Integrated Acute Services Building Addition -Arboricultural Impact Assessment

Advisian on behalf of Health Infrastructure



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Abbreviations

Abbreviation	Description
AQF	Australian Qualifications Framework
AS	Australian Standards
DBH	Diameter at Breast Height
ELA	Eco Logical Australia
m	Metre
mm	Millimetre
NDE	Non-Destructive Excavation
NO	Number
NSW	New South Wales
SP	Species
SRZ	Structural Root Zone
TPZ	Tree Protection Zone
VTA	Visual Tree Assessment

1. Background

1.1 Proposed activity

Advisian on behalf of Health Infrastructure propose to submit a State Significant Development (SSD) application for the proposed Integrated Acute Services Building (IASB) Addition, at Randwick (the proposed development).

The proposed development comprises of the following core elements:

- UNSW Eastern Extension (Base Building Only)
- Associated modifications within the IASB
- Lowering of Hospital Road
- Landscaping.

The key features of the proposed development that are likely to negatively affect the subject trees (trees within the subject site) can be summarised as follows:

- excavation works
- plant movement
- changes in soil grades
- installation of underground services.

1.2 The subject site

The subject site covers the proposed IASB Addition footprint. The IASB subject site is largely located at the mid to southern end of Hospital Road towards Magill Street. It also encompasses parts of the former rear yards of 35-45 Eurimbla Avenue and a section of the Prince of Wales Hospital being Delivery Drive (vehicle entry to the existing loading dock).

1.3 Purpose of report

The purpose of this report is to:

- identify the trees within the subject site that are likely to be affected by the proposed development
- assess the current overall health and condition of the subject trees
- evaluate the retention value of the subject trees
- determine the likely impact to the subject trees.

2. Method

2.1 Definitions used in this assessment

2.1.1 Definition of a tree

Randwick City Council defines a tree as being:

"(a) a height equal to or exceeding six (6) metres; or (b) a canopy width to or exceeding four (4) metres; or (c) for a single trunk tree species, a trunk circumference equal to or exceeding one (1) metre at a height of one metre above ground level or; for a multi trunk 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 (Randwick City Council 2013)".

2.1.2 Tree protection zone (TPZ)

The TPZ is the combination of crown and root area (as defined by AS 4970-2009) that requires restriction of access during the construction process. Tree sensitive construction measures must be implemented if works are to proceed within the Tree Protection Zone.

2.1.3 Structural root zone (SRZ)

The SRZ is the area of the root system (as defined by AS 4970-2009) used for stability, mechanical support and anchorage of the tree. It is critical for the support and stability of trees. Severance of roots within the SRZ is not recommended as it may lead to the destabilisation and/or decline of the tree.



Figure 1: Indicative TPZ and SRZ

2.2 Tree assessment

The health and structure of the subject trees was assessed in accordance with a stage one visual tree assessment (VTA) as formulated by Mattheck & Breloer (1994), and practices consistent with modern arboriculture. Measurements to determine the tree protection zone were carried out in accordance with Clause 3.2 and 3.3.5 of AS4970-2000 Protection of Trees on Development Sites (Standards Australia 2009).

Three trees were inspected on 22 December 2017 by AQF Level 5 Consulting Arborist, Lex Atkins **Seven** trees were inspected on 6 June 2019 by AQF Level 5 Consulting Arborist, Elizabeth Hannon.

The following applies to this methodology:

- Trees were inspected from ground level, without the use of any invasive or diagnostic tools and testing. Trees that met the definition of a tree under Randwick City Council's provisions (2013)
- No aerial inspections or root mapping was undertaken.
- Tree heights were determined using a clinometer 15 m from the base of the tree
- Canopy spread was determined using a measured stride out on site.
- The diameter at breast height (DBH) was measured by placing a diameter tape around the trunk of the tree at 1.4 m above ground and recording the measurement. The DBH measurements were used to determine the area for the tree protection zone (which also incorporates the structural root zone).
- The structural root zone (SRZ) was calculated by an estimated measurement of the trunk diameter taken above the root buttress
- Tree identification to species level was based on broad taxonomical features present and visible from ground level at the time of inspection.
- There has been no detailed survey showing the accurate location of the trees or detailed design drawings provided. Consequently, the location and impacts to the trees are indicative only.

2.3 Retention value

The retention value/importance of a tree or group of trees is determined using a combination of environmental, cultural, physical and social values. This tree retention assessment has been undertaken in accordance with the Institute of Australian Consulting Arboriculturists (IACA) *Significance of a Tree, Assessment Rating System (STARS[©])*. The following categories were used:

- Low: These trees are not considered important for retention, nor require special works or design modification to be implemented for their retention.
- **Medium**: These trees are moderately important for retention. Their removal should only be considered if adversely affected by the proposed works and all other alternatives have been considered and exhausted.
- **High**: These trees are considered important and should be retained and protected. Design modification or re-location of building/s should be considered to accommodate the setbacks as prescribed by Australian Standard AS4970 Protection of trees on development sites.

Further details and assessment criteria are in Appendix A.

2.4 Potential impacts

Trees may be impacted by cutting or damaging roots or branches. Impacts to the tree protection zones are determined by the percentage of the area that the development incurs into the tree protection zone. The following are the definition of these impacts:

- **High impact:** The SRZ may be impacted if the proposed encroachment is greater than 20 % of the TPZ. Trees may not remain viable if they are subject to high impact.
- Medium impact: If the proposed encroachment is greater than 10% of the TPZ and outside of the SRZ, the project arborist may require detailed root investigation to demonstrate that the tree(s) would remain viable.
- Low impact: If the proposed encroachment is less than 10% (total area) of the TPZ, and outside of the SRZ, detailed root investigations should not be required.
 - TP2
- No impact: No likely or foreseeable encroachment within the TPZ.

Figure 2: Indicative zones of impact

3. Results and discussion

Results of the arboricultural assessment are tabulated and mapped in Figure 1 and Table 1.

All **ten** trees would be subject to a major encroachment (>20%) within the TPZ from the proposed development. These trees are unable to be sustainably retained without substantial modification of the proposed footprint. The trees have the following retention values:

- **four** trees with a low retention value
- **six** trees with a medium retention value.



Figure 3: Tree impacts

Table 1: Results of arboricultural assessment

Tree	Scientific Name	Height (m)	Spread (m)	Health	Structure	ULE	Tree Significance	Retention Value	DBH (mm)	TPZ (mm)	SRZ (mm)	Tree Impact
1	Tecoma stans	6	6	Fair	Poor	Short	Low	Low	100	2000	1500	High Impact: >20%
2	Tecoma stans	3	4	Fair	Poor	Short	Low	Low	100	2000	1500	High Impact: >20%
3	Angophora costata	4	3	Fair	Fair	Medium	Medium	Medium	280	3400	1900	High Impact: >20%
4	Corymbia maculata	5	7	Fair	Fair	Medium	Medium	Medium	250	3000	1900	High Impact: >20%
5	Angophora costata	5	4	Fair	Fair	Medium	Medium	Medium	220	2600	1800	High Impact: >20%
6	Angophora costata	4	3	Poor	Poor	Short	Low	Low	150	2000	1500	High Impact: >20%
7	Tecoma stans	3	3	Fair	Poor	Short	Low	Low	100	2000	1500	High Impact: >20%
8	Angophora costata	8	6	Good	Faire	Medium	Medium	Medium	200	2400	1700	High Impact: >20%
9	Angophora costata	8	6	Good	Faire	Medium	Medium	Medium	200	2400	1700	High Impact: >20%
10	Angophora costata	8	6	Good	Faire	Medium	Medium	Medium	200	2400	1700	High Impact: >20%

4. Tree protection plan

Following the approval of a proposed building envelope, the following measures are to be implemented:

4.1 Tree pruning and removal

- All tree work is to be carried out by an arborist with a minimum AQF Level 3 qualification in Arboriculture.
- All tree work must be in accordance with Australian Standard AS 4373-2007, Pruning of Amenity Trees and the NSW WorkCover Code of Practice for the Amenity Tree Industry (1998).
- Permission must be granted from the relevant consent authority prior to removing or pruning of any of the subject trees.

4.2 Replacement planting

Health Infrastructure has committed approximately 200 trees to be considered for planting both within the Randwick Health and Education Precinct and across the Randwick local government area in the coming years as part of the overall Randwick Campus Redevelopment Project. Consultation with Randwick City Council is being undertaken on their possible location.

5. References

5.1 General references

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Harris, R.W., Matheny, N.P., and Clark, J.R., 1999. *Arboriculture: integrated management of landscape trees, shrubs, and vines*, Prentice Hall, Upper Saddle River, New Jersey.

Mattheck, C. and Breloer, H. 1994. 'Field Guide for Visual Tree Assessment' *Arboricultural Journal*, Vol 18 pp 1-23.

Mattheck, C. 2007. Updated Field Guide for Visual Tree Assessment. Karlsruhe: Forschungszentrum Karlsruhe.

IACA 2010. *IACA Significance of a Tree, Assessment Rating System (STARS)*, Institute of Australian Consulting Arboriculturalists, Australia, <u>www.iaca.org.au</u>.

Robinson L, 2003. Field Guide to the Native Plants of Sydney, 3rd ed, Kangaroo Press, East Roseville NSW

Standards Australia 2007. *Australian Standard: Pruning of amenity trees, AS 4373 (2007)*, Standards Australia, Sydney.

Standards Australia 2009. *Australian Standard: Protection of trees on development sites, AS 4970 (2009).* Standards Australia, Sydney.

5.2 Project specific references

Randwick City Council, *Randwick City Council Development Control Plan 2013 Clause B5, Preservation of Trees and Vegetation.*

Detailed satellite view of study area (NearMaps 2019) email provided by Advisian.

Appendix A Tree retention assessment method

A1 Tree Significance Assessment Criteria - STARS[©]

Low	Medium	High		
The tree is in fair-poor condition and good or low vigour.	The tree is in fair to good condition	The tree is in good condition and good vigour		
The tree has form atypical of the species	The tree has form typical or atypical of the species	The tree has a form typical for the species		
The tree is not visible or is partly visible from the surrounding properties or obstructed by other vegetation or buildings	The tree is a planted locally indigenous or a common species with its taxa commonly planted in the local area	The tree is a remnant or is a planted locally indigenous specimen and/or is rare or uncommon in the local area or		
The tree provides a minor contribution or has a negative impact on the visual character and amenity of the local area	The tree is visible from surrounding properties, although not visually prominent as partially obstructed by other vegetation or buildings when	of botanical interest or of substantial age. The tree is listed as a heritage item,		
The tree is a young specimen which may or may not have reached dimensions to be protected by local Tree Preservation	viewed from the street The tree provides a fair contribution to the visual character and amenity of the	threatened species or part of an endangered ecological community or listed on Council's significant tree register		
with a suitable specimen	The tree's growth is moderately restricted by above or below ground	The tree is visually prominent and visible from a considerable distance when viewed from most directions within the landscape due to its size and scale and makes a positive contribution to the local amenity.		
The tree's growth is severely restricted by above or below ground influences, unlikely to reach dimensions typical for the taxa in situ – tree is inappropriate to	influences, reducing its ability to reach dimensions typical for the taxa in situ			
The tree is listed as exempt under the provisions of the local Council Tree		The tree supports social and cultural sentiments or spiritual associations, reflected by the broader population or community group or has commemorative values.		
mechanisms		The tree's growth is unrestricted by		
The tree has a wound or defect that has the potential to become structurally unsound.		above and below ground influences, supporting its ability to reach dimensions typical for the taxa in situ – tree is appropriate to the site conditions		
The tree is an environmental pest species due to its invasiveness or poisonous/allergenic properties.				
The tree is a declared noxious weed by legislation				

A2 Matrix assessment

		Tree significance				
		High	Medium		Low	
Useful Life Expectancy	Long >40 years					
	Medium 15-40 years					
	Short <1-15 years					
	Dead					

Legend:

Priority for retention (High): Tree considered important so should be retained and protected. Design modification or re-location of structure should be considered to accommodate the setbacks as prescribed by the <i>Australian Standard AS4970 Protection of trees on development sites</i> . Tree sensitive construction measures must be implemented if works are to proceed within the Tree Protection Zone.
Consider for retention (Medium): Tree considered less important, however, retention should remain priority. Removal considered only if adversely affecting the proposed building/works and all other alternatives have been considered and exhausted.
Consider for removal (Low): Tree not considered important for retention, nor requiring special works or design modification to be implemented for their retention.
Consider for removal (Low): Tree not considered important for retention, nor requiring special works or design modification to be implemented for their retention.



