ABOUT TREES

URBAN TREE & BUSHLAND MANAGEMENT

TREE REPORT

AT

53B WARRIEWOOD ROAD

WARRIEWOOD

FOR

ZYGT P/L

TABLE OF CONTENT

ABOUT TREES
URBAN TREE AND BUSHLAND MANAGEMENT

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21/01/19
Ref. #2034

1.0 INTRODUCTION

A Development Application is to be lodged with Northern Beaches Council seeking consent for the subdivision 53B Warriewood Road, Warriewood.

The proposed subdivision is for 17 lots (including 1 residue lot), together with demolition, drainage, earthworks and the extension of existing Lorikeet Grove and widening of existing Pheasant Place.

Council has requested the applicant to provide an Arborist report to assess the health and condition of the trees and provide an estimate of their safe life expectancies.

1.1 Scope

- This report has been commissioned by Mr Jayson Blaine and its purpose is to assess the health and condition of the trees shown on the site plan and provide an estimate of their safe life expectancies.

1.2 Summary of Report

- The thirty (30) ornamental species that have been planted as screening around the existing swimming pool area have been scheduled to be removed in order to create Lots 5 - 9 of the proposed 17 lot subdivision. Twenty-five (25) of these are listed as except species under the Northern Beaches LEP, and the remaining five (5) are *Callistemon salignus*. They are of small stature and not prominent in the landscape.

- Tree No. 25 – 37, are *Casuarina glauca* and been planted as a screen/shading on the western side of a large rural shed. They trees are in average health and condition, and appear to have safe life expectancies of at least 10 years. These trees have been scheduled to be removed as they are located in an area that is proposed to be filled.

- Tree No. 38 is an isolated *Casuarina glauca*, and is located about 20m south of the codominant stand of No's 25 – 37. This tree is located within the footprint of proposed Lorikeet Grove and has been scheduled to be removed

- Tree No's 40 – 41 and 43 are mature *Eucalyptus robusta* (Swamp Mahogany) are located near the boundary of the two properties. They are located within the Riparian Zone and have adequate setbacks from proposed earthworks and construction activities. As such, no specific tree protection methods are considered necessary.

1.3 Conclusions

- Tree No's 1 – 25 have been scheduled to be removed in order to create Lots 5 - 9 of the proposed 17 lot subdivision

- Tree No's 26 to 37 is a planted screen of *Casuarina glauca* which has been scheduled to be removed in order to create Lots 12 & 14.

- Tree No. 38 is an isolated *Casuarina glauca*, and is located about 20m south of the codominant stand of No's 25 – 37. This tree is located within the footprint of Lorikeet Grove and has been scheduled to be removed

- Tree No. 39 is not considered suitable for retention within a development as it has a high potential of causing injury to persons and/or damage to property. It is unlikely that treatment and/or tree surgery techniques will significantly increase its safe life expectancy.

- Tree No. 41, 42 & 44 have been scheduled to be retained. They have adequate setbacks from the proposed earthworks and construction activities, and no specific tree protection methods are considered necessary.

1.4 Recommendations

- Tree No. 39 is in declining health and condition and is retainable in the short term. It is unlikely that treatment and/or tree surgery techniques will significantly increase its safe life expectancy.

- Tree No. 43 (Coral Tree) should be removed to prevent further conflict with No. 34, and minimise any adverse impacts on its safe life expectancy.

- Any works within close proximity to the trees being retained should comply with the Tree Protection Plan in Appendices 9.5

If you require any further information, please feel free to contact me on 0439 758 658.

Lawrie Smith,
Arboricultural Consultant

2.0 METHODOLOGY AND OTHER INFORMATION

This report is presented in an accepted industry format and should easily be understood by any person with a reasonable understanding of arboriculture. For those who don't, an explanation of the terminology used within the report is provided in Section 8. Addition information is provided in the Appendices which are referenced to recent industry research.

This Arboricultural Impact Statement has been presented in an accepted industry format and should easily be understood by any person with a reasonable understanding of arboriculture. An explanation of the terminology used within the report is provided in Section 8.0. Addition information is provided in the Appendices which are referenced to recent industry research.

2.1 Methodology

- A visual assessment of these trees was undertaken from ground level on the 21 January 2019 in accordance with the Visual Tree Assessment (VTA method of Mattheck and Breloer (1994).
- The assessment took into account the biological state of the tree/s, as indicated by the health of their foliage, their structural form and growing environment.
- Unless otherwise stated, no underground sections were examined and no aerial inspection (climbing) was undertaken.
- Tree heights were obtained with a clinometer and canopy spreads were measured.
- Ecological and amenity values and visual prominence are based on Thyer (1996) Tree Valuation Method – (see Terminology in Section 8.0)
- Retention Values are based upon the Sustainable Retention Index Value (SRIV) – Refer to the SRIV Matrix in Appendices 9.2.
- Safe Life Expectancies are based on Barrell (2006) 'TreeAZ', which provides the basis for deciding which trees are likely to be suitable for retention. 'A' category trees are suitable for retention for more than 10 years. 'Z' category trees are likely to be removed within 10 years – TreeA/Z Categories in Appendices 9.3.
- The relevant information was recorded on a standard tree survey form and is summarised in the Tree Survey Table in Section 10. The terminology used in the survey is defined in Section 8.0
- A Tree Location Plan is included in Section 11, and shows the location of the subject tree/s.

2.2 Background

The author was provided with a copy of the proposed layout plan of the proposed subdivision, and requested to review a previous tree report prepared by About Trees in 2014, assess their current health and condition, and provide an updated copy of the tree report

2.3 Limitation of Liability

Trees are living organisms and do not remain static over time. Conditions are often hidden within trees and below ground. Unless it has been otherwise stated, observations have been made by eye and from ground level. Tree can be managed, but they cannot be controlled, and to live near a tree is to accept some degree of risk. The only way to eliminate all risks is to remove all trees.

Arborists cannot detect every condition that could possibly lead to the failure of a tree. They cannot guarantee that a tree will be healthy or safe under all circumstances, or for a specified period of time. Likewise remedial treatments, like any medicine, cannot be guaranteed.

Site changes, storms and ongoing growth can alter a tree over time; therefore, tree assessments must occur on a regular basis. Unless stated otherwise, this assessment cycle is based on an annual inspection. This is consistent with and the Land & Environment Courts definition of a tree that is 'likely to cause damage or injury in the near future' as 'likely to cause damage or injury within the next 12 months'.

Tree related hazards should be seen in perspective alongside other everyday things which are desirable or necessary, but not hazard free. For example, chimneys, roof tiles and advertising hoardings can, like trees, cause serious harm if they fall. Like trees they can fall as a direct result of sever weather conditions, even if they are in good condition.

It should also be noted that any opinions given by the Arborist in relation to the health, condition, desirability or significance of any tree will not necessarily coincide with the opinions of the relevant Council authority or their Tree Management Officers.

The author shall not be required to provide additional information, give testimony or attend Court by reason of this report unless subsequent contractual arrangements are made, including an additional fee for such services.

2.4 Uniform Civil Procedures Rules (2005)

In order to ensure the reliability of evidence provided by experts, the Courts have provided the Uniform Civil Procedures Rules 2005 (UCPR) and Land & Environment Court Rules 2007 (LECR).

The author of this report has read and understands the Expert Witness Code of Conduct in Schedule 7 to UCPR, and agrees to be bound by it in accordance with UCPR 31.23.

An expert is permitted to provide evidence before a Court in order to assist the Court draw inferences. The primary overriding duty of an expert is to assist the Court impartially on matters relevant to the expert witness's expertise. Any opinions expressed must be based on the persons training, study or expertise.

2.5 Curriculum Vitae of Author

The authors Curriculum Vitae is attached as Appendices 9.1 of this report which provides the qualifications, experience and additional training on which any stated opinions and conclusions are based.

2.6 Copyright

3.0 LEGISTALTION

3.1 Tree Management within Northern Beaches Local Government Area

Trees and vegetation within the Northern Beaches LGA are protected by the Local Environmental Plans.

Exempt Activities

You can remove trees without a permit in the following circumstances if it is:

- Under 5 meters in height
- Exempt Tree Species List
- In an area in which the Council has authorised their removal as part of a hazard reduction program, where that removal is necessary in order to manage risk
- Required to be removed under other legislation (including the NSW Rural Fires Act 1997 and the Environmental Planning and Assessment Act 1979)
- Can be removed under the 10/50 Legislation. Some clearing of vegetation is allowed if your property is mapped in the 10/50 entitlement area.
- Removed by Rural Fire Services because they pose or will pose a significant threat to access along required fire trails or to human life, buildings or other property during a bushfire
- Placed where the base of the trunk of the tree at ground level, is located within two meters of an existing approved building (not including decks, pergolas, sheds, patios or the like, even if they are attached to a building).
- Is considered a high risk/imminent danger certified by a Level 5 qualified arborist. These trees can be removed without Council consent by the owner of the tree subject to the owner obtaining written confirmation from the arborist that clearly states:
    1. The arborist qualifications: AQF Level 5 Arborist or equivalent
    2. That the tree(s) is declared a ‘high risk’ or is an imminent danger to life and property
    3. That immediate removal of the tree(s) is recommended
    4. A copy of the report must be sent to Council for record keeping purpose
- Any tree on the bio security species listing (See Section 3.2)
- Dead - photographic evidence recommended
- Has fallen or partially fallen as a result of a storm and still present a danger (photos required)
- Part of the pruning or removal of hedges (unless hedge is conditioned to be retained in a development consent). “Hedge” means groups of two or more trees that:
    a. are planted (whether in the ground or otherwise) so as to form a hedge, and
    b. rise to a height of at least 2.5 metres (above existing ground level).

Pruning and Clearing

You can prune trees or clear vegetation in the following circumstances:

- Reasonable pruning of up to 10% of a tree's canopy within 12 calendar months. Pruning must be in accordance with Australian Standards AS 4373 – 2007
- The removal of deadwood from a tree
- Removal of any species of parasite mistletoe or parasitic plant from any part of a tree
- It meets the criteria of other legislations eg under 10/50 Legislation some clearing of vegetation is allowed if your property is mapped in the 10/50 entitlement area.

Note: Public and private bushland is protected under Council's Development Control plan and requires consent to remove or clear understorey vegetation.

Permitted With Council Consent

Tree Removal

Council may permit to the removal of trees in the following circumstances:

- A qualified arborist report is delivered with all applications to remove significant trees
- Removing unsuitable or hazardous trees

- Removing trees in conflict with built structures where all engineering alternatives have been considered

Pruning and Crowning
Council may permit to:

- Crown-thinning for views, solar, pedestrian or vehicular access
- Maintenance pruning to remove dead, diseased or dying branches
- Selective pruning to remove branches causing conflict, like building encroachment
- Root pruning to reduce damage to built and natural structures
- Pruning for service lines, vehicle sight line and Roads and Maritime Services requirements.

A Permit is required for the following:

- Any tree or native vegetation which is a threatened species, threatened species habitat or is part of an Endangered Ecological Community as defined under the NSW Threatened Species Conservation Act 1995
- Any tree which is a heritage item or that is within a heritage conservation area as defined by searching the Planning Rules that may apply to the property
- Any tree specifically identified to be retained as a condition of development consent for building or works or subdivisions

Council will Not Permit

Tree Removal
Council will not approve:

- Tree work without signature of owner or their agent on application
- Removing healthy, stable trees or trees for views
- Removing trees for solar access, leaf, fruit or sap drop, bird or bat droppings, or damage to sewer pipes or built structures
- Removing trees for allergies unless they can be medically linked by a specialist doctor
- Removal of trees for fences, footpaths, or driveways
- Removal of trees in bushland or understorey vegetation without a permit
- Removal of trees where they do not meet the criteria of the permit

Pruning, Clearing and Alteration

- Pruning of trees contrary to Australian Standards 4373
- Pruning beyond what a particular species will tolerate, eg figs pruned by more than 10% are predisposed to sunburn
- Requests for topping of trees
- Alteration of soil levels within a tree’s drip line
- Tree work for emotive reasons

3.2 NSW Biosecurity Act

The NSW Noxious Weed Act (2003) has been superseded by NSW Biosecurity ACT 2015. Any species previously identified as noxious, now called priority weed species, can be removed without Council consent. However some height restriction may apply

The following Tree species can be removed without consent unless identified as a Heritage item or within a Heritage area.

SPECIES NAME COMMON NAME

Acacia baileyana (Cootamundra Wattle)
Acer negundo (Box Elder)
Alnus jorullensis (Evergreen Alder)
Brachychiton acerifolius (Illawarra Flame Tree)
Castanospermum australe (Black Bean)
Cinnamomum camphora (Camphor laurel)
Cotoneaster glaucophyllus (Cotoneaster)
Cupressus spp. (Cupressocyparis spp)
Eriobotrya japonica (Carica papaya)
Eucalyptus nicholii (Peppermint Gum)
Fraxinus griffithii (Himalayan Ash)
Grevillea robusta (Silky Oak)
Jacaranda mimosifolia (Jacaranda)
Lagunaria patersonia (Norfolk Island Hibiscus)
Liquidambar styraciflua (Liquidambar)
Olea spp. (Olive)
Pinus spp. (Pine)
Populus spp. (Poplar)
Raphiolepis indica (Indian Hawthorn)
Salix spp. (Willow)
Schefflera actinophylla (Umbrella Tree)
Syagrus romanzoffiana (Cocos Palm)

Acacia saligna (Golden Wreath Wattle)
Alianthus altissima (Tree of Heaven)
Araucaria bidwillii (Bunya Pine)
Cassia spp (Cassia)
Celtis australis (Hackberry)
Citharexylum spinosum (Fiddlewood)
Cupaniopsis laurina (Tuckeroo)
Chamaecyparis spp. (Cypress Pine)
Erythrina spp. (Coral Tree)
Eucalyptus scoparia (Wallangarra White Gum)
Gleditsia triacanthos (Honey Locust)
Harpephyllum caffrum (Kaffir Plum)
Lagerstroemia indica (Crepe Myrtle)
Ligustrum spp. (Large & Small leaf Prive0
Nerium oleander (Oleander)
Paraserianthes lophantha (Crested Wattle)
Pittosporum spp. (up to 8m) (Pittosporum)
Pyracantha angustifolia (Fire Thorn)
Robinia pseudoacacia (False Acacia)
Sapium sebiferum (Chinese Tallow)
Spathodea campanulata (African tulip tree)
Ulmus parvifolia (Chinese Elm)

All *Ficus* spp. (except *F. macrophylla, F. rubiginosa, F. coronata*

All Palms (other than *Livistona australis* (Cabbage Tree Palm)

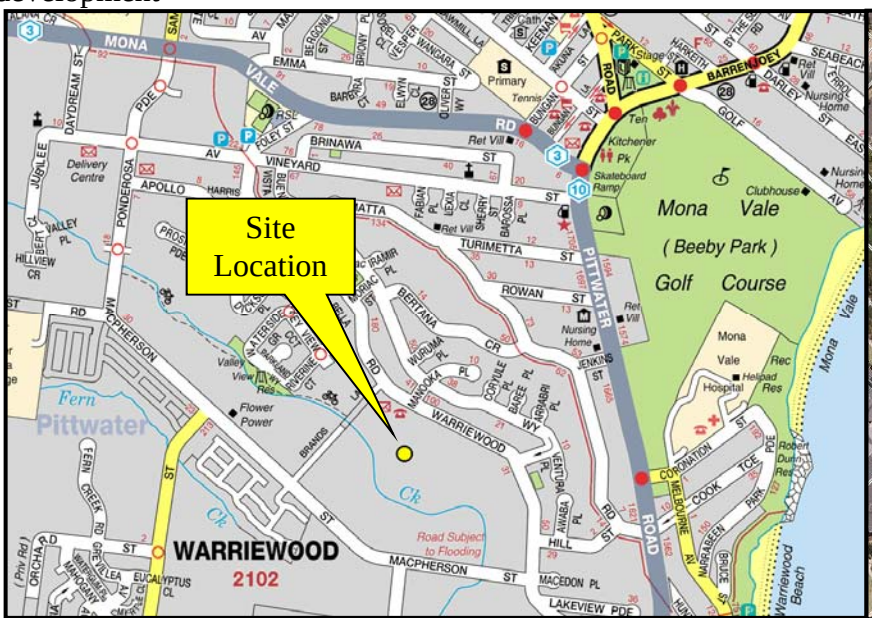
All non-native fruit producing trees

Citrus spp. (Orange, Lemon, Mandarine etc)
Malus, spp. (Apple)
Prunus spp. (Apricot, Almond, Cherry, Plum, Peach)
Fortunella spp. (Kumquat)
Morus spp. (Mulberry)
Persea spp. (Avocado)

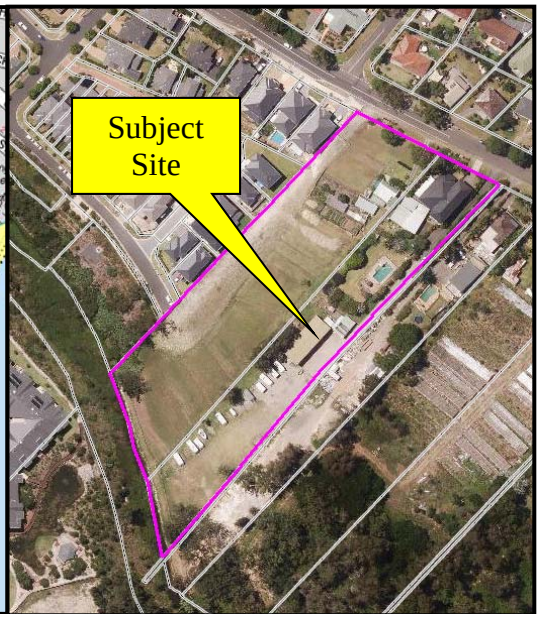
(Loquat, Paw Paw Mango)

4.0 OBSERVATIONS

4.1 The site is known as 53a & 53b Warriewood Road Warriewood and is bordered on the northwest by residential units, on the southwest by Narrabeen Creek, on the east by a large rural residential property and on the northeast by Warriewood Road. The surrounding areas are mainly comprised of urban residential development



Map 1 – showing location of subject site. (UBD 2004)



Map 2 – showing subject site (Dept Lands 2014)

4.2 The soil landscape of the general area has been described by Chapman & Murphy (1989) as 'Erina'. This unit occurs on rolling hills and footslopes of the Erina Hills at Long Reef, Mona Vale, Whale Beach, Daleys Point, and Bensville and at Boudii National Park.

4.3 Current Condition of the Trees

Tree No's 1 – 3 are mature *Howea forsteriana*

a. 'Kentia Palm originates from Lord Howe Island and forms a slender trunk to15m in height with a crown of dark-green drooping fronds to 3m in length'
http://www.burkesbackyard.com.au/1997/archives/27/in_the_garden/trees and palms/kentia
b. These introduced palms are exempt species (see Plate 1)

Tree No's 4 & 5 are mature Domestic Figs

a. These introduced fruit trees are exempt species (see Plate 2)

Tree No. 6 is an unidentified fruit tree

a. This is an introduced fruit tree and is an exempt species under the Northern Councils LEP

Tree No's 7A – 7E are *Hibiscus* sp

a. A large and varied genus comprising evergreen and deciduous trees and shrubs, widely dispersed through the warm climates, but with a few deciduous species from temperate zones (Rowell 1980)
b. Their foliage density, size and colour are normal for the species, indicating average health and vitality (see Plate 3).
c. Their structure is comprised of single and/or codominant stems with a DBH's of 150 - 200mm, and form codominant canopies which are 6m in height, with a crown spread of 5x5m.

Tree No. 8 is a semi-mature *Ficus benjamina*

a. 'Weeping Fig originates from the Malayan Peninsula to northern Australia. It is an evergreen tree to 15m or so tall, with a stout main trunk, usually with buttress roots, and s broad, spreading branch system supporting a dense, rounded crown 12 – 15m across, the outer branchlets attractively pendulous. The common error of underestimating the mature size of Fig-trees should be avoided; most grow very large, with strong invasive roots that frequently cause expensive trouble in underground drains and house foundations' (Rowell 1980)

b. Its foliage density, size and colour are normal for the species, indicating average health and vitality
c. Its structure is comprised of a five codominant stems with a DBH's of 200mm, which combine to form a dominant canopy which is 9.5m in height, with a crown spread of 10x10m (see Plate 3).
d. This is an introduced ornamental fig tree, and is an exempt species

Tree No. 9 was an unidentified palm which has subsequently been removed (see Plate 4)
a. It was an introduced palm and an exempt species

Tree No's 10, 11 &12 – 14, 19 & 20 are mature *Callistemon salignus*
a. Willow Bottlebrush occurs on the NSW coast especially around the Hastings and Camden Haven River valleys, also southern Qld, Vic, Tas. and SA, mainly on alluvial land near permanent water. It forms an erect tree to 8-12m, but occasionally more when forced to compete with taller plants for light, forming an upright, slender dome of dense twigs and branchlets. (Rowel, R.J 1980)
b. Their foliage density, size and colour are normal for the species, indicating average health and vitality.
c. Their structure is comprised of single and/or codominant stems with a DBH's of 150 - 200mm, and form codominant canopies which are 8m in height, with a crown spread of 5x5m (Plates 5, 6 & 8)

Tree No's 15A, 15B & 15C are *Hibiscus* sp
a. A large and varied genus comprising evergreen and deciduous trees and shrubs, widely dispersed through the warm climates, but with a few deciduous species from temperate zones (Rowell 1980)
b. Their foliage density, size and colour are normal for the species, indicating average health and vitality.
c. Their structure is comprised of single and/or codominant stems with a DBH's of 150 - 200mm, and form codominant canopies which are 6m in height, with a crown spread of 5x5m (Plates 6, 8 & 10).

Tree 16A & 16B are semi- mature *Butia capitata*
b. Princess Palm is native to South America, and grows up to height of 6m in a slow but steady manner. It is easily identifiable by the blue-green or grey-green, feather palm pinnate leaves that arch inwards towards a thick stout trunk. Trunks may be covered with retained old, woody frond bases or be relatively smooth with ridged frond scars. http://en.wikipedia.org/wiki/Butia_capitata
c. Their foliage density, size and colour are normal for the species, indicating average health and vitality (see Plates 7 & 9)
d. This is an introduced palm and is an exempt species

Tree No. 17 is a Domestic Figs
a. This introduced fruit tree is an exempt species (see Plate 11)

Tree No. 18 is a semi-mature *Cupressocyparis leylandii*
a. 'Leyland Cypress is a hybrid between *Cupressus macrocarpa* and *Chamaecyparis nootkatensis* having an outstanding growth rate of up to 4m in six years, while the average growth for a thirty year plant is 20m, with a possibility of 30m under ideal conditions. It has inherited the extreme hardiness of its Alaska Cedar parent and is most like that tree in leaf and habit, resembling *Cupressus macrocarpa* only in cone and seed detail. It appears to be free of diseases, will grow in almost any soil type, will tolerate 'wet feet' and has good promise as a timber tree.' (Grace, J. 1983)
b. This introduced conifer is an exempt species (see Plate 11)

Tree No's 19 & 20 are mature *Callistemon salignus*
a. See description of tree No. 10
b. Their foliage density, size and colour are normal for the species, indicating average health and vitality.
c. Their structure is comprised of single and/or codominant stems with a DBH's of 150 - 200mm, and form codominant canopies which are 8m in height, with a crown spread of 5x5m (see Plate 12)

Tree No's 21 – 23 *Philadelphus mexicanus*
'Mexican Mock Orange is an evergreen shrub to about 2 or so, with numerous, slender ascending shoots from the base, arching outwards to form a loose, open crown' (Rowell, R.1980).
a. These are introduced shrubs with low ecological and amenity values (see Plate 12)

Tree No's 26 – 37 are mature *Casuarina glauca*

a. 'Swamp Oak: NSW and Qld, mostly in estuarine swamps and tidal river flats. An evergreen tree to 20m or so tall, with an open, slender form to 6m wide, usually shows the erect trunk for most of the height. The finer branchlets are more or less erect and coarse in texture' (Rowell.1980). Their foliage density, size and colour are normal for the species, indicating average health and vitality
b. Their structure is comprised of a single and/or codominant stems with a DBH's of 250 - 400mm, and they combine to form a codominant canopy which is 24m in height, with a crown spread of 12x30m.

Tree 38 is a mature *Casuarina glauca*

a. See description of tree No. 24
b. Its foliage density, size and colour are normal for the species, indicating average health and vitality
a. Its structure is comprised of a single stem with a DBH of 500mm, and forms a dominant canopy which is 20m in height, with a crown spread of 12x12m.

Tree 39 is a *Eucalyptus robusta*

a. Swamp Mahogany' is common on the coastal plains of NSW and southern Qld. A Mahogany growing to approximately 20-25 m tall, usually having a single trunk to 1m thick and a vase-shaped branch pattern which supports a broad, leafy crown. It is usually found on heavy moist soils adjacent to permanent water near the sea. It is an important species because of its tolerance of moist soils and salt –laden winds near the coast and is a fine decorative tree for shade and screening in parks and other large-scale plantings. (Rowell,1980)
b. Its foliage density is sparse, indicating fair to poor health and vitality (see Plate)
c. Its structure is comprised of a single stem with a DBH of 450mm, and forms a dominant canopy which is 16.5m in height, with a crown spread of 10x14m.
d. A large cambium canker on the main trunk is consistent with symptoms associated with Armillaria Root Decay (See Plate)

Tree 40 is a mature *Eucalyptus robusta*

a. See description of tree No. 27
b. Its foliage density size and colour are normal for the species, indicating average health and vitality
c. Its structure is comprised of a single stem with a DBH of 700mm, and forms a codominant, asymmetrical canopy which is 21m in height, with a crown spread of 10x18m.
d. This tree forms a codominant canopy with tree No's 32 & 33

Tree 41 is a mature *Eucalyptus robusta*

a. See description of tree No. 27
b. Its foliage density, size and colour are normal for the species, indicating average health and vitality
c. Its structure is comprised of a single stem with a DBH of 450mm, and forms a codominant canopy which is 22m in height, with a crown spread of 10x22m.
d. This tree forms a codominant canopy with tree No's 31 & 33

Tree 43 is a mature *Erythrina x sykesii*

a. 'Coral-tree; a large deciduous tree, 12 – 18m tall and 10 – 15m wide, with a short main trunk, sometimes massive in old age, and an irregular crown of large branches and foliage providing a dappled, not over dense shade.' (Rowell, R. 1980)
b. Its foliage density, size and colour are normal for the species, indicating average health and vitality
c. Its structure is comprised of two codominant stems with a DBH's of 250 and 500mm, and forms a suppressed canopy which is 10m in height, with a crown spread of 6x6m.
d. This tree originated as an opportunistic seedling and is growing against the trunk of Tree No. 27 and its canopy is heavily suppressed by the more dominant.

Tree 44 is a mature *Eucalyptus robusta*

a. See description of tree No. 27
b. Its foliage density, size and colour are normal for the species, indicating average health and vitality
c. Its structure is comprised of a single stem with a DBH of 500mm, and forms a codominant, asymmetrical canopy which is 23m in height, with a crown spread of 7x17m.
d. This tree forms a codominant canopy with tree No's 31 & 32

Plate 1 – showing tree No's 1 – 3

Plate 2 – showing tree No's 4 and 5

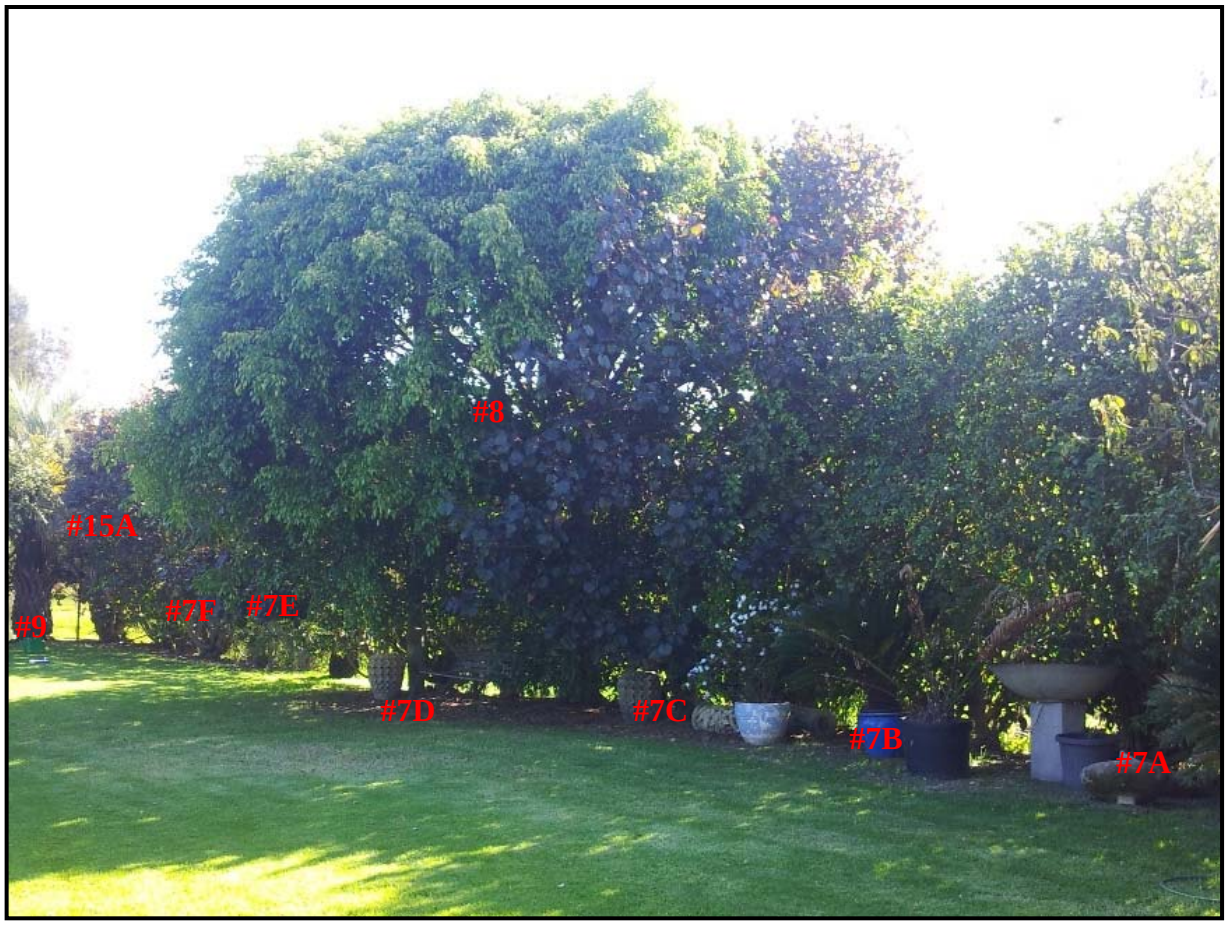


Plate 3 – showing tree No's 7, 7A, 7B. 7C, 7D, & 15

Plate 4 – showing tree No. 9 (Palm)

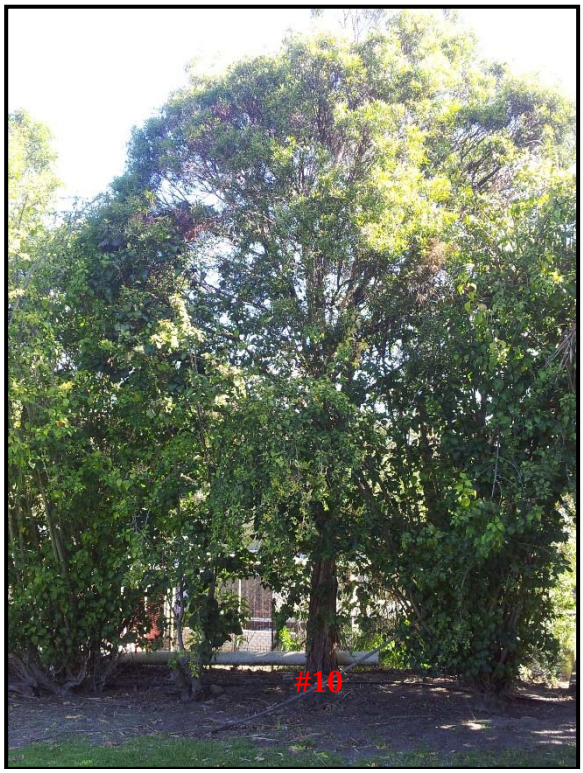


Plate 5 – showing tree No. 10 (Paperbark)

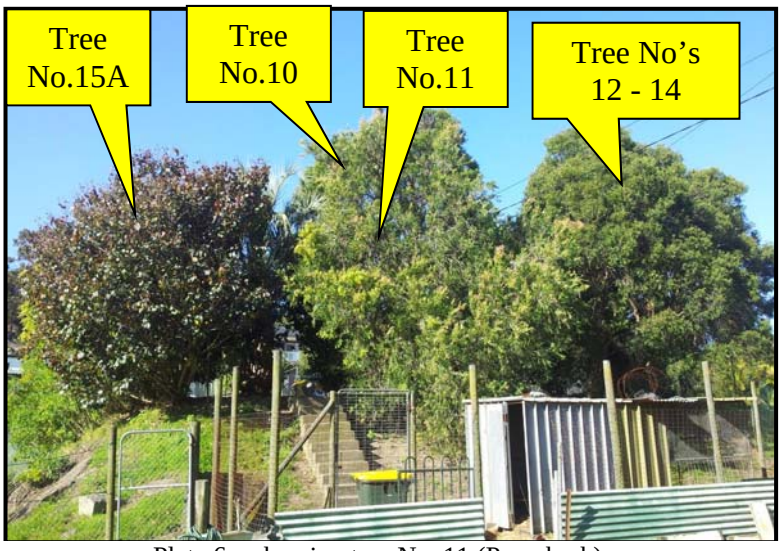


Plate 6 – showing tree No. 11 (Paperbark)

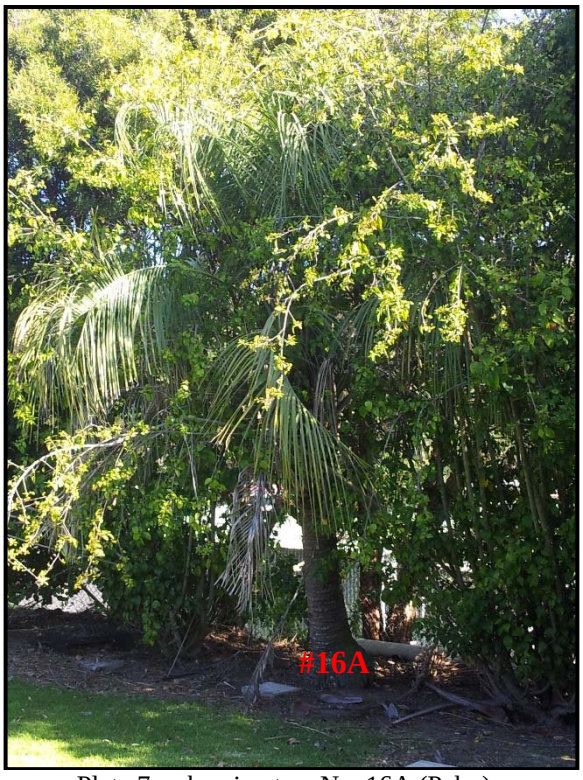


Plate 7 – showing tree No. 16A (Palm)

Plate 8 – showing tree No. 13 – 16.

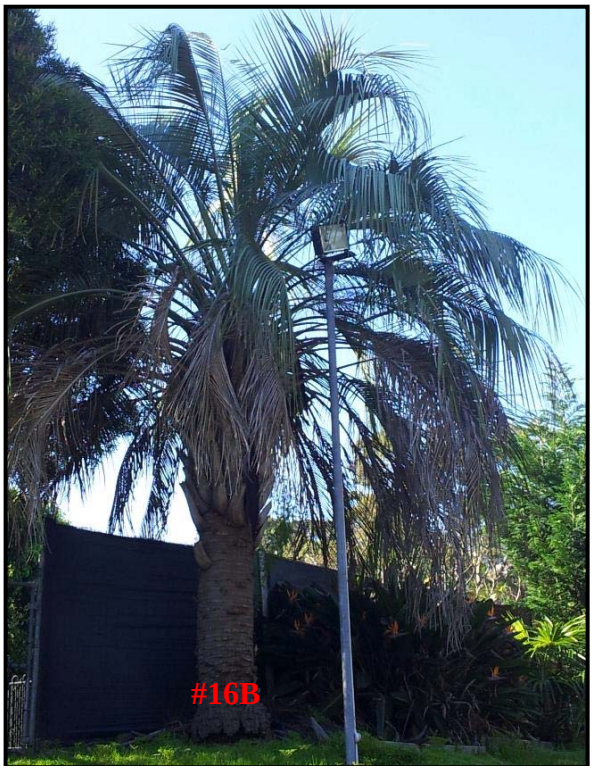


Plate 9 – showing tree No. 16B (Palm)

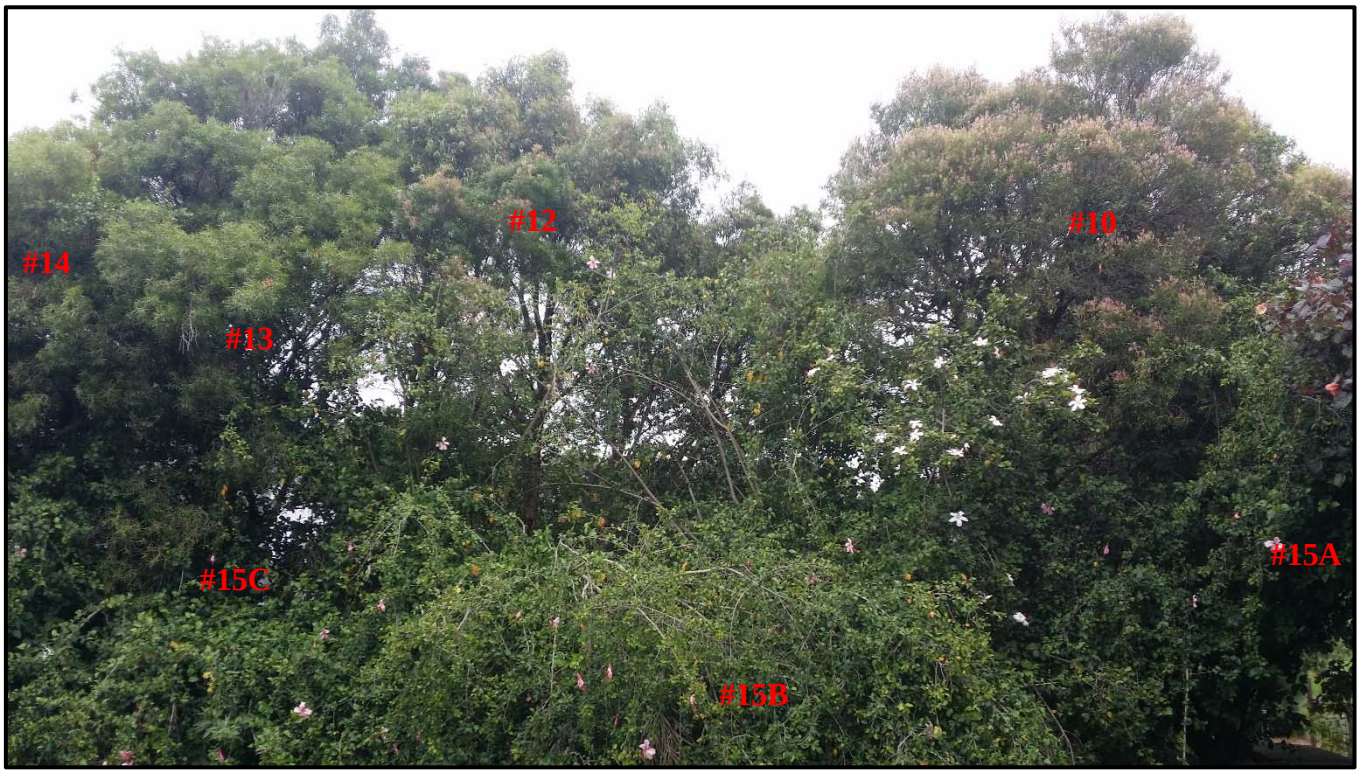


Plate 10 – showing tree No. 10, 12 – 14, 15A, 15B & 15C

Plate 11 – showing tree No. 16B, 17 & 18

Plate 12 – showing tree No. 19 & 20 & 21 – 23

Plates 13 & 14 – showing tree No's 11 - 28

Plate 15 – showing tree No. 29

Plate 16 – showing tree No. 30

Plate 17 – decline & dieback in canopy of tree No. 39

Plate 18 – showing large wound on tree No. 39

Plate 19 – showing tree No's 32 - 35

4.5 Retention Vales of the Subject Tree/s

Sustainable Retention Index Value (SRIV©) considers its age class, condition class, vigour class and its sustainable retention with regard to the safety of people or damage to property. The ability to retain the tree with remedial work or beneficial modifications to its growing environment or removal and replacement is also considered (See Matrix in Appendices 9.2).

Unfortunately, like all methodologies used to assess trees, not all trees fit neatly into a category. For example, SRIV doesn't give consider the negative attributes that an individual tree may have, or of its suitability for the location.

- Tree No's 10 – 14 have a retention values of MGVF (9) 'Mature tree is good health and fair condition with a Retention Index Value of 9 – Able to be retained if sufficient space available above and below ground for future growth.

- Tree No's 26 – 38 have retention values of MGVF (9) 'Mature tree is good vigour and fair condition with a Retention Index Value of 9 – Able to be retained in the medium term, if sufficient space available above and below ground for future growth.

- Tree No's 39 has retention value of OLVF (2) 'Mature tree is fair vigour and condition with a Retention Index Value of 2 – Able to be retained in the short term, if sufficient space available above and below ground for future growth.

- Tree No's 40 – 41 & 43 have retention values of MFVF (9) 'Mature tree is fair vigour and fair condition with a Retention Index Value of 9 – Able to be retained in the medium term, if sufficient space available above and below ground for future growth.

4.6 Safe Life Expectancy of the Subject Tree/s (TreeA/Z)

'TreeAZ' is a systematic method of assessing whether individual trees are important, and how much consideration should be given to them in management decisions. It views each tree as being worthy of 'consideration' in the planning process, not automatically as a 'constraint' on development. Each tree is considered against a standard list of thirteen (13) negative attributes. If a tree fails any of these tests, it is categorised as 'Z' and further analysis stops. If it passes all attributes, it is categorised as 'A', and is then viewed as a constraint on the development.

Tree No's 1, 3 & 16B (Introduced Palms) and are exempt species under Northern Beaches LEP (NB LEP)

Tree No's 4, 5, 6 & 17 (are introduced fruit trees) and are exempt species under NB LEP

Tree No. 7A – 7E (*Hibiscus* sp) are less than 5m in height. They are categorised as **Z2**, and are exempt species under NB LEP

Tree No. 8 (Introduced Fig Tree) is an exempt species under NB LEP

Tree No. 9 & 16A (Introduced Palms) were exempt species under NB LEP and have been removed

Tree No's 10 – 14, 21 & 22 (Bottlebrush) are small trees and are categorised as and are categorised as **A1**

Tree No's 15, 15A, 15B, 15C & 20 (*Hibiscus* sp) are less than 5m in height. They are categorised as **Z2**, and are exempt species under NB LEP

Tree No. 19 (*Photinia* sp.) is less than 5m in height. It is categorised as **Z2**, and is an exempt species under NB LEP

Tree No. 18 (Introduced conifer) is an exempt species under NB LEP

Tree No's 23 – 25 (Mock Orange) are less than 5m in height. They are categorised as **Z2**, and are exempt species under NB LEP

Tree No's 26 – 38 (*Casuarina glauca*) are local indigenous trees and are categorised as **A4**

Tree No's 39 – (*Eucalyptus robusta*) is categorised as **Z8** – poor condition with no realistic potential to improve

Tree No's 41 & 43 (*Eucalyptus robusta*) are local indigenous trees and are categorised as **A4**

Tree No. 44 (Coral Tree) is an exempt species and categorised as **Z1**. It is listed as a biosecurity risk and is exempt species under NB LEP

5.0 DISCUSSION

5.1 Arboricultural Impacts of the Proposed Development

- The thirty (30) ornamental species that have been planted as screening around the existing swimming pool area have been scheduled to be removed in order to create Lots 5 - 9 of the proposed 17 lot subdivision. Twenty-five (25) of these are listed as except species under the Northern Beaches LEP, and the remaining five (5) are *Callistemon salignus*. They are of small stature and not prominent in the landscape.

- Tree No. 25 – 37, are *Casuarina glauca* and been planted as a screen/shading on the western side of a large rural shed. They trees are in average health and condition, and appear to have safe life expectancies of at least 10 years. These trees have been scheduled to be removed as they are located in an area that is proposed to be filled.

- Tree No. 38 is an isolated *Casuarina glauca*, and is located about 20m south of the codominant stand of No's 25 – 37. This tree is located within the footprint of proposed Lorikeet Grove and has been scheduled to be removed

- Tree No's 40 – 41 and 43 are mature *Eucalyptus robusta* (Swamp Mahogany) are located near the boundary of the two properties. They are located within the Riparian Zone and have adequate setbacks from proposed earthworks and construction activities. As such, no specific tree protection methods are considered necessary.

6.0 CONCLUSIONS & RECOMENDATIONS

6.1 Conclusions

- Tree No's 1 – 25 have been scheduled to be removed in order to create Lots 5 - 9 of the proposed 17 lot subdivision

- Tree No's 26 to 37 is a planted screen of *Casuarina glauca* which has been scheduled to be removed in order to create Lots 12 & 14.

- Tree No. 38 is an isolated *Casuarina glauca*, and is located about 20m south of the codominant stand of No's 25 – 37. This tree is located within the footprint of Lorikeet Grove and has been scheduled to be removed

- Tree No. 39 is not considered suitable for retention within a development as it has a high potential of causing injury to persons and/or damage to property. It is unlikely that treatment and/or tree surgery techniques will significantly increase its safe life expectancy.

- Tree No. 41, 42 & 44 have been scheduled to be retained. They have adequate setbacks from the proposed earthworks and construction activities, and no specific tree protection methods are considered necessary.

6.2 RECOMMENDATIONS

- Tree No. 39 is in declining health and condition and is retainable in the short term. It is unlikely that treatment and/or tree surgery techniques will significantly increase its safe life expectancy.

- Tree No. 43 (Coral Tree) should be removed to prevent further conflict with No. 34, and minimise any adverse impacts on its safe life expectancy.

- Any works within close proximity to the trees being retained should comply with the Tree Protection Plan in Appendices 9.5

If you require any further information, please feel free to contact me on 0439 758 658.

Lawrie Smith,
Arboricultural Consultant

7.0 REFERENCES

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8.0 TERMINOLOGY

AGE CLASS (Modified from the British Standard 5837 - 1991)

Immature:	Young trees.	Less than 1/3 of life expectancy
Semi-mature:	Middle age trees.	Between 1/3 to 2/3 of life expectancy
Mature:	Mature trees.	Older than 2/3 of life expectancy
Over-mature:	Senescent trees.	Declining irreversibly to death

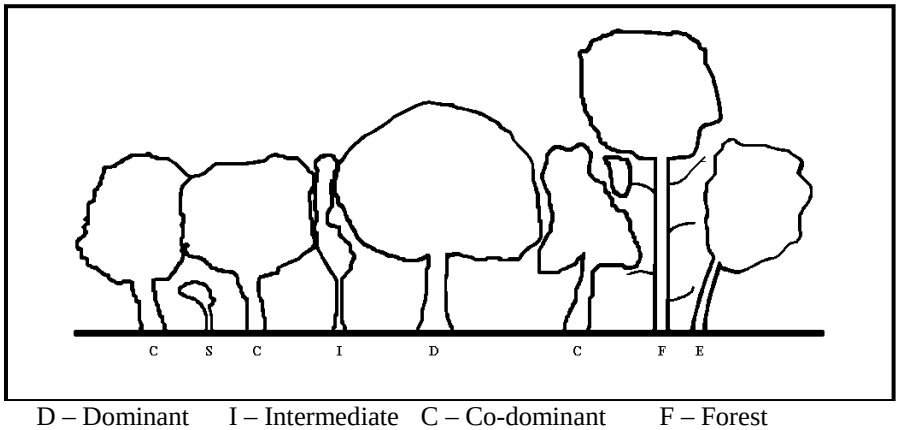
AMENITY VALUE

These categories are based upon the criteria used in the Thyer Tree Valuation Method (1996) to evaluate a tree's visual appeal.

0:	None	Ugly and not interesting
1:	Low	Ordinary or plain
2:	Medium	Attractive or interesting for part of the year.
3:	High	Attractive or interesting in all seasons.
4:	Very High	Superb, appealing specimen.

CANOPY TYPES (Modified from Matheny, N. & Clarke, J. 1998)

Co-dominant:	Trees that define the general upper edge of the canopy, receiving light primarily from above.
Dominant:	Trees with crowns above the upper layer of the canopy and generally receiving light from above and the sides.
Edge:	Trees located on the edge of a more dominant canopy, and frequently possessing asymmetrical crowns, (heavier on the open side) and trunks that bow out of the stand
Forest:	Trees that have grown in a forest setting and only have about 1/3 of their canopy located on tall straight trunks
Intermediate:	Trees that have been largely overtopped, but may receive some light from above.
Suppressed:	Trees that have been overtopped, and become part of the understorey canopy
Understorey:	Small trees and shrubs that form the understorey canopy.



D – Dominant I – Intermediate C – Co-dominant F – Forest
S – Suppressed E – Edge U – Forms part of the understorey canopy

CROWN FORM

This relates to the overall balance of the crown

1:	Symmetrical	Crown generally centered evenly above trunk
2:	Minor Asymmetrical	Crown located slightly to one side above the trunk
3:	Asymmetrical	Crown located unevenly to one side above the trunk
4:	Major Asymmetrical	Crown located significantly to one side above the trunk

ECOLOGICAL VALUE

These categories are based upon the criteria used in the Thyer Tree Valuation Method (1996) to evaluate a tree's ecological benefit.

0:	None	Weed species
1:	Low	Restricts desirable plants or of little benefit to fauna.
2:	Medium	Beneficial to flora & fauna, provides food source and/or shelter.
3:	High	Remnant species of native vegetation.
4:	Very High	Indigenous species being an integral part of a natural ecosystem.

HEALTH

This evaluates a tree's vitality; as indicated by its crown density, leaf size & colour and its ability to withstand pests and diseases.

Good	Tree is generally healthy and growing vigorously and is expected to continue to remain so provided conditions around the tree required for its survival do not change.
Average	Tree is typical of the species, considering its age, without noticeable decline.
Fair	Tree is generally vigorous but shows some indications of decline due to pests and diseases or changes to its growing environment
Poor	Tree exhibits symptoms of advanced and irreversible decline due to fungal decay major dieback of branch and crown canopy, predation of pests, storm or lightning damage, root damage or instability of the tree and alterations to its growing environment.

PROMINENCE

These categories are based upon the criteria used in the Thyer Tree Valuation Method (1996) to evaluate a tree's visibility in the local area.

0:	None	Seldom seen
1:	Low	Seen frequently by private owners or adjacent residents
2:	Medium	Seen by neighbourhood residents and passers by
3:	High.	Known locally or seen by many passers by
4:	Very High	Of local historical importance, or known widely

STRUCTURAL CONDITION

This refers to the tree's form and growth habit modified by its environment, the state of the trunk and main structural branches. It includes the presence of defects as decay, weak branch junctions and other visible abnormalities. Although some trees without defects fail in major storms, the presence of any defect will increase the chances of failure.

Good;	Trees with a single dominant trunk along which evenly spaced branches are spread. Branches have properly formed collars which provide strong attachment to the trunk, and are about 25% of the trunk diameter. Minor structural defects may be present with low failure potentials.
Average;	Trees with structural defects with low failure potential
Fair;	Trees with structural defects with medium failure potentials and require monitoring on an annual basis.
Poor;	Trees with defects which have failed, or have a high risk of failing soon, and corrective action must be taken as soon as possible.

SULE CATEGORIES (Safe useful life expectancy)

'TreeAZ' is a systematic method of assessing whether individual trees are important, and how much consideration should be given to them in management decisions. Each tree is considered against a standard list of tree removal tests. If a tree fails any of these tests, it is categorised as 'Z' and further analysis stops. If it passes all the tests, it is categorised as 'A'.

'Z' Tree are not suitable for retention for more than 10 years and not considered important or worthy of consideration in management decisions.

Exempt Species: Trees that could be removed under TPO policies

Z1	Exempt species (invasive or noxious species)

Small Trees: Plants that could realistically be easily replaced in the short term

Z2	Less than 5m tall
Z3	Formal hedges or trees regularly pruned to restrict size

High Risk: Trees that would be removed within 10 years because of declining health or poor structural damage

Z4	Dead, dying, diseased or declining
Z5	Severe damage or structural defects that cannot be properly addressed by remedial care including cavities, decay, weak junctions, wounds and excessively unbalanced
Z6	Present or future instability because of poor anchorage or increased exposure

Good Management: Trees that would be probably pruned or removed within 10 years through responsible management

Z7	Severe damage or structural defects that can be temporarily addressed by remedial care including cavities, decay, weak junctions, wounds and excessively unbalanced
Z8	Poor trees with no potential to improve
Z9	Adversely interfering with adjacent trees
Z10	Overgrown hedge or row of trees vulnerable to adverse weather events
Z11	Causing unreasonable inconvenience to existing properties (light, dominance, debris, interference, etc)
Z12	Causing or likely to cause damage to existing structures
Z13	Unacceptably expensive to retain

'A' Trees are suitable for retention for more than 10 years and considered important and worthy of consideration in management decisions.

A1	No significant defects and could be retained with minimal remedial care
A2	Minor defects that could be addressed by limited remedial care or work to adjacent trees
A3	Special significance for historical, commemorative or rarity reasons that would warrant extraordinary efforts to retain for more than 10 years
A4	Trees that may have legal protection for ecological reasons

TRUNK LEAN

1:	Slight lean	0 - 15º from vertical
2:	Moderate lean	15 - 30º from vertical
3:	Sever lean	30 - 45º from vertical
4:	Sever lean	> 45º from vertical

9.0 APPENDICES

9.1 QUALIFICATIONS & EXPERIENCE OF AUTHOR

QUALIFICATIONS

- Graduate Certificate in Bushfire Design, University of Western Sydney (2012 – Completed)
- Diploma in Conservation & Land Management (AQF 5), Hortus Australia (2005)
- Advanced Diploma of Horticulture (Arboriculture – AQF 6), Hortus Australia (2002).
- Small Business Enterprise Certificate, Blue Mountains TAFE (1996).
- Certificate in Tree Care, Lynnfield West (1995).
- Tree Surgery Certificate, Ryde School of Horticulture (1990).
- Certificate in Horticulture, Wollongong TAFE (1987).

WORK HISTORY

- 1998 – *Present Self-employed as an Arboricultural Consultant.*
- *2000 – 2002. Tree Management Officer, Blue Mountains City Council.*
- *1984 – 1998. Self employed as a Practicing Arborist.*
- *1977 – 1978. Tree pruning and removal, SEC Victoria.*
- *1975 – 1976. Tree maintenance, Queensland Forestry Commission.*

FURTHER TRAINING

- Attendance of the following seminars or conferences;
    1. ISA Tree Risk Assessment Qualification (TRAQ) Melbourne (2013)
    2. EIANZ Environmental Expert Professional Development Course (Sydney 2013)
    3. HEDRA Workshop (Sydney 2012)
    4. ISA National Conference Newcastle (2009)
    5. Tree Roots in the Built Environment, J. Urban (2008)
    6. *Phytophthora cinnamomi* – Workshop (2008)
    7. Trees on Construction Sites Workshop by J. Barrell (2006)
    8. ISA National Conference, Parramatta (2004)
    9. 5 Day Scientific Workshop on Tree Pathology and Wood Decay by F. Schwarze (2004)
    10. Safe Trees Seminar by Ed Hayes (2002)
    11. ISA National Conference, Melbourne (2002)
    12. Advanced Lecture on Visual Tree Assessment by Dr Claus Mattheck (2001)
    13. Trees for Urban Landscapes (2000)
    14. Assessing Hazardous Trees & their Safe Useful Life Expectancy (1997)

PROFESSIONAL ASSOCIATIONS

- International Society of Arboriculture (#152238)
- Fire Protection Association Australia (#26890)

9.2 SUSTAINABLE RETENTION INDEX VALUE (SRIV) ©

SRIV © provides a dual method of objectively rating the viability of urban trees for development sites based on general tree and landscape assessment criteria, and a numeric index for each tree as a tree management tool.

SRIV © is designed as an objective system based on set criteria to replace previous subjective systems.

SRIV © is based on the principle of sustaining trees in the urban environment including remnant forest trees, but does not cover social aspects of trees, or hedges. Dead trees and environmental or noxious weed species are not considered as removal of these trees is generally encouraged.

SRIV© benefits the arboriculturist by defining each variable providing certainty and clarity to their meaning and by issuing a definite index value to each category. This enables the professional manager of urban trees with an assumed knowledge of the taxa and its growing environment to consider the tree in situ and is based on the physical attributes of the tree and its response to its environment.

SRIV© considers its age class, condition class, vigor class and its sustainable retention with regard to the safety of people or damage to property. The ability to retain the tree with remedial work or beneficial modifications to its growing environment or removal and replacement is also considered.

To promote tree retention, remediation works to improve the growing environment should always be attempted where ever possible. Successive assessments may document improvements in a tree where it responded favorably to remediation, or where conditions in its growing environment improved naturally, or conversely a decline, or a static rating if the tree deteriorated, or no change was observed, respectively.

SRIV© is designed to achieve a quick and readily understood value for a tree but does not replace the need for a comprehensive assessment of a tree and as a tool is intended to be used in conjunction with or complementary to a detailed tree assessment. As a management tool the ongoing SRIV© assessment of a tree may indicate its response to remedial works or other modifications to its growing environment over time.

SRIV© is a realistic approach to managing trees but recognises from the outset that as tree taxa are a vast and varied array of organisms, not all will fit easily into the system e.g. tree species with a lifespan shorter than twenty years, most Acacia species. Field trials have revealed that it is suitable for the majority of trees.

An example of a SRIV© for a Mature tree with Good Vigour and Poor Condition is an assessment value of MGVP - 6, with 6 as the index value (see Matrix provided in Section 11.1.

The matrix provides indices as a tree management decision making tool and the Age / Vigor / Condition classes as a tree assessment system.

The Glossary details the definitions for terms to be used with the SRIV© system are provided in Section 8.1.2, and are taken from the Institute of Australian Consulting Arboriculturists (IACA) © Dictionary for Managing Trees in Urban Environments[1].

9.2.1 SRIV Matrix

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.	Able to be retained if sufficient space available above and below ground for future growth.	Able to be retained if sufficient space available above and below ground for future growth.	May be able to be retained if sufficient space available above and below ground for future growth.	May be able to be retained if sufficient space available above and below ground for future growth.	Unlikely to be 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.	Remedial work may be required or improvement to growing environment may assist.	Remedial work unlikely to assist condition, improvement to growing environment may assist.	No remedial work required, but improvement to growing environment may assist vigour.	Remedial work or improvement to growing environment may assist condition and vigour.	Remedial work or improvement to growing environment unlikely to assist condition or vigour.
Medium to Long Term Retention	**Medium Term Retention** Potential for longer with remediation or favourable environmental conditions.	**Short Term Retention** Potential for longer with remediation work, or favourable environmental conditions.	**Short Term Retention** Potential for longer with remediation work, or favourable environmental conditions.	**Short Term Retention** Potential for longer with remediation work, or favourable environmental conditions.	**Short Term Retention** Potential for longer with remediation work, or favourable environmental conditions.

YGVG - 9	YGVF - 8	YGVP - 5	YLVG - 4	YLVF - 3	YLVP - 1
	Index Value 8	Index Value 5	Index Value 4	Index Value 3	Index Value 1
Long Term Retention Potential	Short - Medium Term Retention Potential	Short Term Retention Potential	Short Term Retention Potential	Short Term Retention Potential	Likely to be removed immediately or retained for Short Term.
Likely to provide minimal contribution to local amenity if height <5m.	Potential for longer with improved growing conditions. Likely to provide minimal contribution to local amenity if height <5m.	Potential for longer with improved growing conditions. Likely to provide minimal contribution to local amenity if height <5m.	Potential for longer with improved growing conditions. Likely to provide minimal contribution to local amenity if height <5m.	Potential for longer with improved growing conditions. Likely to provide minimal contribution to local amenity if height <5m.	Likely to provide minimal contribution to local amenity if height <5m.
Retain, move or replace.	Medium-high potential for future growth and adaptability. Retain, move or replace.	Low-medium potential for future growth and adaptability. Retain, move or replace.	Medium potential for future growth and adaptability. Retain, move or replace.	Low-medium potential for future growth and adaptability. Retain, move or replace.	Low potential for future growth and adaptability. Retain, move or replace.

MGVG - 10	MGVF - 9	MGVP - 6	MLVG - 5	MLVF - 4	MLVP - 2
Index Value 10	Index Value 9	Index Value 6	Index Value 5	Index Value 4	Index Value 2
	Medium Term.	Short Term.	Short Term.	Short Term.	Zero to Short
Medium - Long Term.	Potential for longer with improved growing conditions.	Potential for longer with improved growing conditions.	Potential for longer with improved growing conditions.	Potential for longer with improved growing conditions.	Likely to be removed immediately or retained for Short term

OGVF - 6	OGVF - 5	OGVP - 4	OLVG - 3	OLVF - 2	OLVP
Index Value 6	Index Value 5	Index Value 4	Index Value 3	Index Value 2	Index Value 0
Retention potential Medium - Long Term.	Retention potential Medium Term	Retention potential Short Term	Retention potential Short Term Potential for longer with improved growing conditions.	Retention potential Short Term	Retention potential Likely to be removed immediately or retained for Short Term.

9.2.2 SRIV GLOSSARY

AGE– 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 and can be categorized as Young, Mature and Over-mature.

- **Young** Tree aged less 20% of life expectancy, in situ
- **Mature** Tree aged 20-80% of life expectancy, in situ.
- **Over-mature** Tree aged greater than >80% of life expectancy, in situ, or senescent with or without reduced vigour, and declining gradually or rapidly but irreversibly to death.

PERIODS OF TIME – The life span of a tree in the urban environment may often be reduced by the influences of encroachment and the dynamics of the environment and can be categorized as Immediate, Short Term, Medium Term and Long Term.

- **Short Term** Period of time less than 15 years.
- **Medium Term** Period of time 15 - 40 years.
- **Long Term** Period of time greater than >40 years.

DEAD TREE – 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 roots 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);
- Shedding of the epidermis (bark desiccates and peels off to the beginning of the sapwood).

VIGOUR – The 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.

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

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

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

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

9.3 SULE CATEGORIES (Safe useful life expectancy)

TreeAZ' is a systematic method of assessing whether individual trees are important, and how much consideration should be given to them in management decisions. Each tree is considered against a standard list of tree removal tests. If a tree fails any of these tests, it is categorised as 'Z' and further analysis stops. If it passes all the tests, it is categorised as 'A'.

'Z' Tree are not suitable for retention for more than 10 years and not considered important or worthy of consideration in management decisions.

Exempt Species: Trees that could be removed under TPO policies

Z1 Exempt species (invasive or noxious species)

Small Trees: Plants that could realistically be easily replaced in the short term

Z2 Less than 5m tall

Z3 Formal hedges or trees regularly pruned to restrict size

High Risk: Trees that would be removed within 10 years because of declining health or poor structural damage

Z4 Dead, dying, diseased or declining

Z5 **Severe damage or structural defects that cannot be properly addressed by remedial care including cavities, decay, weak junctions, wounds and excessively unbalanced** - *Severe means that there is no realistic chance of the tree achieving its full potential with an acceptable level of risk. In many cases, acceptable levels of risk can be achieved by dramatic reduction in tree size, but this has severe health, maintenance cost and amenity implications, so it would not be considered to be a sustainable management option*

Z6 **Present or future instability because of poor anchorage or increased exposure** – *Alterations to tree exposure to the wind occurs because of changes in the shelter provided by adjacent objects such as buildings or other trees. This primarily applies to maturing and mature trees that have greater sail areas to catch the wind and established root systems that are less able to adapt to changes than younger trees. This often applies to groups of trees where one large dominant tree will be lost because of poor health or a structural problem, dramatically exposing the remaining trees in the group'* (Barrell (2006).

Good Management: Trees that would be probably pruned or removed within 10 years through responsible management

Z7 **Severe damage or structural defects that can be temporarily addressed by remedial care including cavities, decay, weak junctions, wounds and excessively unbalanced**

Z8 **Poor trees with no potential to improve** – It is common to find trees that are obviously unsuitable for long term retention for many reasons, including poor health, sever imbalance, tall, thin forms, or they have no realistic potential to improve. However, the problems are not so severe that they represent an immediate risk, but their removals should not be discounted for this reason.

This subcategory is for these trees and relies on the principle of sustained amenity to justify the allocation. The short term retention of a tree that is obviously not going to improve and will pose an ongoing risk is not good tree management and is just delaying its inevitable removal.

Z9 Adversely interfering with adjacent trees

Z10 Overgrown hedge or row of trees vulnerable to adverse weather events

Z11 Causing unreasonable inconvenience to existing properties (light, dominance, debris, interference)
Explanation: *In its broadest sense inconvenience is the interference with the authorised use of land. In relation to trees, it can be in the form of root disrupting landscaping and hard surfaces, parts of trees physically preventing land use, tree debris such as leaves and fruit falling and tree crowns causing excessive shade. The principles for establishing what are acceptable levels of inconvenience are the same, irrespective of the cause.*

In a community context, it is reasonable for individuals to tolerate some level of inconvenience from their presence. However, the precise location or value of these thresholds is not always obvious and is often a subjective interpretation rather than a definitive point. There will always have to be a balancing of the benefit to the community weighed against the inconvenience suffered by the individual. What is an acceptable, tolerable or reasonable level of inconvenience is often a matter of judgement for each specific situation, tempered by experience and common sense. This in turn should be guided by court, tribunal and planning decisions that have been made informed judgements on these issues.

Lack of sunlight is a common example, especially in regard to solar panels. People generally expect to be able to use a patio for sitting in the sun and if trees shade is to the extent that irt cannot be used as intended, then that is excessive interference. However, if the garden is large and there are other places to do the same thing, then the case for tree removal might be weakened

On an international level, very large trees near existing occupies buildings can dominate to the extent that the dis-benefit from the anxiety of the occupants outweigh the benefit of the tree. Similarly, regular and sever staining caused by fallen debris to a swimming pool surround may be unacceptable because the stark contrast in colours creates a dirty impression whereas the same staining on a path or driveway surface may be more acceptable. In contrast, falling leaves blocking gutters causing them to be cleaned one a year is not that much of a local inconvenience in the extent of the wider benefits that the trees impart.

Assessing inconvenience is almost entirely a subjective judgement, based on experience and understanding of what is perceived as being reasonable and unreasonable for a normal person. As with all these judgements, a simple test is to imagine a TPO appeal situation where an inspector has to decide if the levels of inconvenience are intolerable. If they are, then the tree is a Z11; if they are not that bad, then the tree belongs in another subcategory (Barrel 2006).

Legal Torte of Nuisance and Negligence
The law of nuisance may be concisely stated. Nuisance is the unreasonable interference with the use and enjoyment of a person's land: Hargrave v Goldman [1963] HCA 56; (1963) 110 CLR 40 at 62 per Windeyer J; Gales Holdings Pty Ltd v Tweed Shire Council [2011] NSWSC 1128 at [295] per Bergin CJ in Eq.

Whether there has been "unreasonable interference" is an objective test - whether a person of ordinary habits and sensibilities in the plaintiff's position and circumstance would regard the interference with the enjoyment of the land as unreasonable; some "reasonable give and take" is involved; and another way of stating the test is whether there has been "an inconvenience materially interfering with the ordinary comfort physically of human existence, not merely according to elegant or dainty modes and habits of living, but according to plain and sober and simple notions" of the community: Jordan CJ in Don Brass Foundry Pty Ltd v Stead (1948) 48 SR (NSW) 482 at 486 and 487.

In determining whether there has been unreasonable interference, a court will take into account the locality in which the interference occurs: Sturges v Bridgman (1879) 11 Ch D 852 (CA) at 865 per Thesiger LJ; the duration, time of day, frequency and extent of the interference: Halsey v Esso Petroleum Co Ltd [1961] 1 WLR 683; and, any malice on the part of the person causing the interference: Christie v Davey [1893] 1 Ch 316.

"In nuisance, liability is founded upon a state of affairs, created, adopted or continued by one person (otherwise than in the reasonable and convenient use by him of his own land) which, to a substantial degree, harms another person (an owner or occupier of land) in his enjoyment of his land. In negligence, liability is

founded upon the negligent conduct of one person causing, to any degree, foreseeable harm to the person or property of another person (not necessarily an owner or occupier of land) to whom a duty of care was owed".

The common law readily imposes a duty of care on owners or occupiers of neighbouring properties in relation to one another: Robson v Leischke [2008] NSWLEC 152; (2008) 72 NSWLR 98 at 120 (at [96]). An owner or occupier of may be held liable in negligence for damage to a neighbour's property caused by the action of tree roots

As in an ordinary action in negligence, in this area a plaintiff must prove that the defendant owed the plaintiff a duty of care to adhere to a certain standard of conduct, a breach of that duty, loss caused by the breach of duty and that their loss suffered was not too remote but was reasonably foreseeable as a result of the defendant's act or omission: Robson v Leischke at 120 ([93]). (Dimitrios Michos & Another v Council of the City of Botany Bay [2012] NSWSC 625 (8 June 2012)

Z12 **Causing or likely to cause damage to existing structures**
Explanation: Damage as opposed to inconvenience – *Where more serious damage occurs to property from root action, then court judgements on liability help to focus on what level of damage is deemed acceptable by society.*

The most common example is direct damage from roots, trunks, and branches to structures and surfacing. Repairs to walls may vary require such extensive excavations and cutting of roots that the tree cannot be retained. However, the use of innovative techniques may reduce root damage but still provide a viable boundary, allowing the tree to be retained.

As a general rule, there would need to be good evidence of or potential for ongoing damage with little scope for remedial works before a tree could reliably allocated to this category (Barrel 2006)

Council tree inspectors are not legal experts, but are often required to follow council policies that tend to put more emphasis on protect trees more than their rate payers and residents when assessing trees under their Tree Preservation Orders. For example, many Councils in the Sydney area do not consider root damage to privately owned fences and paved surfaces as being a valid reason to remove a tree.

A recent court decision in NSW indicates that this is not always consistent with the legal torte of nuisance and negligence (see addition information under Z11). This case sets a president and Councils could now easily find themselves liable for future claims for damages. Refer to Dimitrios Michos & Another v Council of the City of Botany Bay [2012] NSWSC 625 (8 June 2012)

Z13 Unacceptably expensive to retain

Explanation: Degree of Cost – *This is a matter of judgement and may vary widely. It primarily applies to existing trees that are not suited to their location but there is resistance to their replacement. As a general principle, all trees will incur some management costs and these would normally not be a valid reason for removal. However, as these costs increase, their acceptability decreases to the point where it will be more cost effective to plant a new tree more suited to the location, rather than incur the burden of repeated and excessive costs indefinitely. Typical examples include topped trees with excessive decay, pollarded trees, to reduce subsidence risk, tree beneath powerlines, and trees close to buildings, roads and pathways. All these examples will require high levels of maintenance that may not be financially viable unless the benefits that arise from remaining trees are particularly high*

'A' Trees are suitable for retention for more than 10 years and considered important and worthy of consideration in management decisions.

A1 No significant defects and could be retained with minimal remedial care

A2 Minor defects that could be addressed by limited remedial care or work to adjacent trees

A3 Special significance for historical, commemorative or rarity reasons that would warrant extraordinary efforts to retain for more than 10 years

A4 Trees that may have legal protection for ecological reasons

9.4 IMPORTANCE OF THE ROOT SYSTEM

The most vulnerable part of a tree is its root system. As it is not visible and is poorly understood, it is frequently ignored, but damage or death of the root system will affect the health stability of the entire tree. When either a cut or fill occurs near trees, the root system is immediately reduced and the soil available for root growth is reduced.

9.4.1 Tree Protection Zone (TPZ)

The Tree Protection Zone (TPZ) is the principle means of protecting trees on development sites. The TPZ is a combination of the root area and crown area that requires protection. It is an area isolated from construction disturbance, so that the tree remains viable (AS – 4970)

The radius of the TPZ is calculated for each tree by multiplying its DBH x 12.

TPZ = DBH x 12 (DBH = trunk diameter measured at 1.4m above ground level)

The radius of the TPZ is measured from COT (Centre of the trunk).

A sturdy protective fence is required around each tree to prevent damage occurring in the TPZ.

Variations to a TPZ

While TPZ's usually form a circular area under AS 4970, British Standard 5837 allows the area of a TPZ in m^2 to be converted into a square. This slightly reduces the extent of the TPZ while protecting the same amount of area in m^2's. BS 5837 also allows a 20% variation in the location of the centre of the TPZ, while AS 4970 allows a minor variation of 10%, with any further variation subject to advice from the project Arborist.

9.4.2 Structural Root Zone (SRZ)

The Structural Root Zone (SRZ) is the area around the base of a tree required for its stability. The woody root growth and soil cohesion in this area are necessary to hold the tree upright; therefore there are no variations to its size. The SRZ is normally circular with the trunk at its centre and is expressed by its radius in metres (AS – 4970). Due to the potential of causing instability of a tree, it is highly recommended that no roots within its SRZ are pruned or removed.

9.4 References to Appendices 9.4

- AS 4970 (2009) 'Protection of trees on construction sites' Standards Australia, Sydney, Australia

9.5 TREE MANAGEMENT PLAN

The following specifications are for the specific guidance of projects which must preserve existing trees within or adjacent to a given site. These may be supplemented with additional requirements through the design review process.

1.0 DESIGN

1.1 Planning should include consideration of the levels near the trees that are to be retained so that their root systems can be adequately protected.

1.2 All contractors & sub-contractors whose work will be in close proximity to trees which are to be retained should be given a copy of this Tree Management Plan.

2.0 PRE CONTRUCTION

2.1 Before any construction or site activities begin, trees that are to be retained should have their TPZ clearly defined and protected by a sturdy, 1.8m high mesh fence, which is supported by on a vertical and horizontal framework.

2.2 If a reduced TPZ has been specified to allow access for construction purposes in close proximity to a tree, the following protection methods must be adhered to. All surface areas of the recommended TPZ which are outside the reduced TPZ should be mulched with 100mm woodchip to reduce soil compaction, and be maintained at this depth throughout the project.

2.3 Protective fencing must remain in place through all stages of development and construction activities.

2.4 Appropriate warning signs should be placed on the protective fencing advising that there will be no oils, gas, chemicals, liquid waste, solid waste, construction machinery or construction materials stored or allowed to stand for any period within the dripline of the tree. No one should enter the TPZ for any reason other than monitoring the health of the trees.

3.0 ROOT PROTECTION AREAS

3.1 The Tree Survey sheet will indicate the recommended Tree Protection Zone (TPZ) for each tree.

3.2 Before any construction or site activities begin, trees that are to be retained should have their TPZ clearly defined and protected by a sturdy, 1.8m high mesh fence, which is supported by on a vertical and horizontal framework.

3.3 No one should enter the TPZ for any reason other than to monitor the health of the trees.

3.4 Any work performed within the TPZ is to be done by hand and under the supervision of a consulting arborist.

3.5 No grading or trenching equipment is permitted within the TPZ, without prior approval and a work method statement by the site arborist

3.6 Machinery movements, site sheds etc, stockpiling of materials and site soils are not permitted within the TPZ.

3.7 Should heavy vehicle movement be required within a TPZ, a track should be formed using 100mm x 75mm lengths of hardwood timber fastened at 150mm centers. Alternatively, a 150mm deep layer of wood chip mulch or a 50mm deep layer of coarse gravel beneath rumble boards could be used as a load-spreading surface.

3.8 Care should be taken when using cranes or other machinery to prevent damage occurring to the canopy of trees.

3.9 Concrete mixing should not be carried out within the TPZ. Consideration of the slope should be taken in to account to prevent caustic or other materials flowing towards the trees.

4.0 TRUNK PROTECTION

4.1 Trunk protection will require the placement of 2m lengths of 100mm x 50mm hardwood battens arranged vertically at 150mm intervals around the circumference of the trunk. Battens are to be secured in place by metal strap bindings or ten gauge fencing wire at 300mm apart. Prior to placing battens, a soft protective padding must be installed to the ends of the timbers to prevent damage to the bark and conductive tissue. Under no circumstances are the battens to be secured to the tree by a method that involves the trunk being penetrated by nail, screw, rod or the like. Trunk protection must remain in place for the duration of the works.

5.0 TREE REMOVALS

5.1 Any approved tree removals should be undertaken by a suitably qualified and experienced arborist, and this work should conform to the ‘Workcover Code of Practice for the Tree Industry.

5.2 It is usually more convenient to remove trees before the erection of protective fencing, but the contractor should be instructed not to cause damage to trees that are to be retained. All vehicles should be excluded from the vicinity of these trees.

5.3 To avoid damage to adjacent trees, it may be necessary for trees to be dismantled in sections rather than free felling.

6.0 STUMP REMOVAL

6.1 Stumps of removed trees in protected areas should be ground out and not pulled out by machine.

6.2 The stumps of all trees the in areas designated for construction activities should also be removed.

6.3 Trees to be retained should not be used as anchorages for equipment used in stump removal.

7.0 PRUNING

7.1 Any approved pruning work should be undertaken by a suitably qualified and experienced arborist. This work should conform to the 'Workcover Code of Practice for the Tree Industry', and the Australian Standard 'Pruning of Amenity Trees' (AS 1996)

7.2 The low branches of trees to be retained should not be pruned prior to grading or the mobilization of any equipment on the site. Perimeter fencing should be placed to avoid tearing off limbs by heavy equipment.

7.3 Limbs that must be removed will require prior consent by the Council.

8.0 CHANGING SOIL LEVELS

8.1 Raising soil levels around tree trunks should not be permitted as this can cause decay of the trunk, serious damage to the trees health, or even their death.

8.2 Finished grades should slope away from the trunks to avoid directing runoff water towards the base of trees.

8.3 During grading, roots over 25mm in diameter should be cut off cleanly with a handsaw about 300mm behind the line of excavation. Any exposed roots should be kept moist by covering with backfill soil. This should apply even if the roots are outside the dripline of the tree

9.0 TRENCHES AND FOOTINGS

9.1 These should be located no closer than the TPZ, which will be determined for each tree individually. Any work within the TPZ should be supervised by an appropriately qualified arborist

9.2 A test trench should be hand dug to the depth of the proposed footings or trench to check for the occurrence of roots.

9.3 If roots over 25mm in diameter are excavated, they should be cut off cleanly with a handsaw about 300mm behind the line of excavation. Any exposed roots should be kept moist by covering with backfill soil. This should apply even if the roots are outside the dripline of the tree.

9.4 If larger diameter roots (75mm or greater) are encountered within the zone of excavation, the root should not be cut. The job should be stopped in this area and the Consultant Arborist called in for a site inspection. If the root is located where a footing is to be placed, an alternative footing should be used which bridges the root with pilings and grade beams.

9.5 When trenching for services, tunneling should be done under large diameter roots to prevent any root damage. It is the responsibility of the developer to coordinate and make appropriate arrangements with utility companies when trenching near trees to be retained.

9.6 Areas of root zones beneath concrete should be protected during slab forming and pouring, with a layer of geotextile or similar fabric.

10. UNDERGROUND BORING

10.1 If an underground service must pass through the dripline of a tree, an alternative to open trenching is underground boring. An appropriately qualified consulting arborist should be on site to supervise any boring activities beneath trees.

10.2 Boring under root systems can greatly reduce both damage to the tree and the cost to repair landscape and other features destroyed in the trenching process.

10.3 If underground boring has been approved within the TPZ, an open trench is to be excavated on opposite sides of the tree relative to the location of the service. Where possible, the open trench should be located at a 90° angle to the tree trunk to reduce the likelihood of severing of roots. This can be done by hand or with a backhoe until roots of 25mm diameter are encountered. Backhoes and other machinery must not be located within the TPZ.

10.4 When roots greater than 25mm are encountered, excavation is then performed by hand to the start of the Tree Protection Zone.

10.5 Boring should commence at the start of the TPZ and be located at least 1m deep to reduce impacts with roots

11. PAVING & OTHER HARD SURFACES

11.1 As the majority of feeder roots occur in the uppermost 600mm of soil, changes in level should be minimal.

11.2 Any vegetation on the existing soil surface should be killed using a herbicide which will not leach through the soil (e.g. Glyphosate)

11.3 Lowering the soil surface can be particularly damaging, as this will sever surface roots. For the same reason, the soil surface should not be skimmed to establish the new paving at the former ground level

11.5 New paving should be established not more than 100mm above the former ground level, using a granular fill

11.6 Raising the soil surface can be accommodated more easily provided a permeable material is used which will not impede gaseous diffusion.

11.7 Paving slabs or flags, including those with perforations, should be laid dry-jointed on a sharp sand foundation.

11.8 The practice of laying brick pavers on concrete containing fines should be avoided in the vicinity of trees because of insufficient permeability.

11.9 Bricks or blocks, when laid directly upon sand or another open foundation material, provide enough moisture accessibility and movement of air around the base of a tree.

11.10 In the case of bricks and brick pavers, the long sides should be mortared or grouted, but with the end of only each third paver being mortared.

11.11 Installation of edge support for paving should be carefully considered. Excavation for kerbing and edging may sever roots. Consideration could be given to using an alternative method of edge support, such as steel framed sections.

11.12 Temporary bitumen or road base pathways can be installed in close proximity to the TPZ's if they are laid on the existing grade on a geotextile or similar fabric.

12. LANDSCAPING

12.1 The landscape plan should replace removed trees by providing trees of suitable species and sizes for the development.

12.2 Only drip irrigation and drought tolerant plants should be permitted under the driplines of retained trees.

12.3 No irrigation should be permitted within 2.5 - 3m of the trunks, unless specified by the Consultant Arborist.

12.4 Backfilling of retaining walls should consist of washed river sand or similar material.

10.0 TREE SURVEY

Tree No		#1	#2	#3	#4	#5	#6	#7	#7A	#7B	7C	7D	7E
Species		*Howea forsteriana* Kentia Palm	*Howea forsteriana* Kentia Palm	*Howea forsteriana* Kentia Palm	*Ficus domestica* Fig	*Ficus domestica* Fig	Introduced Fruit Tree	*Hibiscus sp*	*Hibiscus sp*	*Hibiscus sp*	*Hibiscus sp*	*Hibiscus sp*	*Hibiscus sp*
DBH (mm)		150	2x 150	150	200	2x 180	150	4x 100	4x 100	4x 100	4x 100	4x 100	4x 100
RCD (mm)		350	2x 300	350	500	450	300	250	250	250	250	250	250
Height (m)		8	5	7	4	4	5	<5	<5	<5	<5	<5	<5
Canopy Spread (m)	N	2	1	2	2	2	2	5	2	2	2	2	2
	S	2	1	2	2	2	3	5	2	2	2	2	2
	E	2	1	2	2	2	4	5	2	2	2	2	2
	W	2	1	2	2	2	1	5	2	2	2	2	2
Age Class		M	M	M	M	M	M	M	M	M	M	M	M
Canopy Type Direction		C	C	C	C	C	C	C	C	C	C	C	C
Health		A	A	A	A	A	A	A	A	A	A	A	A
Condition		A	A	A	A	A	A	A	A	A	A	A	A
Amenity													
Prominence													
Ecological		2	2	2	1	1	1	2	2	2	2	2	2
Crown Symmetry		1	1	1	1	1	2	1	1	1	1	1	1
Trunk Lean		1	1	1	1	1	1	1	1	1	1	1	1
SULE		**Z**	**Z**	**Z**	**Z**	**Z**	**Z**	**A1**	**A1**	**A1**	**A1**	**A1**	**A1**
TPZ (m)		1.0	1.0	1.0	2.4	3.5	1.8	4.0	4.0	4.0	4.0	4.0	4.0
SRZ (m)		1.0	1.0	1.0	2.5	2.4	2.0	1.8	1.8	1.8	1.8	1.8	1.8
Additional Comments													

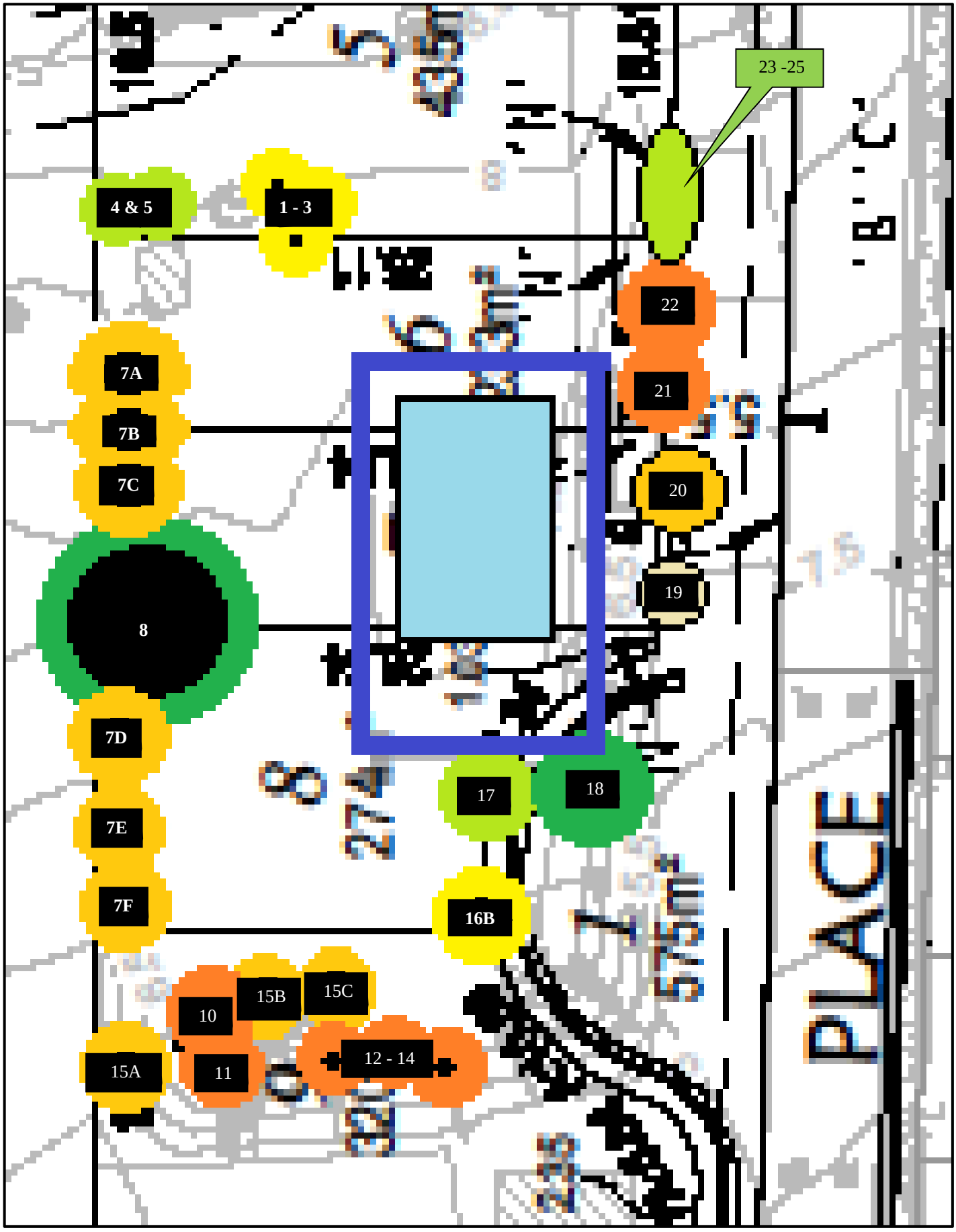
Tree No		7F	#8	#9	#10	#11	#12	#13	#14	#15	#15A	#15B	16A
Species		*Hibiscus sp*	*Ficus benjamina* Hills Weeping Fig	*Butia capitata* Princess Palm	*Callistemon salignus*	*Callistemon salignus*	*Callistemon salignus*	*Callistemon salignus*	*Callistemon salignus*	*Hibiscus sp*	*Hibiscus sp*	*Hibiscus sp*	*Butia capitata* Princess Palm
DBH (mm)		4x 100	5x 200	X	2x 200	250	4x 120	300	2x 150	4x 100	4x 100	4x 100	X
RCD (mm)		250	500	X	300	500	350	450	400	250	250	250	X
Height (m)		<5	9.5	X	8	6	6	6	6	<5	<5	<5	X
Canopy Spread (m)	2		X	x	3	3	2	2	2	2	2	2	X
	2		X	x	2	1	2	2	2	2	2	2	X
	2		X	x	2	2	2	2	2	2	2	2	X
	2		X	x	3	2	2	2	2	2	2	2	X
Age Class		M	S/M	X	M	M	M	M	M	M	M	M	X
Canopy Type Direction		C	C	X	C	C	C	C	C	C	C	C	X
Health		A	A	X	A	A	A	A	A	A	A	A	X
Condition		A	A	X	A	A	A	A	A	A	A	A	X
Amenity				X									X
Prominence				X									X
Ecological		2	2	X	2	2	2	2	2	2	2	2	X
Crown Symmetry		1	1	X	1	1	1	1	1	1	1	1	X
Trunk Lean		1	1	X	1	1	1	1	1	1	1	1	X
SULE		**A1**	**Z**	**Z**	**A1**	**A1**	**A1**	**A1**	**A1**	**A1**	**A1**	**A1**	**Z**
TPZ (m)		4.0	5.0	X	3.5	3.0	4.5	3.6	3.0	4.0	4.0	4.0	X
SRZ (m)		1.8	2.5	X	2.0	2.5	2.1	2.4	2.3	1.8	1.8	1.8	X
Additional Comments													

Tree No		16B	17	18	19	20	21	22	23	24	25
Species		*Butia capitata* Princess Palm	*Ficus domestica* Fig	*Cupressocyparis leylandii*	*Photinia* sp	*Hibiscus* sp	*Callistemon salignus*	*Callistemon salignus*	*Philadelphus mexicanus*	*Philadelphus mexicanus*	*Philadelphus mexicanus*
DBH (mm)						4x 100					
RCD (mm)						250					
Height (m)						<5	<5	<5	<5	<5	<5
Canopy Spread (m)	N					2					
	S					2					
	E					2					
	W					2					
Age Class						M					
Canopy Type Direction						C					
Health						A					
Condition						A					
Amenity											
Prominence											
Ecological						2					
Crown Symmetry						1					
Trunk Lean						1					
SULE						**A1**					
TPZ (m)						4.0					
SRZ (m)						1.8					
Additional Comments											

Tree No	#26	#27	#28	#29	#30	#31	#32	#33	#34	#35	#36	#37
Species	*Casuarina glauca* Swamp Oak	*Casuarina glauca* Swamp Oak	*Casuarina glauca* Swamp Oak	*Casuarina glauca* Swamp Oak	*Casuarina glauca* Swamp Oak	*Casuarina glauca* Swamp Oak	*Casuarina glauca* Swamp Oak	*Casuarina glauca* Swamp Oak	*Casuarina glauca* Swamp Oak	*Casuarina glauca* Swamp Oak	*Casuarina glauca* Swamp Oak	*Casuarina glauca* Swamp Oak
DBH (mm)	300	2x 200	3x 100	3x 250	300	350	2x 280	220	120	2x 350	450	250
RCD (mm)	400	400	400	500	500	500	400	300	150	600	600	350
Height (m)	24	24	24	24	24	24	24	24	24	24	24	24
Canopy Spread (m) N												
Canopy Spread (m) S												
Canopy Spread (m) E												
Canopy Spread (m) W												
Age Class	M	M	M	M	M	M	M	M	M	M	M	M
Canopy Type Direction	C	C	C	C	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I
Health	A	A	A	A	A	A	A	A	A	A	A	A
Condition	A	A	A	A	A	A	A	A	A	A	A	A
Amenity												
Prominence												
Ecological	3	3	3	3	3	3	3	3	3	3	3	3
Crown Symmetry	4	3	3	3	3	3	3	3	3	3	3	4
Trunk Lean	1	1	1	1	1	1	1	1	1	1	1	1
SULE	**A1**	**A1**	**A1**	**A1**	**A1**	**A1**	**A1**	**A1**	**A1**	**A1**	**A1**	**A1**
TPZ (m)	3.6	4.0	3.0	5.0	3.6	4.2	5.5	2.6	1.4	7.0	5.4	3.0
SRZ (m)	2.3	2.3	2.3	2.5	2.5	2.5	2.3	2.0	1.5	2.7	2.7	2.1
Additional Comments												

Tree No		#38	#39	#40	#41	#42	#43				
Species		*Casuarina glauca* Swamp Oak	*Eucalyptus robusta* Swamp Mahogany	*Eucalyptus robusta* Swamp Mahogany	*Eucalyptus robusta* Swamp Mahogany	*Erythrina x sykesii* Coral Tree	*Eucalyptus robusta* Swamp Mahogany				
DBH (mm)		500	450	700	450	250/300	500				
RCD (mm)		600	600	750	650	900	750				
Height (m)		20	16.5	21	22	10	23				
Canopy Spread (m)	N		7	10	5	6	0				
	S		3	0	5	6	7				
	E		6	7	10	6	7				
	W		8	11	12	6	10				
Age Class		M	O/M	M	M	M	M				
Canopy Type Direction		D	D	C	C	S	C				
Health		A	F-P	A-F	A-F	A	A-F				
Condition		A	F-P	A-F	A-F	A	A-F				
Amenity											
Prominence											
Ecological		3	3	3	3	0	3				
Crown Symmetry		1	2	3	2	3	3				
Trunk Lean		1	1	1	1	1	1				
SULE		**A1**	**Z5**	**A1**	**A1**	**Z4**	**A1**				
TPZ (m)		6.0	5.4	8.4	5.4	5.5	6.0				
SRZ (m)		2.7	2.7	2.9	2.8	3.2	2.9				
Additional Comments			Large cambium wound on root crown and base of main trunk			Priority Weed					

11.0 TREE LOCATION PLAN



12.0 PROPOSED SITE PLAN