Moore Trees
Arboricultural Services

ABN 26009753751

Arborist development assessment report

Prince of Wales Hospital
Barker Street
Randwick NSW 2031

Stage 1 and Stage 2
Comprehensive Cancer and Blood Disorder Centre
29 June 2011
(updated 26 March 2012)

Prepared for: Health Infrastructure NSW
c/o Thinc Projects
Level 3, 8 Spring Street
Sydney NSW 2000

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Summary

This report has been compiled for Health Infrastructure NSW c/o Thinc Projects of Level 3, 8 Spring Street, Sydney NSW 2000. The report concerns a proposed Development Application for Prince of Wales Hospital, Randwick NSW 2031 – Stage 1 and Stage 2 Comprehensive Cancer and Blood Disorder Centre ("CCBDC"). This Arborist report refers to twenty (20) trees.

This report contains the following information required in Randwick City Council Development guidelines:-

1) All trees were assessed for Safe Useful Life Expectancy (SULE).
2) Genus and species of each tree.
3) Impact of the proposed development on each tree.
4) Impact of retaining tree on the proposed development.
5) The Tree Protection Zone (TPZ) for each tree to be retained.
6) Any branch or root pruning that may be required for trees.

Trees 1-9, 11, 15 and 16 are required to be removed for the purpose of the development. Trees 10 (Group), 12, 13, 14 and 17-20 are possible to be retained.

Minor tree protection fencing will be required for the duration of the works. A Tree Protection Plan, included in this report, shows the trees proposed to be retained and removed. This plan is attached in Appendix 1. Signage is recommended for tree protection areas and a sample tree protection sign has been included in Appendix 6.

Table of Contents

1 INTRODUCTION

1.1 This report has been conducted to assess the health and condition of twenty (20) trees located at Prince of Wales Hospital, Randwick NSW 2031. This report has been prepared for Health Infrastructure NSW c/o Thinc Projects of Level 3, 8 Spring Street, Sydney NSW 2000 as required for a Development Application with Department of Planning and Infrastructure at this site. This is a State significant Development Application. Based on this classification the Director-General has specified in Section 8 of the *Amended Director-General's Environmental Assessment Requirements* (Application Number SSD 5036-2011) that this report be completed. These requirements are detailed in Section 2.3 of this report.

1.2 Trees 1-9, 11, 15 and 16 are required to be removed for the purpose of the development. Trees 10 (Group), 12, 13, 14 and 17-20 are possible to be retained.

The subject trees were assessed for their health and condition. Also included in this report are tree protection measures that will help retain and ensure that the long term health of the trees to be retained are not adversely affected by the proposed development in the future.

The following data was collected for each tree:

1) A site plan locating all trees over three (3) metres in height, including all street trees.
2) All trees were assessed for Safe Useful Life Expectancy (SULE), health and amenity value.
3) Genus and species of each tree.
4) Impact of the proposed development on each tree.
5) The Tree Protection Zone (TPZ) for each tree to be retained.
6) Any branch or root pruning that may be required for trees.

Also noted for the purposes of this report were:

- Health and Vigour; using foliage colour and size, extension growth, presence of deadwood, dieback and epicormic growth throughout the tree.
- Structural condition using visible evidence of bulges, cracks, leans and previous pruning.
- The suitability of the tree taking into consideration the proposed development.
- Age rating; Over-mature (>80% life expectancy), Mature (20-80% life expectancy), Young, Sapling (<20% life expectancy).

1.3 Documents and information provided: For this Arborist report I was given a site plan of the location that has been 'marked up' showing the locations of the proposed development areas for Stage 1 and Stage 2 of the Comprehensive Cancer and Blood Disorder Centre ("CCBDC"). Plans by Rice Daubney Stage 1 level 2 Proposed site plan, Drawing No. SD 1003, Issue B, dated 15.3.2012 and Stage 2 level 2, Drawing No. SD 1005, Issue A, dated 15.3.2012.

1.4 Location: The proposed development is Stage 1 and Stage 2 Comprehensive Cancer and Blood Disorder Centre ("CCBDC"). The proposed development site is located at Prince of Wales Hospital, Randwick NSW 2031 and from herein will be referred to as "the Site".

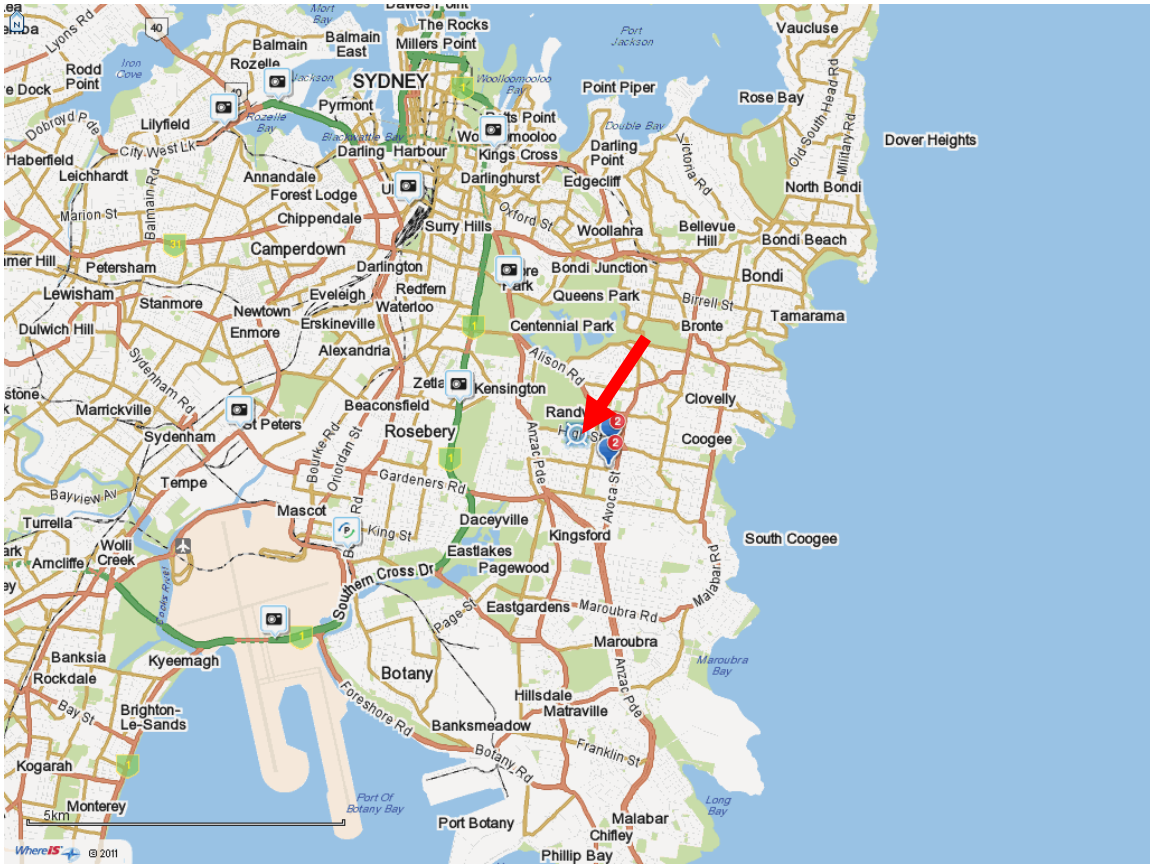


Diagram 1: Location of subject site, Prince of Wales Hospital, Randwick NSW 2031 (Red arrow) (whereis.com.au, 2011)

2 METHODOLOGY

2.1 To record the health and condition of the trees, a Visual Tree Assessment (VTA) was undertaken on the subject trees on 28 June 2011. This method of tree evaluation is adapted from Matheny and Clark, 1994 and is recognised by The International Society of Arboriculture. Individual tree assessments are listed in Appendix 2 of this report. All inspections were undertaken from the ground. No diagnostic devices were used on these trees.

2.2 This report is only concerned with trees on the site that come under the Randwick Council Tree Preservation Order (TPO) developed in 1986 and revised in 2005**.** It takes no account of any tree or shrub under six (6) metres in height.

The trees covered by this TPO are:
a. any palm tree, cycad or tree fern;
b. any tree in bushland;
c. any tree on public land; and
d. any other tree with:
i. a height equal to or exceeding 6 metres; or
ii. a canopy width equal to or exceeding 4 metres; or
iii. for a single trunk tree species, a trunk circumference equal to or exceeding one (1) metre at a height of one (1) metre above ground level; or
iv. for a multi-trunk tree species, a combined trunk circumference (measured around the outer girth of the group of trunks) equal to or exceeding one (1) metre at a height of one (1) metre above ground level.

2.3 **Director-General's Requirements:** Also addressed in this report is Section 8 of the Amended Director-General's Environmental Assessment Requirements (Application Number SSD 5036-2011).

Section 8 - (Landscaping) requires the following points be addressed;
• Address the potential impact on any adjacent/nearby trees that are listed in Council's Significant Tree Register.
• Provide a Tree Survey and Arboriculture Assessment of all trees location either within or adjacent to the proposed development footprint, including measures to protect trees and compensatory planting for any trees to be removed.

2.4 **Height:** The heights and distances within this report have been measured with a Bosch DLE 50 laser measure.

2.5 **Tree Protection Zones (TPZ):** The Tree Protection Zone (TPZ) is the principal means of protecting trees on development 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. TPZ's have been calculated for each tree to be retained. The TPZ calculation is based on the Australian Standard *Protection of trees on development sites*, AS 4970, 2009.

2.6 **Structural Root Zone (SRZ)**: The SRZ is a specified distance measured from the trunk that is set aside for the protection of the trees roots both structural and fibrous. The

woody root growth and soil cohesion in this area are necessary to hold the tree upright. The TPZ and SRZ are measured as a radial measurement from the trunk. No roots should be severed within this area. A detailed methodology on the TPZ and SRZ calculations can be found in Appendix 4.

2.7 **SULE**: The subject trees were assessed for a Safe Useful Life Expectancy (SULE). The SULE rating for each tree can be seen the Tree Assessment Schedule (Appendix 2). A detailed explanation of SULE can be found in Appendix 3.

2.8 Randwick City Council Significant Tree Register (adopted at Council's meeting on 28 August 2007) was reviewed as a part of this report (Appendix 11).

2.9 **Impact Assessment:** An impact assessment was conducted on the site trees. This was conducted by assessing the site survey and plans provided by Thinc Projects. The plans provided were assessed for the following:

- Reduced Level (R.L.) at base of tree.
- Incursions into the Tree Protection Zone (TPZ).
- Assessment of the likely impact of the works.

3 RELEVANT BACKGROUND INFORMATION

3.1 The subject property is known as Prince of Wales Hospital, Randwick NSW 2031. The site is located on the corner of High Street and Avoca Streets and is part of Randwick Hospital grounds. It contains several out buildings that are part of Randwick Hospital. A large portion of the site is used for car parking. Tree plantings are both native and exotic species in various degrees of health and condition. Two (2) street trees are present along High Street. The development is Stage 1 and Stage 2 Comprehensive Cancer and Blood Disorder Centre ("CCBDC") and is a State significant development. The proposed plans by Rice Daubney show a bunker complex to be constructed below the car parking area with new consulting and waiting rooms to be constructed on the location of existing buildings. This area of the site also has two (2) sandstone buildings built prior to 1900.

3.2 Environmental Significance: A Tree Preservation Order (TPO) applies to the whole of the Randwick Local Government Area. This TPO protects all trees above six (6) metres in height, measured at a distance of one hundred (100) centimetres above the ground. If any design changes are required that are near the subject trees, the Architect should refer to the TPZ and SRZ measurements to enable adequate distances to be maintained between the tree and any proposed works.

3.3 Significant Tree Register: On 28 August 2007, Council adopted a Significant Tree Register which identifies and recognises the importance of significant trees in the Randwick landscape, guides their management and ensures their protection for future generations. This Register lists trees of significance growing on both public and private land which has been recognized as having helped shape Randwick's cultural landscape and character. The only trees on this Register near the site are located to the south of the site and as such will not be affected by the proposed works. These trees specified in this Register are detailed on pages 128-131 (Appendix 11) and although there is no map associated with the Register, their detailed descriptions clearly do not match any tree associated with this Arborist Report or the proposed development of CCBDC.

3.4 Tree definition: Randwick City Council's states as follows:
Tree or trees means a perennial plant with at least one self-supporting woody or fibrous stem, being of

any species whether indigenous, exotic or introduced which:
a) is six (6) metres or more in height; and/or
b) is four (4) metres or more in canopy width, and/or
c) has a trunk diameter of one (1) metre or more measured at one (1) metre above ground
level (or its equivalent in the case of multi-trunked trees); or
d) is a palm tree (except Syagrus romanzoffianum - Cocos palm), cycad or tree fern of any
species growing within the City of Randwick, irrespective of its size, or
e) is any tree on public land of any size, or
f) is any tree in bushland of any size.

3.5 **The Site Trees:** The site was inspected on 28 June 2011. Each tree has been given a unique number for this site and can be viewed on the Tree Protection Plan (Appendix 1). This plan is based on an aerial photograph and is not survey accurate. Tree 6 appears to be one of the older specimens assessed as a part of this report (Plate 5). This tree is a mature Monterey Cypress *(Cupressus macrocarpa).* Although Tree 6 appears to be one of the older trees on site, on close inspection of the aerial photograph from 1943 (Diagram 2) it is apparent that all trees in this area have since been removed at some stage and Trees 1-20 have grown post 1943 (note: Trees 12 and 14 currently, having large canopies, are not even present in the 1943 image). Also of note are the distinct Cooks pines that are clearly present in Diagrams 2 & 3 (note the long shadows cast). These Cooks pines are much larger than Tree 6 and as such Tree 6 would be very difficult to compare from an age/size comparison. It would be very unlikely that this one tree (Tree 6) was retained for the purpose of the newer buildings to the north of the older sandstone building. Trees 5, 7-9 are small trees that could readily be replaced elsewhere on the site (Plate 5).

3.6 Tree group 10 is a group of mature Bangalow Palms *(Archontophoenix cunninghamiana)* that create a formal entry to the Hospital car park (Plate 2). This group of palms should be retained and incorporated into any new design for the area.

3.7 Tree 11 is a mature that Swamp She Oak *(Casuarina glauca)* that has developed an asymmetrical lean towards the stone building (Plate 4). This tree has suffered storm damage to the leader and has a large stem wound on the southern side of the trunk. This tree would not be considered to have a long life expectancy.

3.8 Tree 12, 13 and 14 are located between the stone building and the boundary fence (Plates 3 & 6). Tree 12 is a native Cheese Tree *(Glochidion ferdinandii)* 13 is a mature Monterey Cypress *(Cupressus macrocarpa)* and 14 is a mature Camphor Laurel *(Cinnamomum camphora)* that could potentially double in size however this species is relatively hardy and would tolerate pruning to maintain a manageable tree.

3.9 Tree 15 is a *Prunus sp*. that is not significant to the site. Tree 16 Bangalay *(Eucalyptus botryoides).* Is a stunted example that appears stressed as evidenced by the quantities of epicormic growth along the stems (Plate 7).

3.10 Trees 17 & 18 are native species that are in good health and condition and will not be affected by the development (Plate 8).

3.11 Trees outside the site include a mature Brush Box (Tree 19) and a stunted Callistemon (Tree 20) on High Street that will not be affected by the proposed works (Plate 8).

Diagram 2: Location of subject site in 1943, Prince of Wales Hospital, Randwick NSW 2031 (RTA *From the skies*, 2006)

Diagram 3: Location of subject site 2009. The distinctive shadow of the Cooks Pine can be seen (Red arrows) to match the young trees in Diagram 1 (Google Earth, 2011)

4 RECOMMENDATIONS

4.1 **Trees 1-9, 11, 15 and 16** are required to be removed for the purpose of the development. **Trees 10 (Group), 12, 13, 14 and 17-20** are possible to be retained.

4.2 Tree group 10 will require protection fencing due to being located near the site entry. Trees 12, 13 and 14 shall be fence as part of fencing for the sandstone cottage near High Street.

4.3 **Tree group 10 and Trees 12, 13 and 14** will require tree protection fencing as specified in Section 5.1 of this report. Indicative fencing locations can be seen in the Tree Protection Plan (Appendix 1). The area within the fencing shall be classified as the Tree Protection Zone (TPZ). The specifications for a TPZ are in Section 5.2 of this report.

5 TREE PROTECTION

5.1 Implementation of Tree Protection Zone: All tree protection works should be carried out before the start of demolition or building work. It is recommended that chain mesh fencing with a minimum height of 1.8 metres be erected as shown in the Tree Protection Plan (Appendix 1). Specifications for this fencing are shown in Tree Protection Fencing Specifications (Appendix 5).

5.2 The Tree Protection Zone (TPZ) and Structural Root Zone (SRZ): The TPZ is implemented to ensure the protection of the trunk and branches of the subject tree. The TPZ is based on the Diameter at Breast Height (DBH) of the tree. The SRZ is also a radial measurement from the trunk used to protect and restrict damage to the roots of the tree.

The Tree Protection Zone (TPZ) and Structural Root Zone (SRZ) have been measured from the centre of the trunk. The following activities shall be avoided within the TPZ and SRZ of the trees to be retained;

- Erecting site sheds or portable toilets.
- Trenching, ripping or cultivation of soil (with the exception of approved foundations and underground services).
- Soil level changes or fill material (pier and beam or suspended slab construction are acceptable).
- Storage of building materials.
- Disposal of waste materials, solid or liquid.

Tree No.	TPZ	SRZ
Tree group 10	kerb edge	kerb edge
Tree 12	5m	2.5m
Tree 13	3.5m	2.3m
Tree 14	9m	3.3m

Table 1: TPZ and SRZ distances

5.3 Tree Damage: If the retained trees are damaged a qualified Arborist should be contacted as soon as possible. The Arborist will recommend remedial action so as to reduce any long term adverse effect on the tree's health.

5.4 Signage: Signage is recommended on tree protection fencing. A sample sign has been attached in Appendix 6. This sign may be copied and laminated then attached to any TPZ fencing.

5.5 Root Pruning: If excavations are required within a TPZ this excavation shall be done by hand to expose any roots. Any roots under fifty (50) millimetres in diameter may be pruned cleanly with a sharp saw. Tree root systems are essential for the health and stability of the tree.

5.6 Arborist Certification: It is generally recommended that tree protection fencing and monitoring of the site trees to be retained occurs for large developments. The Principal Certifying Authority should be supplied with certification three (3) times during the construction phase of the development in order to verify that retained trees have been correctly retained and protected as per the conditions of consent and Arborist's recommendations.

(1) Before the commencement of demolition or construction;
(2) At mid-point of the construction phase;
(3) At completion of the construction phase.

If you have any questions in relation to this report please contact me.

Paul Vezgoff
Consulting Arborist
Moore Trees
29 June 2011
(updated 26 March 2012)

www.mooretrees.com.au

6 IMAGES

Plate 1: Trees 1-4. P. Vezgoff.

Plate 2: Tree 10, Group of Bangalow Palm. P. Vezgoff.

Plate 3: Trees 12-14 as seen from High Street. P. Vezgoff.

Plate 4: Trees 16 (left) and 11 (Right). P. Vezgoff.

Plate 5: Trees 6 (left) 7, 8 & 9 all to be removed. P. Vezgoff.

Plate 6: Trees 13 & 14 to be retained. P. Vezgoff.

Plate 7: Trees 15 and 16 to be removed. P. Vezgoff.

Plate 8: Trees 17 (left) 18 & 19 (right) to be retained. P. Vezgoff.

Appendix 1

Plan 1

Tree Protection Plan

Tree protection plan

MOORE TREES

Tree to be retained

Tree to be removed

Site access. Recommended site access that will have least impact on site trees.

Fence. Implementation of tree protection zone (TPZ). All tree protection works should be carried out before the start of demolition or building works. It is recommended that chain mesh fencing with a minimum height of 1.8 metres be erected

Not to scale.

Date: 19.3.12
Drawn: P.Vezgoff
Site Address: Prince of Wales Hospital

Appendix 2

Tree health & condition assessment schedule

TREE HEALTH AND CONDITION ASSESSMENT SCHEDULE – Prince of Wales Hospital, Randwick NSW 2031

Tree No.	Species	Height (m)	Spread (m)	DBH (mm)	Live crown ratio %	Age Class	Defects	SULE	Significance	Remove	Retain
1	Tree fern *(Cyathea sp.)*	3	2	200	95	Mature	Nil	1a	Moderate		Remove
2	Tree fern *(Cyathea sp.)*	3	2	200	95	Mature	Nil	1a	Moderate		Remove
3	Bangalow Palm *(Archontophoenix cunninghamiana)*	4.5	2	multi	95	Mature	Nil	1a	Moderate		Remove
4	Bangalow Palm *(Archontophoenix cunninghamiana)*	4.5	2	Multi	95	Mature	Nil	1a	Moderate		Remove
5	Blueberry Ash *(Elaeocarpus reticulatus)*	3.5	2	100	95	Mature	Nil	1a	Low		Remove
6	Monterey Cypress *(Cupressus macrocarpa)*	14	3.5	430	95	Mature	Nil	1a	Moderate		Remove
7	Scribbly Gum *(Eucalyptus haemastoma)*	13	5	300	90	Mature	Nil	1a	Moderate		Remove
8	Sweet Pittosporum *(Pittosporum undulatum)*	5	2	180	90	Mature	Nil	1a	Low		Remove
9	(Group of 4) Blueberry Ash *(Elaeocarpus reticulatus)*	5	1.5	100	95	Mature	Nil	1a	Low		Remove
10	Bangalow Palm *(Archontophoenix cunninghamiana)*	7-8	2	180-250	90	Mature	Nil	1a	High	Retain	
11	Swamp She Oak *(Casuarina glauca)*	17	6	420	90	Mature	Storm damage/stem wounds	2a	Low		Remove

12	Cheese Tree *(Glochidion ferdinandii)*	9	5	400 200x2	90	Mature	Nil	1a	High	Retain	
13	Monterey Cypress *(Cupressus macrocarpa)*	14	3	300	90	Mature	Nil	2a	Low	Retain	
14	Camphor Laurel *(Cinnamomum camphora)*	14	7	790	90	Mature	Nil	1a	High	Retain	
15	Flowering Cherry *(Prunus sp.)*	4	4	Multi	70	Mature	Decay Inclusion at base	2a	Low		Remove
16	Bangalay *(Eucalyptus botryoides)*	14.5	4.5	280	90	Mature	Stressed Epicormic growth	2a	Moderate		Remove
17	Coastal Banksia *(Banksia integrifolia)*	14	4	300x2	90	Mature	Nil	1a	Moderate	Retain	
18	Weeping Bottlebrush *(Callistemon viminalis)*	6	3	120x3	90	Mature	Nil	2a	Moderate	Retain	
19	Brush Box *(Lophostemon confertus)*	12	4.5	320	95	Mature	Nil	1a	Moderate	Retain	
20	Weeping Bottlebrush (Callistemon viminalis)	5	2	Multi	90	Mature	Nil	1a	Moderate	Retain	

KEY

Tree No: Relates to the number allocated to each tree for the tree protection plan.

Height: Height of the tree to the nearest metre.

Spread: The average spread of the canopy measured from the trunk.

DBH: Diameter at breast height. An industry standard for measuring trees at 1.4 metres above ground level, this measurement is used to help calculate Tree Protection Zones.

Live Crown Ratio: Percentage of foliage cover for a particular species.

Age Class:	Young:	Recently planted tree	Semi-mature:< 20% of life expectancy
	Mature:	20-90% of life expectancy	Over-mature:>90% of life expectancy

SULE: See SULE methodology in the Appendix 3

Significance: A tree's significance in the landscape. This may include but not be limited to visual amenity, historic value, local and site perspective. The tree may be native or it may also be native and endemic to the site. An exotic species such as a mature English Oak in excellent health and condition will be classed as having a higher significance than an over-mature native Forest Red Gum. The values are: High, Moderate, Low

.

Appendix 3

SULE categories (after Barrell, 2001)[1]

SULE Category	Description
Long	Trees that appeared to be retainable at the time of assessment for more than 40 years with an acceptable level of risk.
1a	Structurally sound trees located in positions that can accommodate for future growth
1b	Trees that could be made suitable for retention in the long term by remedial tree care.
1c	Trees of special significance that would warrant extraordinary efforts to secure their long term retention.
Medium	Trees that appeared to be retainable at the time of assessment for 15-40 years with an acceptable level of risk.
2a	Trees that may only live for 15-40 years
2b	Trees that could live for more than 40 years but may be removed for safety or nuisance reasons
2c	Trees that could live for more than 40 years but may be removed to prevent interference with more suitable individuals or to provide for new planting.
2d	Trees that could be made suitable for retention in the medium term by remedial tree care.
Short	Trees that appeared to be retainable at the time of assessment for 5-15 years with an acceptable level of risk.
3a	Trees that may only live for another 5-15 years
3b	Trees that could live for more than 15 years but may be removed for safety or nuisance reasons.
3c	Trees that could live for more than 15 years but may be removed to prevent interference with more suitable individuals or to provide for a new planting.
3d	Trees that require substantial remedial tree care and are only suitable for retention in the short term.
Remove	Trees that should be removed within the next five years.
4a	Dead, dying, suppressed or declining trees.
4b	Dangerous trees because of instability or loss of adjacent trees
4c	Dangerous trees because of structural defects
4d	Damaged trees not safe to retain.
4e	Trees that could live for more than 5 years but may be removed to prevent interference with more suitable individuals or to provide for a new planting.
4f	Trees that are damaging or may cause damage to existing structures within 5 years.
Small	Small or young trees that can be reliably moved or replaced.
5a	Small trees less than 5m in height.
5b	Young trees less than 15 years old but over 5m in height.

1 (Barrell, J. (2001) "SULE: Its use and status into the new millennium" in *Management of mature trees*, Proceedings of the 4th NAAA Tree Management Seminar, NAAA, Sydney.

Appendix 4

TPZ and SRZ methodology

Determining the Tree Protection Zone (TPZ)

The radium of the TPZ is calculated for each tree by multiplying its DBH x 12.

TPZ = DBH x 12

Where

DBH = trunk diameter measured at 1.4 metres above ground

Radius is measured from the centre of the stem at ground level.

A TPZ should not be less than 2 metres no greater than 15 metres (except where crown protection is required.). Some instances may require variations to the TPZ.

The TPZ of palms, other monocots, cycads and tree ferns should not be less than 1 metre outside the crown projection.

Determining the Structural Root Zone (SRZ)

The SRZ is the area required for tree stability. A larger area is required to maintain a viable tree.

The SRZ only needs to be calculated when major encroachment into a TPZ is proposed.

There are many factors that affect the size of the SRZ (e.g. tree height, crown area, soil type, soil moisture). The SRZ may also be influenced by natural or built structures, such as rocks and footings. An indicative SRZ radius can be determined from the trunk diameter measured immediately above the root buttress using the following formula or Figure 1. Root investigation may provide more information on the extent of these roots.

SRZ radius = $(D \times 50)^{0.42} \times 0.64$

Where

D = trunk diameter, in m, measured above the root buttress

NOTE: The SRZ for trees with trunk diameters less than 0.15m will be 1.5m (see Figure 1).

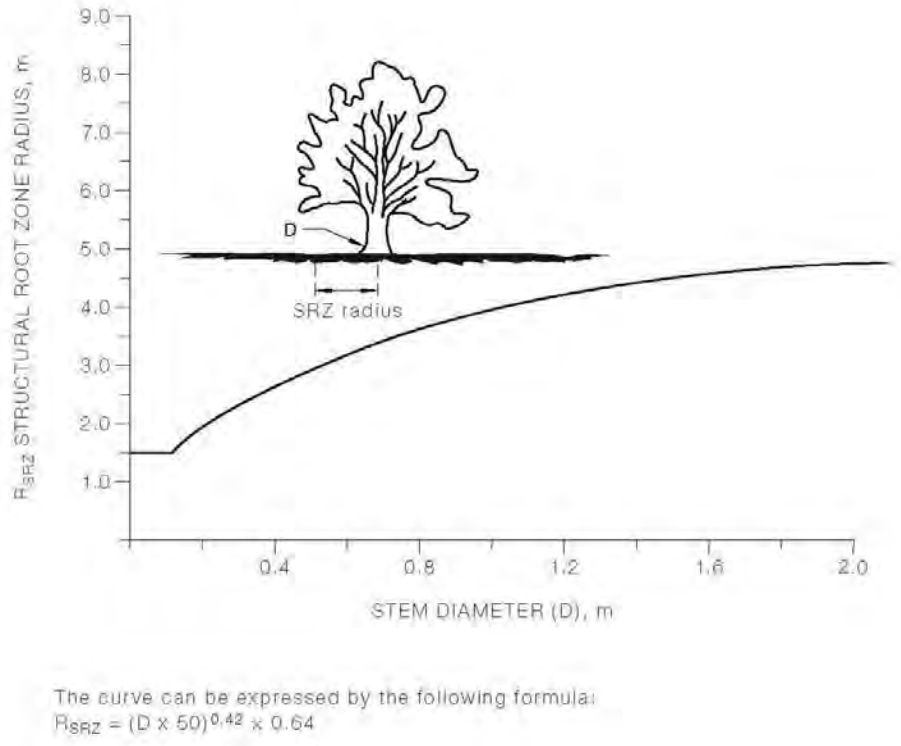


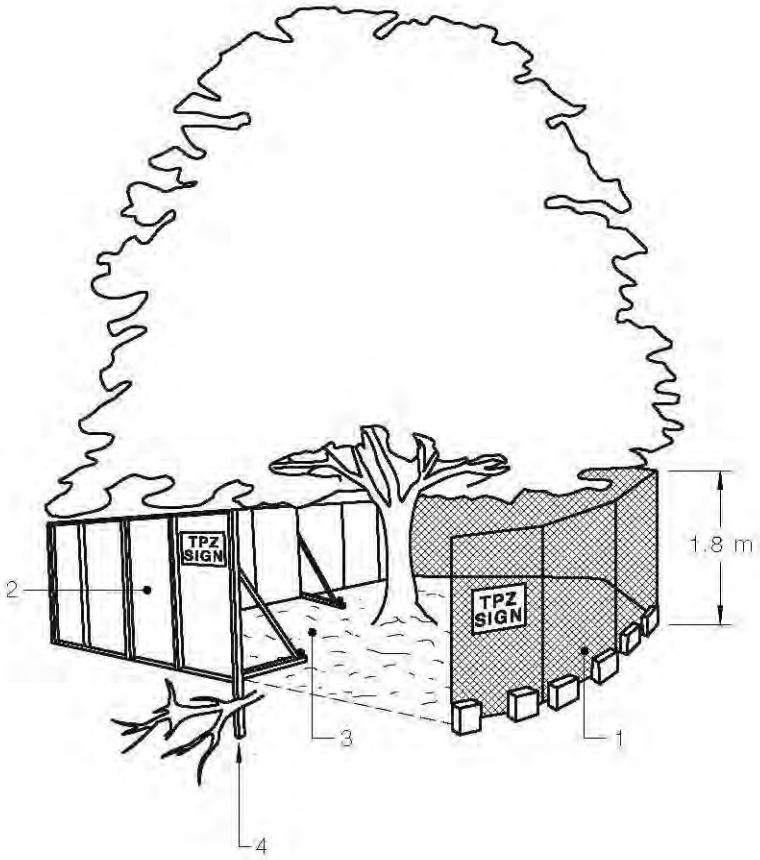
FIGURE 1 - STRUCTURAL ROOT ZONE

Notes:

1 R_{SRZ} is the structural root zone radius.
2 *D* is the stem diameter measured immediately above root buttress.
3 The SRZ for trees less than o.15 metres diameter is 1.5 metres.
4 The SRZ formula and graph do not apply to palms, other monocots, cycads and tree ferns.
5 This does not apply to trees with an asymmetrical root plate.

Appendix 5

Tree protection fencing specifications



LEGEND:

1 Chain wire mesh panels with shade cloth (if required) attached, held in place with concrete feet.
2 Alternative plywood or wooden paling fence panels. This fencing material also prevents building materials or soil entering the TPZ.
3 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.
4 Bracing is permissible within the TPZ. Installation of supports should avoid damaging roots.

Figure 1: Protective fencing as specified in AS 4970, 2009.

Appendix 6

Tree protection sign

sign sample

Moore Trees
Tree Consultancy
0411 712 887

Tree Protection Zone

Fence not to be moved without approval from Arborist

Within this fence there is to be

NO

Storage of materials

Trenching or excavation

Washing of tools or equipment

Appendix 7

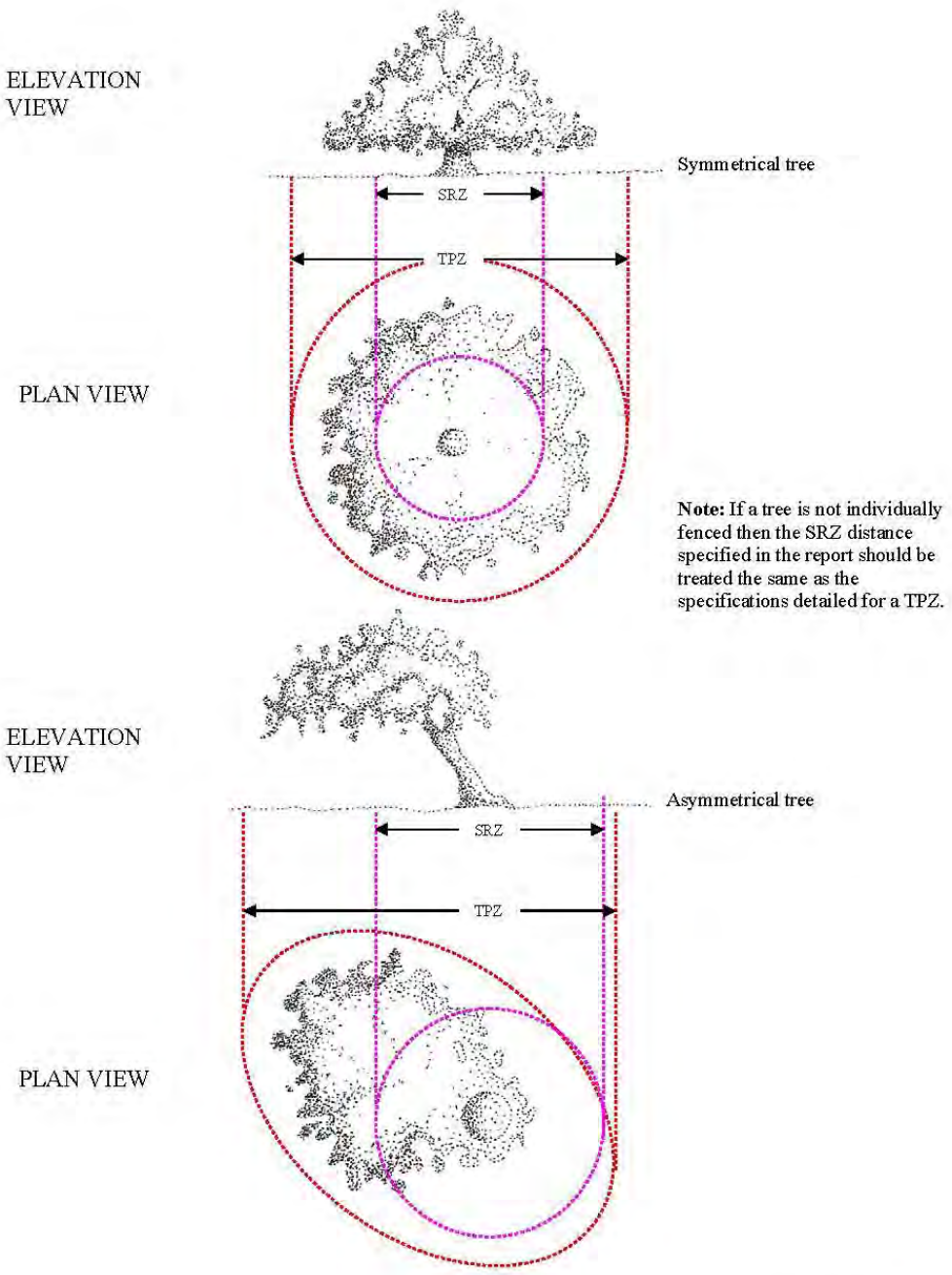


Figure 1: Indicative Tree Protection Zone (TPZ) and Root Protection Zone (SRZ)
Drawn: P. Vezgoff ©

Appendix 8

Tree structure information diagram

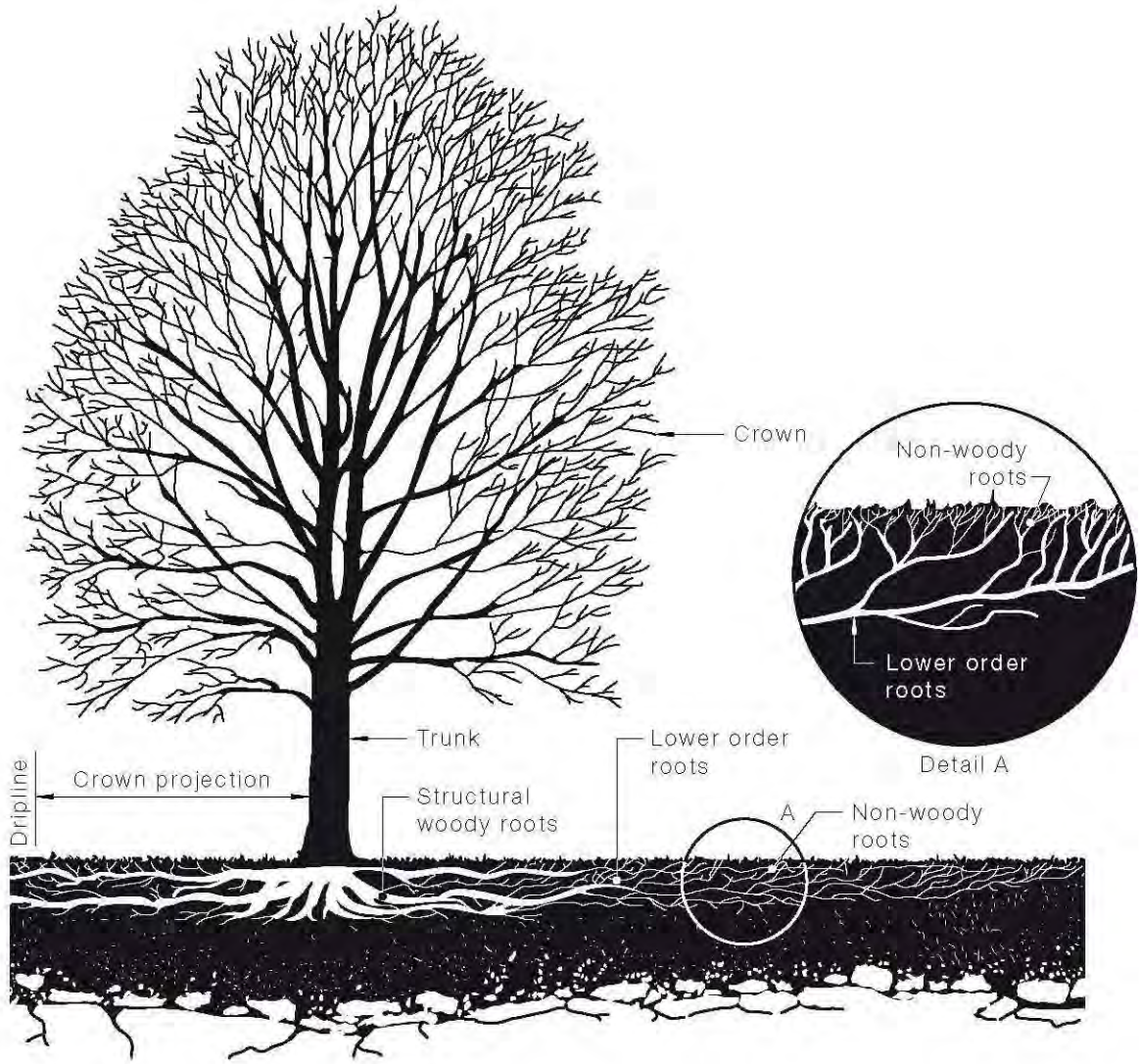


Figure 2: Structure of a tree in a normal growing environment (AS 4970, 2009.).

Appendix 9

Explanatory Notes

- **Mathematical abbreviations:** > = Greater than; < = Less than.

- **Measurements/estimates:** All dimensions are estimates unless otherwise indicated. Less reliable estimated dimensions are indicated with a '?'.

- **Species:** The species identification is based on visual observations and the common English name of what the tree appeared to be is listed first, with the botanical name after in brackets. In some instances, it may be difficult to quickly and accurately identify a particular tree without further detailed investigations. Where there is some doubt of the precise species of tree, it is indicate it with a '?' after the name in order to avoid delay in the production of the report. The botanical name is followed by the abbreviation sp if only the genus is known. The species listed for groups and hedges represent the main component and there may be other minor species not listed.

- **Height:** Height is estimated to the nearest metre.

- **Spread:** The maximum crown spread is visually estimated to the nearest metre from the centre of the trunk to the tips of the live lateral branches.

- **Diameter:** These figures relate to 1.4m above ground level and are recorded in centimetres. If appropriate, diameter is measure with a diameter tape. 'M' indicates trees or shrubs with multiple stems.

- **Estimated Age:** Age is estimated from visual indicators and it should only be taken as a provisional guide. Age estimates often need to be modified based on further information such as historical records or local knowledge.

- **Distance to Structures:** This is estimated to the nearest metre and intended as an indication rather than a precise measurement.

Appendix 10

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Sydney

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Sydney

Appendix 11

Significant Tree Register

Randwick City Council

letter dated 10/9/2007

and

Register of Significant Trees

Prince of Wales Hospital
61 Avoca Street, Randwick

Administrative Centre
30 Frances St
Randwick 2031
Tel: 02 9399 0999 or
1300 722 542 (for Sydney metropolitan area)
Fax: 02 9319 1510
general.manager@randwick.nsw.gov.au
ABN: 77 362 844 121

RANDWICK CITY COUNCIL
"A sense of community"

INCORPORATED
AS A MUNICIPALITY
22 FEBRUARY 1859
PROCLAIMED AS
A CITY 1ST JULY 1990
www.randwick.nsw.gov.au

BB:BB F2004/07359
(Contact Officer: Bryan Bourke – 9399 0609)

10 September 2007

General Manager Northern Network Office
13 SEP 2007
RECEIVED

Director
Prince of Wales Hospital
61 High Street
RANDWICK NSW 2031

Dear Sir/Madam,

Significant Tree Register – Significant Trees under the control and management of Government authorities, Institutional, Religious and non-Government Organisations

Council at its Ordinary Council meeting held on Tuesday, 28 August, 2007, resolved to adopt its Register of Significant Trees and that all trees listed in that document be included in Council's draft Local Environmental Plan 2007.

Trees contained within this Register have been listed because of their botanic/historic/cultural/visual importance, utilising criteria which relates to both the cultural and natural significance of each item and place.

Although listed trees are covered by Council's Tree Preservation Order they are also considered significant enough to warrant the additional protection that this Register will afford them.

For this reason Council is recommending that you protect and nurture these very important natural assets to the best of your organisation's ability and that all tree maintenance works undertaken comply with the appropriate Australian Standard – *AS 4373 – 2007 – Pruning of Amenity Trees.*

A full list and description of all trees growing within the above property which are listed on Council's Register of Significant Trees may be viewed on our website at www.randwick.nsw.gov.au and by clicking onto the following icons – Council Services / Greening Our City / Trees / Significant Tree Register.

Yours faithfully,

Bryan Bourke
Tree Management Officer

Prince of Wales Hospital – 61 Avoca Street, Randwick

SUMMARY OF SCHEDULED ITEMS (CULTURAL PLANTING)

SCHEDULED ITEMS: INFORMAL GROUPS/ ROW PLANTING & SINGLE SPECIMENS
SIGNIFICANCE: INDIVIDUAL/ GROUP – LGA

Group A: Avoca Street frontage/ entry gates and vehicular access road
2 № Moreton Bay Figs *(Ficus macrophylla)*
2 № Port Jackson Figs *(Ficus rubiginosa f. rubiginosa* and f. *glabrescens)*
1 № Western Juniper *(Juniperus occidentalis)*
1 № Norfolk Island Pine *(Araucaria heterophylla)*

Group B: Western courtyard to main sandstone building
1 № Norfolk Island Pine *(Araucaria heterophylla)*
3 № American Cotton Palms *(Washingtonia filifera)*
1 № Dragon's Blood Tree *(Dracaena draco)*
6 № Kentia Palms *(Howea forsteriana)*

Group C: Northern courtyard to sandstone building
1 № Silky Oak *(Grevillea robusta)*

Other tree and palm components/ associates
Brush Box *(Lophostemon confertus)*
Illawarra Flame Tree *(Brachychiton acerifolius)*
Umbrella Tree *(Schefflera actinophylla)*
Canary Island Date Palms *(Phoenix canariensis)*
Washington Palm *(Washingtonia robusta)*

DESCRIPTION OF SCHEDULED TREE SPECIES

Botanical Name:	***Ficus macrophylla*** (2 No.)
Common Name:	Moreton Bay Fig
Significance Attributes:	native rainforest specimen planting cultural/ historic and social visual/ aesthetic (local/ streetscape) biodiversity value
Origin:	ornamental/ cultivated (SE Qld to NSW Shoalhaven region)
Location:	These figs are part of an informal mixed species (dominant *Ficus* spp.) row plantation along eastern boundary (Avoca Street). Fig A is located on the lawn area immediately north of the main vehicular gates. Fig B is located in a mulched area near the south-eastern corner of the site (adjacent to the McNevin Dickson Building).
Extent of Influence:	Canopies extend over public footpath and roadway (Avoca Street). The root zones of these figs are likely to extend to a similar or possibly larger area of influence.
Height:	Fig A: 12 metres; Fig B: 18 metres
Canopy Spread:	Fig A: 14 metres; Fig B: 28 metres
Trunk Diameter:	1700-2400mm @ 1.0 metre above ground level (Fig A: approx. 4000mm and Fig B: approx. 7000mm buttressed bases).

Estimated Age:	100-120 years+
Condition/ Health:	Fig A appears to be in poor health and condition following the recent prolonged drought with extensive dead wood in the crown and a high level of fig psyllid damage/ defoliation. Major branches have been removed/ lopped in the past. Remaining branches display evidence of further sun damage and decline. Fig B appears to be in reasonably fair to good health and condition with some dead wood in the crown and a medium level of fig psyllid damage to leaves. The lower branches have been heavily pruned.
Management Recommendations:	For further detailed assessment of health, condition and tree management recommendations, a qualified arborist should be consulted.

Botanical Name:	***Ficus rubiginosa*** **f. *rubiginosa*** (1 No.) and **f. *glabrescens*** (1 No.)
Common Name:	Port Jackson Fig
Significance Attributes:	native rainforest specimen planting cultural/ historic and social visual/ aesthetic (local/ streetscape) biodiversity value
Origin:	ornamental/ cultivated (form *rubiginosa* northern NSW to Illawarra and form *glabrescens* Qld & northern NSW)
Location:	These figs are part of an informal mixed species (dominant *Ficus* spp.) row plantation along eastern boundary (Avoca Street). Fig A (f. *rubiginosa*) is located in a mulched garden bed north of the main vehicular gates (near the Western Juniper). Fig B *(f. glabrescens)* is located in the lawn south of the main gates.
Extent of Influence:	Canopies extend over public footpath and partially over the roadway (Avoca Street). The root zones of these figs are likely to extend to a similar or possibly larger area of influence.
Height:	Fig A: 12 metres; Fig B: 18 metres
Canopy Spread:	Fig A: 17 metres; Fig B: 14 metres
Trunk Diameter:	1000-1500mm @ 1.0 metre above ground level
Estimated Age:	100-120 years+
Condition/ Health:	Both figs appear to be in good health and condition with relatively dense crowns and vigorous growth. Fig B however has extensive basal scarring (1800mm in height) and cavities.
Management Recommendations:	For further detailed assessment of health, condition and tree management recommendations, a qualified arborist should be consulted.

Botanical Name:	***Juniperus occidentalis*** (1 No.)
Common Name:	Western Juniper
Significance Attributes:	exotic specimen planting/ mixed row plantation cultural/ historic and social aesthetic/ visual (local/ streetscape)
Origin:	ornamental/ cultivated (Western USA)
Location:	This pine is part of an informal mixed species (dominant *Ficus* spp.) row plantation along eastern boundary (Avoca Street).
Extent of Influence:	Canopy extends over public footpath and partially over the roadway (Avoca Street). The root zone is likely to extend to a similar or possibly larger area of influence.
Height:	16 metres
Canopy Spread:	16 metres
Trunk Diameter:	1300mm @ 1.0 metre above ground level
Estimated Age:	100-120 years+
Condition/ Health:	This pine appears to be in good health and condition with a dense crown and vigorous growth.

Management Recommendations:	For further detailed assessment of health, condition and tree management recommendations, a qualified arborist should be consulted.

Botanical Name:	***Araucaria heterophylla*** (2 No.)
Common Name:	Norfolk Island Pine
Significance Attributes:	emergent specimen planting cultural/ historic and social aesthetic/ visual (local/ streetscape and district)
Origin:	ornamental/ cultivated (Norfolk Island)
Location:	Pine A: courtyard garden of main sandstone building (south-eastern corner) – part of mixed group. Pine B: small garden bed between the Euroa Centre and internal access road (off Avoca Street).
Extent of Influence:	Canopies are contained within this property. The root zones are likely to extend to a similar or possibly larger area of influence.
Height:	Pine A: 30 metres; Pine B: 26 metres
Canopy Spread:	Pine A: 10 metres; Pine B: 12 metres
Trunk Diameter:	700-900mm @ 1.0 metre above ground level
Estimated Age:	120-140 years+
Condition/ Health:	Pine A appears to be in good health and condition. Pine B appears to be in decline with a relatively open crown, extensive dead wood, no apical growth and adventitious growth on lower branches.
Management Recommendations:	Pine B: Investigate options to reduce compaction and improve soil conditions within the drip-line. For further detailed assessment of health, condition and tree management recommendations, a qualified arborist should be consulted.

Botanical Name:	***Washingtonia filifera*** (3 No.)
Common Name:	American Cotton Palm or Petticoat Palm
Significance Attributes:	exotic palm specimen/ group planting cultural/ historic and social visual/ aesthetic (local/ courtyard)
Origin:	ornamental/ cultivated (south-western USA & Mexico)
Location:	Courtyard garden of main sandstone building (south-eastern corner) – part of mixed group.
Extent of Influence:	Canopies and roots confined to courtyard.
Height:	12 metres [clear trunk]
Canopy Spread:	3 metres
Trunk Diameter:	n/a
Estimated Age:	90-100 years+
Condition/ Health:	These three palms are in good condition and health with strong apical growth and dense crowns.
Management Recommendations:	No immediate threats or problems are evident.

Botanical Name:	***Dracaena draco*** (1 No.)
Common Name:	Dragon's Blood Tree
Significance Attributes:	single exotic specimen planting cultural/ historic and social botanic/ rarity value
Origin:	ornamental/ cultivated (Canary Islands)
Location:	Courtyard of main sandstone building (near main east-west walkway).
Extent of Influence:	Canopy and root zone confined to courtyard.
Height:	5 metres [single trunk with multiple upper branching]
Canopy Spread:	4 metres
Trunk Diameter:	n/a

Estimated Age:	70-80 years+
Condition/ Health:	Tree appears to be in generally good condition and health with strong new growth evident.
Management Recommendations:	No immediate threats or problems are evident.

STATEMENT OF SIGNIFICANCE

The Prince of Wales Hospital (including the Prince of Wales Private Hospital, the Royal Hospital for Women and Sydney Children's Hospital) is bounded by High Street (north), Avoca Street (east), Barker Street (south) and Hospital Road (west). The grounds of Prince of Wales Hospital contain an exceptional collection of significant trees. These trees are part of the site's historic and cultural heritage associated with the earlier development of the Randwick Asylum for Destitute Children. The High Street frontage and western courtyard to the main sandstone building, designed by the colonial architect Edmund Blackett, retain the major components of the collection. These informal mixed row plantations, informal groupings and individual specimens are believed to date from the earliest period of development with further overlays during the early twentieth century and Inter-War period. The collection contains a curiously eclectic botanical mix of specimen figs, palms and emergent Araucarias (native pines) and is considered to have significance at the Randwick LGA level in terms of its combined historic, cultural, social, commemorative, botanic, aesthetic and visual qualities. The planting palette continues a lush, native evergreen/ rainforest theme typical of the public parks movement promoted by Charles Moore and J. H. Maiden (Directors, Sydney Royal Botanic Gardens 1848-1896 and 1896-1924 respectively).

In 1852, Dr. Henry Grattan Douglass founded the Society for the Relief of Destitute Children and established Ormond House in Paddington to accommodate the growing number of orphans and neglected children in Sydney. The growing numbers of these children placed increasing pressures on this home and its resources. Simeon Pearce's influence helped persuade the New South Wales Government of the day to grant 60 acres [23.6 Ha] for construction of the Randwick Asylum for Destitute Children at High Cross, Randwick. This larger home, designed to accommodate 400 children, was first occupied in 1858. The site included a farm for teaching farming skills. A new wing was added in 1863. By 1888, under a new boarding program, the Asylum was increasingly under-utilised and finally closed. During World War I, a military hospital was established for wounded and disabled returned servicemen. The site was used as a military and repatriation hospital until the 1950s and later became the Prince of Wales Hospital. State records show that 216 children died while under the care of the Asylum. Many of these children were buried in the grounds and a memorial garden installed following archaeological investigations *(State Records NSW – Archives in Brief 66 – Randwick Asylum Records, 2006).*

The mixed row plantation of informally planted mature figs visually dominates the Avoca Street frontage of the Hospital. This historic group of trees makes a important contribution to the aesthetic quality of the streetscape and provides continuity with other heritage elements in this area, particularly with respect to the High Cross Park group of Araucarias (refer to listing in this Register). An undated photograph (possibly c.1900) shows two Norfolk Island Pines *(Araucaria heterophylla)* at the northern end of this row *(Lawrence, J., 2005, p.18).* These are no longer present. The remaining mixed row plantation has stylistic similarities with the planting along the entrance to Royal Prince Alfred Hospital (RPAH) Admission Block on Missenden Road, Camperdown (built 1876-1882). Two Moreton Bay Figs and two Port Jackson Figs are included within this plantation. The Moreton Bay Fig *(Ficus macrophylla)* located near the south-eastern boundary is the stand out specimen in this group. The expansive canopy of this fig stretches over Avoca Street. The buttressed base and surface roots extend over an area of seven metres in diameter. The Port Jackson Figs are notable in exhibiting the two distinct forms of this species – the local form *Ficus rubiginosa* f. *rubiginosa* with rusty colouration on the underside of the leaves and *Ficus rubiginosa* f. *glabrescens*, the glabrous leaf form (ie. no hairs) and no rusty colouration on the underside of leaves. The seed source for the glabrous leaf form would have likely been from early botanical collections in SE Queensland or northern NSW. Together the figs create a dramatic sense of place and provide a high level of visual, aesthetic, amenity and biodiversity value in this urban setting.

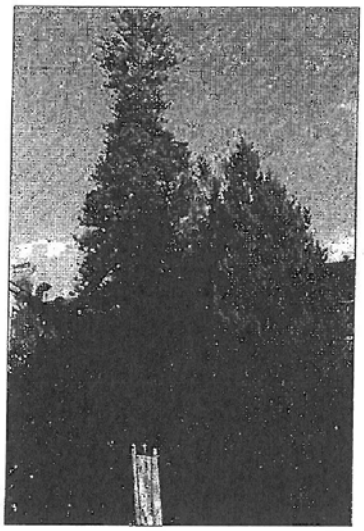
Although not a particularly large specimen or visually significant within this row plantation, the single Western Juniper *(Juniperus occidentalis)* from the Western United States is the only known example of this species as an historic planting in the Randwick LGA. These pines are able to grow out of solid rock in the Sierra Nevada mountain range in California. This species can be exceptionally long-lived. Some trees are known to be more than 2,000 years old.

The courtyard planting would have been an integral part of the building's design and philosophy. A plaque located next to the Norfolk Island Pine *(Araucaria heterophylla)* in this courtyard, commemorates the planting of this specimen by HRH Prince Alfred, Duke of Edinburgh in February 1868. An attempted assassination was made on the Duke of Edinburgh at Clontarf during this visit. A very large Norfolk Island Pine commemorates this event at Clontarf. Notably, the Norfolk Island Pine in this courtyard is an unusual specimen. It has the uncommon characteristics of a slender trunk and small canopy spread similar to the Cook Pine *(Araucaria columnaris)* which may be a response to its confined location adjacent to the three-storey building.

Other significant species in this courtyard include the mature grove of American Cotton Palms *(Washingtonia filifera)* and Kentia Palms *(Howea forsteriana)* which are believed to be later overlays, possibly during the last decade of the nineteenth century or early Pre-War period of the twentieth century. Both the Cotton Palm and Kentia Palm are hardy, drought tolerant palm species and are typical components of many public park schemes during this period. The exotic Cotton Palm is somewhat less common than its close relative, the Washington Palm *(Washingtonia robusta)*. The Dragon's Blood Tree *(Dracaena draco)* is another important botanical specimen in this collection. The common name of Dragon Tree or Dragon's Blood Tree *(Dracaena draco)* is a reference to the resinous dark red sap of this peculiar slow-growing, umbrella-shaped tree. This very hardy and drought tolerant species was highly valued as an ornamental and garden curiosity by plant collectors during the mid-to late nineteenth and early twentieth centuries. Although not particularly tall in stature and hidden from public views on nearby streets, this specimen is of local significance in terms of its aesthetic, visual, historic, social, botanic and rarity value. This is the only mature example of this species identified in the Randwick LGA during this study. Other larger and possibly older specimens are known to occur in Woollahra LGA (eg. McKell Park, Darling Point) and Sydney Royal Botanic Gardens.

The Silky Oak *(Grevillea robusta)*, located in the courtyard to the north of the main building, may date from the early inter-War Period. This native rainforest specimen stands 18 metres in height with a canopy spread of 12 metres and 600mm DBH. Other mature component species include an Umbrella Tree *(Schefflera actinophylla)*, Washington Palm *(Washingtonia robusta)*, Illawarra Flame Tree *(Brachychiton acerifolius)*, Brush Box *(Lophostemon confertus)*, various Cypresses *(Cupressus* spp.*)* and Canary Island Date Palms *(Phoenix canariensis)*. These additional elements are thematically consistent with the overall eclecticism of the period and are considered to be generally supportive of the major historic elements.

Prince of Wales Hospital – 61 Avoca Street. Western Juniper *(Juniperus occidentalis)*



Prince of Wales Hospital – 61 Avoca Street. Western courtyard
Norfolk Island Pine *(Araucaria heterophylla)* [background] &
Cotton Palms *(Washingtonia filifera)* [partially concealed]

Prince of Wales Hospital – 61 Avoca Street.
Moreton Bay Fig *(Ficus macrophylla)*

Curriculum Vitae

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EDUCATION and QUALIFICATIONS

- 2007 – Diploma of Arboriculture (AQF Cert V) Ryde TAFE. (Distinction)
- 1997 – Completed Certificate in Crane and Plant Electrical Safety
- 1996 – Attained Tree Surgeon Certificate (AQF Cert II) at Ryde TAFE
- 1990 – Completed two month intensive course on garden design at the Inchbald School of Design, London, United Kingdom
- 1990 – Completed patio, window box and balcony garden design course at Brighton College of Technology, United Kingdom
- 1989 – Awarded the Big Brother Movement Award for Horticulture (a grant by Lady Peggy Pagan to enable horticulture training in the United Kingdom)
- 1989 – Attained Certificate of Horticulture (AQF Cert IV) at Wollongong TAFE

INDUSTRY EXPERIENCE

Moore Trees Arboricultural Services **January 2006 to date**

Tree Consultancy and tree ultrasound. Tree hazard and risk assessment, Arborist development application reports
Tree management plans.

Woollahra Municipal Council **Oct 1995 to February 2008**

ARBORICULTURE TECHNICAL OFFICER
August 2005 – February 2008
Tree asset management, programmed inspection, inventory and condition surveys of council trees, hazard and risk appraisal, Tree root damage investigation and reporting, assessment of impacts of capital works projects on council trees.
ACTING COORDINATOR OF TREES MAINTENANCE
June – July 2005, 2006
Responsible for all duties concerning park and street trees. Prioritising work duties, delegation of work and staff supervision.
TEAM LEADER
January 2003 – June 2005
TEAM LEADER
September 2000 – January 2003
HORTICULTURALIST
October 1995 – September 2000

Northern Landscape Services **July to Oct 1995**

Tradesman for Landscape Construction business

Paul Vezgoff Garden Maintenance (London, UK) **Sept 1991 to April 1995**

CONFERENCES AND WORKSHOPS ATTENDED

- International Society of Arboriculture Conference (Brisbane 2008)
- Tree related hazards: recognition and assessment by Dr David Londsdale (Brisbane 2008)
- Tree risk management: requirements for a defensible system by Dr David Londsdale (Brisbane 2008)
- Tree dynamics and wind forces by Ken James (Brisbane 2008)
- Wood decay and fungal strategies by Dr F.W.M.R. Schwarze (Brisbane 2008)
- Tree Disputes in the Land & Environment Court – The Law Society (Sydney 2007)
- Barrell Tree Care Workshop- Trees on construction sites (Sydney 2005).
- Tree Logic Seminar- Urban tree risk management (Sydney 2005)
- Tree Pathology and Wood Decay Seminar presented by Dr F.W.M.R. Schwarze (Sydney 2004)
- Inaugural National Arborist Association of Australia (NAAA) tree management workshop- Assessing hazardous trees and their Safe Useful Life Expectancy (SULE) (Sydney 1997).