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14 December 2015

Proposed Residential Flat Building

Lots 5 - 7 DP 24603

Lot 115 + 117 + 119 Derby Street
PENRITH NSW 2750

Arboricultural Impact Assessment

Prepared for;

Elcon Pty Ltd
C/- CK design
Chris Khoury
Level 15/60 Station Street
Parramatta NSW 2150

Prepared by;
Cheryl MacKay Level 5 Consulting Arboriculturist

1. Introduction/Background

CK design on behalf of the client Elcor Pty Ltd have commissioned MacKay Tree Management to assess trees located on the sites Nos 115, 117 and 119 Derby Street Penrith (the subject sites).

CK design are proposing a residential Flat Building development for the three sites. The development comprises demolition of the existing buildings, tree removal and construction of a five storey, sixty two flats building and two basement level car parks with eighty car spaces.

Twenty six (26) trees including site trees, street trees or neighbouring trees within five (5) metres of the proposal are over three (3) metres in height and are the subject trees of this report. Twelve (12) site trees, eight (8) neighbouring trees and six (6) street trees.

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

Assessment finds that eleven site trees have low environmental and/or landscape significance or are unretainable as part of the development.
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 28 November 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 provisions of Penrith Local Environment Plan (LEP) 2010 (Clause 5.9 Preservation of Trees and Vegetation) and Penrith Development Control Plan (DCP) 2014, C2 2.1 Preservation of Trees.

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

Plan/Document	Designer	Drawing No.	Dated
Drawings	CK design Parramatta	A101 – A123	30/1/2015
Survey Plan	Mark Castelletti Surveying	1:100 (A1)	23/04/2015

3. Observations

3.1 The Subject Sites

No 115 is a single storey fibro clad cottage, No 117 a single storey fibro cottage and No 119 a single storey clad cottage.

The three cottages occupy 2090 m² with housing styles and gardens indicative of older/original properties in the locality.

Site vegetation consists of exotic trees and shrubs in poor to good condition and no remnant or significant native plantings. Remnant *Eucalyptus punctata* (Grey Gum) trees line the northern, rear of the properties and are not impacted by the development.

3.2 The Proposed Development

The development comprises demolition of the existing buildings and outhouses, tree removal and construction of sixty two flats over five storeys and eighty car spaces in two basement level car parks.

3.3 Summary of Tree Impacts

Tree Removal

The removal of the twelve site trees is proposed.

Two trees show good form and condition and have high landscape value.
Tree 6 *Ulmus procera* (English Elm) has major SRZ and TPZ encroachment. It is unlikely to withstand the rigors of the development if retained.
Tree 18 *Liquidamber styraciflua* (Liquidamber) is located within 1.2 metres of Unit 10 and is a species unsuitable for retention close to buildings.

Remaining site trees have low landscape and/or environmental significance.

Site trees will be replaced with clusters of trees to the front boundary to retain the character of the streetscape.

Tree Retention and Protection

Eight neighbouring trees have minimal impact from the development.

Six street trees are retainable as part of the development.

See Tree Protection Recommendations pages 4 and 5 and Tree Protection Specification page 10.

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
S 1 - S 6	*Lophostemon confertus*	Brush Box	Derby Street Trees
1	*Thuja orientalis "Aurea nana"* Golden Bookleaf		Neighbouring Tree No 113A Derby Street
2	*Washingtonia robusta* Mexican Fan Palm		Neighbouring Tree No 113A Derby Street
3	Cupressus sempervirens Mediterranean Cypress		Neighbouring Tree No 113 Derby Street
8 + 9	*Eucalyptus punctata*	Grey Gum	Neighbouring Tree No 60 Hope Street
10	*Eucalyptus punctata*	Grey Gum	Neighbouring Tree No 62 Hope Street
19	*Melaleuca bracteata*	Black Tea Tree	Neighbouring Tree No 66 Hope Street
20	*Eucalyptus punctata*	Grey Gum	Neighbouring Tree No 68 Hope Street

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, small size or major TPZ encroachment.

Table 2. Trees Recommended for Removal

Tree No	Scientific/Common Name	Location	Comment
4	*Murraya paniculata* Murraya	East boundary, rear No 115	Small shrub, easily replaced
5	*Lagerstroemia indica* Crepe Myrtle	East boundary, rear No 115	Small tree with poor form, easily replaced
6	*Ulmus procera* English Elm	East boundary, rear No 115	Site tree with major TPZ & SRZ encroachment within 2.5 m. Will succumb to rigors of development if retained.
7	*Melaleuca bracteata* "Revolution Green"	East boundary, rear No 115	Suppressed tree, sparse canopy, easily replaced
11 12	*Callistemon citrinus* Bottlebrush	West boundary, front No 117	Trees reaching full maturity, reduced/low Useful Life Expectancy.
13	*Carrya illinoinensis* Pecan Nut tree	West boundary, rear No 117	Lopped tree, structurally compromised, poor retention value.
14	*Eucalyptus cinerea* Argyle Apple	West boundary, rear No 117	Lopped tree, structurally compromised, poor retention value.
15	*Carrya illinoinensis* Pecan Nut tree	East boundary, rear No 117	Lopped tree, structurally compromised, poor retention value.
16	*Melaleuca bracteata* "Revolution Green"	West boundary, rear No 117	Suppressed leaning tree, sparse canopy, easily replaced
17	*Thuja orientalis "Aurea nana"* Golden Bookleaf	No 119 Street boundary	Good ornamental specimen impacted by landscaping Unit 01.
18	*Liquidamber styraciflua* Liquidamber	West boundary, side No 119	Tree has 6.5 m. Tree Protection Zone & 2.7 m. SRZ. Unit 10 within 1.2 m. Species unsuitable for retention close to buildings.

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 and Construction Impacts

Tree No	Scientific / Common Name	Location	TPZ Setback
S 1 - S 6	*Lophostemon confertus* Brush Box	Derby Street Trees	Tree Trunk and major limb Protection *see Appendix 6*
1	*Thuja orientalis "Aurea nana"* Golden Bookleaf	Neighbouring Tree No 113A Derby Street	2 m. TPZ. Impacted on one side of canopy only. Boundary fence provides adequate small tree protection
2	*Washingtonia robusta* Mexican Fan Palm	Neighbouring Tree No 113A Derby Street	AS4970 allows for a dripline TPZ. Boundary fencing protects trunk.
3	Cupressus sempervirens Mediterranean Cypress	Neighbouring Tree No 113 Derby Street	4.8 m. TPZ. Excavation encroachment within 3 m. TPZ impacted on one side of canopy only. Considered tolerable.
8	*Eucalyptus punctata* Grey Gum	Neighbouring Tree No 60 Hope Street	4.8 metre TPZ, 2.4 m. SRZ within site. Rear boundary TPZ of 4 m. required.
9	*Eucalyptus punctata* Grey Gum	Neighbouring Tree No 60 Hope Street	4.8 metre TPZ, 2.4 m. SRZ within site. Rear boundary TPZ of 4 m. required.
10	*Eucalyptus punctata* Grey Gum	Neighbouring Tree No 62 Hope Street	4.2 metre TPZ, 2.3 m. SRZ within site. Rear boundary TPZ of 4 m. required.
19	*Melaleuca bracteata* Black Tea Tree	Neighbouring Tree No 66 Hope Street	2.4 metre TPZ, 1.8 m. SRZ within site. Rear boundary TPZ of 4 m. required.
20	*Eucalyptus punctata* Grey Gum	Neighbouring Tree No 68 Hope Street	7.3 metre TPZ, 2.8 m. SRZ within site. Rear boundary TPZ of 4 m. required.

6. Recommendations

6.1 Tree Removal Eleven trees listed in Table 2 are site trees/shrubs recommended for removal and replacement as part of the development.

Tree 6 *Ulmus procera* (English Elm) has good form and condition but has major SRZ and TPZ encroachment. It is unlikely to withstand the rigors of the development if retained.

Tree 18 *Liquidamber styraciflua* (Liquidamber) has substantial size and shows good condition. The tree is located within 1.2 metres of Unit 10 and is a species unsuitable for retention close to buildings.

6.2 Tree Protection Trees listed in Table 1 are to be retained and protected.

Table 3 identifies construction setbacks for neighbouring trees; Tree 1, Tree 2, Tree 3, Tree 8, Tree 9, Tree 10, Tree 19 and Tree 20.

Ground Protection should be installed and maintained along the fencelines parallel to Tree 1, Tree 2, Tree 3, Tree 8, Tree 9, Tree 10, Tree 19 and Tree 20.

Ground protection to be installed 2 m. minimum offset from the fence boundaries using planks or rumble boards. 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

The fencing and ground protection shall be maintained throughout the construction phase of the development.

The setback should be fenced off with moveable mesh fencing to protect the trees until the landscaping phase of the development begins – See Appendix 6

6.3 Street Tree Trunk Protection The trees shall be protected in accordance with AS4970 Protection of Trees on Development Sites - See Appendix 6.

All street trees shall be protected during the construction works as follows:

Tree trunk and major limb protection shall be undertaken prior to the issuing of the Construction Certificate. The protection shall be installed by a qualified Arborist (AQF 2 or 3) and will include;

(i) Tree trunks and major overhanging branches shall be protected by wrapped hessian or similar material to limit damage, and

(ii) Timber planks (50mm x 100mm or similar) shall be placed around tree trunk/s. The timber planks shall be spaced at 100mm intervals, and must be fixed against the trunk with tie wire, or strapping. The hessian and timber planks will not be fixed to the tree in any instance, or in any fashion.

(iii) Tree trunk and major branch protection shall remain in place for the duration of construction and development works, and shall be removed at the completion of the project.

Cheryl MacKay

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Level 5 Qualified and Practicing Arborist/Horticulturist since 1995

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.

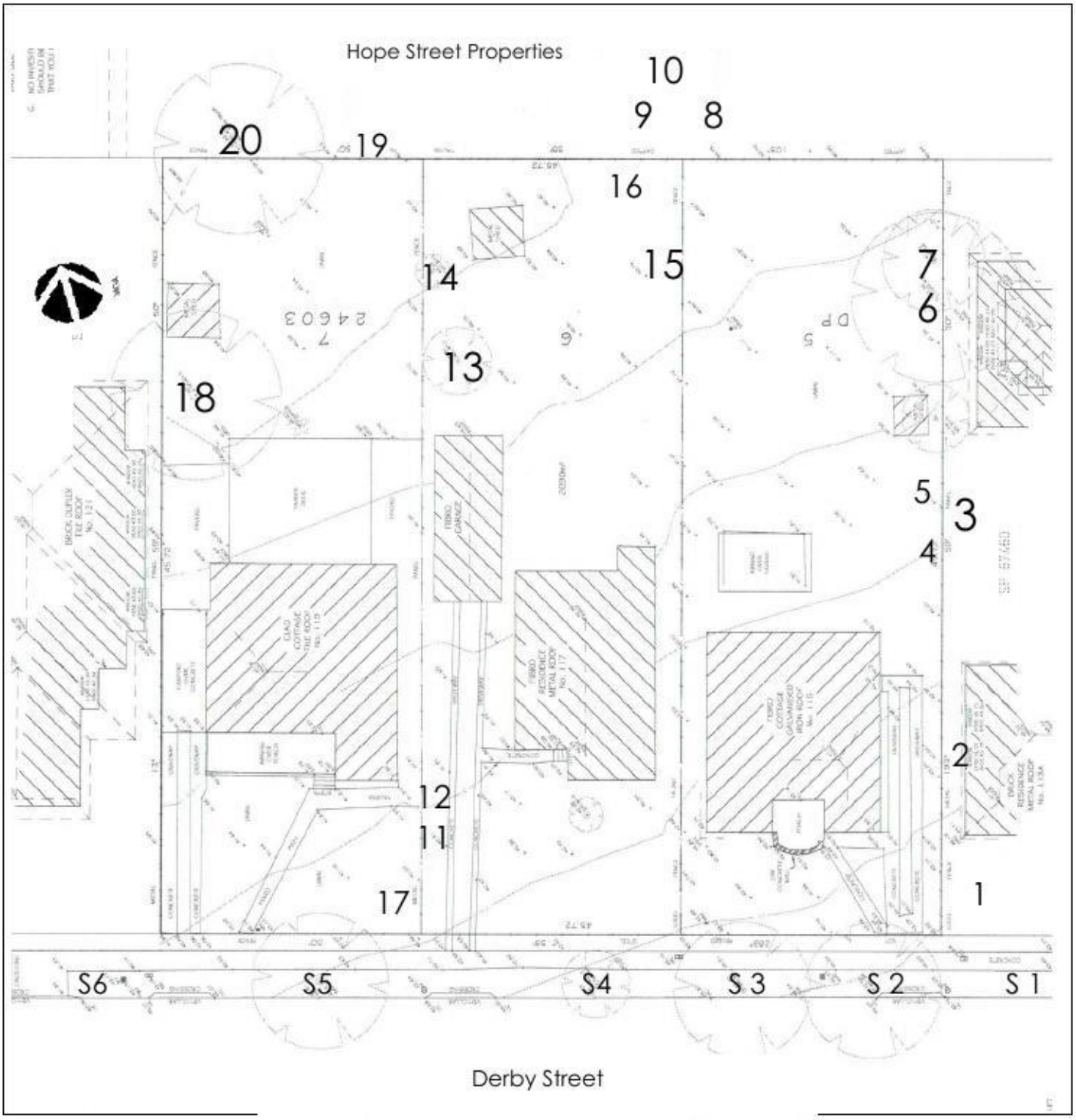
Information contained in this report covers only those trees assessed. It reflects their condition at the time of assessment. The inspection was limited to a Visual Assessment without dissection, excavation, probing or core drilling. By the nature of their size, weight and miscellaneous structure, constant 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 Nos 115 117 + 119 Derby Street Penrith - trees greater than 3 metres in height								
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**
S 1	*Lophostemon confertus* Brush Box	4.5 6	320	M	Intermediate Asymmetrical	Normal	High	High	**Street tree 113A Derby Street**, small tree pruned for powerline clearance.
S 2	*Lophostemon confertus* Brush Box	5 5	350	M	Intermediate Asymmetrical	Normal	High	High	**Street tree 115 Derby Street**, small tree pruned for powerline clearance.
S 3	*Lophostemon confertus* Brush Box	5 6	450 at 1m.	M	Intermediate Asymmetrical	Normal	High	High	**Street tree 115 Derby Street**, small tree pruned for powerline clearance.
S4	*Lophostemon confertus* Brush Box	4 5	350	M	Intermediate Asymmetrical	Normal	High	High	**Street tree 117 Derby Street**, small tree pruned for powerline clearance.
S5	*Lophostemon confertus* Brush Box	5 6	400	M	Intermediate Asymmetrical	Normal	High	High	**Street tree 119 Derby Street**, small tree pruned for powerline clearance, sparse canopy.
S6	*Lophostemon confertus* Brush Box	5 6	400	M	Intermediate Asymmetrical	Normal	High	High	**Street tree 211 Derby Street**, small tree pruned for powerline clearance.
1	*Thuja orientalis "Aurea nana"* Golden Bookleaf	4 3	multi	M	Intermediate Symmetrical	Normal	Medium	High	**Neighbouring Tree 113A Derby Street**, within .5 m. eastern boundary. Negligible canopy overhang.
2	*Washingtonia robusta* Mexican Fan Palm	7 2	400	M	Dominant Symmetrical	Normal	Low	High	**Neighbouring Tree 113A Derby Street**, within .5 m. south eastern boundary. Negligible canopy overhang.
3	Cupressus sempervirens Mediterranean Cypress	9 5	Multi to 400	M	Dominant Symmetrical	Normal - Low	Low	High	**Neighbouring Tree 113 Derby Street**, within 1 m. eastern boundary. 2 m. canopy overhang at 3 m. above ground level.
4	*Murraya paniculata* Murraya	3 2	150	S	Supressed Asymmetrical	Low	Low	Low	**115 Derby Street** Small shrub
5	*Lagerstroemia indica* Crepe Myrtle	4 4	150	S	Intermediate Asymmetrical	Normal	Low	Low	Small shrub/tree
6	*Ulmus procera* English Elm	9 6	380	M	Dominant Symmetrical	Normal	Low	High	Deciduous tree with good form and condition.

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
7	*Melaleuca bracteata* "Revolution Green"	8 5	320	M	Suppressed Asymmetrical	Low	Low	Low	Suppressed, sparse canopy.
8 **9** **10**	*Eucalyptus punctata* Grey Gums x 3	18 5	400 400 350	M	Codominant Asymmetrical	Normal	High	Priority High	**Rear Neighbouring Trees 60 + 62 Hope Street, tree 9** within 2 m. of rear, northern boundary. No canopy overhang.
11	*Callistemon citrinus* Bottlebrush	5 5	150 at base	M	Codominant Symmetrical	Low	Low	Low	**117 Derby Street** Small tree reaching full maturity/senescence. Poor structure.
12	*Callistemon citrinus* Bottlebrush	5 5	150 at base	OM	Codominant Asymmetrical	Normal - Low	Low	Low	Small tree reaching full maturity/senescence. Poor structure.
13	*Carrya illinoinensis* Pecan Nut tree	7 4	300	M	Suppressed Asymmetrical	Normal	Low	Low	Fruiting tree lopped at 3 m. 80% epicormic growth.
14	*Eucalyptus cinerea* Argyle Apple	7 5	500	M	Suppressed Symmetrical	Normal	Low	Low	Lopped at 4 m. 80% epicormic growth, reduced form and condition.
15	*Carrya illinoinensis* Pecan Nut tree	9 5	400	M	Suppressed Symmetrical	Normal	Low	Low	Fruiting tree lopped at 3 m. 80% epicormic growth.
16	*Melaleuca bracteata* "Revolution Green"	6 4	100 150	M	Suppressed Asymmetrical	Normal	Low	Low	Small tree reaching full maturity/senescence. Poor structure, phototropic lean.
17	*Thuja orientalis* "Aurea nana" Golden Bookleaf	5 3	300	M	Dominant Symmetrical	Normal	Low	Medium	**119 Derby Street.** Ornamental conifer.
18	*Liquidamber styraciflua* Liquidamber	8 7	350 400	M	Dominant Symmetrical	Normal	Low	Low	Codominant from base and at 1.2 m., slightly stunted for species type.
19	*Melaleuca bracteata* Black Tea Tree	5 3	200	M	Suppressed Asymmetrical	Low	Low	High	**Rear Neighbouring Tree 66 Hope Street**, within 1.1 m. of rear, northern boundary. Sparse canopy. No canopy overhang.
20	*Eucalyptus punctata* Grey Gums	15 9	400 450	M	Dominant Symmetrical	Normal	High	Priority High	**Rear Neighbouring Tree 68 Hope Street** on rear, northern boundary. Minor canopy overhang at 5m.

Appendix 2

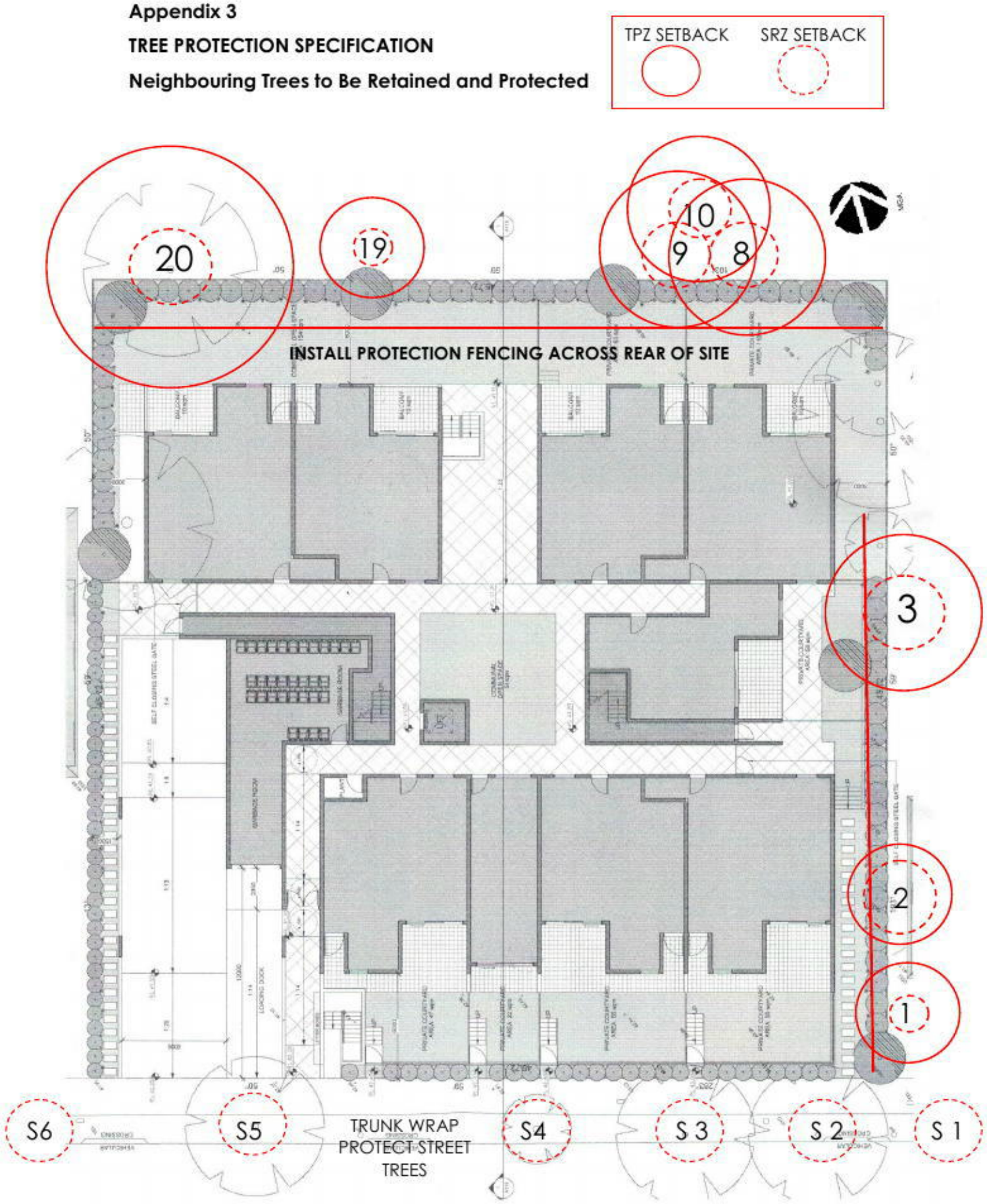
SITE PLAN – Indicating Tree Locations - Canopies are indicative.



Appendix 3

TREE PROTECTION SPECIFICATION

Neighbouring Trees to Be Retained and Protected



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 (Φ) at Root Base (DRB) is estimated at 10% greater than DBH.

TREE NO.	Φ 1	Φ 2	Φ 3	DBH (cm)	DRB (cm)	TPZ radius (m)	TPZ area (m^2)	SRZ radius (m)
S1	32			32	35	3.8	46	2.2
S2	35			35	39	2.4	18	1.8
S3	45			45	50	2.4	18	1.8
S4	35			35	39	4.2	55	2.3
S5	40			40	45	4.8	72	2.4
S6	40			40	45	4.8	72	2.4
1	20			20	22	2.4	18	1.8
2	40			40	44	4.8	72	2.4
3	40			40	44	4.8	72	2.4
4	15			15	18	1.8	10	1.7
5	15			15	18	1.8	10	1.7
6	38			38	42	4.6	65	2.3
7	32			32	35	3.8	46	2.2
8	40			40	44	4.8	72	2.4
9	40			40	44	4.8	72	2.4
10	35			35	39	4.2	55	2.3
11	15			15	18	1.8	10	1.7
12	15			15	18	1.8	10	1.7
13	30			30	33	3.6	41	2.1
14	50			50	55	6.0	113	2.6
15	40			40	44	4.8	72	2.4
16	10	15		19	22	2.3	16	1.8
17	30			30	33	3.6	41	2.1
18	35	40		54	60	6.5	132	2.7
19	20			20	22	2.4	18	1.8
20	40	45		61	66	7.3	168	2.8

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.

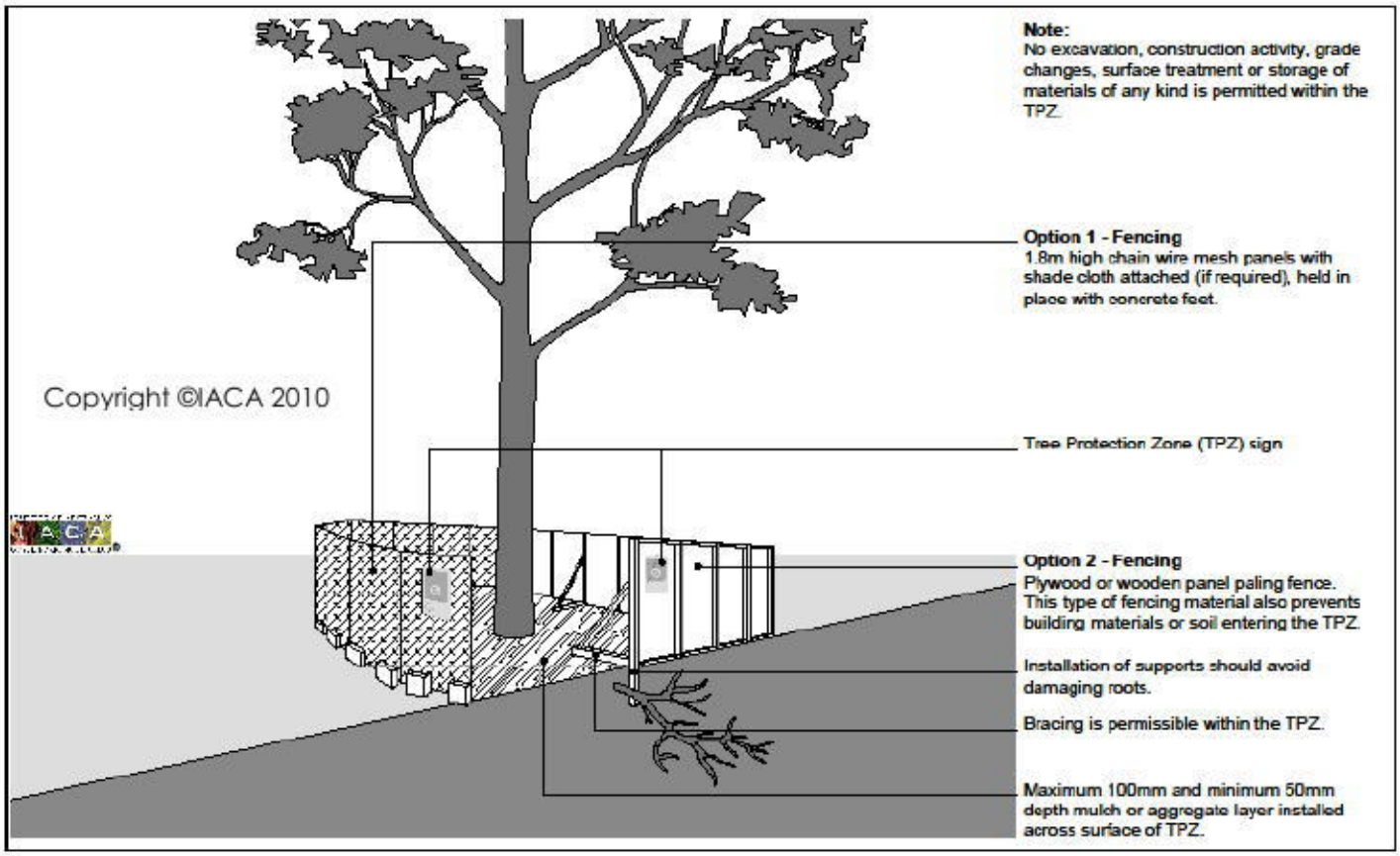
6.2 Activities Restricted within the TPZ - AS4970 Section 4.

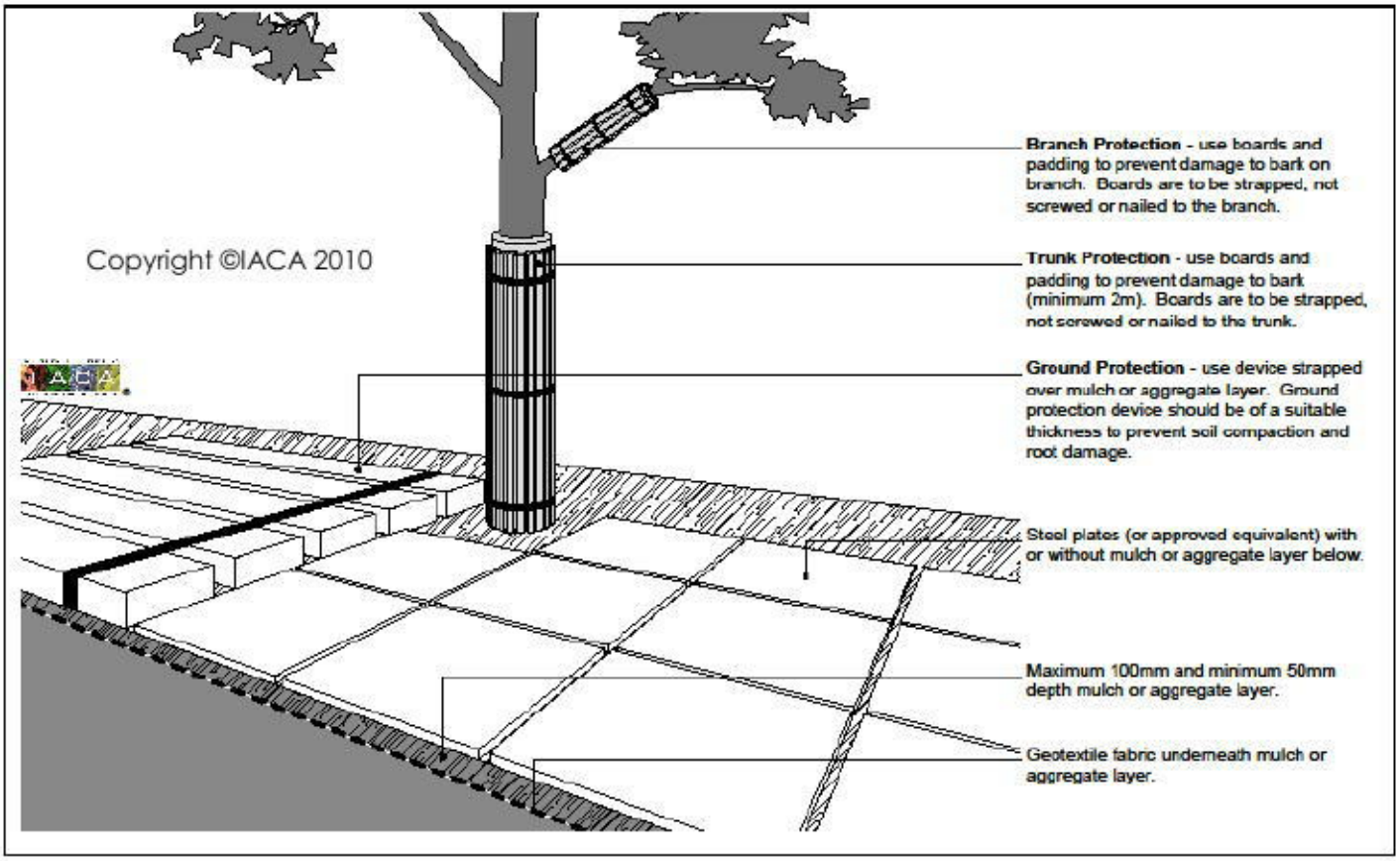
Activities generally excluded from the **TPZ** included but are not limited to -

(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.

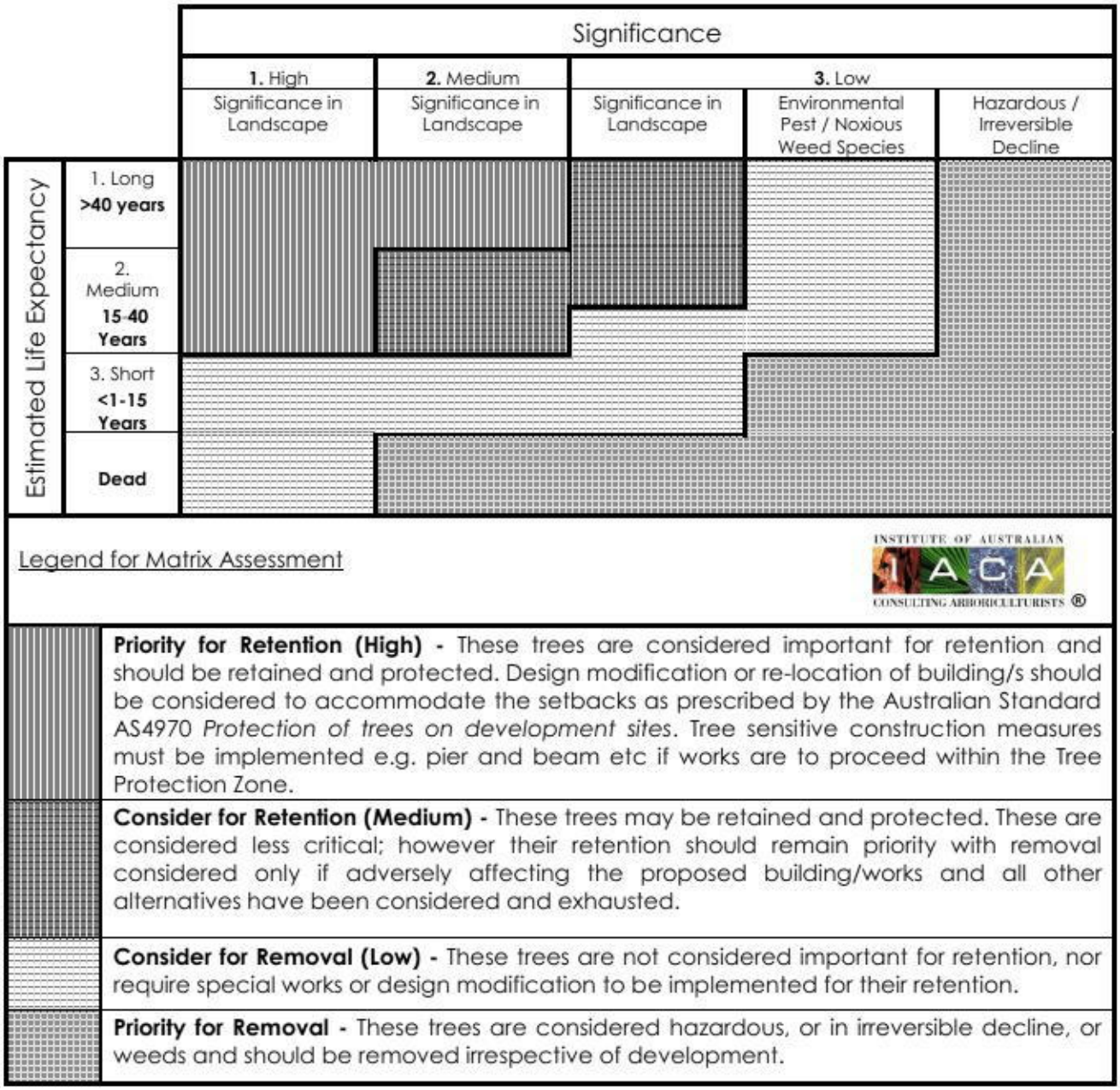
Hazardous/Irreversible Decline

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

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

Footprint Green Pty Ltd 2001, *Footprint Green Tree Significance & Retention Value Matrix*, Avalon, NSW Australia, www.footprintgreen.com.au

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, where 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.

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*.

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.