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16 March 2015

Proposed Flat Development

Lot 30 – 31 Sec 20 DP 2296

No 41 and No 43 Barber Avenue
PENRITH NSW 2750

Arboricultural Impact Assessment

Prepared for;

Mr Simon Elias
C/- JS Architects Pty Ltd
PO Box 6967 BAULKHAM HILLS NSW 2153

Prepared by;
Cheryl MacKay Level 5 Consulting Arboriculturist

1. Introduction/Background

Mr Simon Elias has commissioned MacKay Tree Management to assess trees located on the sites 41 and 43 Barber Street Penrith (the subject sites).

Mr Elias is proposing a Six Storey Flat Building Development for the site. The development comprises demolition of the existing buildings, tree removal and construction of a six storey flat building with two levels of basement parking.

Twenty three (23) trees are over three (3) metres in height and are within five (5) metres of the proposal. Fifteen (15) site trees, six (6) neighbouring trees and two (2) street trees are the subject trees of this report.

The report assesses the twenty three trees and provides basic arboricultural data for each tree; species type, dimensions, health and condition and retention value.

Assessment finds that fifteen site trees have low environmental and/or landscape significance. Street trees and trees located on neighbouring properties are allocated a high retention value regardless of their condition or significance as they are privately owned and cannot be adversely impacted by the proposal.

This report and any works recommended herein are to form part of the Development Application to Penrith City Council.

2. Assessment Methods

A visual tree assessment (*VTA*) [1.] was carried out from the ground on 13 March 2015.

Tree height and age was estimated and Diameter at Breast Height (D.B.H.) was measured 1.4 metres (m.) above ground.

No tree root investigation or soil exploration was undertaken.

Tree Protection Zones and Protection Methods are referenced from Standard® AS 4970 - 2009 Protection of Trees on Development Sites. [2.] Radius is measured from the center of the trunk at ground level.

Tree Significance is determined by using the Tree Significance - Assessment Criteria of the *IACA Significance of a Tree, Assessment Rating System* (STARS)© (IACA, 2010), Appendix 7.

In preparing this report the author is aware of and has taken into account the objectives of Penrith Local Environment Plan (LEP) 2010 Section 5.9 Preservation of Trees; Penrith Development Control Plan (DCP) 2014 Volume 1 – C2 Vegetation Management and Volume 2 Preservation of Trees and Vegetation; D2 Residential Development and 2.5 Residential Flat Building.

The report has relied upon the following plan/s and documents:

Plan/Document	Designer	Drawing No.	Dated
Drawings	J S Architects	02/15 – 15/15	16/12/2014
Survey Plan	Cedar Surveying Services	CCAD5/DATA/3100	17/11/2014

3. Observations

3.1 The Subject Sites

No 41 Barber Avenue is a rectangular block measuring 843.1 m $^{2.}$
No 43 Barber Avenue is a rectangular block measuring 843.1 m $^{2.}$

No 41 houses single storey brick cottage with a rear workshop/garage
No 43 Houses a single storey fibro cottage with an in-ground swimming pool and metal garage.

No 41 holds mature exotic and native trees and palms in the rear garden and side boundaries.

3.2 The Proposed Development

The proposal involves demolition of the existing dwellings, metal work sheds and garages and tree removal.

A six storey flat building with three levels of underground parking is proposed for the site.

3.3 Summary of Tree Impacts

Tree Removal

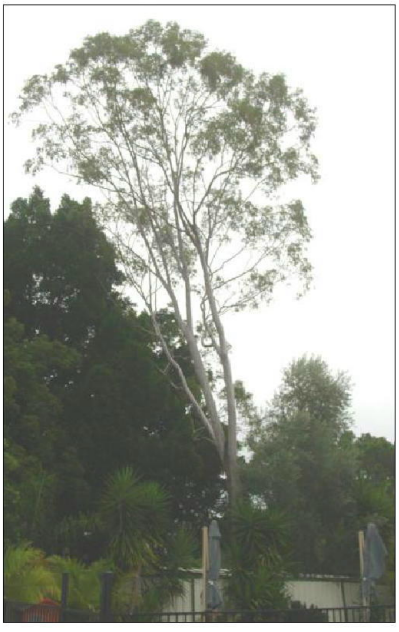
The removal of the fifteen site trees and palms is proposed.
The trees are assessed as having low to medium environmental significance and low priority for retention. The trees can be replaced as part of the landscaping works.

Tree retention and Protection

Street trees can be safely retained as part of the development.

Six neighbouring trees have minimal impact from the development.

Neighbouring Tree 3 *Corymbia maculata* (Spotted Gum) (photograph at right) is sensitive to environmental change and is given a 4.3 m. TPZ – 3 m. inside the site.



See recommendations page 6.

Tree Pruning:

Based on current arboricultural best practice, pruning should not significantly alter the natural form of a tree or remove live foliage and branches as to significantly impact the tree's biological processes.

To prevent damage to the overhanging canopy of neighbouring Tree 2 *Cinnamomum camphora* (Camphor Laurel) during construction 2nd and 3rd order overhanging branches will need to be reduction pruned.

Cheryl Mackay

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Founding Member I.A.C.A (ACM0062003), I.S.A (Member 200984) & L.G.T.R.A.
Level 5 Qualified and Practicing Arborist/Horticulturist since 1995

4. Discussion

4.1 Trees Recommended for Retention and Protection

The following trees are council or privately owned and are rated with a high retention value regardless of their current condition or environmental significance.

Table 1. Trees Recommended for Retention

Tree No	Scientific / Common Name	Location
S1 S2	*Lophostemon confertus* Brush Box	No 43 Barber Avenue Street Trees
1	*Acer negundo* Box Elder	Neighbouring Tree 4 Collees Street, within 1 m. of western site boundary. Exempt weed species.
2	*Cinnamomum camphora* Camphor Laurel	Neighbouring Tree 4 Collees Street, within 1 m. of western site boundary. Weed species
3	*Corymbia maculata* Spotted Gum	Neighbouring Tree 4 Collees Street, within 1.5 m. of western site boundary.
19	*Jacaranda mimosifolia* Jacaranda	Neighbouring Tree 39 Barber Avenue, within 1 m. of eastern site boundary.
20	*Casuarina cunninghamiana* River She Oak	Neighbouring tree 148 Great Western Highway within 1.2 m., of northern site boundary.
21	*Casuarina cunninghamiana* River She Oak	Neighbouring tree 152 Great Western Highway within 1.5 m., of northern site boundary.

4.2 Trees Recommended for Removal

The following trees are considered to have moderate to low significance and should be considered for removal due to their poor condition or small size.

Small trees or shrubs can easily be replaced with screening trees as part of site landscaping works.

Table 2. Trees Recommended for Removal

Tree No	Scientific/Common Name	Location	Comment
4	*Syagrus romanzoffianum* Cocos Palm	Eastern boundary No 41	Exempt from provision of Clause 5.9 Penrith LEP 2010. Weed species.
5	*Cupressus sempervirens "Stricta"* Swane's Golden Pencil Pine	Eastern boundary No 41	Stunted conifer can easily be replaced with better screening shrub
6	*Syagrus romanzoffianum* Cocos Palm	Eastern boundary No 41	Exempt from provision of Clause 5.9 Penrith LEP 2010. Weed species.
7	*Syagrus romanzoffianum* Cocos Palm	Eastern boundary No 41	Exempt from provision of Clause 5.9 Penrith LEP 2010. Weed species.
8	*Cupressus sempervirens "Stricta"* Pencil Pine	Eastern boundary No 41	Stunted conifer can be replaced with better screening shrub

Table 2. continued Trees Recommended for Removal			
Tree No	**Scientific/Common Name**	**Location**	**Comment**
9	*Cupressus sempervirens "Stricta"* Swane's Golden Pencil Pine	Eastern boundary No 41	Stunted conifer can easily be replaced with better screening shrub
10	*Syagrus romanzoffianum* Cocos Palm	Rear No 41	Exempt from provision of Clause 5.9 Penrith LEP 2010. Weed species.
11	*Leptospermum petersonii* Lemon Scented Tea Tree	Rear No 41	Small tree reaching full maturity
12	*Brachychiton populneus Kurrajong*	Rear No 41	Stunted tree reaching full maturity
13	*Livistona chinensis* Chinese Fan Palm	Western rear boundary No 41	Palm can easily be replaced
14	*Syagrus romanzoffianum* Cocos Palm	Western rear boundary No 41	Exempt from provision of Clause 5.9 Penrith LEP 2010. Weed species.
15	*Archontophoenix alexandrae* Alexander Palm	Western rear boundary No 41	Palm can easily be replaced
16	*Archontophoenix alexandrae* Alexander Palm	Western rear boundary No 41	Small palm can easily be replaced
17	*Melaleuca armillaris* Honey Bracelet Myrtle	Eastern rear boundary No 41	Small tree reaching full maturity
18	*Melaleuca armillaris* Honey Bracelet Myrtle	Northern rear boundary No 41	Small tree with poor structure reaching full maturity

5. Tree Management Recommendations

Tree Protection Zones

Tree Protection Zones (TPZ) are the principal means of protecting trees on construction sites.
The TPZ is a combination of the root area and crown area requiring protection.
It is an area isolated from construction disturbance, so that the tree remains viable.

Structural Root Zones (SRZ) are the areas required for stability.
A larger area is required to maintain a viable tree. No root severance is undertaken in the SRZ.

5.1 Trees Recommended for Retention and Tree Protection Zones

Before the commencement of works, a Tree Protection Zone/s (TPZ) must be established around all tree/s to be retained not less than the distance indicated in the TPZ schedule below. Tree protection must be installed and maintained in accordance with the Australian Standard 4970 Protection of Trees on Development Sites.

Table 3. Trees Recommended for Retention

Tree No	Scientific / Common Name	Location	TPZ Setback
S1 **S2**	*Lophostemon confertus* Brush Box	No 43 Barber Avenue Street Trees	4.2 metres
1	*Acer negundo* Box Elder	No 4 Collees Street	3 metres
2	*Cinnamomum camphora* Camphor Laurel	No 4 Collees Street	3.6 metres
3	*Corymbia maculata* Spotted Gum	No 4 Collees Street	4.8 metres
19	*Jacaranda mimosifolia* Jacaranda	No 39 Barber Avenue	2 metres
20	*Casuarina cunninghamiana* River She Oak	No 148 Great Western Highway	6 metres
21	*Casuarina cunninghamiana* River She Oak	No 152 Great Western Highway	4.8 metres

5.2 Tree Protection Zones and Development Impacts

Table 4. Identification of Tree Protection Zones and Construction Impacts

Tree No	Scientific Common Name	D.B.H. cm	TPZ radius	SRZ radius	TPZ area	Comments Development Impact
S1 **S2**	*Lophostemon confertus* Brush Box	35	4.2 m.	2.3 m.	55 m^2	Concrete pathway within 1 m. Considered a tolerable impact if no encroachment to SRZ.
1	*Acer negundo* Box Elder	25	3.0 m.	2.0 m.	28 m^2	Not impacted by the building or basement parking.
2	*Cinnamomum camphora* Camphor Laurel	30	3.6 m.	2.1 m.	41 m^2	Not impacted by the building or basement parking.
3	*Corymbia maculata* Spotted Gum	40	4.8 m.	2.4 m.	72 m^2	Tolerable impact from basement parking and the building.
19	*Jacaranda mimosifolia* Jacaranda	16	1.9 m.	1.7 m.	12 m^2	Negligible impact from basement parking
20	*Casuarina cunninghamiana* River She Oak	50	6.0 m.	2.6 m.	113 m^2	Negligible impact from building and basement parking
21	*Casuarina cunninghamiana* River She Oak	40	4.8 m.	2.4 m.	72 m^2	Negligible impact from building and basement parking

6. Recommendations

Existing boundary Colorbond boundary fencelines offer trunk protection and should be maintained throughout the construction phase of the development.

6.1 Tree 3 *Corymbia maculata* (Spotted Gum) within a 4.8 m. radius.

Tree sensitive construction methods including hand digging of trenches within a 4.8 m. radius are to be used.

No bulk excavation methods.

Ground Protection using planks/rumble boards within a 4.8 m. radius. The boards are to be strapped together and placed over a layer of organic wood mulch to a depth of 100 mm to prevent soil compaction – see Appendix 6.3

6.2 Tree Pruning – Prior to Site Establishment

Pruning to prevent damage to the canopies of neighbouring trees is to be undertaken in accordance with Australian Standard, AS4373 (2007) Pruning of Amenity Trees will be undertaken by a suitably trained AQF Level 3 arborist.

Table 5 Tree Pruning Works to be Completed Prior to Site Establishment.

Pruning Works **Tree 2 *Cinnamomum camphora* (Camphor Laurel)** 4 Collees Street	**Pruning Class**	**Code**
Crown Lift by removal of lowest branches with a maximum diameter of 50 mm at the point of attachment (branch collar) to achieve a clearance of 3.5 metres above ground level on the western side of the tree. A maximum of 5% of the total live canopy is to be removed in order to achieve the clearances as specified.	Crown Modification	7.3.3

6.3 Street Tree Protection

Trunk wrap protection required for Street Trees – see Appendices 6.1, 6.2, 6.3.

Hand digging for pathways within a 2 m. radius of the trunks.

Pathways are to be relocated away from roots over 50 mm diameter.

7 Arborist Construction Hold Points, Inspection and Certification

Table 6 Hold Points for Arborist Inspection and Certification

Hold Point	**Task**	**Responsibility**	**Certification**	**Inspection Timing**
1	Trees to be pruned as per Pruning Specification	Principal Contractor	Project Arborist	Prior to site establishment and ground works.
2	Installation of Protective Fencing, Trunk Wrap Protection & Ground Protection Tree 8.	Principal Contractor	Project Arborist	Prior to site establishment and ground works.
3	Final inspection of trees by project arborist	Principal Contractor	Project Arborist	Prior to issue of occupation certificate.

Appendices

DISCLAIMER I have no vested interest in any forthcoming tree works or actions carried out from recommendations made in this report. The report is an independent assessment of the trees and does not reflect the opinions of the owner. The author does not receive commission to prune or remove the trees which are the subject trees of this report.

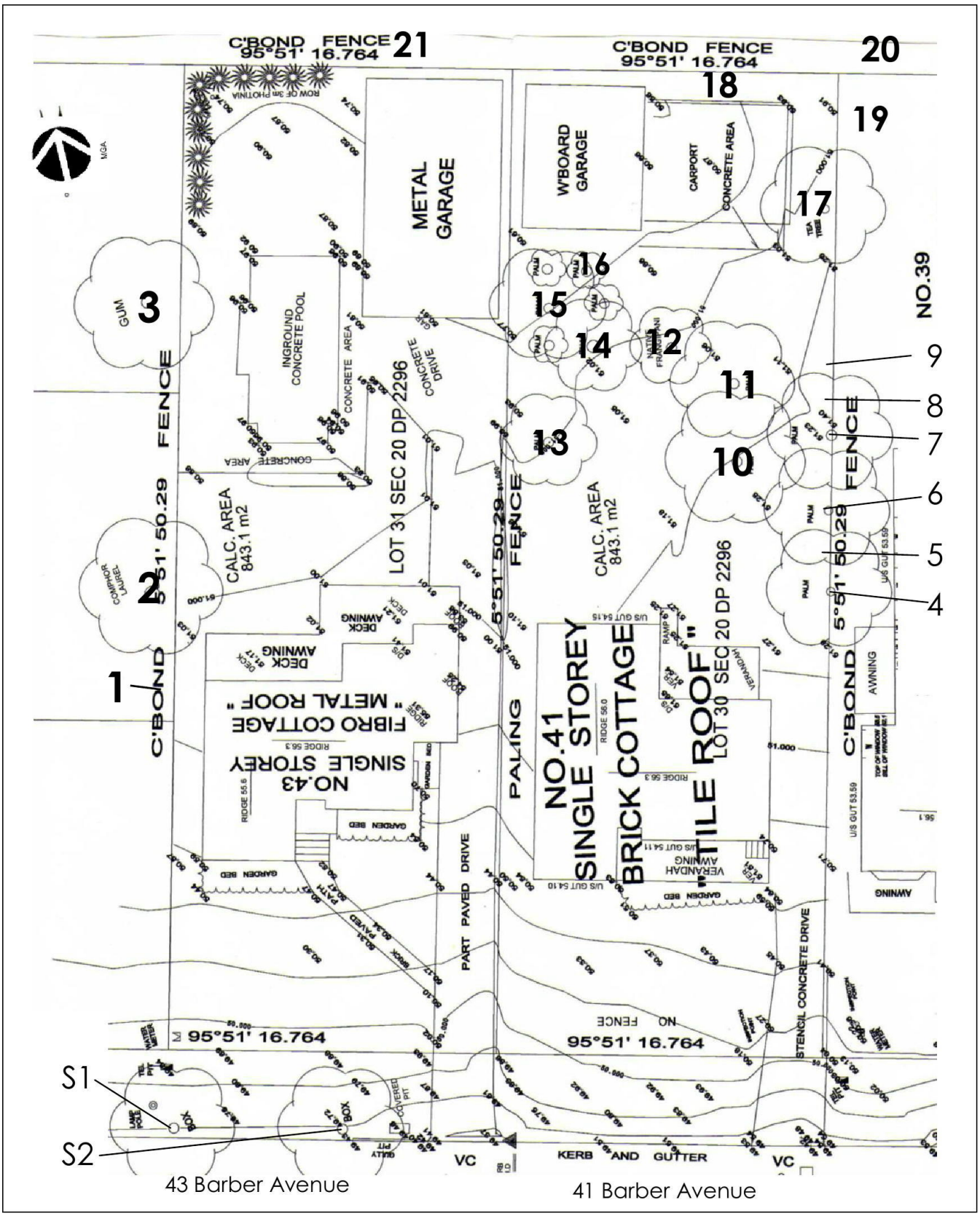
Information contained in this report covers only those trees assessed. It reflects their condition at the time of assessment. The inspection was limited to a Visual Assessment without dissection, excavation, probing or core drilling. By the nature of their size, weight and miscellaneous structure, constant exposure to the weather and the elements, susceptibility to insects, pest and decay organisms, trees always pose an inherent degree of hazard and risk from breakage or failure. Recommendations made by MacKay Tree Management are intended to minimise, reduce or eliminate hazardous conditions associated with the trees.
There is no guarantee, expressed or implied, that problems or deficiencies of the subject trees may not arise in the future.

Appendix 1	Tree Survey	41 – 43 Barber Avenue Penrith							
Tree No.	**Genus/species Common Name**	**Height Spread**	**D.B.H. mm**	**Age**	**Crown Form Condition**	**Vigour**	**STARS Sign.**	**Retention Value**	**Observations/ Condition of Trees**
S1	*Lophostemon confertus* Brush Box	4 6	350	M	Codominant Asymmetrical	Normal	Medium	Priority High	**Street tree 43 Barber Ave,** Asymmetrical crown pruned to 4 m. for powerline clearance, 25% epicormic.
S2	*Lophostemon confertus* Brush Box	4 6	350	M	Codominant Asymmetrical	Normal	Medium	Priority High	**Street tree 43 Barber Ave,** Asymmetrical crown pruned to 4 m. for powerline clearance, 25% epicormic.
1	*Acer negundo* Box Elder	5 5	Multi to 250	M	Intermediate Asymmetrical	Normal	Low	Priority High	**Neighbouring Tree 4 Collees Street,** pest/weed species, crown die back, poor form and declining condition. 1 m. from boundary.
2	*Cinnamomum camphora* Camphor Laurel	6-8 6	Multi to 300	M	Codominant Asymmetrical	Normal	Medium	Priority High	**Neighbouring Tree 4 Collees Street,** pest/weed species, suckered and self sown 1 m. from boundary. Canopy overhang by 2 m. at 4 m. Prune to prevent damage by construction equipment.
3	*Corymbia maculata* Spotted Gum	14 8	400	M	Dominant Symmetrical	Normal	High	Priority High	**Neighbouring Tree 2 Collees Street,** within 1.5 m. of western site boundary.
4	*Syagrus romanzoffianum* Cocos Palm	7 4	300	M	Dominant Symmetrical	Normal	Low	Low	Exempt from provision of Clause 5.9 Penrith LEP 2010. Appendix F5 DCP 2010 Weed/undesirable species.
5	*Cupressus sempervirens "Stricta"* Swane's Golden Pencil Pine	5 1	250	M	Intermediate Symmetrical	Normal	Low	Low	Mature conifer with stunted growth, low environmental significance.
6	*Syagrus romanzoffianum* Cocos Palm	7 4	320	M	Dominant Symmetrical	Normal	Low	Low	Exempt from provision of Clause 5.9 Penrith LEP 2010. Weed/undesirable species.
7	*Syagrus romanzoffianum* Cocos Palm	7 4	350	M	Dominant Symmetrical	Normal	Low	Low	Exempt from provision of Clause 5.9 Penrith LEP 2010. Weed/undesirable species.
8	*Cupressus sempervirens "Stricta"* Pencil Pine	4 2	220	M	Suppressed Symmetrical	Low	Low	Low	Mature conifer with stunted growth, stunted canopy and low environmental significance.
9	*Cupressus sempervirens "Stricta"* Swane's Golden Pencil Pine	7 4	320	M	Intermediate Symmetrical	Normal	Low	Low	Mature conifer with stunted growth, low environmental significance.

Tree No.	Genus/species Common Name	Height Spread	D.B.H. mm	Age	Crown Form Condition	Vigour	STARS Sign.	Retention Value	Observations/ Condition of Trees
10	*Syagrus romanzoffianum* Cocos Palm	6 4	320	M	Codominant Symmetrical	Normal	Low	Low	Exempt from provision of Clause 5.9 Penrith LEP 2010. Appendix F5 DCP 2010 Weed/undesirable species.
11	*Leptospermum petersonii* Lemon Scented Tea Tree	6 5	310	M	Codominant Symmetrical	Normal	Medium	Low	Small tree reaching full maturity.
12	*Brachychiton populneus* *Kurrajong*	6 5	310	M	Codominant Symmetrical	Normal	Medium	Low	Stunted, small tree reaching full maturity.
13	*Livistona chinensis* Chinese Fan Palm	4 4	400	M	Codominant Asymmetrical	Normal	Medium		Palm can be replaced as part of overall development landscaping.
14	*Syagrus romanzoffianum* Cocos Palm	7 4	320	M	Codominant Symmetrical	Normal	Low	Low	Exempt from provision of Clause 5.9 Penrith LEP 2010. Weed/undesirable species.
15	*Archontophoenix alexandrae* Alexander Palm	7 4	310	M	Intermediate Symmetrical	Normal	Medium	Medium	Palm can be replaced as part of overall development landscaping.
16	*Archontophoenix alexandrae* Alexander Palm	5 2	300	M	Intermediate Symmetrical	Normal	Low	Low	Small palm can easily be replaced as part of overall development landscaping.
17	*Melaleuca armillaris* Honey Bracelet Myrtle	6 8	250 320	M - OM	Codominant Symmetrical	Normal	Low	Low	Small tree reaching full maturity.
18	*Melaleuca armillaris* Honey Bracelet Myrtle	6 8	Multi 900 at 1 m.	M - OM	Codominant Symmetrical	Normal	Low	Low	Small tree with co dominant included limbs from base showing poor structure and branch union cracking/failure at 1 m.
19	*Jacaranda mimosifolia* Jacaranda	6 5	100 120	Semi	Suppressed Asymmetrical	Normal	Medium	Priority High	**Neighbouring Tree 39 Barber Ave**, within 1 m. of eastern boundary. No canopy overhang.
20	*Casuarina cunninghamiana* River She Oak	11 10	500 approx.	M	Dominant Symmetrical	Normal	High	Priority High	**Neighbouring Tree 148 Great Western Highway**, within 1.2 m. of northern site boundary.
21	*Casuarina cunninghamiana* River She Oak	12 9	400 approx.	M	Dominant Symmetrical	Normal	High	Priority High	**Neighbouring Tree 152 great Western Highway** 1.5 m. off northern site boundary, 2 m. canopy overhang at 4 m.

Appendix 2

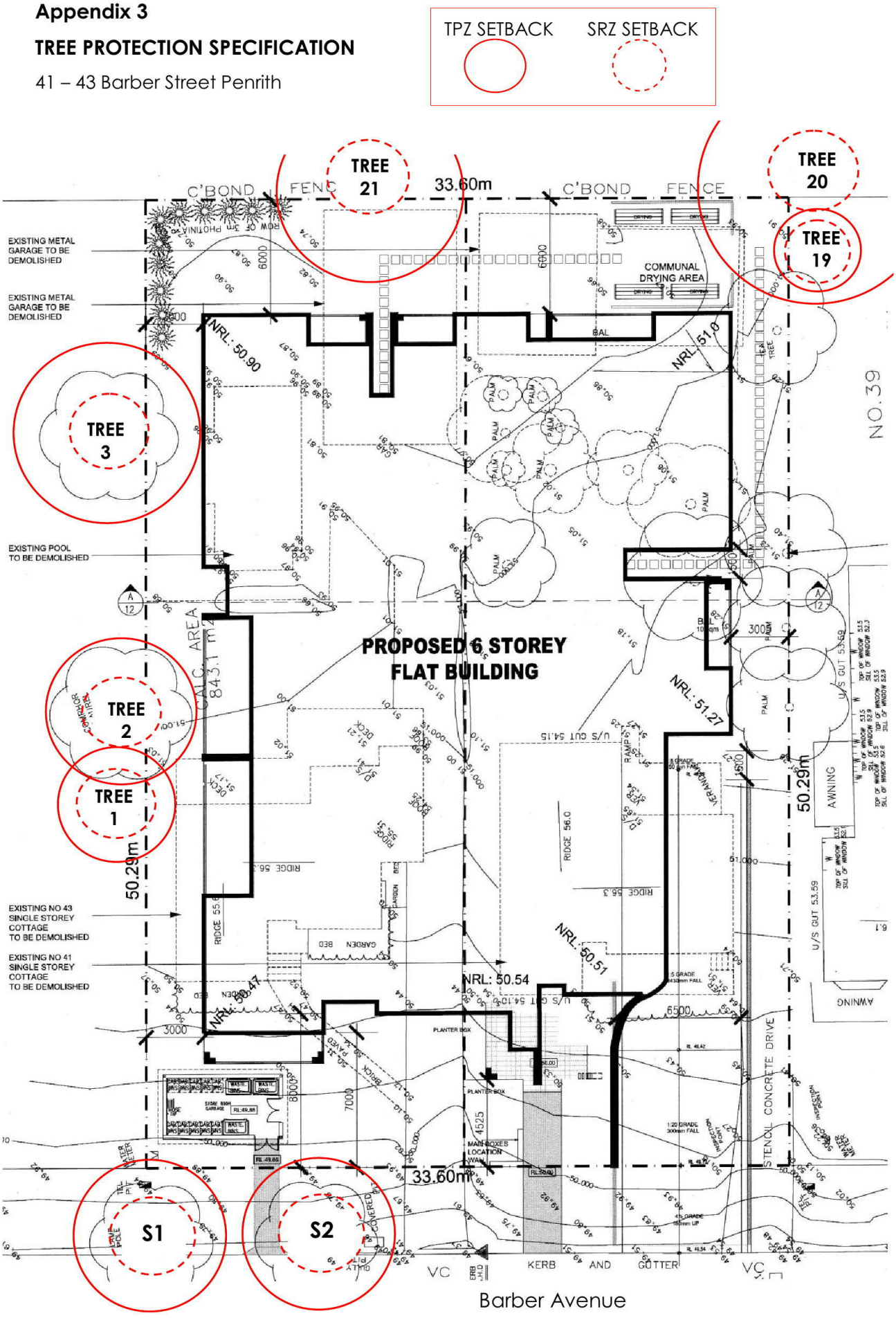
SITE PLAN – Indicating Tree Locations - Canopies are indicative.



Appendix 3

TREE PROTECTION SPECIFICATION

41 – 43 Barber Street Penrith



Appendix 4

Tree Protection Zone Calculations
Reference - AS4970 2009 Protection of Trees on Development Sites

Radius is measured from the center of the trunk at ground level.
Diameter at Root Base (DRB) is estimated at 10% greater than DBH.

TREE NO	diam 1	diam 2	diam 3	diam 4	DBH (cm)	DRB (cm)	TPZ radius	TPZ area	SRZ radius
S1	35				35	38	**4.2 m.**	55 **m²**	**2.3 m.**
S2	35				35	38	**4.2**	55	**2.3**
1	25				25	28	**3.0**	28	**2.0**
2	30				30	33	**3.6**	41	**2.1**
3	40				40	44	**4.8**	72	**2.4**
4	30				30	33	**3.6**	41	**2.1**
5	25				25	28	**3.0**	28	**2.0**
6	32				32	36	**3.8**	46	**2.2**
7	35				35	39	**4.2**	55	**2.3**
8	22				22	25	**2.6**	22	**1.9**
9	32				32	36	**3.8**	46	**2.2**
10	32				32	36	**3.8**	46	**2.2**
11	31				31	35	**3.7**	43	**2.2**
12	31				31	35	**3.7**	43	**2.2**
13	40				40	44	**4.8**	72	**2.4**
14	32				32	36	**3.8**	46	**2.2**
15	31				31	35	**3.7**	43	**2.2**
16	30				30	33	**3.6**	41	**2.1**
17	25	32			41	46	**4.9**	76	**2.4**
18	90				90	99	**10.8**	366	**3.3**
19	10	12			16	19	**1.9**	12	**1.7**
20	50				50	55	**6.0**	113	**2.6**
21	40				40	44	**4.8**	72	**2.4**

Appendix 5

References

1. A Visual Tree Assessment (VTA) is a systematic method of identifying tree characteristics and hazard potential recognised by The International Society of Arboriculture. Journal of Arboriculture, Vol. 22, No. 6, November 1996.

The VTA was formulated by Mattheck and Breloer and described in, - Mattheck, C. and Breloer, H (2001) *The Body Language of Trees a Handbook for Failure Analysis*, Department of Transport, Local Government and the Regions. London, Research for Amenity Trees No. 4.

2. Standards Australia 2009, *Australian Standard 4970 Protection of trees on development sites*, Standards Australia, Sydney, Australia.

3. Draper BD and Richards PA 2009, *Dictionary for Managing Trees in Urban Environments*, Institute of Australian Consulting Arboriculturists (IACA), CSIRO Publishing, Collingwood, Victoria, Australia.

Appendix 6 General Tree Protection Measures

6.1 Tree Protection Fencing

The Protective fencing where required may delineate the **TPZ** and should be located as determined by the project or council arborist.

Fencing should be erected before any machinery or materials are brought onto the site and before the commencement of works including demolition.
Once erected, protective fencing must not be removed or altered without approval by the project or council arborist.

The **TPZ** must be secured to restrict access.

AS 4687 Temporary fencing and hoardings specifies applicable fencing requirements.

Shade cloth or similar should be attached to reduce the transport of dust, other particulate matter and liquids into the protected area.

Fence posts and supports should have a diameter greater than 20 mm and be located clear of roots.

Existing perimeter fencing and other structures may be suitable as part of the protective fencing.

Chain wire mesh panels with shade cloth attached, held in place with concrete feet.

Alternative plywood or wooden paling fence panels. The fencing material also prevents building materials or soil entering the **TPZ.**

Mulch installation across surface of **TPZ** (at the discretion of the project arborist).

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

Bracing is permissible within the **TPZ.** Installation of supports should avoid damaging roots.

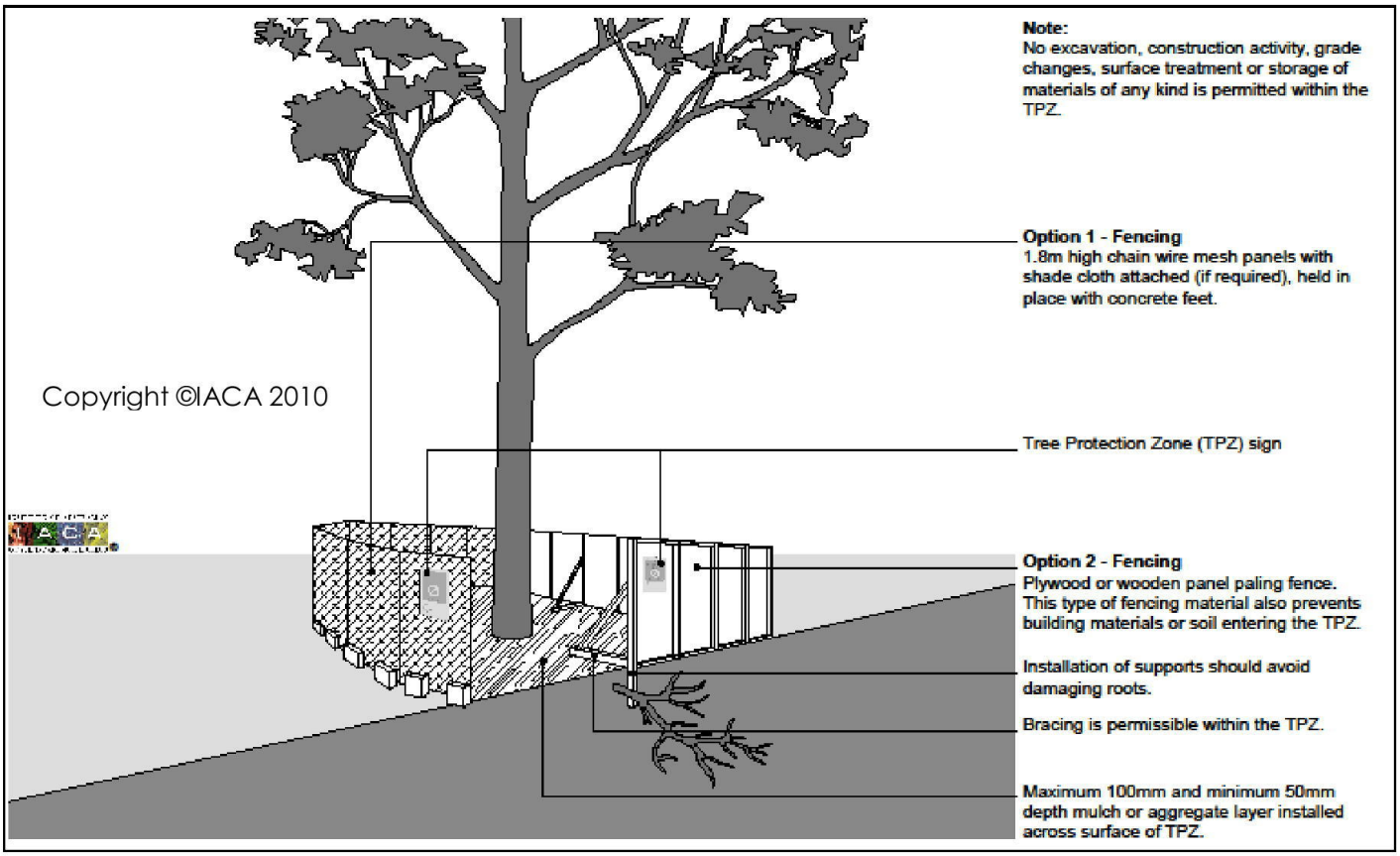
6.2 Activities Restricted within the TPZ - AS4970 Section 4.

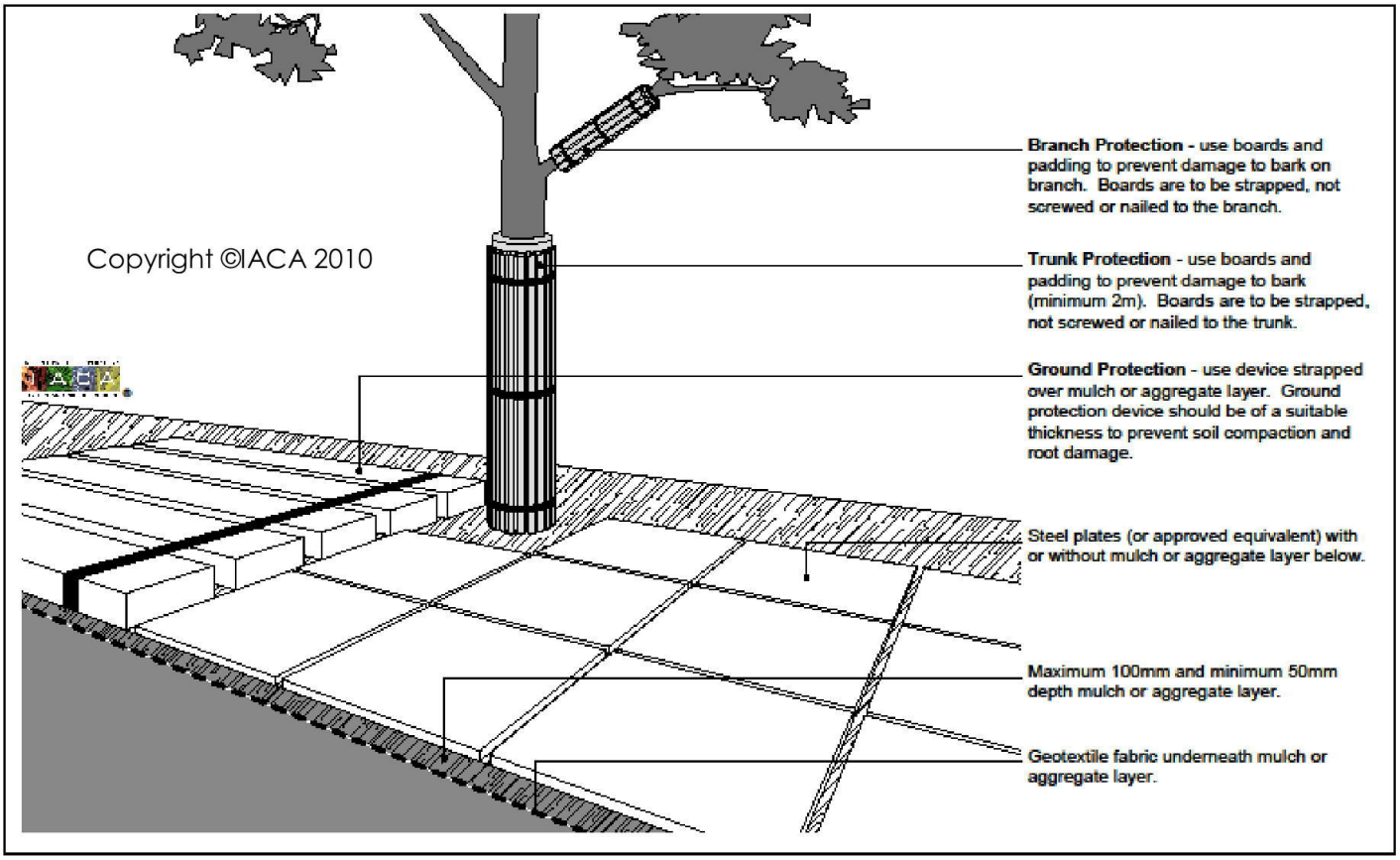
Activities generally excluded from the **TPZ** included but are not limited to -

(a) Machine excavation including trenching;
(b) Excavation for silt fencing;
(c) cultivation;
(d) storage;
(e) preparation of chemicals, including preparation of cement products;
(f) parking of vehicles and plant;
(g) refuelling;
(h) dumping of waste;
(i) wash down and cleaning of equipment;
(j) placement of fill;
(k) lighting of fires;
(l) Soil level changes;
(m) Temporary or permanent installation of utilities and signs, and
(n) Physical damage to the tree.

6.3 Tree Protection Devices

Tree Protection Fencing and Ground, Branch and Trunk Protection





Appendix 7

Significance of a **Tree**, **Assessment Rating System (STARS) ©**

Institute of Australian Consulting Arborists 2010© from an original concept by Footprint Green Tree Significance & Retention Value Matrix, June 2001.

Tree Significance - Assessment Criteria

1 High Significance in landscape

The tree is in good condition and good vigour;

The tree has a form typical for the species;

The tree is a remnant or is a planted locally indigenous specimen and/or is rare or uncommon in the local area or of botanical interest or of substantial age;

The tree is listed as a Heritage Item, Threatened Species or part of an Endangered ecological community or listed on Councils significant Tree Register;

The tree is visually prominent and visible from a considerable distance when viewed from most directions within the landscape due to its size and scale and makes a positive contribution to the local amenity;

The tree supports social and cultural sentiments or spiritual associations, reflected by the broader population or community group or has commemorative values;

The tree's growth is unrestricted by above and below ground influences, supporting its ability to reach dimensions typical for the taxa *in situ* - tree is appropriate to the site conditions.

2 Medium Significance in landscape

The tree is in fair-good condition and good or low vigour;

The tree has form typical or atypical of the species;

The tree is a planted locally indigenous or a common species with its taxa commonly planted in the local area

The tree is visible from surrounding properties, although not visually prominent as partially obstructed by other vegetation or buildings when viewed from the street,

The tree provides a fair contribution to the visual character and amenity of the local area,

The tree's growth is moderately restricted by above or below ground influences, reducing its ability to reach dimensions typical for the taxa *in situ*.

3 Low Significance in landscape

The tree is in fair-poor condition and good or low vigour;

The tree has form atypical of the species;

The tree is not visible or is partly visible from surrounding properties as obstructed by other vegetation or buildings,

The tree provides a minor contribution or has a negative impact on the visual character and amenity of the local area,

The tree is a young specimen which may or may not have reached dimension to be protected by local Tree Preservation orders or similar protection mechanisms and can easily be replaced with a suitable specimen,

The tree's growth is severely restricted by above or below ground influences, unlikely to reach dimensions typical for the taxa *in situ* - tree is inappropriate to the site conditions,

The tree is listed as exempt under the provisions of the local Council Tree Preservation Order or similar protection mechanisms,

The tree has a wound or defect that has potential to become structurally unsound.

Environmental Pest / Noxious Weed Species

The tree is an Environmental Pest Species due to its invasiveness or poisonous/ allergenic properties,

The tree is a declared noxious weed by legislation.

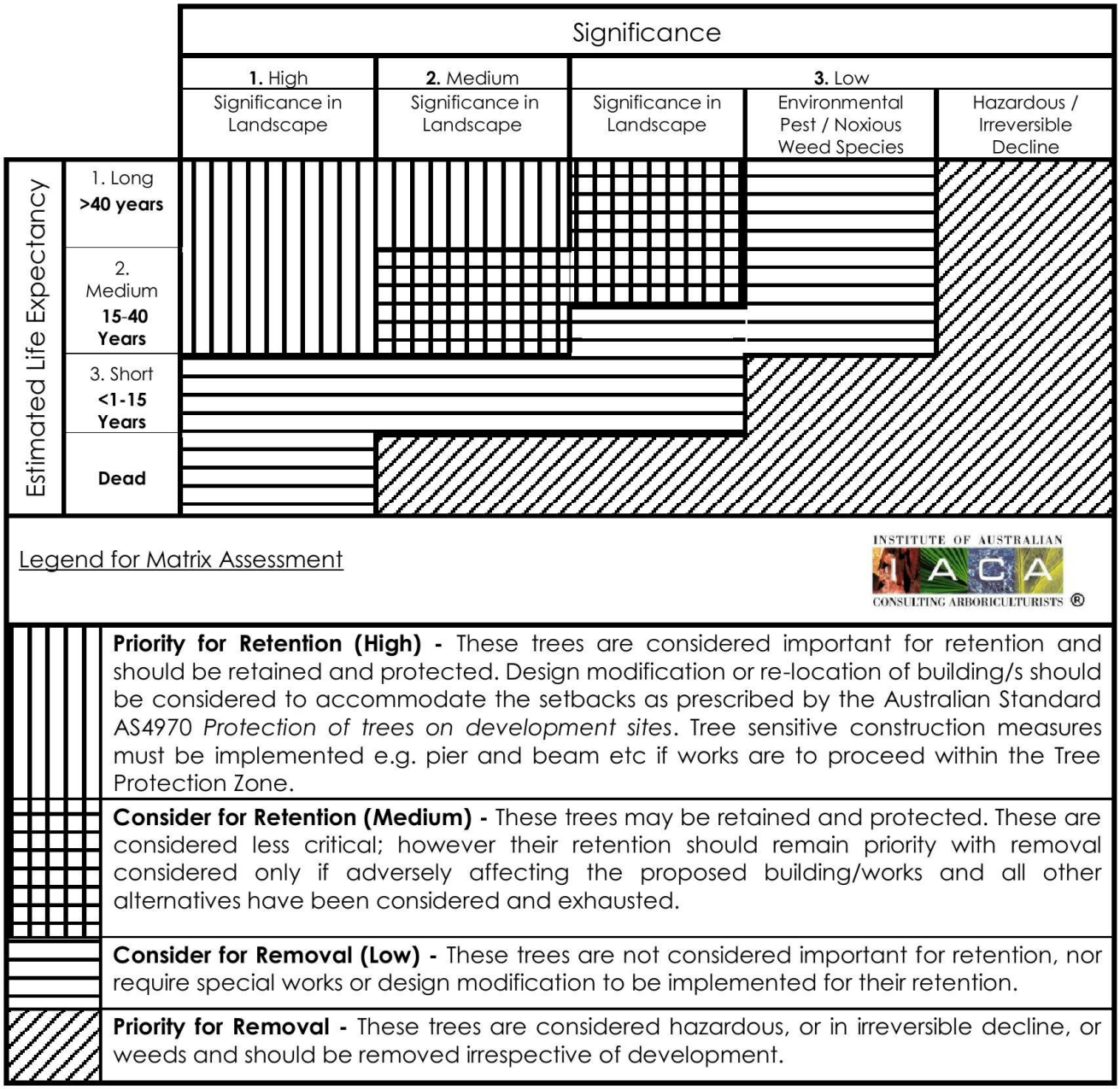
Hazardous/Irreversible Decline

The tree is structurally unsound and/or unstable and is considered potentially dangerous,

The tree is dead, or is in irreversible decline, or has the potential to fail or collapse in full or part in the immediate to short term.

Appendix 8

Tree Retention Value - Priority Matrix.



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Appendix 9

Matrix - Sustainable Retention Index Value (SRIV) ©
Institute of Australian Consulting Arboriculturists, Australia, 2010, Sustainable Retention Index Value (SRIV), Version 4.
A visual method of objectively rating the viability of urban trees for development sites and management, based on general tree and landscape assessment criteria.

The matrix is to be used with the value classes defined in the Glossary for Age / Vigour / Condition.
An index value is given to each category where ten (10) is the highest value.

Age Class	Vigour Class and Condition Class					
	Good Vigour & Good Condition (GVG)	Good Vigour & Fair Condition (GVF)	Good Vigour & Poor Condition (GVP)	Low Vigour & Good Condition (LVG)	Low Vigour & Fair Condition (LVF)	Low Vigour & Poor Condition (LVP)
	Able to be retained if sufficient space available above and below ground for future growth. No remedial work or improvement to growing environment required. May be subject to high vigour. Retention potential - Medium – Long Term.	Able to be retained if sufficient space available above and below ground for future growth. Remedial work may be required or improvement to growing environment may assist. Retention potential - Medium Term. Potential for longer with remediation or favourable environmental conditions.	Able to be retained if sufficient space available above and below ground for future growth. Remedial work unlikely to assist condition, improvement to growing environment may assist. Retention potential - Short Term. Potential for longer with remediation or favourable environmental conditions.	May be able to be retained if sufficient space available above and below ground for future growth. No remedial work required, but improvement to growing environment may assist vigour. Retention potential - Short Term. Potential for longer with remediation or favourable environmental conditions.	May be able to be retained if sufficient space available above and below ground for future growth. Remedial work or improvement to growing environment may assist condition and vigour. Retention potential - Short Term. Potential for longer with remediation or favourable environmental conditions.	Unlikely to be able to be retained if sufficient space available above and below ground for future growth. Remedial work or improvement to growing environment unlikely to assist condition or vigour. Retention potential - Likely to be removed immediately or retained for Short Term. Potential for longer with remediation or favourable environmental conditions.
(Y) Young	**YGVG - 9** **Index Value 9** Retention potential - Long Term. Likely to provide minimal contribution to local amenity if height <5 m. High potential for future growth and adaptability. Retain, move or replace.	**YGVF - 8** **Index Value 8** Retention potential - Short – Medium Term. Potential for longer with improved growing conditions. Likely to provide minimal contribution to local amenity if height <5 m. Medium-high potential for future growth and adaptability. Retain, move or replace.	**YGVP - 5** **Index Value 5** Retention potential - Short Term. Potential for longer with improved growing conditions. Likely to provide minimal contribution to local amenity if height <5 m. Low-medium potential for future growth and adaptability. Retain, move or replace.	**YLVG - 4** **Index Value 4** Retention potential - Short Term. Potential for longer with improved growing conditions. Likely to provide minimal contribution to local amenity if height <5 m. Medium potential for future growth and adaptability. Retain, move or replace.	**YLVF - 3** **Index Value 3** Retention potential - Short Term. Potential for longer with improved growing conditions. Likely to provide minimal contribution to local amenity if height <5m. Low-medium potential for future growth and adaptability. Retain, move or replace.	**YLVP - 1** **Index Value 1** Retention potential - Likely to be removed immediately or retained for Short Term. Likely to provide minimal contribution to local amenity if height <5 m. Low potential for future growth and adaptability.
(M) Mature	**MGVG - 10** **Index Value 10** Retention potential - Medium - Long Term.	**MGVF - 9** **Index Value 9** Retention potential - Medium Term. Potential for longer with improved growing conditions.	**MGVP - 6** **Index Value 6** Retention potential - Short Term. Potential for longer with improved growing conditions.	**MLVG - 5** **Index Value 5** Retention potential - Short Term. Potential for longer with improved growing conditions.	**MLVF - 4** **Index Value 4** Retention potential - Short Term. Potential for longer with improved growing conditions.	**MLVP - 2** **Index Value 2** Retention potential - Likely to be removed immediately or retained for Short Term.
(O) Over-mature	**OGVG - 6** **Index Value 6** Retention potential - Medium - Long Term.	**OGVF - 5** **Index Value 5** Retention potential - Medium Term.	**OGVP - 4** **Index Value 4** Retention potential - Short Term.	**OLVG - 3** **Index Value 3** Retention potential - Short Term. Potential for longer with improved growing conditions.	**OLVF - 2** **Index Value 2** Retention potential - Short Term.	**OLVP - 0** **Index Value 0** Retention potential - Likely to be removed immediately or retained for Short Term.

Appendix 10

Glossary of Terms
From Dictionary for Managing Trees in Urban Environments

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* (British Standards 1991, p. 13, Harris *et al*, 2004, p. 262).

Young Tree aged less than <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.

Condition of Trees 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*.
Can be categorized as Good Condition, Fair Condition, Poor Condition or 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 not severely restricted for space and light, exhibits symptoms of advanced and irreversible decline such as fungal or bacterial infestation, major dieback in the branch and foliage crown, structural deterioration from insect damage, or storm damage from lightning strike, ring barking from borer activity.

Form of Trees

Crown Form The shape of the crown of a tree as influenced by the availability or restriction of space and light, or other contributing factors within its growing environment. Crown Form may be determined for tree shape and habit generally as *Dominant*, *Codominant*, *Intermediate*, *Emergent*, *Forest* and *Suppressed*. The habit and shape of a *crown* may also be considered qualitatively and can be categorized as *Good Form* or *Poor Form*.

Good Form Tree of *typical* crown shape and habit with proportions representative of the taxa considering constraints such as origin e.g. indigenous or exotic, but does not appear to have been adversely influenced in its development by environmental factors in situ such as *soil water* availability, prevailing wind, or cultural practices such as lopping and competition for space and light.

Poor Form Tree of *atypical* crown shape and habit with proportions not representative of the species considering constraints and appears to have been adversely influenced in its development by environmental factors in situ such as *soil water* availability, prevailing wind, cultural practices such as lopping and competition for space and light; causing it to be *misshapen* or disfigured by disease or vandalism.

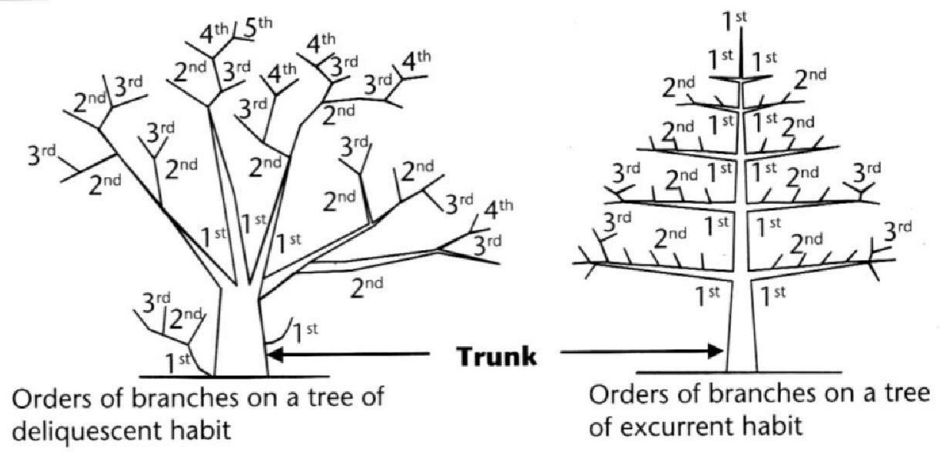
Crown Form Codominant Crowns of trees restricted for space and light on one or more sides and receiving light primarily from above e.g. constrained by another tree/s or a building.

Crown Form Dominant Crowns of trees generally not restricted for space and light receiving light from above and all sides.

Crown Form Intermediate Crowns of trees restricted for space on most sides with light primarily from above and on some sides only.

Crown Form Suppressed Crowns of trees generally not restricted for space but restricted for light by being overtopped by other trees and occupying an understorey position in the canopy and growing slowly.

Order of Branches The marked divisions between successively smaller branches commencing at the initial division where the trunk terminates. Successive branching is generally characterised by a gradual reduction in branch diameters at each division, and each graduation from the trunk can be categorised numerically, e.g. 1st order, 2nd order, etc



Orders of branches on a tree of deliquescent habit

Orders of branches on a tree of excurrent habit