Martin Peacock Tree Care
Arboricultural & Horticultural Consultancy

Arboricultural Impact Assessment Report

139 & 141 Riverview Road
Avalon Beach
NSW 2107

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1.0 Summary

1.1 This Arboricultural Impact Assessment Report provides an assessment of forty-three (43) trees/groups of trees growing at 139 and 141 Riverview Road, Avalon Beach, NSW, 2107 (the site). An additional twenty-three (23) trees growing in the street and neighbouring properties are also included in this report; however, being located outside of the site not all of these trees have not been fully assessed.

1.2 The development proposal for the site includes: demolition of the existing dwelling, and construction of a new dwelling over three levels, plus a wellness studio, entry carparking structure, swimming pool, modification of the driveway (shared with the neighbouring property) and associated landscaping works.

1.3 The development proposal includes the retention of eight (8) trees growing within the site. Tree Protection Zone (TPZ) areas are to be established to protect the retained trees during the construction stage of the project, and tree sensitive construction methods and to be utilised when working within a TPZ.

1.4 The development proposal includes the removal of thirty-five (35) trees growing within the site. Eleven (11) of these trees are listed as Exempt Species under Councils Tree Management Controls.

An additional five (5) trees growing within the road reserve to the front of the site are also proposed for removal to facilitate site access. One (1) of these trees are listed as Exempt Species under Councils Tree Management Controls.

Four (4) trees growing within the neighbouring property to the north are also proposed for removal to facilitate construction of the shared driveway. Three (3) of these trees are listed as Exempt Species under Councils Tree Management Controls.

1.5 To maintain the canopy cover at the site the proposed landscaping treatment includes the planting of advanced size trees.

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 139 and 141 Riverview Road, Avalon Beach, NSW, 2107 (the site) and forms part of the Development Application documentation for the site.

2.2 This Report provides an assessment of forty-three (43) trees/groups of trees growing at the site. An additional twenty-one (21) trees growing in the street and neighbouring properties are also included in this report; however, being located outside of the site not all of these trees have not been fully assessed.

2.3 The development proposal for the site includes: demolition of the existing dwelling, and construction of a new dwelling over three levels, plus a wellness studio, entry carparking structure, swimming pool, modification of the driveway (shared with the neighbouring property) and associated landscaping works.

2.4 Martin Peacock (Martin Peacock Tree Care) visited the site on the 25th of October 2023 and assessed the trees and their growing environment. Selected images showing a number of the trees are contained within Appendix B – Photographs.

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:

- Level & Detail Survey (Issue C), dated 24.10.23 – prepared by Hill & Blume
- Architectural Plans DA000 – DA900 (Revision 1), dated 11.09.24 – prepared by CM Studio
- Landscape Plans DA_01-DA_50 (Issue A), dated 27.09.24 – Prepared by Myles Baldwin Design

4.0 Caveats & Limitations

4.1 The subject trees were inspected from the ground only, using the methodology detailed in this Report. The findings of this Report are based on the observations made at the time of inspection (25/10/23), and from the information contained within the supplied plans/documentation.

4.2 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 = $\surd$ 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: 139 & 141 Riverview Road, Avalon Beach, NSW Date of survey: 25.10.23

Tree No.	Species	DBH comb. (mm)	Height	Radial Crown Spread (m)	Health	Structural Condition	Comments	Age Class	ULE (years)	Quality& Value	Retention Category	Radial TPZ (m)	Radial SRZ (m)
T1	*Corymbia maculata* (Spotted Gum)	500	14	9	Good	Good	Branch contact with adjacent tree Partially suppressed. Wound(s), early signs of decay. **Proposed for retention**	Mature	5-15	Moderate	Consider for Retention	6.0	2.5
T2	*Araucaria cunninghamii* (Hoop Pine)	400	16	3	Good	Fair	Trunk defect due to crossing branch from T1. Partially suppressed. **Proposed for removal**	Early Mature	5-15	Moderate	Consider for Removal	4.8	2.3
T3	*Araucaria cunninghamii* (Hoop Pine)	400	17	3	Good	Good	Partially suppressed. **Proposed for retention**	Early Mature	40+	Moderate	Priority for Retention	4.8	2.3

T4	*Araucaria cunninghamii* (Hoop Pine)	325	14	2	Good	Fair	Codominant inclusion major Heavily suppressed. **Proposed for removal**	Early Mature	5-15	Low	Consider for Removal	3.9	2.1
T5	*Araucaria cunninghamii* (Hoop Pine)	250	14	2	Good	Good	Heavily suppressed. **Proposed for removal**	Early Mature	5-15	Low	Consider for Removal	3.0	1.8
T6	*Araucaria cunninghamii* (Hoop Pine)	275	14	2	Good	Good	Heavily suppressed. **Proposed for retention**	Early Mature	5-15	Low	Consider for Removal	3.3	1.9
T7	*Araucaria cunninghamii* (Hoop Pine)	500	18	3	Good	Good	Heavily suppressed. **Proposed for removal**	Early Mature	40+	Moderate	Consider for Retention	6.0	2.5
G8	*Livistonia australis* (Cabbage Tree Palm)	300	5	2	Good	Good	Group of trees. Partially suppressed. **Proposed for removal**	Semi-mature	15-40	Low	Consider for Removal	3.6	2.0
T9	*Corymbia maculata* (Spotted Gum)	350	14	4	Poor	Good	Crown density 0-25%. Heavily suppressed. **Proposed for retention**	Early Mature	5-15	Low	Consider for Removal	4.2	2.1

T10	*Corymbia maculata* (Spotted Gum)	350	13	5	Good	Good	Crown density 75-95%. Partially suppressed. **Proposed for removal**	Early Mature	15-40	Moderate	Consider for Retention	4.2	2.1
T11	*Allocasuarina torulosa* (Forest Oak)	350	9	5	Good	Fair	Partially suppressed. Wound(s), advanced stages of decay. **Proposed for removal**	Mature	15-40	Moderate	Consider for Retention	4.2	2.1
T12	*Pittosporum undulatum* (Native Daphne)	150	7	3	Poor	Fair	Exempt species (<8m). Crown density 0-25%. Partially suppressed. **Proposed for removal**	Late Mature	<5	Low	Priority for Removal	2.0	1.5
T13	*Pittosporum undulatum* (Native Daphne)	225	9	3	Fair	Good	Partially suppressed. **Proposed for removal**	Mature	5-15	Low	Consider for Removal	2.7	1.8
T14	*Allocasuarina torulosa* (Forest Oak)	275	10	5	Good	Good	Crown density 75-95%. **Proposed for removal**	Mature	15-40	Moderate	Consider for Retention	3.3	1.9
T15	*Corymbia maculata* (Spotted Gum)	250	12	5	Good	Good	Partially suppressed. **Proposed for removal**	Semi-mature	15-40	Moderate	Consider for Retention	3.0	1.8

T16	*Brachychiton acerifolius* (Illawarra Flame Tree)	225	10	3	Good	Good	Exempt species Crown conflict with T14 and T15. **Proposed for removal**	Semi-mature	<5	Low	Priority for Removal	2.7	1.8
T17	*Allocasuarina torulosa* (Forest Oak)	150	7	3	Good	Good	Partially suppressed. **Proposed for retention**	Mature	15-40	Low	Consider for Removal	2.0	1.5
T18	*Allocasuarina torulosa* (Forest Oak)	175	7	3	Good	Good	**Proposed for removal**	Mature	15-40	Low	Consider for Removal	2.1	1.6
T19	*Allocasuarina torulosa* (Forest Oak)	325	7	4	Good	Good	**Proposed for removal**	Mature	15-40	Low	Consider for Removal	3.9	2.1
T20	*Corymbia maculata* (Spotted Gum)	300	12	5	Good	Good	Crown density 75-95%. Small (<25mmø) epicormic growth in low volumes. Partially suppressed. **Proposed for removal**	Early Mature	15-40	Moderate	Consider for Retention	3.6	2.1

T21	*Eucalyptus crebra* (Narrow Leaved Iron Bark)	300	13	4	Fair	Good	Small (<25mmø) epicormic growth in moderate volumes. Partially suppressed. **Proposed for removal**	Mature	15-40	Moderate	Consider for Retention	3.6	2.1
T22	*Jacaranda mimosifolia* (Jacaranda)	250	5	3	Good	Poor	Exempt species Crown consists mainly of epicormic growth. Lopped with resultant epicormics. **Proposed for removal**	Semi-mature	<5	Low	Priority for Removal	3.0	1.9
T23	*Strelitzia nicolai* (Giant Bird of Paradise)	1000	4	3	Good	Good	**Proposed for removal**	Mature	15-40	Low	Consider for Removal	4	n/a
T24	*Corymbia maculata* (Spotted Gum)	350	13	5	Fair	Good	Crown density 75-95%. Partially suppressed. **Proposed for removal**	Early Mature	15-40	Moderate	Consider for Retention	4.2	2.2

T25	*Jacaranda mimosifolia* (Jacaranda)	325	9	10	Good	Good	Exempt species Partially suppressed. **Proposed for removal**	Mature	15-40	Low	Consider for Removal	3.9	2.1
T26	*Corymbia maculata* (Spotted Gum)	200	10	4	Fair	Good	Crown density 0-25%. Heavily suppressed. **Proposed for removal**	Semi-mature	5-15	Low	Consider for Removal	2.4	1.8
T27	*Corymbia maculata* (Spotted Gum)	825	18	12	Good	Good	Partially suppressed. **Proposed for removal**	Mature	15-40	High	Priority for Retention	9.8	3.2
G28	*Archontophoenix cunninghamiana* (Bangalow Palm)	200	10	2	Good	Good	Exempt species Group of 6 trees. **Proposed for removal**	Mature	15-40	Low	Consider for Removal	2.4	1.8
G29	*Jacaranda mimosifolia* (Jacaranda)	400	15	9	Good	Good	Exempt species Group of 3 trees. Partially suppressed. **Proposed for removal**	Mature	15-40	Moderate	Consider for Retention	4.8	2.3
T30	*Eucalyptus botryoides* (Bangalay)	650	14	5	Fair	Poor	Extensive crown dieback. Wound(s), advanced stages of decay. Termites. **Proposed for removal**	Mature	5-15	Moderate	Consider for Removal	7.8	2.9

G31	*Syzygium australe* (Brush Cherry Lilly Pilly)	250	4	3	Good	Fair	Hedge Crown density 25-50%. Partially suppressed. **Proposed for removal**	Semi-mature	5-15	Low	Consider for Removal	3.0	1.9
T32	*Jacaranda mimosifolia* (Jacaranda)	350	10	4	Good	Good	Exempt species Partially suppressed. **Proposed for removal**	Mature	15-40	Low	Consider for Removal	4.1	2.2
T33	*Corymbia maculata* (Spotted Gum)	1000	22	9	Good	Good	Wound(s), various stages of decay. **Proposed for retention**	Mature	15-40	High	Priority for Retention	12.0	3.4
T34	*Corymbia maculata* (Spotted Gum)	250	10	2	Good	Good	Partially suppressed. **Proposed for removal**	Semi-mature	15-40	Low	Consider for Removal	3.0	1.9
T35	*Corymbia maculata* (Spotted Gum)	250	12	3	Good	Good	Partially suppressed. **Proposed for retention**	Semi-mature	15-40	Low	Consider for Removal	3.0	1.9
T36	*Glochidion ferdinandi* (Cheese Tree)	325	6	4	Good	Good	Crown density 75-95%. **Proposed for removal**	Mature	15-40	Moderate	Consider for Retention	3.9	2.1

G37	*Olea europea subsp. cuspidata* (African Olive)	400	5	4	Good	Good	Exempt species Group of 3 trees. **Proposed for removal**	Mature	<5	Low	Priority for Removal	4.8	2.3
T38	*Pinus radiata* (Monterey Pine)	475	11	5	Good	Good	Exempt species Partially suppressed. Phototrophic lean, slight. **Proposed for removal**	Mature	15-40	Low	Consider for Removal	5.7	2.5
T39	*Eucalyptus robusta* (Swamp Mahogany)	300	4	5	Good	Fair	Partially suppressed. Wound(s), early signs of decay. **Proposed for removal**	Mature	15-40	Low	Consider for Removal	3.6	2.1
T40	*Angophora costata* (Sydney Red Gum)	500	8	8	Good	Good	Partially suppressed. Wound(s), early signs of decay. Phototrophic lean, moderate. **Proposed for retention**	Mature	15-40	Moderate	Consider for Retention	6.0	2.6
T41	*Eucalyptus botryoides* (Bangalay)	500	11	6	Good	Fair	Crown density 75-95%. Wound(s), various stages of decay. **Proposed for removal**	Mature	15-40	Moderate	Consider for Retention	6.0	2.6

T42	*Schefflera actinophylla* (Queensland Umbrella Tree)	450	5	4	Good	Fair	Exempt species Bark inclusion(s), minor. **Proposed for removal**	Mature	5-15	Low	Consider for Removal	5.4	2.5
T43	*Ficus benjamina* (Weeping Fig)	900	3	2	Fair	Poor	Exempt species Lopped. **Proposed for removal**	Mature	<5	Low	Priority for Removal	10.8	3.3
A	*Corymbia maculata* (Spotted Gum)	600	-	-	-	-	Located in road reserve. **Proposed for retention**	-	-	-	N/A – outside of site	7.2	2.7
B	*Brachychiton acerifolius* (Illawarra Flame Tree)	200	-	-	-	-	Exempt species Located in road reserve. **Proposed for retention**	-	-	-	N/A – outside of site	2.4	1.7
C	*Brachychiton acerifolius* (Illawarra Flame Tree)	175	-	-	-	-	Exempt species Located in road reserve. **Proposed for retention**	-	-	-	N/A – outside of site	2.1	1.6
D	*Allocasuarina torulosa* (Forest Oak)	275	-	-	-	-	Located in road reserve. **Proposed for retention**	-	-	-	N/A – outside of site	3.3	1.9

E	*Allocasuarina torulosa* (Forest Oak)	125	-	-	-	-	Located in road reserve. **Proposed for removal**	-	-	-	N/A – outside of site	2.0	1.5
F	*Brachychiton acerifolius* (Illawarra Flame Tree)	300	-	-	-	-	Exempt species Located in road reserve. **Proposed for removal**	-	-	-	N/A – outside of site	3.6	2.0
G	*Allocasuarina torulosa* (Forest Oak)	275	-	-	-	-	Located in road reserve. **Proposed for removal**	-	-	-	N/A – outside of site	3.3	1.9
H	*Allocasuarina torulosa* (Forest Oak)	300 150	-	-	-	-	Located in road reserve. **Proposed for removal**	-	-	-	N/A – outside of site	3.9	2.1
I	*Allocasuarina torulosa* (Forest Oak)	275	-	-	-	-	Located in road reserve. **Proposed for removal**	-	-	-	N/A – outside of site	3.3	1.9
J	*Jacaranda mimosifolia* (Jacaranda)	125	-	-	-	-	Exempt species Located in road reserve. **Proposed for retention**	-	-	-	N/A – outside of site	2.0	1.5
K	*Grevillea* 'Moonlight' (Grevillea cultivar)	50	-	-	-	-	Located in road reserve. **Proposed for retention**	-	-	-	N/A – outside of site	2.0	1.5

L	*Pittosporum undualatum* (Native Daphne)	125	-	-	-	-	Exempt species (<8m) Located in road reserve.	-	-	-	N/A – outside of site	2.0	1.5
M	*Cotoneaster glaucophyllus* (Cotoneaster)	500 @ grade	-	-	-	-	Exempt species Located in road reserve.	-	-	-	N/A – outside of site	6.0	2.5
N	*Ligustrum lucidum* (Large Leaved Privet)	175	-	-	-	-	Exempt species Located in neighbouring property. **Proposed for removal**	-	-	-	N/A – outside of site	2.1	1.6
O	*Jacaranda mimosifolia* (Jacaranda)	250 125	-	-	-	-	Exempt species Located in neighbouring property. **Proposed for removal**	-	-	-	N/A – outside of site	3.3	1.9
P	*Corymbia maculata* (Spotted Gum)	550	-	-	-	-	Located in neighbouring property.	-	-	-	N/A – outside of site	6.6	2.6
Q	*Corymbia maculata* (Spotted Gum)	800	-	-	-	-	Located in neighbouring property.	-	-	-	N/A – outside of site	9.6	3.0
R	*Corymbia maculata* (Spotted Gum)	300	-	-	-	-	Located in neighbouring property.	-	-	-	N/A – outside of site	3.6	2.0

S	*Pinus elliottii* (Slash Pine)	750	-	-	-	-	Exempt species Located in neighbouring property	-	-	-	N/A – outside of site	9.0	2.9
T16(A)	*Nerium oleander* (Oleander)	400	-	-	-	-	Exempt species Located in neighbouring property **Proposed for removal**	-	-	-	N/A – outside of site	4.8	2.3
T17(A)	*Pittosporum undualatum* (Native Daphne)	300	-	-	-	-	Located in neighbouring property **Proposed for retention**	-	-	-	N/A – outside of site	3.6	2.0
T21(A)	*Allocasuarina torulosa* (Forest Sheoak)	400	-	-	-	-	Located in neighbouring property **Proposed for retention**	-	-	-	N/A – outside of site	4.8	2.3
T22(A)	*Strelitzia nicolai* (Giant Bird of Paradise)	1500 @ grade	-	-	-	-	Located in neighbouring property **Proposed for removal**	-	-	-	N/A – outside of site	3.0	n/a

7.0 Observations

7.1 The trees growing within the site 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. Typically, trees growing outside of the site are to be retained regardless of their condition and are not allocated a Retention Category. Full details of the trees assessment are listed in 6.1 Results - Tree Assessment Schedule.

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 When assessing the potential impact of development upon a tree, AS479 provides formulae for calculating the Tree Protection Zone (TPZ) and Structural Root Zone (SRZ) areas required for the tree. The TPZ and SRZ are based on the tree's trunk diameter and are a radial distance measured from the centre of the trunk at ground level. The TPZ area is defined as the minimum area required to maintain the long-term viability of the tree, with the smaller SRZ area defined as the minimum area required for the stability of the tree. When assessing the potential impact of development works within a TPZ area the extent of the encroachment from the works can be divided into two categories:

- Minor Encroachment - an area no greater than 10% of the TPZ that is outside of the SRZ.
- Major Encroachment - an area greater than 10% of the TPZ, or within the SRZ (regardless of the percentage of encroachment)

A Minor Encroachment should not significantly impact the tree, whilst a Major Encroachment requires a range of factors to be considered and in some cases further investigations, to determine the potential impact of the encroachment. Typically, tree sensitive design and construction methods will be required where development works represent a Major Encroachment.

7.4 Trees Proposed for Retention

Trees T1, T3, T6, T9, T17, T33, T35 and T40 are proposed for retention. The table below provides a summary of the trees' quality and value and Retention Category:

Quality & Value	Retention Category	Tree no.
A - High	Priority for Retention	T3, T33
B - Moderate	Consider for Retention	T1, T40
C - Low	Consider for Removal	T6, T9, T17, T35
D – Not suitable for Retention	Priority for Removal	-

The supplied plans show Trees T1, T3, T6, T7 and T9 will be subject to varying degrees of encroachment (+/- 10%) within their Tree Protection Zone (TPZ) areas from the proposed footpath and stairs.

Tree T17 will be subject to a Major Encroachment (>10%) within the TPZ area from the proposed storage room/carport.

Tree T18 will be subject to a Minor Encroachment (<10%) within the TPZ area from the proposed shared driveway realignment.

Tree T33 will be subject to a Major Encroachment (>10%) within the TPZ area from the proposed dwelling, swimming pool and retaining wall construction.

No development works other than soft landscaping is proposed within the TPZ area of Tree T35.

Tree T40 will be subject to a Major Encroachment (>10%) within the TPZ area from the proposed swimming pool, stairs and retaining wall.

Where the trees listed above are subject to a Major Encroachment, tree sensitive design and construction methods will be required when working within the TPZ area.

7.5 Trees Proposed for Removal

Trees T2, T4, T5, T7, G8, T10-T16, T18-T32, T34, T36, G37-T39 and T41-T43 are proposed for removal. The table below provides a summary of the trees' quality and value and Retention Category:

Quality & Value	Retention Category	Tree no.
A - High	Priority for Retention	T27
B - Moderate	Consider for Retention	T7, T10, T11, T14, T15, T20, T21, T23, T24, G29*, T36, T41
C - Low	Consider for Removal	T2, T4, T5, G8, T13, T18, T19, T25, T26, G28*, T30, G31, T32*, T34, T38*, T39, T42*
D – Not suitable for Retention	Priority for Removal	T12*, T16*, T22*, G37*, T43*

*Tree listed as Exempt under Council's Tree Management Controls

7.6 Trees Outside of The Site

Trees A-M are growing within the road reserve to the front of the site, and Trees N-S are growing within the neighbouring property to the south of the site.

Trees T16(A), T17(A), T21(A) and T22(A) are growing within the neighbouring property to the north of the site. These trees have been previously assessed by treeiQ as part of a separate Development Application for 143-145 Riverview Road. To differentiate between these trees and the trees growing within the site that have been assessed by Martin Peacock Tree Care as part of the preparation of this Report the label (A) has been added to the trees.

No development works are proposed within the TPZ areas of Trees A-D, K, L, M and R.

Tree J will be subject to a Major Encroachment (>10%) within the TPZ area from the proposed storage room/carport.

Trees E, F, G, H, I, N, O, T16(A) and T22(A) are proposed for removal.

Tree P and Q will be subject to a Major Encroachment (>10%) within the TPZ area from the proposed building footprint.

Tree S will be subject to a Minor Encroachment (<10%) within the TPZ area from the proposed building footprint.

8.0 Discussion

8.1 The construction of the proposed footpath and stairs connecting the entry portico to the dwelling will require the removal of Trees T2, T4, T5 and T7. These trees form part of a same species group (including T3 and T6) which has been very closely planted, and as a result the form and quality of the trees is being heavily impacted by suppression. Thinning of the group to retain Trees T3 and T6 will provide additional space for the development of these trees over the long term.

8.2 To minimise the impact of construction upon Trees T1, T3, T6 and T9 the proposed footpath and stairs connecting the entry portico to the dwelling should be installed predominantly above exiting grade. The stairs should be supported on isolated piers, installed to avoid significant roots (as determined by the Project Arborist). Any excavation within TPZ areas should be undertaken using hand tools under the supervision of the Project Arborist. Where required, the footpath and stairs should be modified to allow for the retention of significant roots (as determined by the Project Arborist).

8.3 The store room/entry portico is to be constructed above existing grade on piered footings and the driveway crossover is to be designed as a cantilevered slab which will minimise the impact of construction upon Trees T17 and J. Piers should be installed to avoid significant roots (as determined by the Project Arborist).

8.4 The removal of Trees E-I (growing within the road reserve) will have limited impact on the canopy cover and amenity of the streetscape as these trees are all relatively small, partially supressed specimens with low landscape value.

8.5 Tree T33 will be subject to a Major Encroachment (13.5%) from excavation for construction of the dwelling and swimming pool. However, the proposed excavation works are on one side of the tree's TPZ area, and are only marginally greater than that which would be classed as a Minor Encroachment. Therefore, with the implementation of best practice tree protection measures, the proposed development should not significantly impact the tree.

8.6 A linear strip of fill is to be installed to the rear of the proposed retaining wall within the TPZ area of Tree T33. The fill will be graded out to meet existing ground levels to the east. Although placement of large amounts of fill over a tree's root system can impact root function and tree health, in this case installing a relatively narrow strip of fill tangentially through the TPZ should have minimal impact upon the tree. To minimise excavation requirements and retain roots, retaining walls should be installed above existing grade on piered footings with all other parts of the structure located above existing grade.

8.7 The proposed building footprint (dwelling and garage) within the TPZ area of Trees P and Q represent a Major Encroachment of 16% and 11.6% respectively. However, in accordance with AS4970 - point *3.3.4 TPZ encroachment considerations (g), 'the presence of existing or past structures or obstacles affecting root growth'* has been considered when determining the impact of the proposed development. A number of existing retaining walls are located in the garden area between the site boundary and the existing carport. The footings of these walls should have restricted to some extent the tree's root spread into the site. In addition, the existing carport slab within the TPZ area of Tree Q on a large section of exposed rock where no root growth is present.

The proposed excavation works are on one side of the Trees' TPZ areas and are only marginally greater than that which would be classed as a Minor Encroachment. Therefore, with the implementation of best practice tree protection measures, the proposed development should not significantly impact the trees.

8.8 The removal of Trees N, O, T16(A) and T22(A) as part of the shared driveway construction will have limited impact on the canopy cover and amenity within the neighbouring property. Trees N, O, T16(A) are low value specimens that are listed as an exempt species under Councils Tree Management Controls and can therefore be removed without Council approval. Tree T22(A) is an exotic, clump forming perennial plant only, and is of low value.

Realignment will position the new driveway further from Tree T17(A) which is proposed for retention.

8.9 To support the health of all trees subject to encroachment from development works, irrigation and mulch should be installed in TPZ areas during the construction stage of the project.

8.10 All construction works in TPZ areas will require the use of tree sensitive demolition and construction methods and should be supervised by the Project Arborist.

8.11 To offset tree removals and ensure the canopy cover at the site is maintained over the long term the Landscape Plans include the planting of advanced size trees.

9.0 Recommendations

9.1 Trees T2, T4, T5, T7, G8, T10-T16, T18-T32, T34, T36, G37-T39 and T41-T43, E, F, G, H, I, N, O, T16(A) and T22(A) 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*. Prior to undertaking the work, the Project Arborist shall clearly mark all trees approved for removal with marker spray or surveyor's tape.

Where the stumps of removed trees are located within TPZ areas of trees to be retained, to minimise ground disturbance the stumps shall be either ground out or treated with herbicide to prevent regrowth.

9.2 As part of the site establishment works install fenced TPZ areas for the following trees:

- Trees T1, T3, T6, T9, T17, T33, T35 and T40
- Retained trees growing within the road reserve adjacent to the proposed entry portico
- Retained trees growing adjacent to the shared driveway

TPZ fencing shall be set back from each tree by the radial distance (measured from the center of the trunk at ground level) detailed in column 12 of the Tree Assessment Schedule (section 6.0 Results). Where TPZ areas overlap, a single combined TPZ shall be established. Where the installation of fencing is impractical for development access, trunk and ground protection shall be installed.

To the most appropriate TPZ set out in terms of demolition and construction access whilst providing adequate tree protection, as part of the site establishment works the Project Arborist shall meet on site with the Project/Site Manager to determine the detailed TPZ setout required for each tree.

A temporary drip irrigation system shall be installed in each TPZ area. Irrigation lines shall be spaced at 600mm centres and be covered with a 75mm thick layer of leaf litter mulch. At the time of irrigation installation, a soil wetting agent shall be applied with each TPZ area.

The irrigation system shall be operated via an automated timer for a duration of 30 minutes every second day, or as directed by the Project Arborist. A seaweed based soil conditioner shall be applied to all TPZ areas on a quarterly basis throughout the construction stage of the project.

TPZ areas shall be maintained for the duration of the project and shall not be modified or used for the storage of demolition waste or construction materials.
Refer: Appendix C – Establishment of TPZ Areas

9.3 Within TPZ areas sediment and erosion control infrastructure shall be installed above grade without excavation. Sediment fencing shall be help in place with steel pins, coir logs or mulch.

9.4 Existing pavements and structures within TPZ areas shall be carefully demolished in small sections, ensuring that the surrounding soil profile remains undisturbed. Where possible, redundant footings and services should be left in situ. Shrubs and ground cover vegetation in TPZ areas shall be removed using hand tools and woody stumps shall be treated with herbicide or ground out to prevent regrowth.

9.5 Prior to excavation for construction of the swimming pool within the TPZ area of Trees T33 and T40, and the building footprint within the TPZ areas of trees P Q and S, root pruning shall be undertaken by the Project Arborist. All woody roots within the upper 600mm of the soil profile along the line of proposed excavation shall be cleanly pruned using a sharp saw.

9.6 Excavation within TPZ areas for the installation of approved structures, retaining walls and the shared driveway shall avoid over excavation, benching or battering. Where required, sheet piling (or similar methods) shall be utilised to provide support to excavated areas. Where sub surface drainage is required to the rear of retaining walls a slimline drainage cell type product shall be utilised.

9.7 The entry portico/crossover slab, retaining walls and stairs within TPZ areas shall be installed predominantly above existing grade on piered footings. The upper 600mm of each pier hole shall be excavated by hand, and where roots greater than 30mm diameter are encountered the pier location shall be adjusted (unless root pruning is approved by the Project Arborist). Where required, pier holes shall be sleeved to prevent contact between roots and freshly poured concrete.

9.8 Back fill to the rear of the retaining wall within the TPZ area of Tree T33 shall comprise of either, excavated site soil (free from organic material), or an imported 80/20 washer river sand/screened topsoil blend.

9.9 Underground services within TPZ areas shall be installed using tree sensitive methods and retain all roots >25mm diameter (or as specified by the Project Arborist and/or Conditions of Development Approval). Tree sensitive methods include the following:

- Hand excavation: trenches shall be excavated using hand tools only.
- Hydrovac excavation: trenches shall be excavated using low water pressures and the lance shall not be pointed directly at roots to avoid bark damage.
- A combination of compact excavator/hand excavation: trenches shall be excavated using a compact excavator (<2T) fitted with a flat bladed bucket. Soil levels shall be lowered in small increments. The excavator operator shall be guided by a spotter at all times to identify and carefully expose all roots >25mm diameter using hand tools.

Pipework/conduits shall be installed under or around significant roots (as determined by the Project Arborist), unless root pruning is approved by the Project Arborist.

9.10 Other than excavation for approved structures, existing landscape levels within TPZ areas shall be generally maintained. Installation of top soil, soil conditioners and turf underlay up to a maximum depth of 150mm in TPZ areas is permissible; however, existing levels within 1.5m of the base of any tree shall be maintained.

9.11 New trees shall be grown and supplied in accordance with *AS:2303 2018 Tree stock for landscape use.* The planting and aftercare of the trees shall be undertaken by a qualified horticulturalist (minimum AQF level 3).

9.12 Development works within TPZ areas shall be supervised by the Project Arborist in accordance with the Conditions of Development Approval.

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)

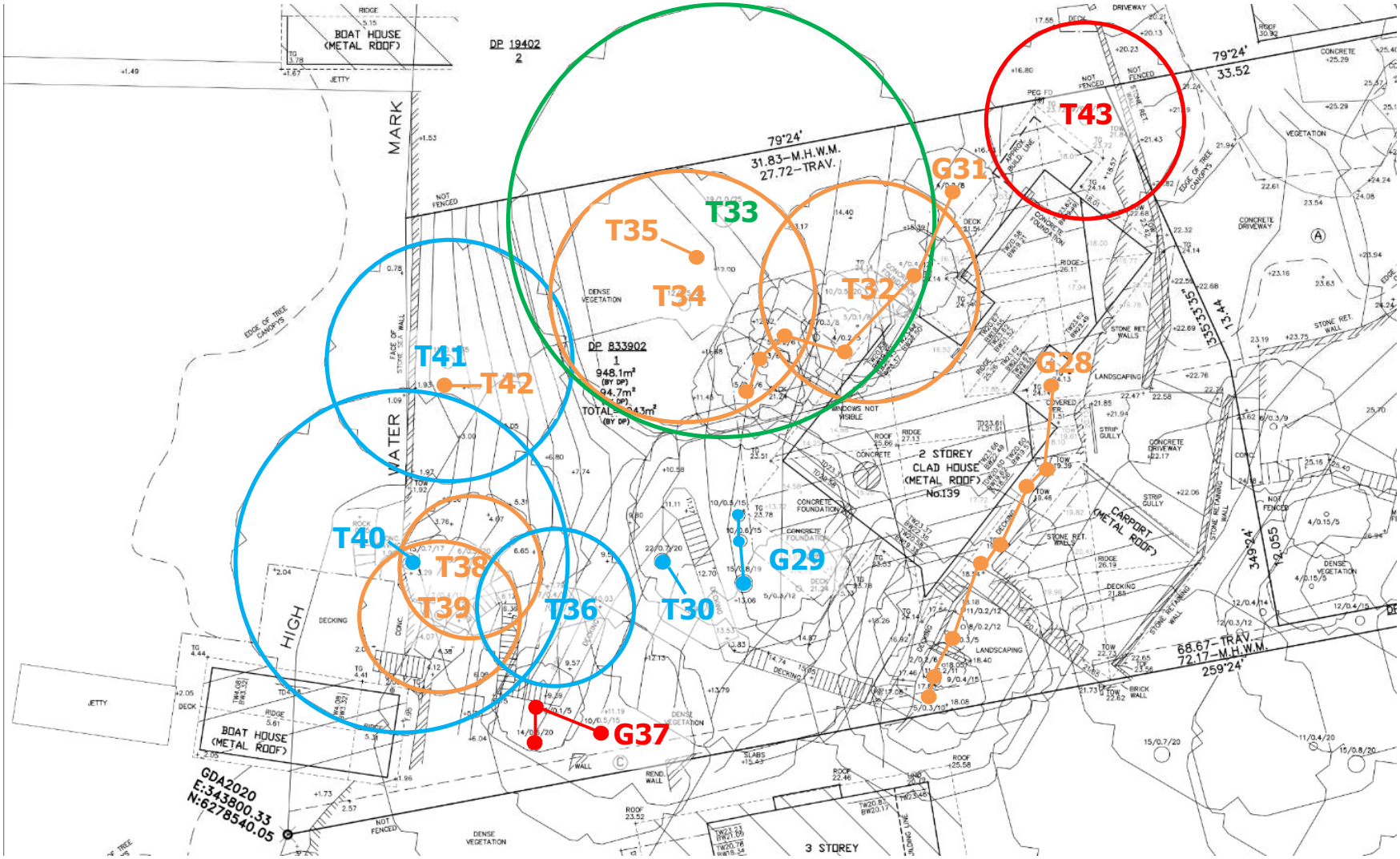
References

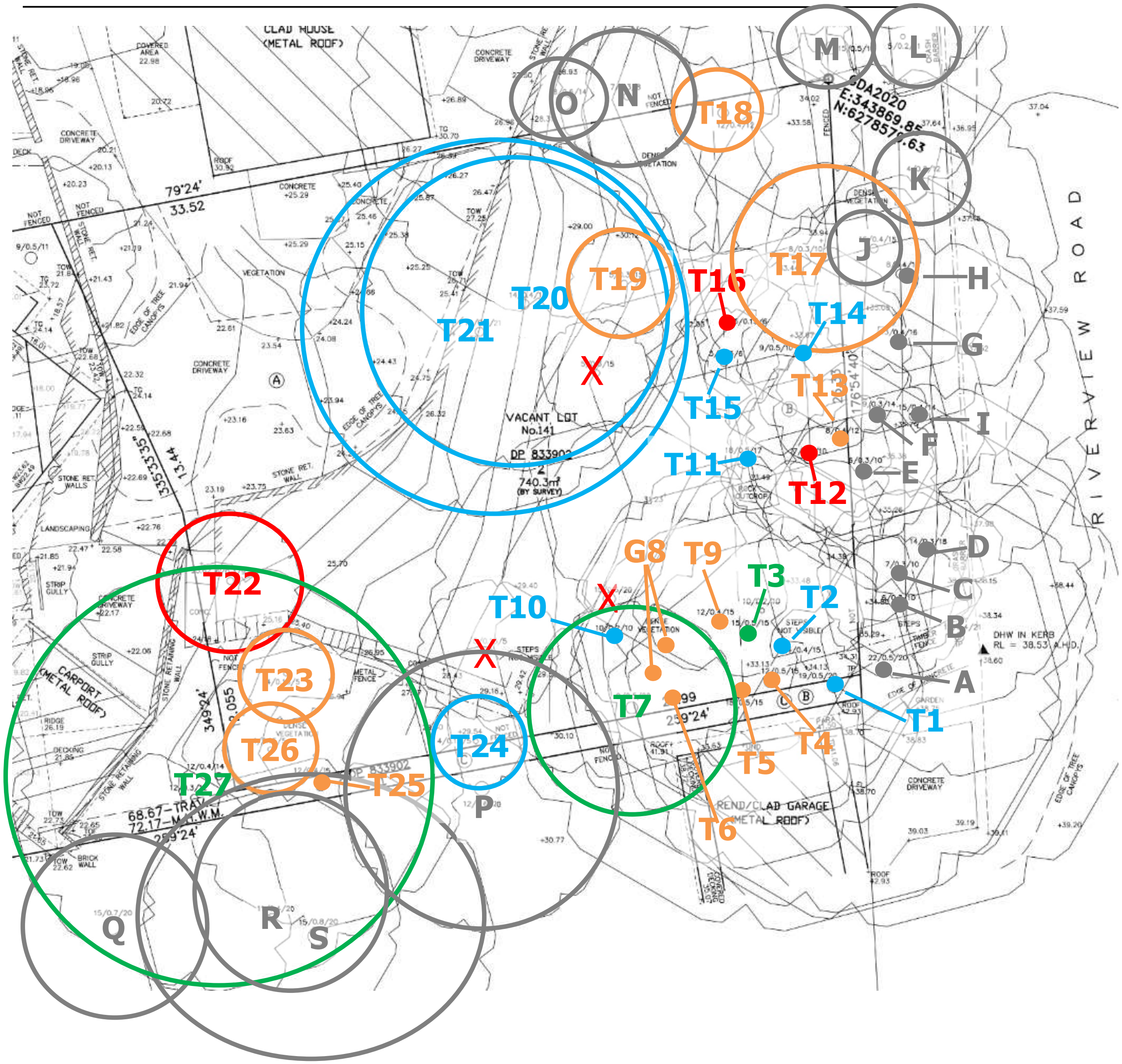
Australian Standard: *AS 4970 - 2009 Protection of trees on development sites*. Standards Australia GPO Box 476, Sydney, NSW, 2001.

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

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.

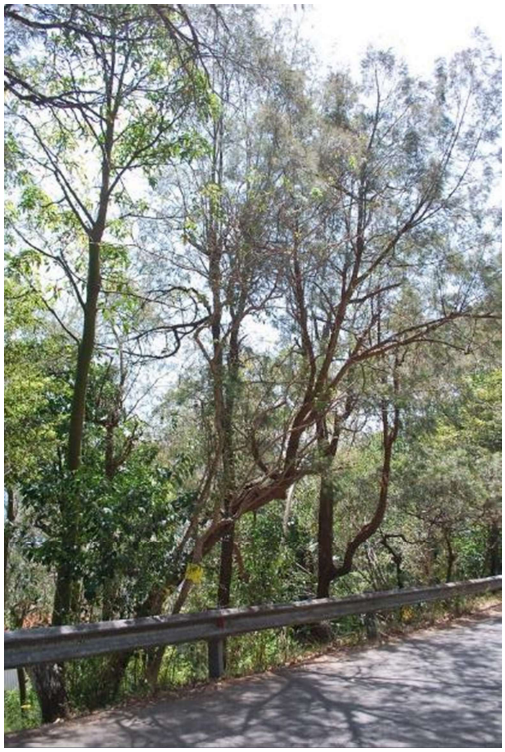
Appendix A – Tree Location Plan




T1
T2
T3
T4
T5
T6
T7
G8
T9
T10
T11
T12
T13
T14
T15
T16
T17
T18
T19
T20
T21
T22
T23
T24
T25
T26
T27
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P
Q
R
S
VACANT LOT
No.141
DP 833902
740.3m²
RIVERVIEW ROAD
GDA2020
REND/CLAD GARAGE
(METAL ROOF)
CLAD HOUSE
(METAL ROOF)
CARPORT
(METAL ROOF)
DHW IN KERB
RL = 38.53 A.H.D.

Appendix B – Photographs

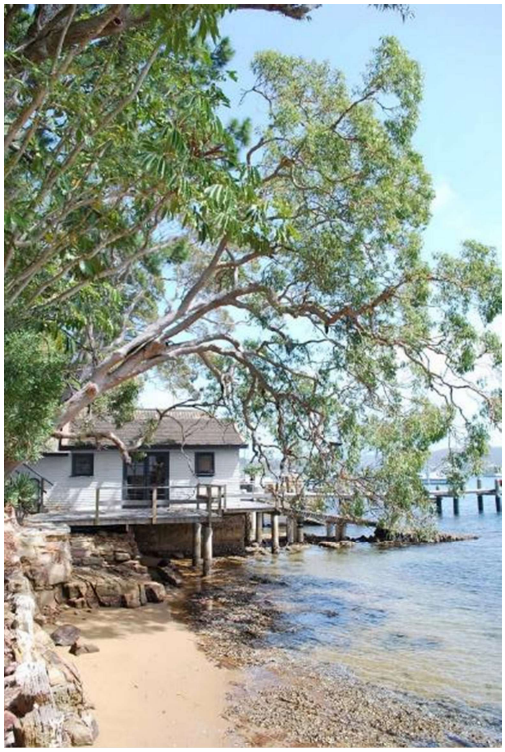
1: Trees T1-T5



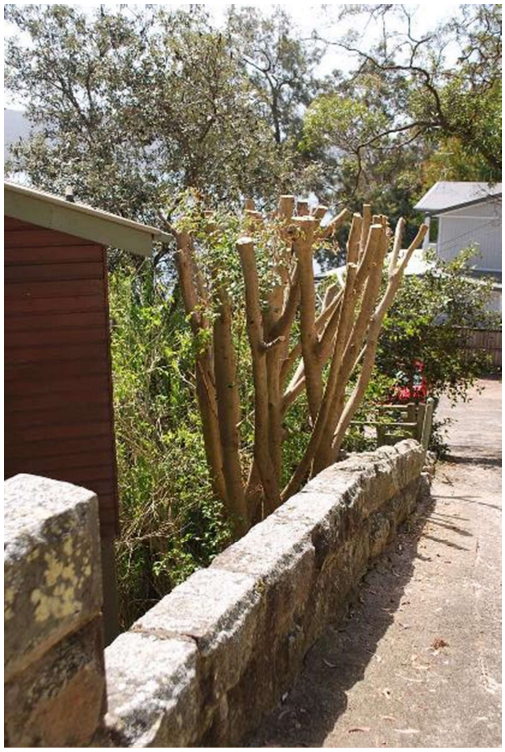
2: Trees T11-T14

3: Trees G28

4: Tree T33



5: Tree T40

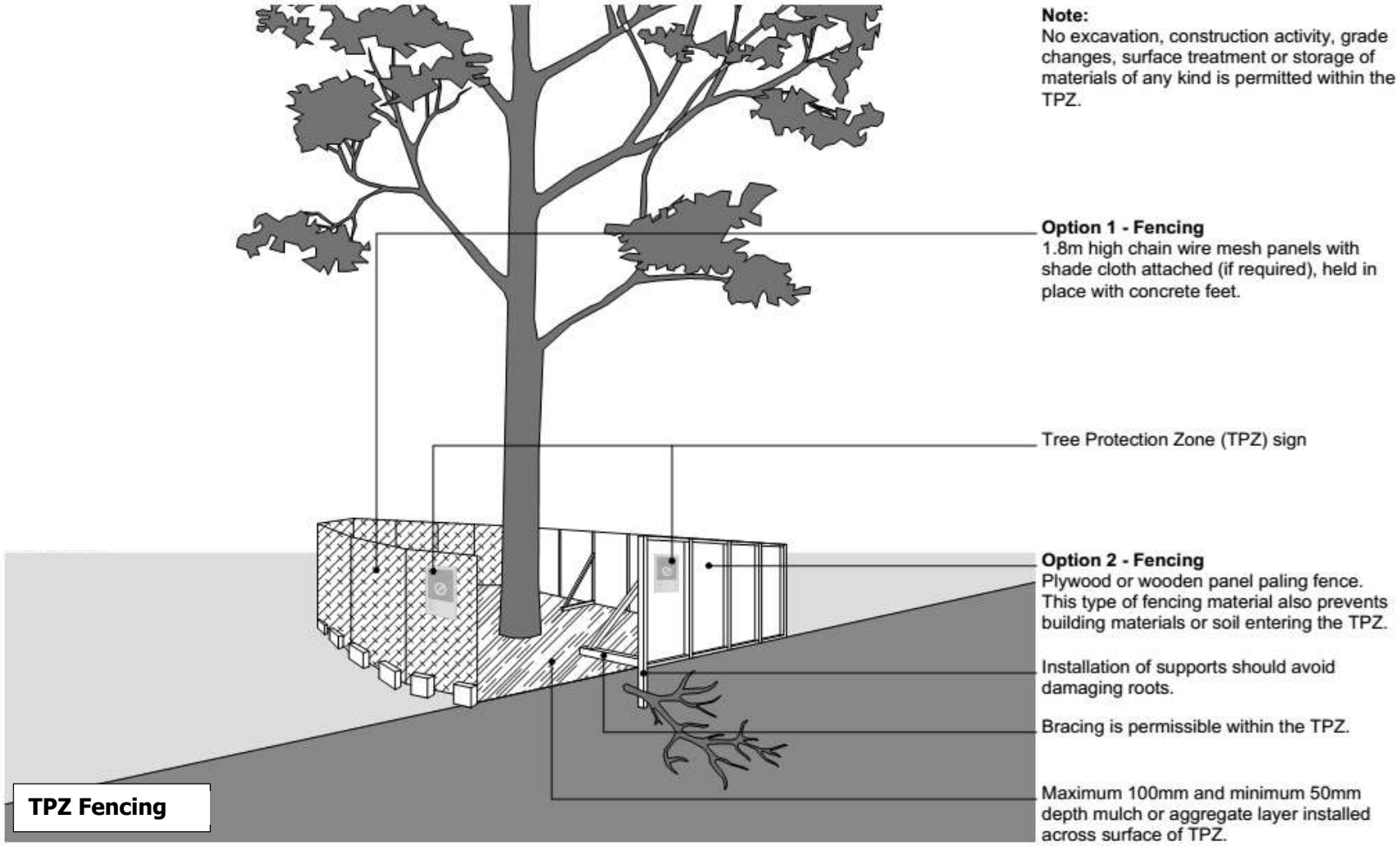


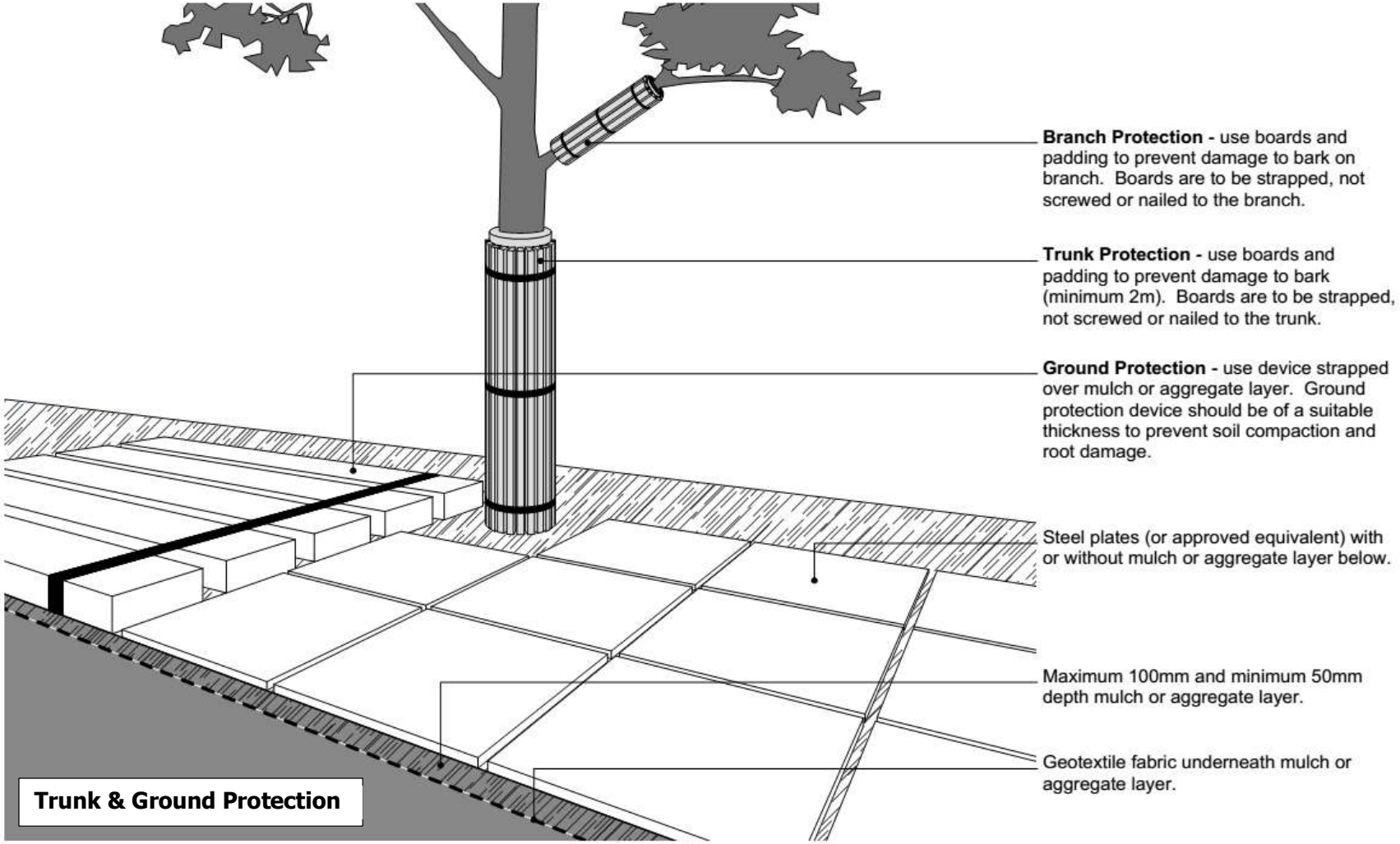
6: Tree T43

7: Trees P-S and adjacent retaining wall

8: Showing exposed rock outcrop/carport within the TPZ area of Tree Q

Appendix C – Establishment of TPZ Areas




Branch Protection - use boards and padding to prevent damage to bark on branch. Boards are to be strapped, not screwed or nailed to the branch.
Trunk Protection - use boards and padding to prevent damage to bark (minimum 2m). Boards are to be strapped, not screwed or nailed to the trunk.
Ground Protection - use device strapped over mulch or aggregate layer. Ground protection device should be of a suitable thickness to prevent soil compaction and root damage.
Steel plates (or approved equivalent) with or without mulch or aggregate layer below.
Maximum 100mm and minimum 50mm depth mulch or aggregate layer.
Geotextile fabric underneath mulch or aggregate layer.
Trunk & Ground Protection

Appendix D - 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 suitable for 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