Martin Peacock Tree Care
Arboricultural & Horticultural Consultancy

Arboricultural Impact Assessment Report

60 Hudson Parade
Clareville
NSW 2017

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Contents

1.0 Summary

1.1 This Arboricultural Impact Assessment Report (the Report) has been prepared on behalf of the owners of 60 Hudson Parade, Clareville, NSW (the site) as part of the Development Application for the site.

1.2 This Report provides an assessment of seventeen (17) trees growing within the site. An additional twelve (12) trees growing within the street and neighbouring properties are also included in this report however these trees have not been fully assed.

1.3 The development proposal for the site includes alterations and additions to the existing dwelling, construction of a swimming pool and associated landscaping works.

1.4 The development proposal includes the removal of eight (8) trees covered by Councils Tree Management Policy. To offset tree removals the Landscape Plans include the installation of new, locally indigenous tree species.

1.5 Tree Protection Zone areas are to be established to protect the retained trees within, and adjacent to the site from development impacts during the construction stage of the project. Tree sensitive methods are to be utilised when undertaking approved development works within TPZ areas.

1.6 The recommendations of this report are subject to approval by Northern Beaches Council.

2.0 Introduction

2.1 This Arboricultural Impact Assessment Report has been prepared on behalf of the owners of 60 Hudson Parade, Clareville, NSW (the site) as part of the Development Application for the site.

2.2 This Report provides an assessment of seventeen (17) trees growing within the site. An additional twelve (12) trees growing within the street and neighbouring properties are also included in this report however these trees have not been fully assed.

2.3 The development proposal for the site includes alterations and additions to the existing dwelling, construction of a swimming pool and associated landscaping works.

2.4 Martin Peacock Tree Care visited the site on the 2nd of March 2022 and the 11th of April 2022 and assessed the subject trees and their growing environment.

3.0 Scope of The Report

3.1 This report has been prepared to meet the following objectives:

- Conduct at ground level, a visual inspection of the subject tree(s) and their growing environment.
- Assess the physiological and structural condition of the subject tree(s).
- Determine the useful life expectancy, quality and value(s) of the subject tree(s).
- Award a retention category for the subject tree(s).
- Assess relevant plans and documentation to determine the potential impacts of the proposed development upon the subject tree(s).
- Make recommendations for retention, removal or remedial works to the subject tree(s), and/or implementation of tree protection measures as appropriate.

3.2 The following plans/documentation were referenced in the preparation of this report:

- Detail & Level Survey (Issue 1) - prepared by CMS Surveyors, dated 25.01.22
- Site Plan-DA003 (Rev 00) - prepared by Bennet Murada Architects, dated 23.09.22
- Cut & Fill Plan-DA012 (Rev 00) - prepared by Bennet Murada Architects, dated 23.09.22
- Landscape Plans Pages 1-35 (Rev G) - prepared by Arcadia, dated 09.09.22

4.0 Caveats & Limitations

4.1 The subject trees were inspected from the ground only, using the methodology detailed in this report.

4.2 The findings of this report are based on the observations made at the time of inspection (02.03.22 & 11.04.22) and from the information contained within plans/documentation provided by the Architect.

4.3 The report reflects the subject trees as found on the day of inspection. There is no warranty or guarantee, expressed or implied, that problems or deficiencies with the site or the subject trees may not arise in the future. Any changes to development proposals or tree management works beyond those recommended in this report may alter the findings of the report.

5.0 Methodology

5.1 Data Collection:

The methodology used in this report follows the procedures detailed in *Australian Standard: AS 4970—2009. Protection of Trees on Development Sites*. This report also references the *British Standard BS: 5837 (2005) Trees in Relation to Construction – Recommendations.*

The methodology used in this report provides the following information:

1. Tree species - botanical and common name.
2. Age class - Juvenile, semi-mature, mature, senescent.
3. DBH – Diameter at breast height (mm)*
4. Height – estimated total height (m)
5. Crown spread – estimated, average radial crown spread in meters (m)
6. Physiological condition - good, fair, poor
7. Structural condition - good, fair, poor
8. Useful Life Expectancy - <5, 5–15, 15–40, >40 (years)**
9. Quality & Value – A, B, C, D ***
10. Retention Category - Priority for Retention, Consider for Retention, Consider for Removal, Priority for Removal****
11. SRZ – Structural Root Zone radius (m)
12. TPZ – Tree protection Zone radius (m)
13. Comments / Preliminary Management Recommendations

5.2 *DBH (Diameter at Breast Height) - Stem /trunk diameter measured at 1.4m above ground level. On sloping ground, measurements will be taken at the mid slope point at the base of the tree. Where a tree stem / trunk begins to branch at a point that is less than 1.4m above ground, a combined stem diameter is calculated using the formula:
Total DBH = $\sqrt{DBH^2 + DBH^2 + DBH^2}$

5.3 **Useful Life Expectancy – The estimated lifespan of the tree over which it will positively contribute to the amenity of the area and to the local environment, in a safe, healthy condition.

5.4 ***Quality & Value – The quality of the tree when compared to an idealised example of the species and the values which the tree provides to the site and local area (see Appendix D – Cascade Chart for Assessment of Tree Quality & Value).

5.5 ****Retention Category – The subject tree is allocated one of four categories based on a combination of its Quality and Value and Useful Life Expectancy. A certain amount of flexibility may be allowed when allocating a Retention Category, to take into account tree species, significance and site/environmental conditions.

5.6 An assessment of the trees condition is made using the Visual Tree Assessment (VTA) method (Mattheck & Breoler, 1994).

5.7 Tree assessment results are recorded in the Tree Assessment Schedule (see section 6.0 Results). Note: for trees outside of the site only the species and DBH is recorded for the purposes of calculating the SRZ/TPZ.

6.0 Results

6.1 Tree Assessment Schedule — Site: 60 Hudson Parade, Clareville, NSW — Surveyed by: Martin Peacock — Date of survey: 02.03.22 — Tagged: no

Tree ref. no.	Species	Age Class	DBH (mm)	Height (m)	Crown Spread (m)	Physiological Condition	Structural Condition	Useful Life Expectancy (years)	Quality & Value	Retention Category*	TPZ (m)	SRZ (m)
T1	*Allocasuarina torulosa* (Forest Sheoak)	Late Mature	300	10	2	Good	Good	15-40	C	Consider for Removal	3.6	2.0
T2	*Corymbia maculata* (Spotted Gum)	Mature	400	16	5	Good	Good	15-40	B	Consider for Retention	4.8	2.3
T3	*Pittosporum undualatum* (Native Daphne)	Mature	300	6	3	Good	Good	15-40	C	Consider for Removal	3.6	2.0
T4	*Golchidion ferdinandi* (Cheese Tree)	Semi Mature	125	3	2	Good	Fair	5-15	C	Consider for Removal	2.0	1.5
T5	*Celtis sinensis* (Chinese Hackberry)	Semi Mature	150	4	3	Good	Good	<5	D	Priority for Removal	2.0	1.5

	Comments / Preliminary Management Recommendations
T1	Low landscape value. Crown contains low volumes of small (<25mm) diameter epicormic growth. **Proposed for Removal**
T2	Moderate landscape value. Crown contains low volumes of medium (25-75mm) diameter deadwood. Partially supressed. **Proposed for Removal**
T3	Low landscape value. Partially supressed. Proposed for Retention
T4	Low landscape value. Lopped for power line clearance. Not covered by NBC Tree Management Policy (<5m). Proposed for Retention
T5	Environmental weed. Removal recommended regardless of development proposal. Not covered by NBC Tree Management Policy (<5m). **Proposed for Removal**

Tree ref. no.	Species	Age Class	DBH (mm)	Height (m)	Crown Spread (m)	Physiological Condition	Structural Condition	Useful Life Expectancy (years)	Quality & Value	Retention Category	TPZ (m)	SRZ (m)
T6	*Banksia integrofolia* (Coast Banksia)	Semi Mature	100	4	2	Good	Good	15-40	C	Consider for Removal	2.0	1.5
T7	*Jacaranda mimosifolia* (Jacaranda)	Mature	400	12	5	Good	Good	15-40	B	Consider for Retention	4.8	2.4
T8	*Bauhinia* × *blakeana* (Hong Kong Orchid Tree)	Semi Mature	75	3	1	Good	Good	15-40	C	Consider for Removal	2.0	1.5
T9	*Acacia fimbriata* (Fringed Wattle)	Late Mature	100	5	2	Good	Good	5-15	C	Consider for Removal	2.0	1.5
T10	*Eucalyptus crebra* (Narrow leaved Ironbark)	Mature	350	11	4	Good	Good	15-40	B	Consider for Retention	4.2	2.1

	Comments / Preliminary Management Recommendations
T6	Low landscape value. Not covered by NBC Tree Management Policy (<5m). Proposed for Retention
T7	Moderate landscape value. Partially supressed. Exempt species under NBC Tree Management Policy. **Proposed for Removal**
T8	Low landscape value. Not covered by NBC Tree Management Policy (<5m). Proposed for Retention
T9	Low landscape value. **Proposed for Removal**
T10	Moderate landscape value. Crown density 75-95%. **Proposed for Removal**

Tree ref. no.	Species	Age Class	DBH (mm)	Height (m)	Crown Spread (m)	Physiological Condition	Structural Condition	Useful Life Expectancy (years)	Quality & Value	Retention Category*	TPZ (m)	SRZ (m)
T11	*Golchidion ferdinandi* (Cheese Tree)	Mature	350	8	4	Good	Good	15-40	B	Consider for Retention	4.2	2.1
T12	*Jacaranda mimosifolia* (Jacaranda)	Mature	300	8	5	Good	Good	15-40	B	Consider for Retention	3.6	2.0
T13	*Jacaranda mimosifolia* (Jacaranda)	Mature	300 250	7	5	Good	Good	15-40	B	Consider for Retention	4.8	2.3
T14	*Corymbia maculata* (Spotted Gum)	Mature	600	20	6	Poor	Good	5-15	C	Consider for Removal	7.2	2.7
T15	*Corymbia maculata* (Spotted Gum)	Mature	300	13	4	Good	Good	15-40	B	Consider for Retention	3.6	2.0

	Comments / Preliminary Management Recommendations
T11	Moderate landscape value. **Proposed for Removal**
T12	Moderate landscape value. Partially supressed. Phototropic trunk lean, root plate appears stable. Exempt species under NBC Tree Management Policy. **Proposed for Removal**
T13	Moderate landscape value. Partially supressed. Phototropic trunk lean, root plate appears stable. Exempt species under NBC Tree Management Policy. **Proposed for Removal**
T14	Moderate landscape value. Crown density 25-50%. Declining health and short Useful Life Expectancy due to burying of root collar. **Proposed for Removal**
T15	Moderate landscape value. Partially supressed. Proposed for Retention

Tree ref. no.	Species	Age Class	DBH (mm)	Height (m)	Crown Spread (m)	Physiological Condition	Structural Condition	Useful Life Expectancy (years)	Quality & Value	Retention Category*	TPZ (m)	SRZ (m)
T16	*Corymbia maculata* (Spotted Gum)	Mature	750	18	7	Good	Poor	<5	D	Priority for Removal	9.0	2.9
T17	*Corymbia maculata* (Spotted Gum)	Mature	325	7	5	Fair	Poor	5-15	C	Consider for Removal	3.6	2.1
A	*Corymbia maculata* (Spotted Gum)	-	1100	-	-	-	-	-	-	Retain – outside of site	13.2	3.4
B	*Eucalyptus crebra* (Narrow leaved Ironbark)	-	500	-	-	-	-	-	-	Retain – outside of site	6.0	2.5
C	*Brachychiton acerifolius* (Illawarra Flame Tree)	-	175	-	-	-	-	-	-	Retain – outside of site	2.1	1.6
	Comments / Preliminary Management Recommendations											
T16	Moderate landscape value. Trunk cavity at 3m, internal diagnostic testing indicates extensive decay. Wounds in various stages of decay. **Proposed for Removal**											
T17	Low landscape value. Top of tree missing, poor form. Partially supressed. **Proposed for Removal**											
A	Street tree.											
B	Street tree.											
C	Street tree.											

Tree ref. no.	Species	Age Class	DBH (mm)	Height (m)	Crown Spread (m)	Physiological Condition	Structural Condition	Useful Life Expectancy (years)	Quality & Value	Retention Category*	TPZ (m)	SRZ (m)
D	*Livistona australis* (Cabbage Palm)	-	250	-	-	-	-	-	-	Retain – outside of site	2.0	n/a
E	*Cupressus sp.* (Cypress species)	-	300 200	-	-	-	-	-	-	Retain – outside of site	4.2	2.1
F	*Corymbia maculata* (Spotted Gum)	-	800	-	-	-	-	-	-	Retain – outside of site	9.6	3.0
G	*Jacaranda mimosifolia* (Jacaranda)	-	400	-	-	-	-	-	-	Retain – outside of site	4.8	2.3
H	*Corymbia maculata* (Spotted Gum)	-	500	-	-	-	-	-	-	Retain – outside of site	6.0	2.5

	Comments / Preliminary Management Recommendations
D	Neighbours tree.
E	Neighbours tree. Exempt species under NBC Tree Management Policy.
F	Neighbours tree.
G	Neighbours tree. Exempt species under NBC Tree Management Policy.
H	Neighbours tree.

Tree ref. no.	Species	Age Class	DBH (mm)	Height (m)	Crown Spread (m)	Physiological Condition	Structural Condition	Useful Life Expectancy (years)	Quality & Value	Retention Category*	TPZ (m)	SRZ (m)
I	*Eucalyptus crebra* (Narrow leaved Ironbark)	-	450 300	-	-	-	-	-	-	Retain – outside of site	6.6	2.6
J	*Jacaranda mimosifolia* (Jacaranda)	-	500	-	-	-	-	-	-	Retain – outside of site	6.0	2.5
K	*Eucalyptus crebra* (Narrow leaved Ironbark)	-	700	-	-	-	-	-	-	Retain – outside of site	8.4	2.8
L	*Corymbia maculata* (Spotted Gum)	-	1000	-	-	-	-	-	-	Retain – outside of site	12.0	3.3
	Comments / Preliminary Management Recommendations											
I	Neighbours tree.											
J	Neighbours tree.											
L	Neighbours tree.											

*__Note:__ The Retention Category is an indicator of tree quality and is not a schedule for tree retention/removal (refer point 7.2)

7.0 Observations

7.1 The subject trees have been assessed in accordance with *Australian Standard AS4970 (2009) Protection of trees on development sites* (AS4970) to determine their; condition, quality and value(s), Useful Life Expectancy and to allocate a Retention Category. Full details of the assessment of the subject tree are listed in *6.1 Results - Tree Assessment Schedule*. It should be noted that Trees A-L have not been fully assessed as the trees are located outside of the site, and are therefore to be retained regardless of their condition.

7.2 **The allocation of a Retention Category is a requirement of AS4970** and provides and overview of the quality and value of trees on site. Retention Categories are a guide only and do not take into account design considerations/constraints relating to the development proposal. **It should be noted that Retention Categories are not a schedule for tree removal or retention.**

7.3 Trees Proposed for Retention:
The following trees are proposed for retention:

- T3 - *Pittosporum undualatum* (Native Daphne)
- T4 - *Golchidion ferdinandi* (Cheese Tree)
- T6 - *Banksia integrofolia* (Coast Banksia)
- T8 - *Bauhinia* × *blakeana* (Hong Kong Orchid Tree)
- T15 - *Corymbia maculata* (Spotted Gum)

Of the trees listed above trees T3 and T15 are covered by Councils Tree Management Policy.

The supplied plans show tree T3 will be subject to a Major Encroachment (as defined by AS4970) form the proposed driveway. However, the driveway is to be constructed above existing grade which will minimise the impact of the encroachment.

Tree T15 will be subject to a Minor Encroachment (as defined by AS4970) form the proposed boathouse. A Minor Encroachment should not significantly impact the health or structural condition of the tree.

7.4 Trees Proposed for Removal:
The following trees are proposed for removal:

- Tree T1 - *Allocasuarina torulosa* (Forest Sheoak)
- T2 - *Corymbia maculata* (Spotted Gum)
- T5 - *Celtis sinensis* (Chinese Hackberry)
- T7 - *Jacaranda mimosifolia* (Jacaranda)
- T9 - *Acacia fimbriata* (Fringed Wattle)
- T10 - *Eucalyptus crebra* (Narrow leaved Ironbark)
- T11 - *Golchidion ferdinandi* (Cheese Tree)
- T12 - *Jacaranda mimosifolia* (Jacaranda)
- T13 - *Jacaranda mimosifolia* (Jacaranda)
- T14 - *Corymbia maculata* (Spotted Gum)
- T16 - *Corymbia maculata* (Spotted Gum)
- T17 - *Corymbia maculata* (Spotted Gum)

Of the trees listed above trees T1, T2, T9, T10, T11, T14, T16 and T17 are covered by Councils Tree Management Policy.

7.5 Trees Located Outside of the Site:
Trees A – C are located in the street fronting the site, and Trees D – L are located in neighbouring properties. These trees are to be retained and protected through the use of tree sensitive design and construction methods.

8.0 Discussion

8.1 Of the trees covered by Councils Tree Management Policy which are proposed for removal, Trees T2, T10 and T11 have been allocated a Retention Value of *Consider for Retention*. Trees T1, T9 and T17 are of low quality and value and have been allocated a Retention Value of *Consider for Removal*. These trees are considered easily replaceable. Tree T14 is a relatively large specimen with moderate landscape value, however the tree appears to be in a state of irreversible decline which is invariably due to the burying of the tree's root collar as part of previous landscape works. Based on its poor health and short Useful Life Expectancy (ULE), Tree T14 has been allocated a Retention Value of *Consider for Removal*.

8.2 Tree T16 is a relatively large specimen with moderate landscape value, however due to the presence of cavities and in the trunk and larger diameter branches, internal diagnostic testing using a Resistograph was undertaken to more accurately determine the structural condition of the tree. Testing was undertaken around the circumference of the trunk at a height if 1.6m above grade. The minimum acceptable shell wall thickness at the testing point (i.e. residual wall of healthy trunk tissue) was calculated in accordance with the widely used t/R Ratio methodology[1]. The test results show the shell wall thickness at two of the four test locations does not meet the minimum acceptable t/R Ratio value. In addition to Resistograph testing, sounding of the trunk using a nylon mallet was undertaken. A distinct drumminess (hollow sound) indicates that the cavity/advanced decay extends both above and below the testing point on the trunk and it is highly likely that the cavities observed in the trunk and higher in the crown are linked, forming a continuous column of decay. Internal diagnostic testing determined the tree to be in poor structural condition with a significantly reduced ULE. Based on the above, Tree T16 has been allocated a Retention Value of *Priority for Removal* (refer Appendix C- Internal Diagnostic Testing Results).

8.3 The removal of Tree T16 will provide additional space for the development of the adjacent, better-quality tree (T15) which it is currently supressing.

8.4 Tree T5 - *Celtis sinensis* (Chinese Hackberry) is considered an environmental weed. The removal of this tree does not require Council approval.

8.5 The development proposal has been designed to minimise construction impacts on the trees proposed for retention. The proposed driveway is to be installed predominantly above existing grade and should be supported on either piers located to avoid significant roots or, a no-fines sub base to maximise infiltration of rainfall and gaseous diffusion through the soil profile. Retaining walls at the driveway edges (where required) should be installed above existing grade on a piered footing to minimise excavation in Tree Protection Zone (TPZ) areas.

8.6 The 1.8m wide informal path leading to the front door of the dwelling should be installed above existing grade. A no-fines sub base is not required as the narrow width of the path should have minimal; impact on rainfall infiltration within the TPZ areas of adjacent trees.

[1] Mattheck & Breloer (1994) Body Language of Trees: A Handbook for Failure Analysis

Retention of the footpath and sub base materials should utilise timber/steel edging, or loose rock installed without a footing.

8.7 The proposed boat shed represents a Minor Encroachment with the TPZ area of Tree T15 and therefore should not significantly impact the tree. Construction of the boat shed should avoid over excavation, benching or battering beyond the footprint of the structure within the TPZ area of the tree.

8.8 In general, existing levels within the TPZ areas of the neighbours' trees are to be maintained. The landscape proposal retains the existing retaining wall within the TPZ area of Tree F and the proposed paved fire pit area, path and stairs represent a Minor Encroachment only.

8.9 The alterations and additions to the dwelling fall predominantly within the existing building footprint. The footings of the existing building should have limited root spread under the building; therefore, the works should not significantly impact the neighbour's trees G-L. The proposed drying court and additions to the dwelling beyond the existing building footprint have been designed to be predominantly above existing grade. Where excavation is required, the extent of encroachment has been limited to a Minor Encroachment only and should not significantly impact the trees. New above grade structures are to be supported on piers with the pier location to be flexible to allow for the retention of significant roots. To minimise impacts on the neighbours trees, installation of the proposed swale along the southern boundary should maintain existing ground levels.

8.10 The Landscape Plans show a number of locally indigenous new trees are to be installed. New trees should be supplied in advanced sizes (>45 litre), however due to the shallow soil profile across the site potentially limiting tree pit excavation, rootball sizes should not exceed 100 litres. Where sub surface rock limits excavation, localised mounding around the exposed section of rootball should be installed to prevent desiccation of the rootball.

8.11 The installation of TPZ fencing will be required during the construction period to protect the trees on site and the street/neighbours trees from development impacts.

8.12 To minimise potential root damage, sediment control fencing running through TPZ areas should be installed on the surface rather than buried.

8.13 Where possible, all underground services should be located outside of TPZ areas. Where this cannot be achieved the use of tree sensitive methods will be required when installing services.

9.0 Recommendations

9.1 A Project Arborist shall be engaged to supervise and document works in TPZ areas, in line with Councils Conditions of Development Approval. The Project Arborist shall provide recommendations (where required) to maintain the health of the trees throughout the construction stage of the project.

9.2 Trees T1, T2, T5, T7, T9 – T14, T16 and T17 are proposed for removal. Approved tree removals shall be undertaken by a qualified Arborist (minimum AQF level 3) covered by adequate third party, public liability insurance. Arborists and ground staff shall comply with the *Work Cover Code of Practice for the Amenity Tree Industry*.

9.3 As part of the site establishment works install TPZ fencing for Trees T3, T4, T6, T8, T15 and A-L. **Refer Appendix D – Establishment of TPZ Areas**. To allow for construction access a combination of TPZ fencing and trunk and ground protection shall be utilised. Individual TPZ set out requirements shall be determined through consultation between the Project Arborist and the Project Manager prior to the commencement of works. The TPZ area of each tree shall be set out in accordance with the radial measurement (taken from centre of trunk at ground level) detailed in column 12 of the Tree Assessment Schedule (page 5).

9.4 TPZ areas shall be maintained for the duration of the project and shall not be modified in any way unless approved and documented by the Project Arborist. Building and demolition materials shall not be stored within fenced TPZ areas. Other than for approved development works, existing ground levels within TPZ areas shall be maintained. Access within the TPZ areas shall be permitted for approved development works only and machinery shall be excluded from the TPZ at all times.

9.5 Temporary silt fencing in TPZ areas shall be installed without excavation. Geotextile fabric shall be laid on the surface and held in place with metal pins and mulch or sand bags.

9.6 Demolition works within TPZ areas should be supervised by the Project Arborist. Where possible, existing in-ground structures and services shall be left in situ to minimise ground disturbance.

9.7 New above grade structures (dwelling additions, decking etc.) in TPZ areas shall be supported on piers/posts. At the time of installation each pier/post location shall be excavated by hand to a depth of 600mm or rock. Where roots >25mm diameter are encountered the pier/post location shall be adjusted to allow for the retention of roots (unless root pruning is approved by the Project Arborist).

9.8 No over excavation, benching or battering beyond the footprint of approved structures shall be permitted in TPZ areas. Slimline Draincell type products shall be utilised to the rear of retaining walls to minimise excavation requirements.

9.9 The driveway shall be supported on a no-fines, sub base layer (aggregate size - 20mm and above) installed above existing grade. Retaining walls retaining the sub base layer shall be installed on piers, installed by hand excavation and located to avoid roots >25mm diameter. Where timber or steel edging is utilised to retain the sub base layer pegs/pins shall avoid roots >25mm diameter.

9.10 Landscape plantings in TPZ areas shall be undertaken using hand tools only and mechanical cultivation of soil shall be avoided. Where roots >25mm diameter are encountered the planting hole shall be adjusted to allow for the retention of roots.

9.11 Trenches for underground services shall be located outside of TPZ areas. Where this cannot be achieved, trenches shall be excavated by hand with pipework located under or around roots >25mm diameter, unless root pruning is approved and undertaken by a qualified arborist (AQF level 5).

9.12 New trees shall be grown and supplied in accordance with *AS:2303 2018 Tree stock for landscape use* and installed by a qualified horticulturalist (minimum AQF level 3). When installing irrigation, lines/drippers shall be placed over the rootballs of new trees to ensure the rootball is kept moist at all times during the tree's establishment phase (minimum 12 months).

9.13 The recommendations of this report are subject to approval by Northern Beaches Council.

Martin Peacock
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Higher National Diploma Arboriculture (UK)
National Diploma Horticulture (Arb.) (UK)
Diploma Horticulture (Landscape Design) (AUS)

References

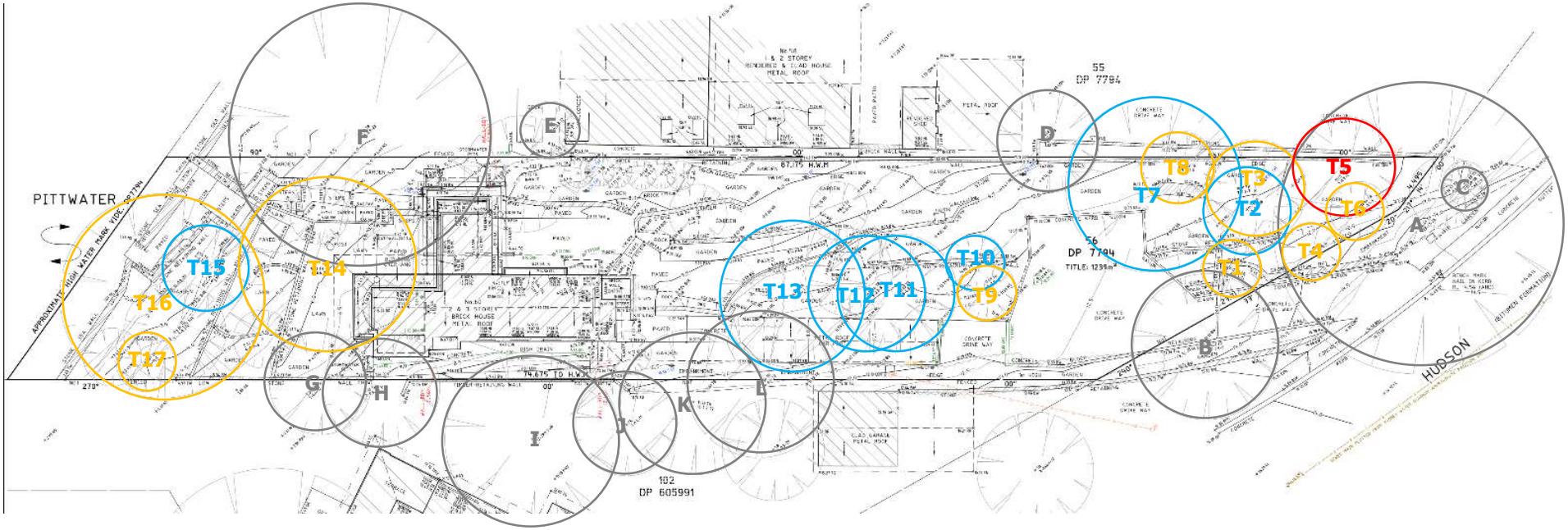
Australian Standard: *AS 4970 - 2009 Protection of trees on development sites*. Standards Australia GPO Box 476, Sydney, NSW, 2001.

British Standard Institution (2005). *Guide for Trees in relation to construction*. BSI, 2 Park Street, London W1A 2BS.

Mattheck, C. and Breloer H. (1994). *The Body Language of Trees*. A Handbook for Failure Analysis. HMSO, London, UK.

Draper B.D. and Richards P.A. (2009), *Dictionary for Managing Trees in Urban Environments*, Institute of Australian Consulting Arboriculturists (IACA), CSIRO Publishing, Collingwood, Victoria, Australia.

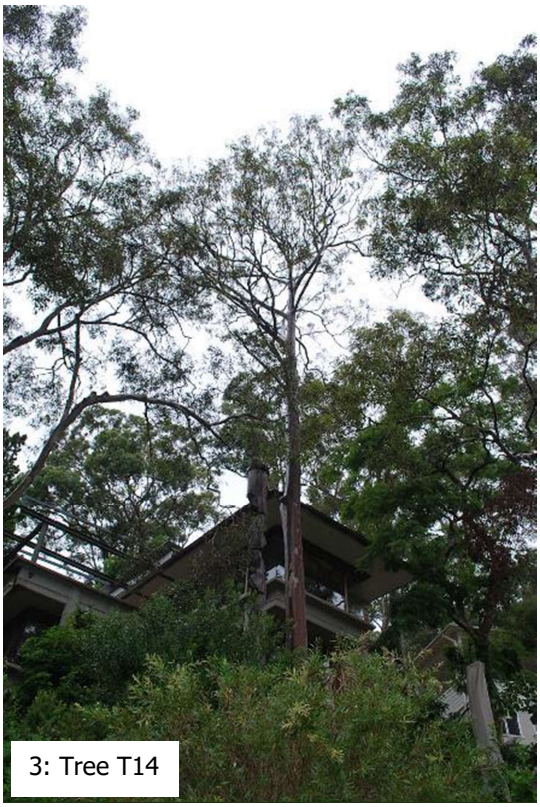
Appendix A - Tree Location Plan



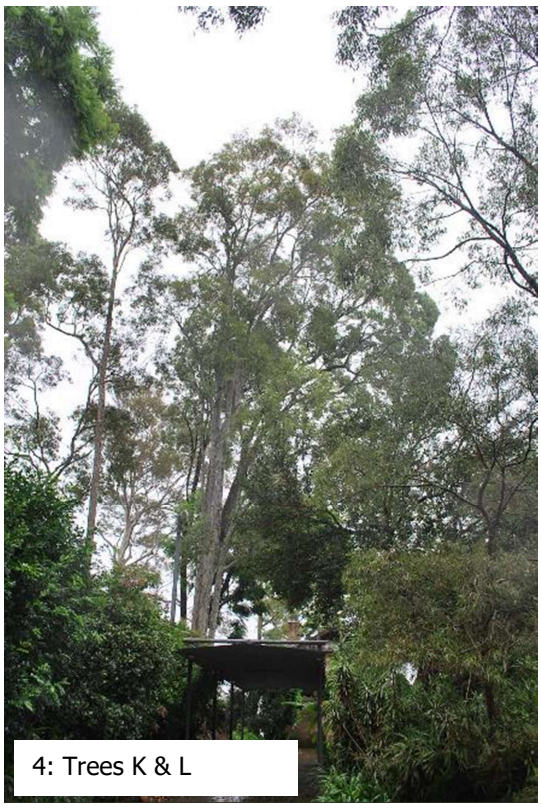
Appendix B - Photographs

1: Tree T2

2: Trees T15 (left) & T16 (right)

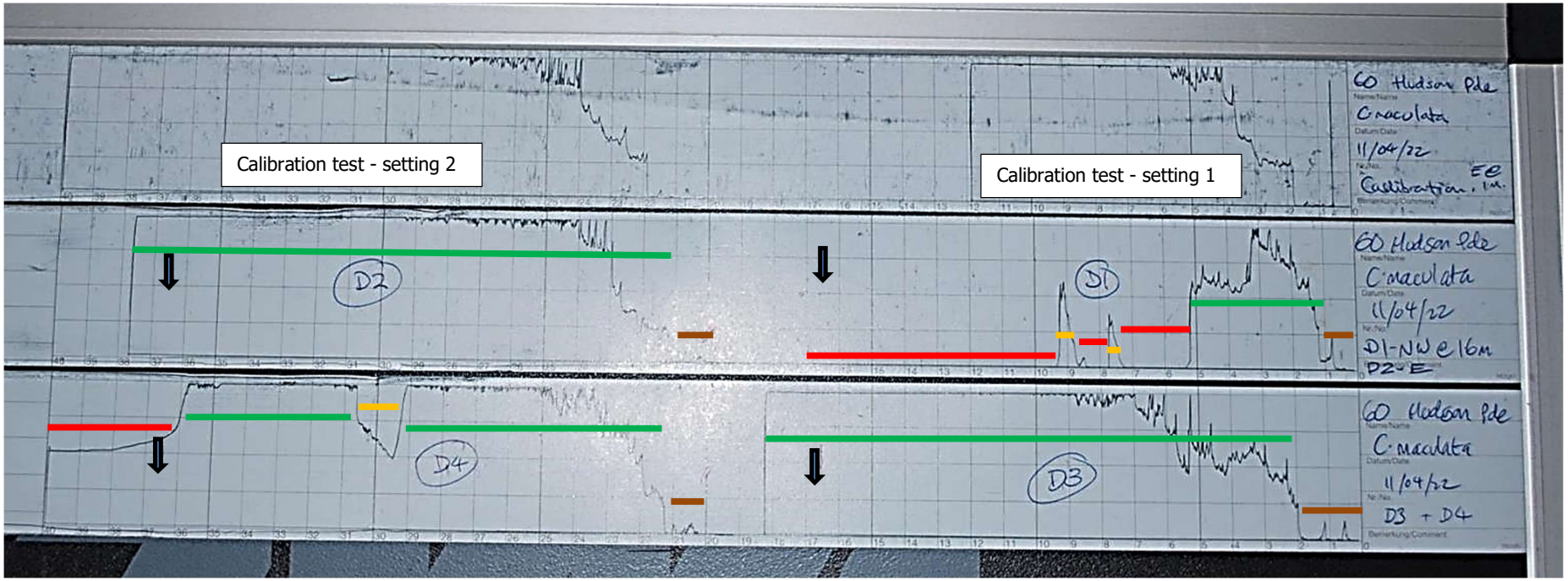


3: Tree T14



4: Trees K & L

Appendix C – Internal Diagnostic Testing Results



Legend:

- Bark
- Healthy tissue
- Incipient (early stage) decay
- Advanced decay/cavity
- Minimum acceptable t/R Ratio

Results (testing point – trunk @ 1.6m above grade):

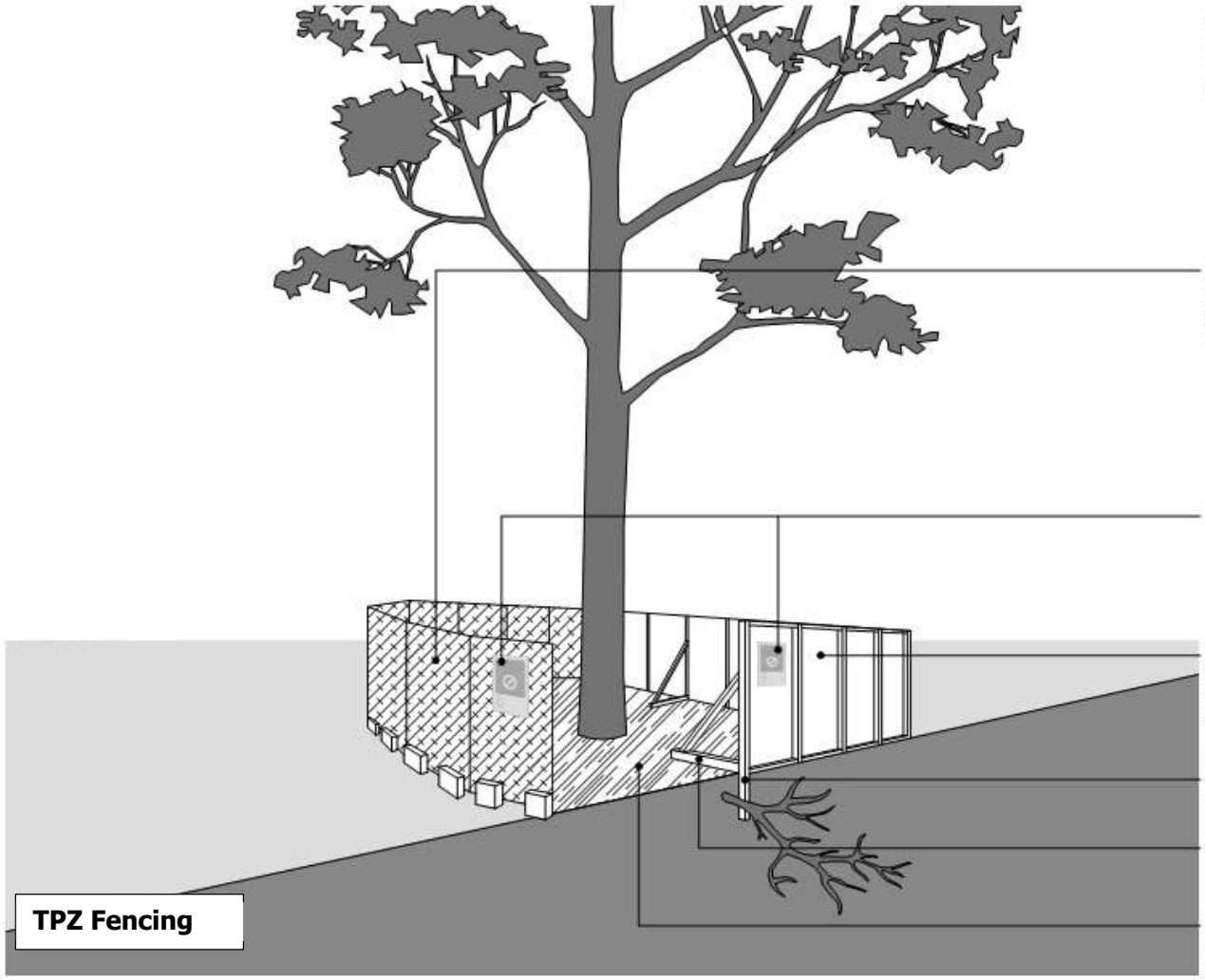
D1: t/R Fail – advanced decay/cavity beyond 50mm

D2: t/R Pass – no decay/cavity detected

D3: t/R Pass – no decay/cavity detected

D4: t/R Fail – advanced decay/cavity beyond 160mm

Appendix D – Establishment of Tree Protection Zone Areas



Note:
No excavation, construction activity, grade changes, surface treatment or storage of materials of any kind is permitted within the TPZ.

Option 1 - Fencing
1.8m high chain wire mesh panels with shade cloth attached (if required), held in place with concrete feet.

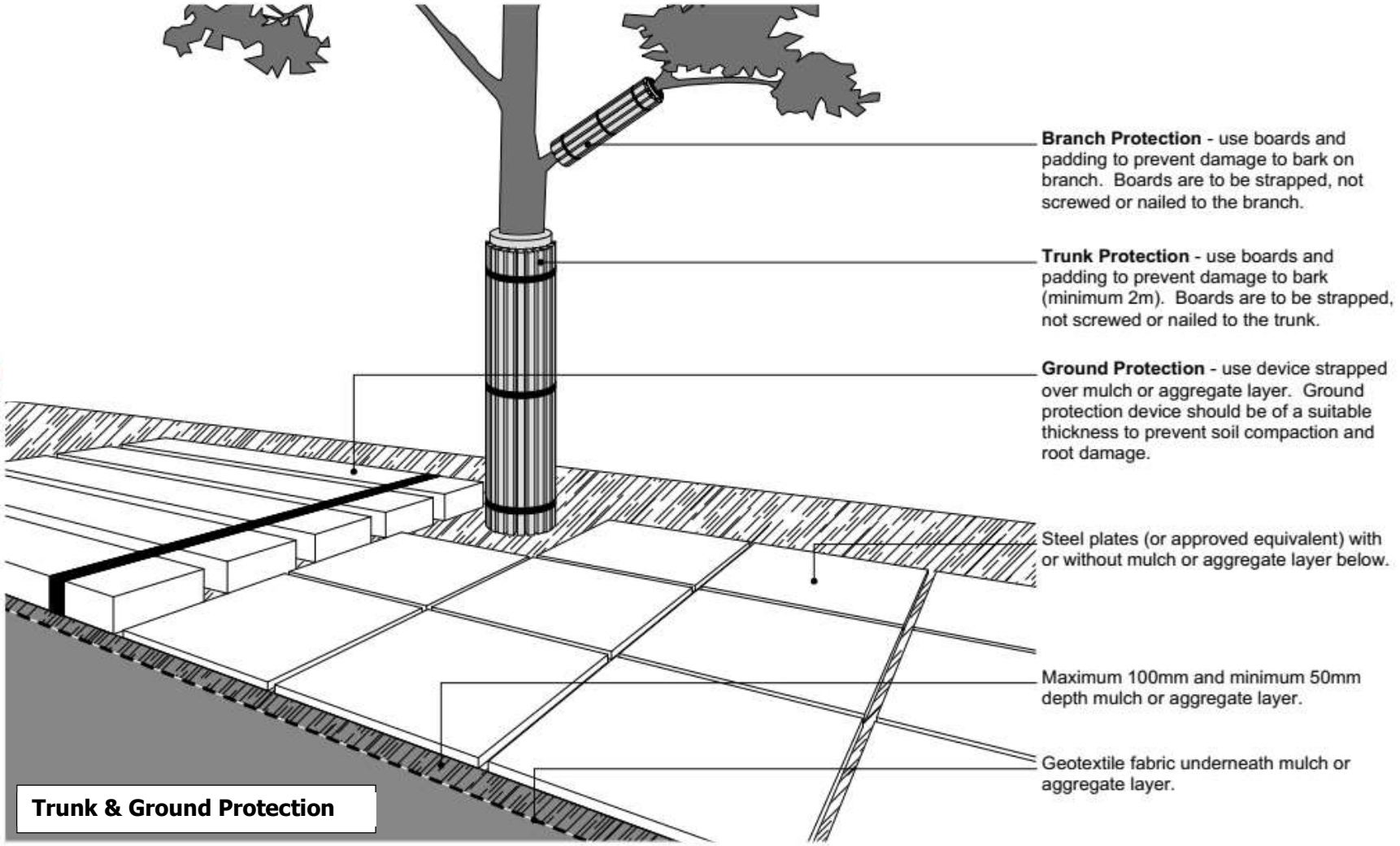
Tree Protection Zone (TPZ) sign

Option 2 - Fencing
Plywood or wooden panel paling fence. This type of fencing material also prevents building materials or soil entering the TPZ.

Installation of supports should avoid damaging roots.

Bracing is permissible within the TPZ.

Maximum 100mm and minimum 50mm depth mulch or aggregate layer installed across surface of TPZ.



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Appendix E - Cascade Chart for Assessment of Tree Quality & Value

(Adapted from British Standard Institution (2005). Guide for Trees in Relation to Construction)

RETENTION CATEGORY & DEFINITION	CRITERIA - SUBCATEGORIES			IDENTIFICATION IF SHOWN ON A PLAN
	1. Mainly Arboricultural values	2. Mainly landscape values	3. Mainly cultural values, including conservation	
Category A **High Quality & Value:** Those in such a condition as to be able to make a substantial contribution for a minimum of 40 years. Highly significant trees or trees listed on a significant tree register regardless of life expectancy (excluding hazardous trees). **Priority for retention.**	Trees that are particularly good examples of their species, especially if rare or unusual or essential components of groups or of formal or semi-formal Arboricultural features (e.g. The dominant and / or principal trees within an avenue). Trees that provide a definite contribution to the amenity of the locality.	Trees, groups or woodlands which provide a definite screening or softening effect to the locality in relation to views into or out of the site, or those of particular visual importance (e.g. Avenues or other Arboricultural features assessed as groups).	Trees, groups, remnant bushland or forest of significant conservation, historical, Aboriginal, commemorative or other value. Note: independent ecological/aboriginal/heritage assessment may be required.	GREEN
Category B **Moderate Quality & Value:** Those in such a condition as to make a significant contribution for a minimum of 15 years. **Consider for retention.**	Trees that might be included in the high category, but are downgraded because of impaired condition (e.g. presence of remediable defects including unsympathetic past management and minor storm damage).	Trees situated mainly internally to the site, therefore individually having little visual impact on the wider locality or, trees present in numbers, usually as groups or woodlands, such that they from distinct landscape features, thereby attracting higher collective rating than they might as individuals but which are not, individually essential components of formal or semi formal Arboricultural features (e.g. trees or moderate quality within an avenue that includes better A category specimens).	Trees with clearly identifiable conservation or other cultural benefits.	BLUE
Category C **Low Quality & Value:** Those in such a condition as to make a contribution for a minimum of 5 years. **Consider for removal.**	Trees not qualifying in higher categories. Juvenile, semi mature or small tree species which are considered easily replaceable.	Trees present in groups or woodlands, but without this conferring on them significantly greater landscape value, and / or trees offering low or only temporary screening benefit.	Trees with very limited conservation or other cultural benefits.	ORANGE
Category D **Not worthy of retention:** Those in such a condition that any existing value would be lost within 5 years and which should in current context, be removed for reasons of sound Arboricultural management. **Priority for removal**.	Trees that have a serious, irremediable structural defect, such that their early loss is expected due to failure, including those that will become unviable after removal of other trees (i.e. where, for whatever reason the loss of companion shelter cannot be mitigated by pruning). Trees that are dead or are showing signs of significant, immediate and irreversible overall decline Trees infected with a pathogen of significance to the health and/or safety of other trees nearby, or very low-quality trees suppressing adjacent trees of better quality. Trees causing significant damage to structures, where no viable alternatives exist for remedial tree management / modification of structures to enable tree retention. Trees considered a weed species or those listed as noxious weeds. **NOTE:** Dead or dying trees with hollows or cavities may be of ecological importance. These trees are to be identified and assessed independently of the criteria in this cascade chart. Where category D trees are removed habitat reinstatement may be appropriate.			RED