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- Australian Institute of Horticulture
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- Australian Chapter of International Society of Arboriculture

Arborist Report

<i>Project</i>	Western Sydney Stadium Cnr O'Connell St and Victoria Rd Parramatta NSW 2150 Ref: 2017-672 Job: 61401
<i>Client</i>	Lend Lease Level 14, Tower 3 International Towers Sydney Exchange Place 300 Barangaroo Avenue Barangaroo 2000
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Table of Contents

1	Summary	3
2	Aims of the Report	5
3	Methodology	5
4	Site Observations	6
5	Recommendations	10
6	Tree Locations	11
7	Existing Tree Schedule	18
8	Survey of Additional Trees to be Preserved	19
9	Photos	24
10	Acceptable Incursions to the Tree Protection Zone (TPZ)	82
11	Tree and Trunk Protection Methodology	83
12	Tree Protection Photograph	84
13	Guidelines for Excavating near Trees to be preserved	85
14	Root Pruning Methodology	87
15	Recommended Paver Types	88
16	References	90
17	Glossary	91
18	Expert Witness Code of Conduct	94

1 Summary

- 1.1 An initial site inspection was conducted on January 16th 2017 with representatives of Lend Lease. At this site inspection we determined location of trees on site and trees were marked with spray paint.
- 1.2 Trees that were to be removed within the tree protection zone were marked with white paint.
- 1.3 Trees that were to be preserved were numbered and marked with orange paint.
- 1.4 Trees to be removed were marked with white paint.
- 1.5 The project has been divided into two stages in relation to the building scopes of work.
- 1.6 Lend Lease advised subsequently on February 10th that Trees 40, 44 and 45 were to be removed.
- 1.7 Lend Lease advised on February 17th that Trees 59 and 60 were to be removed.
- 1.8 An additional site inspection was undertaken on February 20th to identify the additional trees for removal. At this site inspection we were advised that Trees 71, 75 and 76 were also to be removed. Refer Section 8 – Survey of Additional Trees to be removed.
 - a) Figure 6.1 is a satellite map of all trees on site.
 - b) Figure 6.2 shows Stage 2 of the tree works.
 - c) Figure 6.3 shows Stage 1 of the tree works.
 - d) Figure 6.4 shows the Wildlife Sanctuary.
 - e) Figure 6.5 shows the Car park.
 - f) Figure 6.6 shows 500 Space Car Park
 - g) Figure 6.7 shows 500 Space Car Park Series 300 trees for removal.
- 1.9 Figures 6.2, 6.3, 6.4 and 6.5 also identify trees to be removed.
- 1.10 Figure 6.6 also shows two previously unidentified trees 59 A and 59 B.
- 1.11 Tree 47 in Figure 6.3 is to have trunk protection installed. It must be mulched as it is within the construction zone.
- 1.12 Trees 64 A and 64 B in Figure 6.4 are to be removed.

- 1.13 Trees ranging in numbers between 79 and 104 located in the southern carpark are to be removed and are assessed in Dr Treegood Arborist Report 689.
- 1.14 Refer to separate TPZ and SRZ Assessment for further information on the 300 series trees.

2 Aims of the Report

- 2.1 Carry out assessment of trees on site in regards to tree protection.
- 2.2 In table format list all trees to be preserved and indicate those trees that require trunk protection, monitoring and other action.

3 Methodology

- 3.1 In preparation of this report, two ground level visual tree assessments (VTA¹) were undertaken, on January 16th and February 20th. 2017.
- 3.2 No aerial (climbing) inspections, woody tissue testing or tree root mapping were undertaken as part of the preparation of this report.
- 3.3 Heights, widths and diameters were estimated by eye from ground level.
- 3.4 No digging or root exposing work was done.
- 3.5 The comments and recommendations contained in this report are based on findings from the site inspection.

¹ VTA-Visual Tree Assessment undertaken by tree professionals is a recognised (International Society of Arboriculture) systematic method of identifying tree characteristics as hazard potential. Journal of Arboriculture, Vol. 22, No. 6, Nov. 1996. VTA is also an assessment method described by Claus Mattheck in the Body Language of Trees – a handbook for failure analysis. The Stationery Office, London (1994).

4 Site Observations

4.1 TREES TO BE PRESERVED

a) STAGE 2

Tree 32 – Jacaranda

Tree 33 - Platanus

Tree 35 – Platanus

b) STAGE 1

Tree 46A – Eucalyptus

Tree 46G – Eucalyptus

Tree 46H – Eucalyptus

Tree 46I – Eucalyptus

Tree 46J - Eucalyptus

Tree 47 – Platanus trunk protection required.

Tree 49 – Eucalyptus

Tree 52 – Eucalyptus

Tree 55 – Eucalyptus

Tree 56 – Eucalyptus

c) WILDLIFE SANCTUARY

Tree 60-1 – Eucalyptus

Tree 60 K - Eucalyptus

Tree 62 - Ficus

Tree 63 - Ficus

Tree 65 – Casuarina

4.2 ADDITIONAL TREES TO BE REMOVED

a) STAGE 2

Tree 48 – Plane Tree

Tree 50 - Eucalyptus

Tree 51 - Eucalyptus

Tree 53 - Eucalyptus

Tree 54 - Eucalyptus

Tree 57 - Eucalyptus

Tree 58 – Eucalyptus

Tree 300 - Eucalyptus

Tree 301 - Eucalyptus

Tree 302 - Eucalyptus

Tree 303 - Eucalyptus

Tree 60 A – Eucalyptus

Tree 60 B – Eucalyptus

Tree 60 C – Eucalyptus

Tree 60 D – Eucalyptus

Tree 60 E – Eucalyptus

Tree 60 F – Eucalyptus

Tree 60 G – Eucalyptus

Tree 60 H – Eucalyptus

Tree 60 I – Eucalyptus

Tree 60 J – Eucalyptus

Tree 60 L – Eucalyptus

Tree 60 M – Eucalyptus

Tree 64 A – Eucalyptus

Tree 64 B – Eucalyptus

b) STAGE 1

Tree 40 – Camphor Laurel

Tree 44 – Platanus

Tree 45 – Platanus

Tree 46 – Eucalyptus – 5 Trees to be removed, marked 46 B to 46 F on site figure 6.3.

c) 500 SPACE CAR PARK

Tree 59 – Queensland Brush box previously approved for removal in Stage 1 DA

Tree 59A – Conifer – Located on traffic island, marked as 59 A on site figure 6.6.

Tree 59B – Conifer – Located on traffic island, marked 59 B on site figure 6.6.

Tree 300 – Eucalyptus – Located next to Tree 58, marked as 300 on site figure 6.7.

Tree 301 – Eucalyptus – Marked as 301 on site figure 6.7.

Tree 302 – Eucalyptus – Marked as 302 on site figure 6.7.

Tree 303 – Eucalyptus – Marked as 303 on site figure 6.7.

Refer to separate TPZ and SRZ Assessment for further information on the 300 series trees.

d) WILDLIFE SACTUARY

Tree 60 – Eucalyptus – 12 Trees to be removed, marked 60 A to 60 L, with the exception of 60 K and 60-1 on site Figure 6.4.

e) CAR PARK

Tree 71 – Eucalyptus

Tree 75 – Eucalyptus

Tree 76 – Eucalyptus

- f)** These trees are in addition to trees that Stage 1 Development Application approval had identified already been marked to be removed. (Refer Section 7).
- g)** Trees ranging in numbers between 79 and 104 located in the southern carpark are to be removed and are assessed in Dr Treegood Arborist Report 689.

5 Recommendations

5.1 Trunk protection for Tree 47. Follow Guidelines for Tree and Trunk Protection - Sections 11 and 12.

5.2 Construction stage action for trees remaining is listed in table below. Some trees have been highlighted as below:

- a) Highlighted Yellow – Trunk protection.
- b) Highlighted Blue – Monitoring earthworks.

All other tree where possible are to be fenced off. This may not be possible in certain areas, eg Council areas and footpaths as this may cause a trip hazard.

5.3 Refer to separate TPZ and SRZ Assessment for additional tree protection and earthworks monitoring requirements.

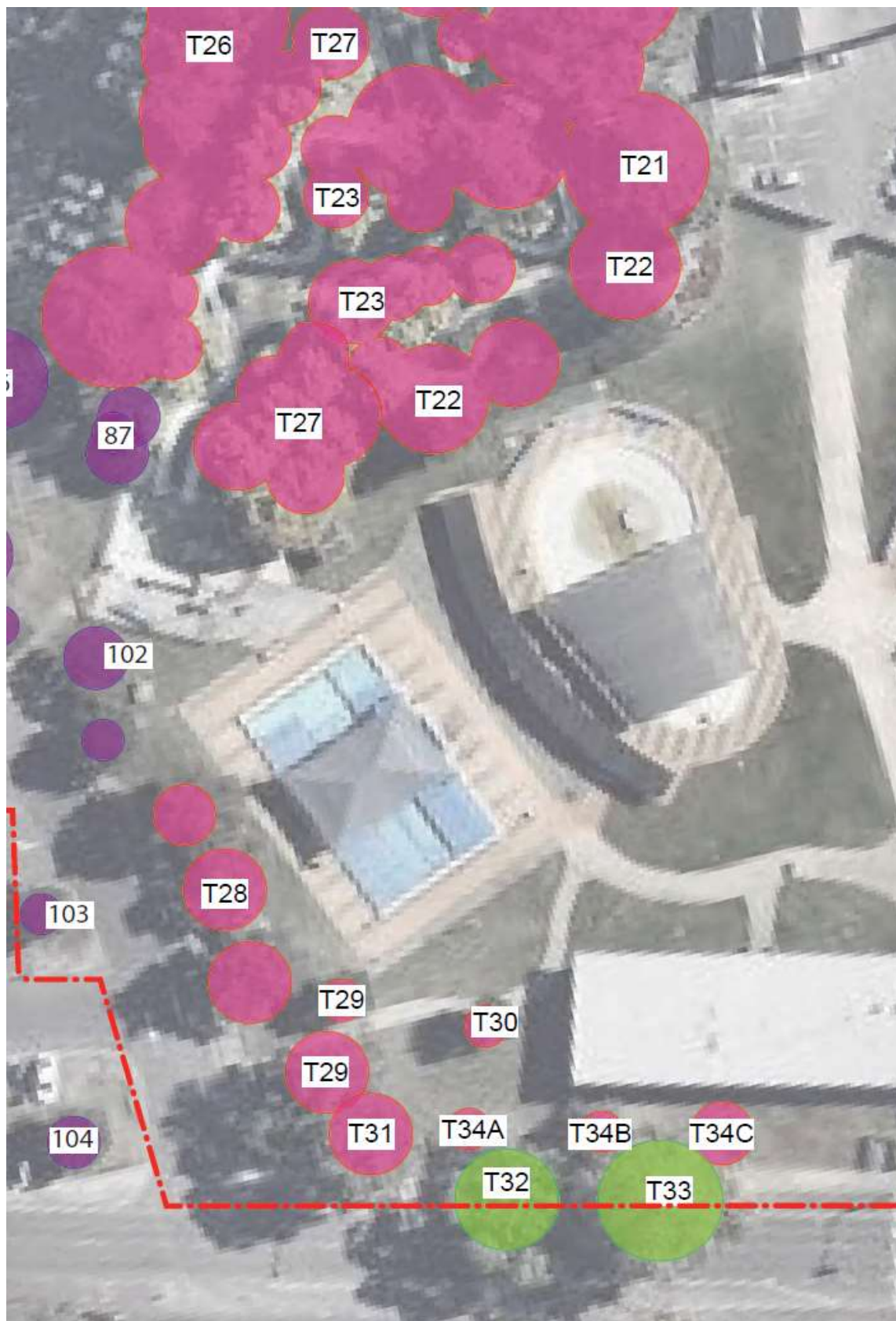
TREE NUMBER	NAME	LOCATION	ACTION	CONSTRUCTION STAGE
32	JACARANDA	STAGE 2		
33	PLATANUS	STAGE 2		
35	PLATANUS	STAGE 2		
47	PLATANUS	STAGE 1	TRUNK PROTECTION	PRE-DEMOLITION
60-1	EUCALYPTUS	Wildlife Sanctuary		
61	EUCALYPTUS	Wildlife Sanctuary		
62	FICUS	Wildlife Sanctuary		
63	FICUS	Wildlife Sanctuary		
65	CASUARIMA	Wildlife Sanctuary		

6 Tree Locations

FIGURE 6.1 – TREE LOCATIONS

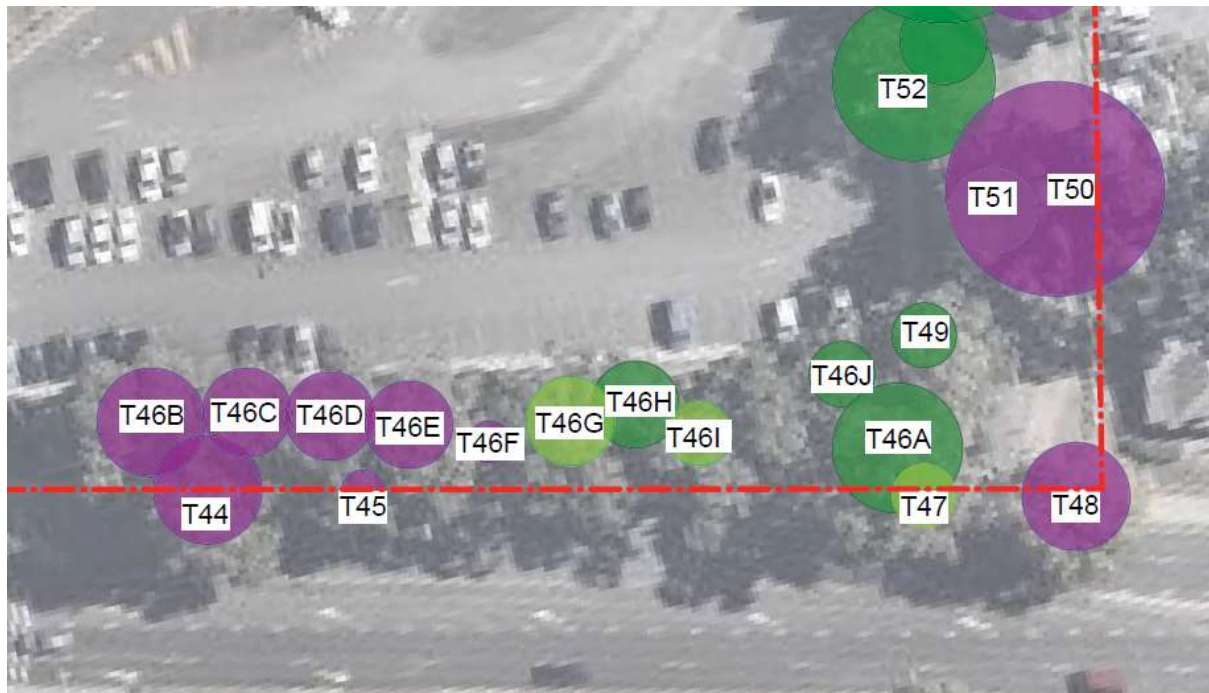


FIGURE 6.2 - STAGE 2



Trees marked pink or purple are to be removed. Tree 34A was not identified in the Stage 1 DA tree group.

FIGURE 6.3 - STAGE 1



Map of trees to be removed showing T44, T45 and T46 consisting of 5 trees to be removed, B to F. Tree A is outside the boundary fence line but will be within the road works line.

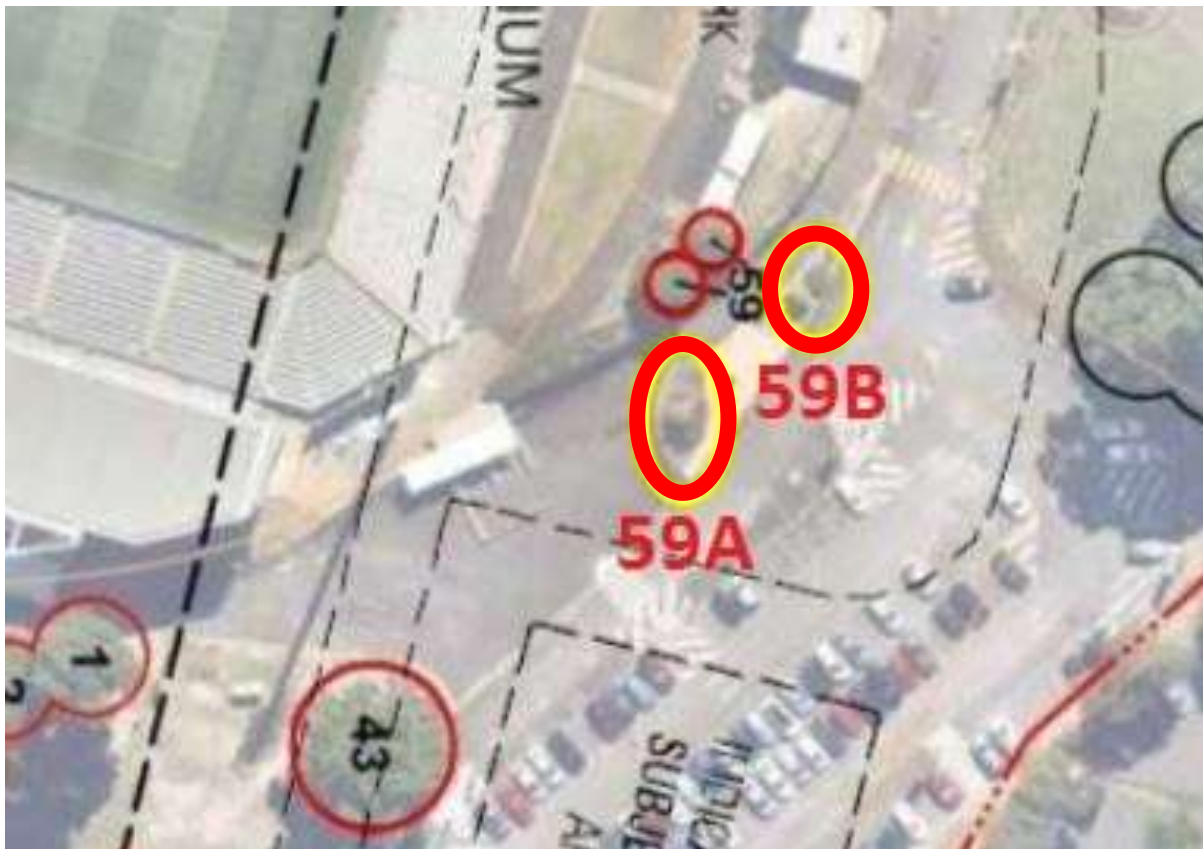
Job: 61401 Ref: 2017-672

FIGURE 6.5 – CAR PARK



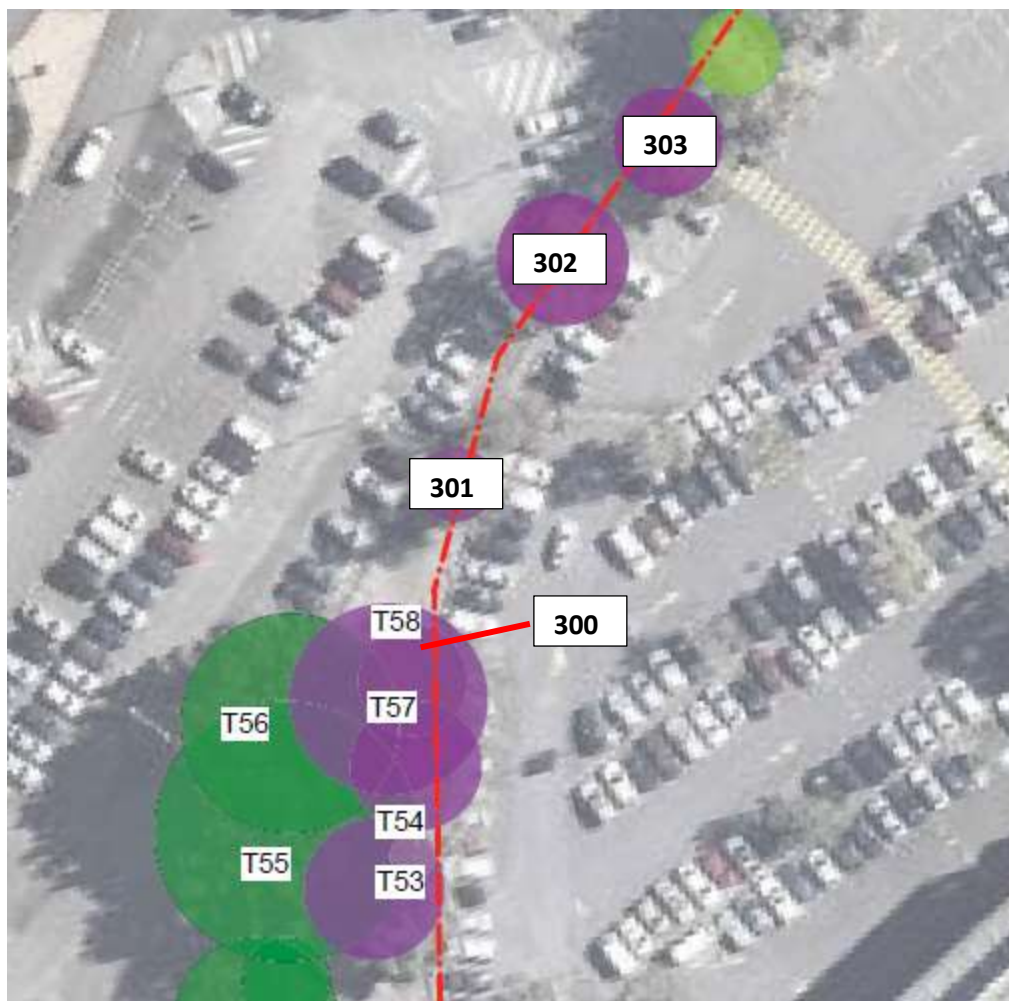
Trees 70, 71, 72, 73, 74, 75 and Tree 76 will also be removed. Refer to separate TPZ and SRZ Assessment for further information on the retained 300 series trees.

FIGURE 6.6 – 500 SPACE CAR PARK



Locations of previously unidentified Conifer trees 59 A and 59 B in relation to location of 59 Brush Box

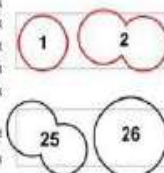
FIGURE 6.7 – 500 SPACE CAR PARK 300 Series Trees



Locations of trees numbered 300 to 303. Refer to separate TPZ and SRZ Assessment for further information on the 300 series trees to be retained.

7 Existing Tree Schedule

1	Eucalyptus sp.	Eucalypt	16 x 12	Good	Remove	Within proposed stadium envelope
2	Eucalyptus sp.	Eucalypt	12 x 10	Good	Remove	Within proposed stadium envelope
3	Eucalyptus sp.	Eucalypt	12 x 12	Good	Remove	Within proposed stadium envelope
4	Eucalyptus sp.	Eucalypt	15 x 14	Good	Remove	Within proposed stadium envelope
5	Brachychiton acerifolius	Illawarra Flame Tree	8 x 6	Average	Remove	Within proposed stadium envelope
6	Lophostemon confertus	Queensland Brush Box	12 x 10	Good	Remove	Within proposed stadium envelope
7	Lophostemon confertus	Queensland Brush Box	12 x 10	Good	Remove	Within proposed stadium envelope
8	Magnolia grandiflora 'Little Gem'	Little Gem	5 x 5	Good	Remove	2 No. Within proposed stadium envelope
9	Eucalyptus citriodora	Lemon Scented Gum	16 x 6	Good	Remove	4 No. Within proposed stadium envelope
10	Melaleuca quinquenervia	Broad-leaved Paperbark	6-12 x 6	Average	Remove	9 No. Within proposed stadium envelope
11	Callistemon viminalis	Weeping Bottlebrush	8 x 4	Average	Remove	Informal hedge planting. Within proposed stadium envelope
12	Eucalyptus nicholii	Narrow-leaf Black Peppermint	8 x 15	Average	Remove	Within proposed stadium envelope
13	Eucalyptus sp.	Eucalypt	12 x 12	Average	Remove	Within proposed stadium envelope
14	Ficus microcarpa var hilli	Hill's Fig	16 x 16	Good	Remove	Within proposed stadium envelope
15	Eucalyptus nicholii	Narrow-leaf Black Peppermint	12 x 12	Poor	Remove	Within proposed stadium envelope
16	Callistemon viminalis	Weeping Bottlebrush	5 x 2	Average	Remove	Informal hedge planting. Within proposed stadium envelope
17	Callistemon viminalis	Weeping Bottlebrush	6-8 x 2	Average	Remove	Informal hedge planting. Within proposed stadium envelope
18	Ficus microcarpa var hilli	Hill's Fig	16 x 16	Good	Remove	Within proposed stadium envelope
19	Ficus microcarpa var hilli	Hill's Fig	16 x 16	Good	Remove	Within proposed stadium envelope
20	Eucalyptus citriodora	Lemon Scented Gum	16 x 6	Average	Remove	Grove planting to embankment. Within proposed stadium envelope
21	Eucalyptus citriodora	Lemon Scented Gum	16 x 6	Good	Remove	Within proposed stadium envelope
22	Melaleuca quinquenervia	Broad-leaved Paperbark	8 x 6	Average	Remove	3 No. Within proposed stadium envelope
23	Acacia sp.	Wattle	8 x 6	Average	Remove	Grove planting to embankment. Within proposed stadium envelope
24	Casuarina sp.	She Oak	14 x 5	Average	Remove	Grove planting to embankment. Within proposed stadium envelope
25	Callistemon salignus	Swamp Bottlebrush	10 x 10	Good	Remove	Within proposed public domain and ring road zone.
26	Casuarina sp.	She Oak	14 x 2	Average	Remove	Grove planting to embankment. Within proposed public domain and ring road zone.
27	Acacia sp.	Wattle	8 x 8	Good	Remove	Grove planting to embankment. Within proposed public domain and ring road zone.
28	Melaleuca quinquenervia	Broad-leaved Paperbark	8 x 6	Good	Remove	3 No. Within proposed public domain and ring road zone.
29	Pinus pinea	Stone Pine	7 x 6	Good	Remove	2 No. Within proposed public domain and ring road zone.
30	Pinus pinea	Stone Pine	7 x 6	Good	Remove	Within proposed public domain.
31	Melaleuca quinquenervia	Broad-leaved Paperbark	10 x 14	Good	Remove	Within proposed public domain.
32	Jacaranda mimosifolia	Jacaranda	10 x 10	Good	Retain	Within footpath
33	Platanus orientalis	Oriental Plane	12 x 15	Average	Retain	Within footpath
34	Platanus orientalis	Oriental Plane	6 x 3	Good	Remove	2 No. Within footpath
35	Platanus orientalis	Oriental Plane	8-12 x 6-10	Good	Retain	7 No. Within footpath
36	Melaleuca quinquenervia	Broad-leaved Paperbark	10 x 12	Average	Remove	Within proposed public domain.
37	Ficus sp.	Fig	8 x 12	Good	Remove	Within proposed public domain.
38	Lophostemon confertus	Queensland Brush Box	10 x 10	Good	Remove	Within proposed public domain.
39	Lophostemon confertus	Queensland Brush Box	10 x 12	Good	Remove	Within proposed public domain.
40	Cinnamomum camphora	Camphor Laurel	12 x 14	Poor	Retain	
41	Eucalyptus sp.	Eucalypt	14 x 15	Good	Remove	3 No. Within proposed public domain. Close to main entry point.
42	Eucalyptus sp.	Eucalypt	15 x 10	Good	Remove	Within proposed public domain. Close to main entry point.
43	Eucalyptus sp.	Eucalypt	20 x 17	Good	Remove	Within proposed public domain and ring road zone.
44	Platanus orientalis	Oriental Plane	14 x 14	Good	Retain	Within footpath
45	Platanus orientalis	Oriental Plane	6 x 6	Average	Retain	Within footpath
46	Eucalyptus sp.	Eucalypt	14-16 x 10-12	Good	Remove Part	12 No. 4 trees in row encroach on building envelope
47	Platanus orientalis	Oriental Plane	8 x 8	Average	Retain	Within footpath
48	Platanus orientalis	Oriental Plane	12 x 12	Good	Retain	Within footpath
49	Eucalyptus sp.	Eucalypt	14 x 12	Good	Remove	Tree encroaches on building envelope
50	Eucalyptus sp.	Eucalypt	10 x 10	Poor	Retain	
51	Eucalyptus sp.	Eucalypt	14 x 8	Good	Retain	
52	Eucalyptus sp.	Eucalypt	14 x 15	Good	Remove	Tree encroaches on building envelope
53	Corymbia maculata	Spotted Gum	16 x 16	Good	Retain	
54	Corymbia maculata	Spotted Gum	16 x 14	Good	Retain	
55	Ficus microcarpa var hilli	Hill's Fig	14 x 20	Good	Remove	Tree encroaches on building envelope
56	Ficus microcarpa var hilli	Hill's Fig	14 x 20	Good	Remove	Tree encroaches on building envelope
57	Eucalyptus sp.	Eucalypt	16 x 12	Good	Retain	
58	Eucalyptus sp.	Eucalypt	16 x 15	Good	Retain	
59	Lophostemon confertus	Queensland Brush Box	6 x 7	Good	Remove	2 No. Tree encroaches on carpark area
60	Eucalyptus sp.	Eucalypt	10-18 x 10-15	Good	Retain	11 No.
61	Eucalyptus sp.	Eucalypt	10-18 x 10-15	Good	Retain	6 No.
62	Ficus microcarpa var hilli	Hill's Fig	12 x 20	Good	Retain	
63	Ficus microcarpa var hilli	Hill's Fig	12 x 20	Good	Retain	
64	Eucalyptus sp.	Eucalypt	12 x 15	Good	Retain	2 No.
65	Casuarina sp. Acacia sp.	She Oak and Wattle	5-12 x 3-6	Average	Retain	Grove planting to embankment
66	Eucalyptus sp.	Eucalypt	18 x 18	Good	Remove	Tree encroaches carpark
67	Eucalyptus sp.	Eucalypt	18 x 18	Good	Remove	Tree encroaches carpark
68	Callistemon sp.	Bottlebrush	8 x 7	Good	Remove	Tree encroaches carpark
69	Fraxinus sp.	Ash	8 x 7	Good	Remove	Tree encroaches carpark
70	Eucalyptus sp.	Eucalypt	12 x 13	Good	Remove	Tree encroaches carpark
71	Eucalyptus sp.	Eucalypt	11 x 14	Good	Retain	
72	Eucalyptus sp.	Eucalypt	12 x 14	Good	Remove	Tree encroaches carpark
73	Eucalyptus sp.	Eucalypt	12 x 14	Good	Remove	Tree encroaches carpark
74	Eucalyptus sp.	Eucalypt	12 x 8	Good	Remove	Tree encroaches carpark
75	Eucalyptus sp.	Eucalypt	10 x 8	Good	Remove	Tree encroaches carpark
76	Eucalyptus sp.	Eucalypt	11 x 12	Good	Retain	
77	Lophostemon confertus	Queensland Brush Box	8 x 7	Good	Remove	Tree encroaches carpark
78	Lophostemon confertus	Queensland Brush Box	7 x 7	Good	Remove	Tree encroaches carpark



NOTE:
TREE STUDY WAS LIMITED TO VISUAL ASSESSMENT
FROM GROUND LEVEL & AERIAL IMAGE REVIEW.
LOCATION OF TREES IS APPROXIMATE & SUBJECT TO FUTURE SURVEY.
CROWN SPREAD & TREE HEIGHTS WERE ESTIMATED BY EYE.

Some of these trees have had numbering changed as they were in groups

8 Survey of Additional Trees

1.0 Tree Assessment Survey Sheet												Client: Lend Lease	
Location: Parramatta Stadium												Quotation Number: 61401	
Weather : Fine 20/2/2017												Page number: 1 / 5	
Tree #	Species Botanical name Common name	Trunk Diameter @1.4m	Height	Width	Age	SULE	Health 1 = Poor 5 = Excel	Structure 1 = Poor 5 = Excel	Canopy Cover %	Crown Class	Tree Surgery	Suitability for Preservation	Comments
40	Cinnamomum camphora Camphor Laurel	70	12	14	M		1	3	50%	D		Moderate	Old wounds from lopping & pruning. Deadwood and epicormic growth throughout
44	Platanus Orientalis Oriental Plane	60	14	14	M		3	4	60%	D		Moderate	Wound on limb overhanging road
45	Plantanus Orientalis Oriental Plane	30	6	6	SM		1	1	10%	S		Low	Many cavities and wounds from pruning Trunk inclusion at 2.5m Mainly deadwood on larger trunk
46-1	Eucalyptus microcorys Tallowwood	Group of 11 trees											
A	Eucalyptus microcorys Tallowwood	60	16	8	M		2	2	20%	D		Low	Outside of perimeter fence Deadwood throughout Tree in decline
B	Eucalyptus microcorys Tallowwood	50	16	8	M		4	4	60%	D		Moderate	
C	Eucalyptus microcorys Tallowwood	50	16	8	M		3	3	40%	C		Moderate	
D	Eucalyptus microcorys Tallowwood	50	14	8	M		3	3	40%	C		Moderate	
E	Eucalyptus microcorys Tallowwood	60	14	10	M		3	3	50%	C		Moderate	
F	Eucalyptus microcorys Tallowwood	60	16	12	M		3	3	50%	C		Moderate	

Tree surgery:
1. Deadwood. 2. Reshape Crown. 3. Wound repair. 4. Insect control. 5 Improve soil conditions (mulch, fertility, aeration etc).
6. Investigate cavities. 7. Thin crown, consider installation of cabling/bracing and or retain and fence off for public safety.
8. Line clearance of structures or service wires. 9. Remove attached plant. 10. Root girdling. 11 Remove. 12. No tree surgery required.
13. Requires tree protection measures. *Refer to accompanying report. 14. Borer damage. 15. Fungal or bacterial damage

Age classification:

Y - Young
SM - Semi Mature
M - Mature
OM - Overmature

Crown Class

D - Dominant
C - CoDominant
I - Intermediate
S - Suppressed

SULE

L = Long	Remaining life span greater than 40 years
M = Medium	remaining life span from 15 to 40 years
Sh = Short	remaining life span from 5 to 15 years
R = Remove	Should be removed within 5 years
Sm = Small	Young or regularly pruned; trees that can readily be moved or replace
U = Unstable	Unstable in the ground or have significant trunk damage rendering them structurally hazardous



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Refer to the "Tree Removal Plan" issued by Aspect Studios for identification of the trees to be removed.

1.0 Tree Assessment Survey Sheet

Client: Lend Lease
Quotation Number: 61401
Page number: 2 / 5

Location: Parramatta Stadium

Weather : Fine 20/2/2017

Tree #	Species Botanical name Common name	Trunk Diameter @1.4m	Height	Width	Age	SULE	Health 1 = Poor 5 = Excel	Structure 1 = Poor 5 = Excel	Canopy Cover %	Crown Class	Tree Surgery	Suitability for Preservation	Comments
46-1	Eucalyptus microcorys Tallowwood	Group of 11 trees Continued											
G	Eucalyptus microcorys Tallowwood	50	14	10	M		2	2	50%	C		Low	Trunk union at 2.5m Storm damage, limb wounds and deadwood throughout
H	Eucalyptus microcorys Tallowwood	35	12	8	M		2	2	30%	C		Low	Canopy one-sided causing stress within trunk Deadwood throughout
I	Eucalyptus microcorys Tallowwood	35	14	10	M		2	2	40%	C		Low	Deadwood throughout
J	Eucalyptus microcorys Tallowwood	38	12	8	M		5	5	70%	C	1	High	
K	Eucalyptus microcorys Tallowwood	36	12	6	M		4	3	40%	C	5, 4	Low	Basal wound, inclusion at 3 metres, Misshapen canopy with dieback throughout
48	Platanus orientalis Oriental Plane	61	12	12	M		5	2	80%	D		Moderate	Trunk inclusion at 1.2 metres
50	Eucalyptus SP. Rough Bark Eucalyptus	50	10	10	M		5	5	90%	D		High	Epicormic growth at base
51	Eucalyptus oreades Smooth Bark Eucalyptus	31	14	8	M		5	4	50%	C		Moderate	3 way branch union at 6 metres
53	Eucalyptus SP. Rough Bark Eucalyptus	45	14	14	M		5	5	90%	C		High	

Tree surgery:

- Deadwood.
- Reshape Crown.
- Wound repair.
- Insect control.
- Improve soil conditions (mulch, fertility, aeration etc).
- Investigate cavities.
- Thin crown, consider instalation of cabling/bracing and or retain and fence off for public safety.
- Line clearance of structures or service wires.
- Remove attached plant.
- Root girdling.
- Remove.
- No tree surgery required.
- Requires tree protection measures. *Refer to accompanying report.
- Borer damage.
- Fungal or bacterial damage

Age classification:

Y - Young
SM - Semi Mature
M - Mature
OM - Overmature

Crown Class

D - Dominant
C - CoDominant
I - Intermediate
S- Suppressed

SULE

L = Long
M = Medium
Sh = Short
R = Remove
Sm = Small
U = Unstable

Safe Useful Life Expectancy

Remaining life span greater than 40 years
remaining life span from 15 to 40 years
remaining life span from 5 to 15 years
Should be removed within 5 years
Young or regularly pruned; trees that can readily be moved or replace
Unstable in the ground or have significant trunk damage rendering them structurally hazardous



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1.0 Tree Assessment Survey Sheet

Client: Lend Lease
Quotation Number: 61401
Page number: 3 / 5

Location: Parramatta Stadium

Weather : Fine 20/2/2017

Tree #	Species Botanical name Common name	Trunk Diameter @1.4m	Height	Width	Age	SULE	Health 1 = Poor 5 = Excel	Structure 1 = Poor 5 = Excel	Canopy Cover %	Crown Class	Tree Surgery	Suitability for Preservation	Comments
54	Eucalyptus oreades Smooth Bark Eucalyptus	48	16	8	M		5	5	30%	C		High	No lower canopy All canopy located between 10 and 16 metres
57	Eucalyptus oreades Smooth Bark Eucalyptus	38 35	16	12	M		5	2	50%	C		Low	Trunk inclusion at 1 Metre
58	Eucalyptus oreades Smooth Bark Eucalyptus	54	16	10	M		5	3	40%	C		Moderate	One side of canopy over car park
59A	Coniferophyta Conifer	10, 10	3.5	2	SM		4	4	70%	D		High	Located on traffic island adjacent to tree 59
59B	Coniferophyta Conifer	10, 10	3	2	SM		4	4	70%	D		High	Located on traffic island adjacent to tree 59
60-1	Eucalyptus microcorys Tallowwood	Group of 14 trees											
A	Eucalyptus microcorys Tallowwood	60	20	15	M		3	3	60%	C		High	
B	Eucalyptus microcorys Tallowwood	50	12	10	M		3	3	50%	C		High	
C	Eucalyptus microcorys Tallowwood	60	18	15	M		3	3	60%	C		High	
D	Eucalyptus microcorys Tallowwood	60	12	10	M		2	2	40%	C		Low	Tree in decline Deadwood throughout and storm damage

Tree surgery:

1. Deadwood.
2. Reshape Crown.
3. Wound repair.
4. Insect control.
5. Improve soil conditions (mulch, fertility, aeration etc).
6. Investigate cavities.
7. Thin crown, consider installation of cabling/bracing and or retain and fence off for public safety.
8. Line clearance of structures or service wires.
9. Remove attached plant.
10. Root girdling.
11. Remove.
12. No tree surgery required.
13. Requires tree protection measures. *Refer to accompanying report.
14. Borer damage.
15. Fungal or bacterial damage

Age classification:

Y - Young
SM - Semi Mature
M - Mature
OM - Overmature

Crown Class

D - Dominant
C - CoDominant
I - Intermediate
S - Suppressed

SULE

L = Long
M = Medium
Sh = Short
R = Remove
Sm = Small
U = Unstable

Safe Useful Life Expectancy

Remaining life span greater than 40 years
remaining life span from 15 to 40 years
remaining life span from 5 to 15 years
Should be removed within 5 years
Young or regularly pruned; trees that can readily be moved or replace
Unstable in the ground or have significant trunk damage rendering them structurally hazardous



DR. TREEGOOD

WILLIAM HOME

Aust. Institute of Horticulture
International Society of Arboriculture
National Arborist Association

Tree Surgeon / Transplantation Garden Design & Maintenance

INQUIRIES, PLEASE CONTACT WILLIAM HOME: 0418 979 922

1.0 Tree Assessment Survey Sheet												Client: Lend Lease	
Location: Parramatta Stadium												Weather : Fine 20/2/2017	
												Quotation Number: 61401	
												Page number: 4 / 5	
Tree #	Species Botanical name Common name	Trunk Diameter @1.4m	Height	Width	Age	SULE	Health 1 = Poor 5 = Excel	Structure 1 = Poor 5 = Excel	Canopy Cover %	Crown Class	Tree Surgery	Suitability for Preservation	Comments
60-1	Eucalyptus microcorys Tallowwood	Group of 14 trees Continued											
E	Eucalyptus microcorys Tallowwood	50	15	8	M		2	2	30%	C		Low	Tree in decline Deadwood throughout and storm damage
F	Eucalyptus microcorys Tallowwood	60	15	6	M		2	2	30%	C		Low	Limbs lopped Canopy to one side
G	Eucalyptus microcorys Tallowwood	40	10	6	M		1	1	10%	I		Low	Tree in decline Deadwood throughout
H	Eucalyptus microcorys Tallowwood	50	12	10	M		2	2	40%	C		Low	Tree in decline Deadwood throughout and storm damage
I	Eucalyptus microcorys Tallowwood	35	8	5	SM		3	3	50%	C		Moderate	Trunk wound at the base
J	Eucalyptus microcorys Tallowwood	40	10	8	M		3	3	50%	C		Moderate	4 way trunk union at 1.5m Tree in decline Deadwood throughout and storm damage
K	Eucalyptus microcorys Tallowwood	60	15	10	M		3	4	50%	C		Moderate	Tree in decline Deadwood throughout and storm damage
L	Eucalyptus Microcorys Tallowwood	50	14	14	OM		3	1	40%	D	11	Low	Storm damage at 12 metres Major cambium dieback at base Cavity at the base
M	Eucalyptus Microcorys Tallowwood	80	14	12	M		5	5	70%	C	1	High	Hanging branch

Tree surgery:
1. Deadwood.2. Reshape Crown. 3. Wound repair. 4. Insect control. 5 Improve soil conditions (mulch, fertility, aeration etc).
6. Investigate cavities. 7. Thin crown, consider instalation of cabling/bracing and or retain and fence off for public safety.
8. Line clearance of structures or service wires. 9. Remove attached plant. 10. Root girdling. 11. Remove. 12. No tree surgery required.
13. Requires tree protection measures. *Refer to accompanying report. 14. Borer damage. 15. Fungal or bacterial damage

Age classification:

Y - Young
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OM - Overmature

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S - Suppressed

SULE

L = Long **Safe Useful Life Expectancy**
Remaining life span greater than 40 years
M = Medium remaining life span from 15 to 40 years
Sh = Short remaining life span from 5 to 15 years
R = Remove Should be removed within 5 years
Sm = Small Young or regularly pruned; trees that can readily be moved or replace
U = Unstable Unstable in the ground or have significant trunk damage rendering them structurally hazardous



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1.0 Tree Assessment Survey Sheet

Client: Lend Lease

Quotation Number: 61401

Page number: 5 / 5

Location: Parramatta Stadium

Weather : Fine 20/2/2017

Tree #	Species Botanical name Common name	Trunk Diameter @1.4m	Height	Width	Age	SULE	Health 1 = Poor 5 = Excel	Structure 1 = Poor 5 = Excel	Canopy Cover %	Crown Class	Tree Surgery	Suitability for Preservation	Comments
64A	Eucalyptus microcorys Tallowwood	50	10	10	M		5	4	80%	C	1, 7	High	
64B	Eucalyptus microcorys Tallowwood	50	10	10	M		5	4	75%	C		High	Branch inclusion at 6 metres Old basal damage
71	Eucalyptus microcorys Tallowwood	50	20	12	M		3	4	40%	D		Low	Limb broken off and lying on ground
75	Eucalyptus microcorys Tallowwood	40	15	8	M		4	4	40%	C		Moderate	Trunk inclusion at 2.5m
76	Eucalyptus microcorys Tallowwood	50	17	10	M		4	4	60%	C		Moderate	Old storm damage and wounds
300	Eucalyptus SP. Rough Bark Eucalyptus	71	16	12	M		5	4	70%	D		High	
301	Eucalyptus nicholii Willow Peppermint	44	11	10	OM		2	3	30%	C	11	Low	Misshapen canopy, dieback throughout, Epicormic growth throughout
302	Eucalyptus nicholii Willow Peppermint	47	10	10	OM		5	1	35%	C	11	Low	Cambium dieback, bracket fungi, Misshapen canopy, old branch failure
303	Eucalyptus nicholii Willow Peppermint	71	10	10	M		5	3	80%	D	5, 4	Moderate to High	Well shaped canopy, Old cuts on trunk, possible termites

Tree surgery:

- Deadwood.
- Reshape Crown.
- Wound repair.
- Insect control.
- Improve soil conditions (mulch, fertility, aeration etc).
- Investigate cavities.
- Thin crown, consider instalation of cabling/bracing and or retain and fence off for public safety.
- Line clearance of structures or service wires.
- Remove attached plant.
- Root girdling.
- Remove.
- No tree surgery required.
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9 PHOTOS

Photo 1



Tree 40

Photo 2



Tree 40 - Deadwood throughout

Photo 3



Tree 40 - Trunk union and wounds from lopping and pruning

Photo 4



Tree 40 - Deadwood

Photo 5



Tree 44 with tree 45 in the background

Photo 6



Tree 45 – Deadwood throughout main limb.

Photo 7



Tree 45 – Many cavities throughout tree

Photo 8



Tree 45 – Many cavities throughout

Photo 9



Tree 46A – Outside of boundary fence, deadwood throughout

Photo 10



Tree 46B

Photo 11



Tree 46C

Photo 12



Tree 46D

Photo 13



Tree 46E

Photo 14



Tree 46F

Photo 15



Tree 46G

Photo 16



Tree 46H

Photo 17



Tree 46l

Photo 18



Tree 46B to 46I

Photo 19



Tree 46B to 46H in view

Photo 20



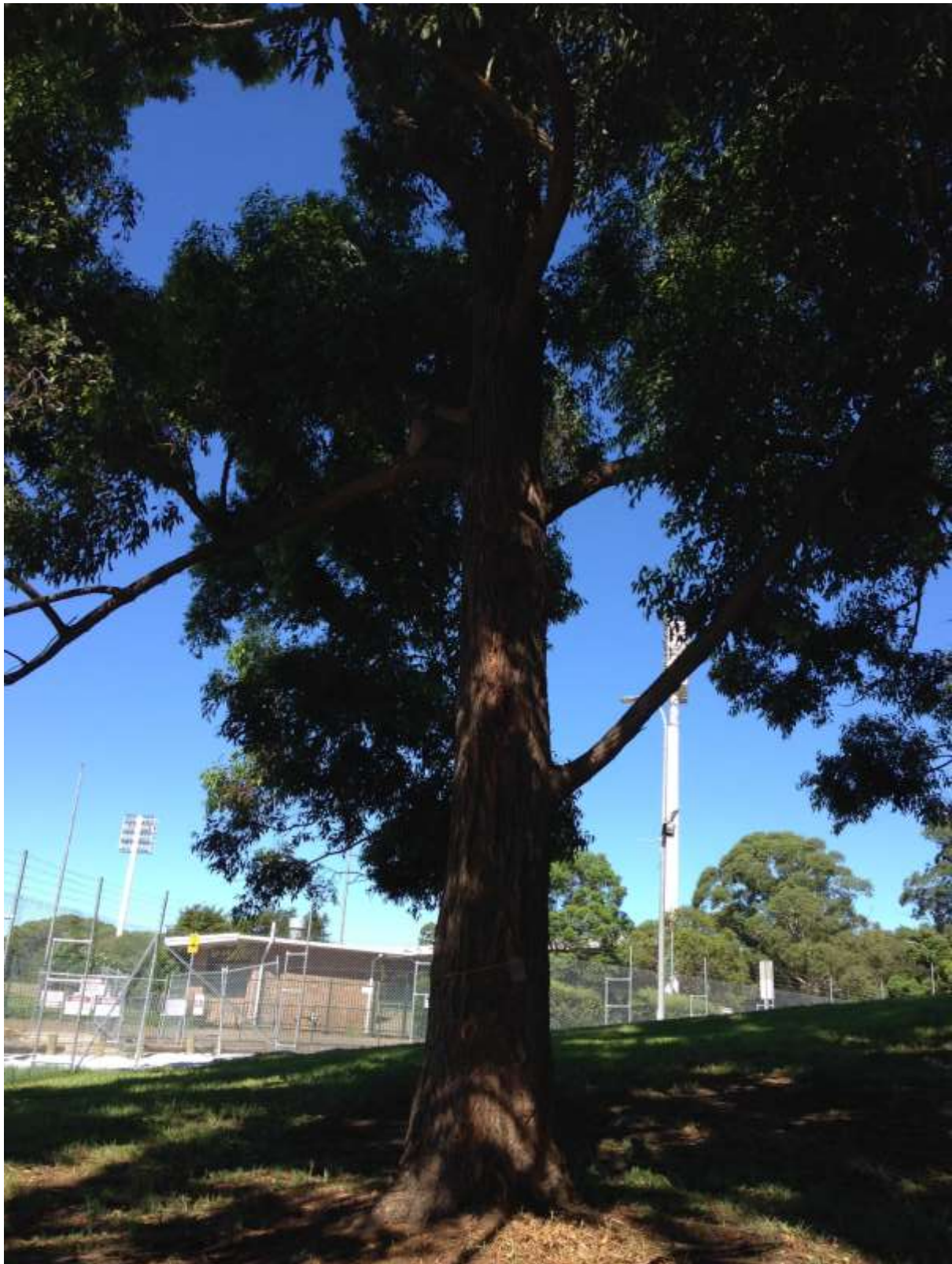
Tree 59A – Located on traffic island

Photo 21



Tree 59B – Located on traffic island

Photo 22



Tree 60A

Photo 23



Tree 60B

Photo 24



Tree 60C

Photo 25



Tree 60D

Photo 26



Tree 60E

Photo 27



Tree 60F

Photo 28



Tree 60G

Photo 29



Tree 60H

Photo 30



Tree 60 I

Photo 31



Tree 60J

Photo 32



Tree 60K

Photo 33



Tree 60L

Photo 34



Tree 60 grouping

Photo 35



Tree 61A

Photo 36



Tree 62

Photo 37



Tree 63

Photo 38



Tree 71 – Broken limb lying to the right

Photo 39



Tree 71

Photo 40



Tree 71 – Broken limb

Photo 41



Tree 71 – Wound from broken limb

Photo 42



Tree 75

Photo 43



Tree 76

Photo 44



Trees 34A, 34B and 34C, where only 34B and 34C were identified on the site plan.

Photo 45



Tree 48 – Trunk inclusions in two locations

Photo 46



Tree 48

Photo 47



Tree 50

Photo 48



Tree 51

Photo 49



Tree 52

Photo 50



Tree 53 and Tree 54

Photo 51



Tree 55

Photo 52



Tree 56

Photo 53



Tree 57 – Twin trunk inclusion

Photo 54



Tree 57

Tree 300 Tree 58

Photo 55



Tree 300

Tree 58

Photo 56



Tree 301 showing dieback

Photo 57



Tree 302

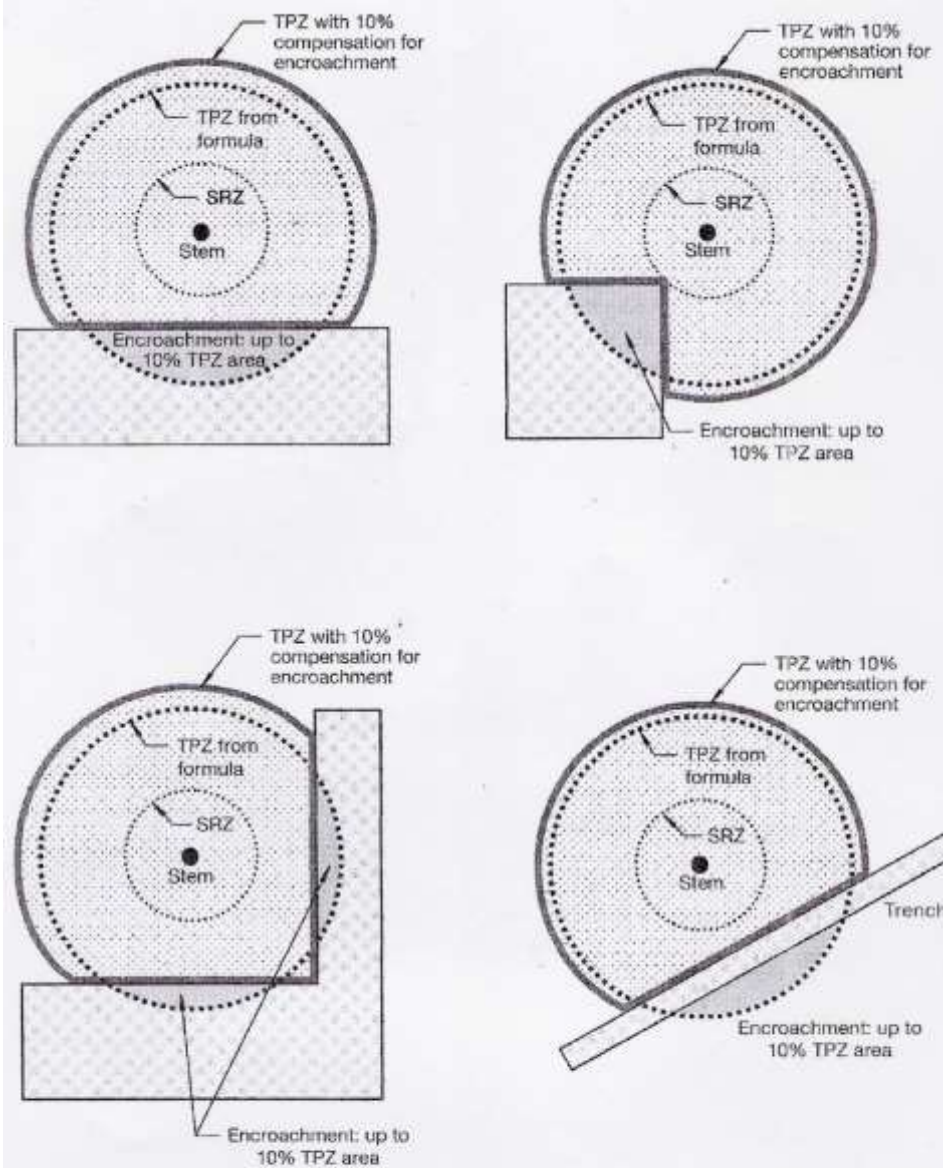
Photo 58



Tree 303

10 Acceptable Incursions to the Tree Protection Zone (TPZ)

APPENDIX 2 – ACCEPTABLE INCURSIONS TO THE TREE PROTECTION ZONE (TPZ)



NOTE: Less than 10% TPZ area and outside SRZ. Any loss of TPZ compensated for elsewhere.

REF:- Council of Standards Australia (August 2009)
AS 4970 – 2009 – Protection of Trees on Development Sites
Standards Australia, Sydney

11 Tree and Trunk Protection Methodology

11.1 Tree Protection Fencing

- a)** The trees to be retained should be protected by means of fencing prior to commencement of demolition (including tree removal) or bulk earthworks.
- b)** The protection fencing should be immovable. It should be constructed from 1.8 metre high chain link suspended on 2.4m x 45mm galvanised steel pipe.
- c)** The area within should be kept free of all building materials, contaminants and other debris. It should not be used for storage of any building materials.

11.2 Mulching

- a)** The area within the protective fencing should be mulched to a depth greater than 75mm and not exceeding 100millimetre using a leaf mulch or 25 millimetre eucalypt chip. The mulch should be free of weed seeds and other contaminants. If construction access is required within the trees dripline, outside the protective fencing, heavier mulch should be spread to a depth no greater than 100 millimetres to reduce soil compaction.

11.3 Trunk Protection

- a)** Trunk protection of hardwood timbers should be used to protect the trees trunk where construction is proposed. This should be fastened around the trunk with hoop iron strapping or similar, and padded with carpet underlay or equivalent

12 Tree Protection Photograph



13 Guidelines for Excavating near Trees to be preserved

- 13.1 Monitor the excavation work within a five plus metre radius of the tree. Excavation in this zone is to be done using hand tools, not an excavator.
- a) An arborist must monitor all excavation works within the TPZ.
 - b) Use hand tools to carry out any work within the drip zone of the tree.
 - c) Excavation work can be also done with Air Knit or Air Spade.
- 13.2 An arborist must cut any roots to be removed with a clean sharp handsaw.
- a) Cut all roots with clean equipment that is specifically designed to cut roots not with impacted tool.
 - b) Do not cut large roots (>30mm diameter) closer than halfway from drip line to the trunk.
 - c) Severance of structural roots of 25mm or more in diameter is not permitted without prior permission of the arborist.
- 13.3 Wrap any roots found in damp cloth.
- a) Protect roots that are exposed during excavation from drying out – wrap etc.
 - b) Immediately wrap all tree roots uncovered in dampened jute matting or equivalent sacking made of natural fibre cloth, until backfilling takes place. Hessian fibre or Hessian sack. Tree roots must not remain exposed.
 - c) Clumps of fibrous roots must not be severed/cut and need to be retained as per wrapping instructions in 'b'. Arborist must inspect to give guidelines.
- 13.4 Any area within five metres of the tree trunk (limited) should not be used to storage or mixing of building materials as this could change the microorganisms in the soil.
- a) Do not store equipment, materials or chemical based solutions in the TPZ.
 - b) Do not use heavy machinery within the protection zone.
 - c) No vehicle access without the agreement of the arborist.
 - d) If vehicle access requires measure must be put in place to prevent compaction.
- 13.5 Any footing in the zone of the roots is to be built with a pier and beam construction with the aim to give 100mm clearance of the roots.
- a) Keep the original soil level – RL – where possible – with no disturbance of the soil, including level changes or compaction, within the TPZ without prior consultation with the arborist.
 - b) Make no changes that will alter the amount of water infiltration surrounding or within the TPZ without the consent of the arborist.
- 13.6 Any paving installed must allow air and water penetration to the root zone. The pavers must have sand placed between them and not cement as cement would prevent air flow to the root location.

- 13.7 If any roots are found in this zone, the pavers are to be raised by the placement of washed sand over the roots. This RL should be determined at an early stage of the construction so that the pavers do not go above the damp course of the house.

14 Root Pruning Methodology

- 14.1 Expose roots with hand tools or air spade or air knife. Clean roots with water or soft brush. Cover exposed roots and soil and prevent foot traffic in area. A trained arborist should inspect roots before pruning or removing roots.
- 14.2 Cover the roots with wetted rags or natural fibre. Then cover with soil where possible if left exposed for more than one day, or as soon as possible in extreme weather conditions. The natural fibre will break down in time and can be left on roots or buried.
- 14.3 Clean cut any roots found with a clean and sharp handsaw. The saw or secateurs should be cleaned by dipping in bleach or methylated spirits, or use alcohol wipes, to clean the saw. This can be done after each cut and must be done if pruning roots of different trees. This will minimise the spreading of pathogens or disease.
- 14.4 Drench the exposed soil with water and mulch soil surface with wood chips and leaf litter, not pine bark or palm fronds.
- 14.5 Hydrophobic soil may need wetting agent applied to aid in water penetration.
- 14.6 Cover the exposed soil along the excavation line with jute matting or hessian and apply water to the covering material once a day minimum in cool weather and up to 3 times per day in hot or windy conditions, until the trench is back filled. Hold jute matting in place with pegs or equivalent.

15 Recommended Paver Types

Construction

While easy to construct, HydroSTON pavements need to be free draining and structurally stable. This requires creation of voids in the pavement substructure and compaction of materials having minimal fines.

Maintenance

Regular removal of surface debris will maintain the performance of HydroSTON pavements. However, when necessary, HydroSTON can be cleaned in situ with readily available water/suction equipment.

Research

HydroSTON pavers manufactured in Australia benefit from extensive research conducted over many years in Germany. Research focuses on hydraulic behaviour, pollutant retention, design, construction and maintenance. HydroCon participates as an industry partner in permeable pavement research programs undertaken at the University of South Australia.

Colours

Charcoal

Natural

Terracotta

Applications

HydroSTON Pedestrian
Suitable for footpaths, walkways, plazas, courtyards and tree surrounds.



H90 FLAG
100 x 300 x 300mm

HydroSTON Traffic
Suitable for carparks, driveways and minor roads.



H80 CLASSIC
80 x 200 x 100mm

Sizes indicated are work (paver) sizes rather than planning sizes.

HydroSTON®

HydroCon

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Chippendale NSW 2008
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HydroCon

Managing water in the urban environment

Permeable pavements

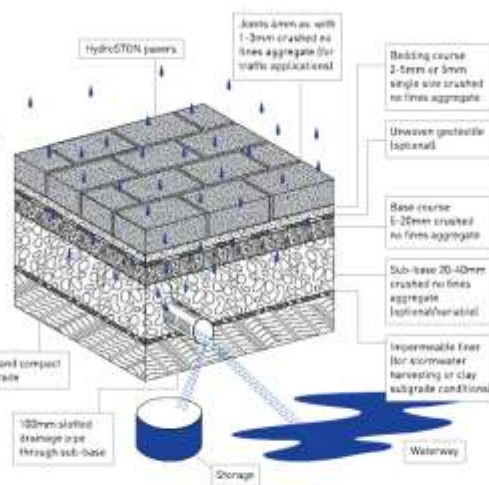
The use of concrete, asphalt and other non-porous materials for roads, carparks, footpaths, driveways and many public spaces is having profound effects on the water cycle within the urban environment. It has been calculated that up to 95% of rain falling on cities and towns is rapidly directed via stormwater drainage systems to local waterways. Surface water runoff places heavy pressure on existing drainage systems and increases the volume and rate of flow to waterways.

Permeable pavements can help restore the natural water cycle, reduce the impact of development on waterways and improve urban water security.

Permeable pavements offer an environmentally sustainable, cost effective and beneficial long term approach to site and urban drainage.

HydroSTON® permeable concrete pavers

- Are fully permeable, durable and non-slip
- Improve water quality by filtering stormwater runoff at source
- Facilitate on-site water retention and harvesting of stormwater
- Reduce local flooding and surface ponding
- Take pressure off existing stormwater drainage systems
- Assist in replenishing groundwater and aquifers
- Contribute to urban water security
- Provide a viable and cost effective alternative to existing storm drainage systems
- Satisfy local government permeable area property ratios
- Increase water supply to trees and landscaped areas
- Allow root aeration
- Improve urban micro-climates



Permeability

HydroSTON pavers are categorised as "free draining" under AS 4454.1s with average rates under laboratory testing of at least 270mm per minute or 4.5 l/sec/m². HydroSTON pavements have very high permeability rates due to 100% permeable surface area. Overall performance of HydroSTON pavements depends not only on infiltration capacity of pavers but also on pavement substructure (and subgrade in the case of infiltration applications).

Water quality

HydroSTON assists in improving water quality by filtering out debris and pollutant laden particles. Pollutants such as heavy metals, hydrocarbons and nutrients (phosphorous) attached to particles are retained in the surface layer of HydroSTON pavements, where they can be flushed out by periodic cleaning.

Harvesting and storage

Installation of slotted collection pipes within a HydroSTON pavement allows water to be channelled to existing stormwater systems, waterways or to storage tanks for potential reuse. Placement of a liner around the HydroSTON pavement prevents ground infiltration and overcomes problems associated with clay soils.

Infiltration

HydroSTON allows rain and stormwater to permeate into the ground as occurs naturally in rural and undeveloped environments. Infiltration 'at source' reduces stormwater runoff, improves water quality, supplements groundwater and lowers temperature in densely settled urban areas.



Permeable Paver Specifications

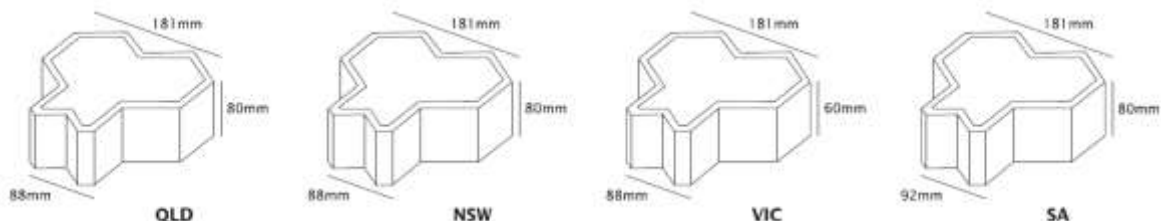
ITEM	UNIT	HydroSTON 80	HydroSTON 50 FLAG	HydroSTON 50 BLOCK
Application		Vehicle & pedestrian	Pedestrian only	Pedestrian only
Nominal size	mm	210 x 140 x 80 [†]	300 x 300 x 50	200 x 100 x 50
Work size	mm	206 x 136 x 80	300 x 300 x 50	200 x 100 x 50
Work size (face) area	m ²	0.0280	0.0900	0.0200
Gross plan area (nom.)	m ²	0.0294	0.0900	0.0200
Dry weight per unit (av.)	kg	4.2	9.0	1.85
Units (work size) per m ²	no.	35.71	11.11	50
Units (nom.) per m ²	no.	34.01	11.11	50
Units per pallet	no.	400	192	600
Units per row	no.	40	16	100
Rows per pallet	no.	10	12	6
Pallet dry weight inc. base	tonnes	1.71	1.76	1.16
Coverage per pallet	m ²	11.2	17.28	12.00
Permeability (QMR Q304)	rating	Category E (Free Draining)		
Slip Resistance (AS4586)	rating	Surface Class V (very low contribution to risk of slipping when wet)		
Breaking Load mean [SD]	kN	8.4 [0.6]	6.2 [1.4]	2.6 [0.3]
Modulus of Rupture mean [SD]	MPa	2.2 [0.2]	3.1 [0.7]	2.4 [0.2]
Characteristic Breaking Load	kN	7.4	3.9	2.1
Characteristic MOR	MPa	1.9	1.9	2.1
Bevels	mm	4	rounded	4

[†] With 4 mm av. joints

Application Chart

										Domestic and Light Commercial				Commercial				Industrial**				
Please note: Size and thickness vary in each state this is a Made to Order Product.	Dimensions (mm)	Bullnose available	No. per m ²	Unit Weight (kg)	Shape type (per CMAA Ref T35)	Breaking Load (kN)	Slip Resistance (standard)	Slip Resistance (froned)	Walkways	Patios	Pergolas	Driveways	Courtyards	Footpaths	Public Areas	Malls	Arcades	Road Cross Overs	Carriageways	Roadways	Truck Hard Stands	Forklift Traffic
QLD ECOTRIHEX® 80mm	88 x 181 x 80	N	43.5	3.5	A	12	V	W	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
NSW ECOTRIHEX® 80mm	88 x 181 x 80	N	43.5	3.9	A	12	V	W	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
VIC® ECOTRIHEX® 60mm	88 x 181 x 60	N	43.5	2.93	A	10	V	W	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SA ECOTRIHEX® 80mm	92 x 181 x 80	N	43.5	3.9	A	12	V	W	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

*80mm available, however minimum quantities apply, please ask your local Adbri Masonry representative for more details.
Note: Greater breaking loads can be achieved for industrial paving if requested. Please refer to your local representative for details.



16 References

Urban, J. (2008) *Up By Roots*

Matheny, N. and Clark, J. (1998) *Trees and Development*

17 Glossary

Absorbing roots – common term describing the fine, non-woody, short-lived roots that absorb water and mineral nutrients and that are often infected with beneficial organisms.

Aerobic – a biochemical process or condition occurring in the presence of oxygen.

Air knife – device that directs a jet of highly compressed air to excavate and loosen soil. Used within the root zone of trees or near underground structures such as pipes and wires to avoid or minimize damage to the roots or structure.

Anaerobic – biological process that occurs in the absence of oxygen.

Bark – protective outer covering of branches and stems that arises from the cork cambium or cambium.

Basal (or trunk) flare – the increased diameter where the roots and trunk meet (also known as the root flare or buttress).

Branch collar – area where a branch joins another branch or trunk that is created by the overlapping vascular tissues from both the branch and the trunk. Typically enlarged at the base of the branch.

Broad-leaved – trees whose foliage is flat and broad.

Buttress root – roots at the trunk base that help support the tree and equalize mechanical stress.

Cambium – thin layer(s) of meristematic cells that give rise (outward) to the phloem and (inward) to the xylem, increasing stem and root diameter.

Central leader – the main stem, trunk, or bole.

Clay – (1) soil particles with a typical grain size less than 0.002 millimetre (USDA classification) and less than 0.005 AASHTO Classification. (2) A soil predominantly composed of such particles.

Compaction – compression of the soil that breaks down soil aggregates and reduces soil volume and total pore space, especially macropore space.

Compartmentalization – natural defence process in trees by which chemical and physical boundaries are created that act to limit the spread of disease and decay organisms.

Compost – (1) (noun) organic matter that has been intentionally subjected to decay processes and is more or less decomposed. (2) (verb) To subject organic matter to decay and decomposition processes.

Compression – action of forces to squeeze, crush, or push together any material(s) or substance(s). Contrast with tension.

Cork cambium – meristematic tissue from which the corky, protective outer layer of bark is formed.

Crown (or canopy) – the leaves and branches of a tree.

Deciduous – Trees that lose their leaves each year.

Decurrent – trees that lack a central leader; the crown is composed of a number of equal-sized branches.

Dripline – the edge of the canopy

Epicormic branches – shoot arising from a latent or adventitious bud (growth point).

Evergreen – trees that maintain foliage throughout the year.

Expanding clay – clay that tends to expand when wet and then, when drying, contracts more than other particles in the soil.

Field capacity – maximum soil moisture content following the drainage of water due to the force of gravity.

Gap-graded – soil with some particles coarse and some fine but without any significant amount of intermediate-sized fine and very fine sand particles.

Girdling root – root that encircles all or part of the trunk of a tree or other roots and constricts the vascular tissue and inhibits secondary growth and the movement of water.

Heart rot – any of several types of fungal decay of tree heartwood, often beginning with infected wounds in the living portions of wood tissue.

Heartwood – wood that is altered (inward) from sapwood and provides chemical defence against decay-causing organisms and continues to provide structural strength to the trunk. Trees may or may not have heartwood.

Hyphae – long, root-like, filamentous cells of a fungus.

Infiltration – movement of water penetrating the soil surface and into the soil. Contrast with percolation.

Lateral roots – roots that branch from larger primary roots.

Loam – soil texture classification containing some proportion of each of the tree major soil particle types (sand, silt, and clay). Has good qualities for plant growth.

Multi-trunked – tree with more than one trunk arising at or near the ground.

Percolation – movement of water through the soil. Contrast with infiltration.

Phloem – plant vascular tissue that transports sugar and growth regulators. Situated on the inside of the bark, just outside the cambium. Is bidirectional (transports up and down). Contrast with xylem.

Pollarding – specialty pruning technique in which a tree with a large-maturing form is kept relatively short. Starting on a young tree, pruning cuts are made at the same point in the tree, resulting in the development of callus knobs at the cut height. Requires regular (usually annual) removal of the sprouts arising from the cuts.

Psyllid – tiny sap sucking insects which attack mostly native plants such as lily pilli.

Reaction wood – wood formed in leaning or crooked trunks and stems as a means of counteracting the effects of gravity.

Root crown – the point at which the trunk and buttress roots meet.

Root plate – area under the ground around the base of the tree where the roots taper away from the trunk (see zone of rapid taper). The area of the primary roots that structurally support the forces on the tree.

R.L – Reduced level.

Scaffold branches – the major structural support branches that attach to the trunk.

Sapwood – outer wood (xylem) that is active in longitudinal transport of water and minerals.

Soil – surface layers of sand, silt, clay, and organic material on the surface of the earth that support plants. More generally, the material between the rocky parts of the planet and the atmosphere composed of fine – to coarse-grained mineral material.

Soil amendment – item added to the soil to improve certain aspects of the soil's condition.

Suckers – shoot arising from the roots.

S.R.Z. – Structural root zone

Taper – the change in diameter associated with height or length; related to strength.

Tap root – central, vertical root growing directly below the main stem or trunk that may or may not persist into plant maturity; rarely exists in nursery-produced plants.

Tension – in mechanics, the action of forces to stretch or pull apart any material or substance.

Trunk flare or root flare – transition zone from trunk to roots, above the ground where the trunk expands begins to expand to the form root structures that support the tree.

T.P.Z - Tree protection zone.

Xylem – main water – and mineral-conducting (unidirectional, up only) tissue in trees and other plants. Provides structural support. Arises (inward) from the cambium and becomes wood after lignifying. Contract with phloem.

Zone of rapid taper – area around the base of the tree under the ground where the roots taper away from the trunk. The taper reflects the stresses within the root generated by wind and gravity.

18 Expert Witness Code of Conduct

Uniform Civil Procedure Rules 2005

Schedule 7 Expert witness code of conduct

(Rule 31.23)

(cf SCR Schedule K)

1 Application of code

This code of conduct applies to any expert witness engaged or appointed:

- (a) to provide an expert's report for use as evidence in proceedings or proposed proceedings, or
- (b) to give opinion evidence in proceedings or proposed proceedings.

2 General duty to the court

- (1) An expert witness has an overriding duty to assist the court impartially on matters relevant to the expert witness's area of expertise.
- (2) An expert witness's paramount duty is to the court and not to any party to the proceedings (including the person retaining the expert witness).
- (3) An expert witness is not an advocate for a party.

3 Duty to comply with court's directions

An expert witness must abide by any direction of the court.

4 Duty to work co-operatively with other expert witnesses

An expert witness, when complying with any direction of the court to confer with another expert witness or to prepare a parties' expert's report with another expert witness in relation to any issue:

- (a) must exercise his or her independent, professional judgment in relation to that issue, and
- (b) must endeavour to reach agreement with the other expert witness on that issue, and
- (c) must not act on any instruction or request to withhold or avoid agreement with the other expert witness.

5 Experts' reports

- (1) An expert's report must (in the body of the report or in an annexure to it) include the following:
 - (a) the expert's qualifications as an expert on the issue the subject of the report,
 - (b) the facts, and assumptions of fact, on which the opinions in the report are based (a letter of instructions may be annexed),
 - (c) the expert's reasons for each opinion expressed,
 - (d) if applicable, that a particular issue falls outside the expert's field of expertise,
 - (e) any literature or other materials utilised in support of the opinions,
 - (f) any examinations, tests or other investigations on which the expert has relied, including details of the qualifications of the person who carried them out,

JTKS2017AW

- (g) in the case of a report that is lengthy or complex, a brief summary of the report (to be located at the beginning of the report).
- (2) If an expert witness who prepares an expert's report believes that it may be incomplete or inaccurate without some qualification, the qualification must be stated in the report.
- (3) If an expert witness considers that his or her opinion is not a concluded opinion because of insufficient research or insufficient data or for any other reason, this must be stated when the opinion is expressed.
- (4) If an expert witness changes his or her opinion on a material matter after providing an expert's report to the party engaging him or her (or that party's legal representative), the expert witness must forthwith provide the engaging party (or that party's legal representative) with a supplementary report to that effect containing such of the information referred to in subclause (1) as is appropriate.

6 Experts' conference

- (1) Without limiting clause 3, an expert witness must abide by any direction of the court:
 - (a) to confer with any other expert witness, or
 - (b) to endeavour to reach agreement on any matters in issue, or
 - (c) to prepare a joint report, specifying matters agreed and matters not agreed and reasons for any disagreement, or
 - (d) to base any joint report on specified facts or assumptions of fact.
- (2) An expert witness must exercise his or her independent, professional judgment in relation to such a conference and joint report, and must not act on any instruction or request to withhold or avoid agreement.