree's growth is Mediumly restricted by above or below ground influences, reducing its ability to reach dimensions typical for the taxa in situ.	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 substantial age. The tree is listed as a heritage item, threatened species or part of an endangered ecological community or listed on councils' significant/notable tree register. The tree is visually prominent and visible from a considerable distance when viewed from most directions within the landscape due to its size and scale and makes a positive contribution to the local amenity. The tree supports social and cultural sentiments or spiritual associations, reflected by the broader population or community group or has commemorative values. The tree's growth is unrestricted by above and below ground influences, supporting its ability to reach dimensions typical for the taxa in situ – tree is appropriate to the site conditions.

10.6 Additional Landscape Significance Considerations

CATERGORY	HERITAGE VALUE	ECOLOGICAL VALUE	AMENITY VALUE
SIGNIFICANT	*The subject site is listed as a Heritage Item at a local, state or National level of significance or is listed as a Significant/Notable tree. * The subject tree is a Commemorative Planting having been planted by an important historical person(s) or to commemorate an important historical event.	*The subject tree is scheduled as a 'Threatened Species' as defined under the Biodiversity Conservation Act 2016. *The tree is a locally indigenous species, representative of the original vegetation of the area and is known as an important food, shelter or nesting tree for endangered or threatened fauna. *The subject tree is a Remnant Tree, being a tree in existence prior to development of the area.	*The subject tree has a very large live crown size exceeding 100m2 with normal to dense foliage cover, is located in a prominent position in the landscape, and exhibits very good form typical of the species. *The subject tree makes a significant contribution to the amenity & visual character of the area by creating a sense of identity. *The tree is visually prominent in view from surrounding areas, being a landmark or visible from a considerable distance.
HIGH	The tree has a strong historical association with a Heritage Item (building/structure/etc) within or adjacent the property and/or exemplifies a particular era or style of landscape design associated with the original development of the site.	The tree is a locally indigenous species, representative of the original vegetation of the area and is a dominant or associated canopy species of an Endangered Ecological Community formerly occurring in the area occupied by the site.	The subject tree has a very large live crown exceeding 60m2; crown density exceeding 70%, very good representative of the species in terms of form & branching habit, is aesthetically distinctive & makes a positive contribution to the visual character & the amenity of value of the area.

MODERATE	The tree has a suspected historical association with a heritage item or landscape supported by anecdotal or visual evidence.	The tree is a locally indigenous species & representative of the original vegetation of the area & the tree is located within a defined Vegetation Link/Wildlife Corridor or has well known habitat value.	A good representative of the species in terms of form & branching habit with minor deviations from normal. Crown density at least 70% (normal); the tree is visible from the street and/or surrounding properties & makes a positive contribution to the visual amenity of the area.
LOW	The subject tree detracts from Heritage values or diminishes the value of a Heritage Item.	The subject tree is possibly scheduled as exempt under the provisions of this Development Control Plan due to its species, or tree can be a nuisance or its position problematic – relative to buildings or other structures.	The subject tree has a small live crown size of less than 25m2 & can be replaced within the short-term (5-10yrs) with new planting.
VERY LOW	The subject tree is causing damage to a Heritage Item.	The subject tree is listed as an Environmental Weed Species in the Local Government Area, being invasive, or is a known nuisance species.	The subject tree is not visible from surrounding properties & has a negative impact on the amenity & visual character of the area. The tree is a poor representative of the species, showing significant deviations from the typical form & branching habit with a crown density of less than 50%.

(STARS) Tree Retention Value - Priority Matrix

Significance of a Tree, Assessment Rating System (STARS), Institute of Australian Consulting Arboriculturists, Australia 2010.

		Significance				
		1.High	2.Medium	3.Low		
		Significance in Landscape	Significance in Landscape	Significance in Landscape	Environmental Pest/Noxious Weed Species	Hazardous / Irreversible Decline
Useful Life Expectancy	1.Long **>40 Years**					
	2.Medium **15-40 Years**					
	3.Short **<1-15 Years**					
	Dead					

	Priority for Retention (High) - These trees are considered important for retention and should be retained and protected. Design modification or re-location of building/s should be considered to accommodate the setbacks as prescribed by the Australian Standard *AS 4970 Protection of trees on development sites.* Tree sensitive construction measures must be implemented (pier and beam cantilever, Structural Confinement Cells etc if works are to proceed within the TPZ).
	Consider for Retention (Medium) - These trees may be retained and protected. These are considered less critical; however, their retention should remain priority with removal considered only if adversely affecting the proposed building/works and all other alternatives have been considered and exhausted.
	Consider for Removal (Low) - These trees are not considered important for retention, nor require special works or design modification to be implemented for their retention.
	Priority for Removal - These trees are considered hazardous, or in irreversible decline, or weeds and should be removed irrespective of development.

10.7 Assumptions and Limiting Conditions

1) Active Green Services Pty Ltd (herein after referred to as AGS) contracts with you on the basis that you promise that all legal information which you provide, including land title and ownership of other property, are correct. AGS is not responsible for verifying or ascertaining any of these issues.
2) AGS contracts with you on the basis that your promise that all affected property complies with all applicable statutes and subordinate legislation.
3) AGS will take all reasonable care to obtain necessary information from reliable sources and to verify data. However, AGS neither guarantees nor is responsible for the accuracy of information provided by others.
4) If, after delivery of this report, you later require a representative of AGS to attend court to give evidence or to assist in the preparation for a hearing because of this report, you must pay an additional hourly fee at our then current rate for expert evidence.
5) Alteration of this report invalidates the entire report.
6) AGS retains the copyright in this report. Possession of the original or a copy of this report does not give you or anyone else any right of reproduction, publication or use without the written permission of AGS.
7) The contents of this report represent the professional opinion of the consultant. AGS consultancy fee for the preparation of this report is in no way contingent upon the consultant reporting a particular conclusion of fact, nor upon the occurrence of a subsequent event.
8) Sketches, diagrams, graphs and photographs in this report are intended as visual aids, are not to scale unless stated to be so, and must not be construed as engineering or architectural reports or as surveys.
9) Unless expressly stated otherwise:
    a. The information in this report covers only those items which were examined and reflects the condition of those items at the time of the inspection.
    b. Our inspection is limited to visual examination of accessible components without dissection, excavation or probing. There is no warranty or guarantee, express or implied, that even if they were not present during our inspection, problems or defects in plants or property examined may not arise in the future.
10) This Report supersedes all prior discussions and representations between AGS and the client on the subject.

10.8 AGS Quality Control

Document control

File reference	File type	Modifications	Date
JN 99001	AR	Original document	07/11/2022

Documents reviewed

Date	Title	Author	Company
N/A	N/A	N/A	N/A

Communication register

Date	Type	From	To	Description
N/A	N/A	N/A	N/A	N/A

Review register

Date	File reference	Reviewer	Qualification	Company
08/11/2022	Preliminary Arboricultural Report	M. McHugh	Dip of Arb (AQF 5)	Active Green Services