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ARBORICULTURAL IMPACT ASSESSMENT

3 Lumeah Avenue, Elanora Heights NSW 2101.

Prepared by:

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Arboriculture Australia Consulting Arborist

Tree care and Consultancy

Prepared for:

Jon Ducker

22/02/2022

Executive Summary

Graham Brooks Arboricultural Tree Services Pty Ltd was commissioned by Jon Ducker to undertake an Arboricultural Impact Assessment (AIA) report in regards to the proposed development of 3 Lumeah Avenue, Elanora Heights NSW 2101 (the subject site).

This AIA report will include information relating to 1 tree located within the subject site.

Following an assessment of construction impacts from the proposed development (Section 8) it has been concluded and recommended that;

Although construction impacts could potentially be managed, T1 is of Low retention value and not considered worthy of being a constraint to development.

The removal of T1 is recommended (subject to approval from Northern Beaches Council) to facilitate the proposed development. Removal must be undertaken by a qualified Arborist (AQF 3) and following the guidelines provided in the Amenity Tree Industry – Work Cover Code of Practice 1998 Safe work Australia's "Guide to managing risks of tree trimming and removal work" (July 2016). All tree waste is to be removed from site, including timber, mulch and stump grindings.

It is recommended that 2 small replacement trees (capable of reaching maturity under existing power lines without pruning) are planted within the front garden bed. It is preferred that locally indigenous species are used to maintain the biodiversity of the local area.

Yours faithfully,

Arboricultural Tree Services Pty Ltd

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Graham Brooks dip arb

Managing director

Arboriculture Australia Approved Consulting Arborist No: 1983 Member International Society of Arboriculture Mem No: 173140 ISA Tree Risk Assessment Qualified 2019-2024

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1. Introduction

- 1.1 Graham Brooks Arboricultural Tree Services Pty Ltd has been commissioned by Jon Ducker to undertake an Arboricultural Impact Assessment (AIA) report in regards to the proposed development of 3 Lumeah Avenue, Elanora Heights NSW 2101 (the subject site).
- 1.2 This AIA report will include information relating to 1 tree located within the subject site.

2. Relevant Legislation and development controls

- 2.1 Lot 108 / DP24360 24 3 Lumeah Avenue, Elanora Heights NSW 2101 is zoned C4 – Environmental Living and is located within the Local Government Area of Northern Beaches Council (NSW Government, n.d.)
- 2.2 Section A1.9 of the Pittwater 21 Development Control Plan - 2014 (DCP) (Pittwater Council, 2014), defines a tree as;
“tree means a palm or woody perennial plant with a single or multi stem greater than five (5) metres in height.”
- 2.3 Section B4.22 of the Pittwater 21 Development Control Plan - 2014 (DCP) (Pittwater Council, 2014), Preservation of Trees or Bushland Vegetation has also been considered, in particular;
“10. Where trees proposed to be retained may be affected by the construction of new buildings and works of Classes 1 and 10, a Tree Protection Plan as per Appendix 18 (P21DCP) is to be submitted.”
- 2.4 State Environmental Planning Policy (Vegetation in Non–Rural Areas) 2017 (NSW Government, 2017) has been considered in the preparation of this report. The aims of the policy are to;
 - *“(a) to protect the biodiversity values of trees and other vegetation in non-rural areas of the State, and*
 - *(b) to preserve the amenity of non-rural areas of the State through the preservation of trees and other vegetation.”*

3.The Site

- 3.1 The subject site is 3 Lumeah Avenue, Elanora Heights NSW 2101 and can be seen below in figure 1 outlined in red.



Figure 1: The subject site, subject trees outlined in red. (SIX Maps, n.d.)

4. Method

- 4.1 The tree and site were visually assessed from ground level. The genus and species of the tree was recorded, as well as the dimensions for diameter at breast height (DBH), diameter at root crown and canopy width. Height and age of the tree were estimated as well as the percentage of deadwood, the tree was given a vigour rating and signs and symptoms of pests and diseases were looked for. Comments/Structural defects were also recorded.
- 4.2 Calculations have been made using guidelines supplied in AS4970-2009 Protection of Trees on Development Sites (Standards Australia, 2009) for the;
- Tree Protection Zone (TPZ),
 - Structural Root Zone (SRZ),
 - Live Crown Ratio (LCR),
 - Live Crown Size (LCS),
 - Height/Diameter ratio (H/D).
- 4.3 The subject tree has been allocated a landscape significance rating of Low, Medium or High using the *IACA Significance of a Tree, Assessment Rating System (STARS)©* (IACA, 2010). Stars assessment criteria includes:
- Condition and Vigour
 - Form, species specific
 - Provenance, age and botanical significance
 - Heritage and Ecological significance
 - Size, shape, and local amenity value
 - Restrictions to tree growth

Appendix A contains the assessment criteria in full.

- 4.4 The subject tree has been allocated a Useful Life Expectancy (ULE) rating, categorised as either;
- Long – 40+ years
 - Medium – 15-40 years
 - Short – 5-15 years
 - Consider for removal - <5 years

5. Observations

5.1 Listed in Table 1 below are observations from the subject tree relating to;

- Vigour. Good, Fair or Poor
- Deadwood. An overall % has been estimated.
- Structural defects and comments.
- Any signs/symptoms of pest and disease attack.
- Previous pruning or wounds.

Tree No.	Genus/Species & Common Names	Vigour	Dead wood %	Structural Defects/ Comments	Pests/ Disease	Pruning/ Wounds
1	<i>Eucalyptus haemastoma</i> Scribbly Gum	Fair	5-10%	Open decay in main stem and first order structural stems. High percentage of epicormic growth.	None visible	Eastern canopy removed for cable clearance

TABLE 1: TREE OBSERVATIONS

5.2 Listed in Table 2 below are measurements from the subject tree relating to;

- Diameter at breast height (DBH).
- Diameter above buttress (DAB).
- Canopy spread – measured to the North, East, South and West (N, E, S, W).
- Tree height.
- Lowest scaffold branch.

Tree Number	Species	Maturity	Height (m)	Lowest Scaffold (m)	Spread (m)				DBH / Multi (cm)	DAB (cm)
					N	S	E	W		
1	<i>Eucalyptus haemastoma</i>	Mature	8	2	6	8	1	8	57	60

TABLE 2: TREE MEASUREMENTS

5.3 Listed in Table 3 Below are calculations from the subject tree relating to;

- Tree Protection Zone (TPZ)
- Structural Root Zone (SRZ)
- Live Crown Ratio (LCR)
- Live Crown Size (LCS)
- Height/Diameter ratio (H/D)

Tree Number	Species	TPZ (m)	SRZ(m)	H/D Ratio	Live Crown Size (m2)	Live Crown Ratio (%)
1	<i>Eucalyptus haemastoma</i>	6.84	2.67	14	69	75%

TABLE 3: CALCULATIONS FROM THE SUBJECT TREE

5.4 Figure 2 below shows observations for T1 as recorded in Table 1.



FIGURE 2: OBSERVATIONS - T1

6. Tree Retention Value

6.1 The subject Tree has been allocated a retention value using the priority Matrix in the *IACA Significance of a Tree, Assessment Rating System (STARS)*© (IACA, 2010). The Matrix uses the Landscape Significance rating combined with the Useful Life Expectancy (ULE) to determine a retention value of either;

- Priority for Retention (High) – All measures must be taken to retain and protect these trees. If the guidelines set out in AS4970-2009 Protection of trees on development sites cannot be used to protect the trees, design modification or re-location of the proposed development should be considered.
- Consider for Retention (Medium) – Retention of these trees should remain a priority. If the trees are adversely affecting the proposed development and all protection measures have been considered but are not viable, removal can be considered.
- Consider for Removal (Low) – Retention of these trees is not important. No modification to design should be considered for their retention.
- Priority for Removal – Trees in an irreversible decline, weed species or hazardous trees. These trees should be removed.

Tree Number	Species	Landscape Significance Rating	Useful Life Expectancy	Retention Value
1	<i>Eucalyptus haemastoma</i>	Low	Short (5-15)	Low

TABLE 4: TREE RETENTION VALUES

7. Construction Impacts

- 7.1 Retaining walls are proposed to the North, East and West of T1 as shown in the Retaining Wall Plan (Planning 2 Build, 24/11/2021) in figure 3 below. The TPZ (blue) and SRZ (orange) of T1 have been overlayed.

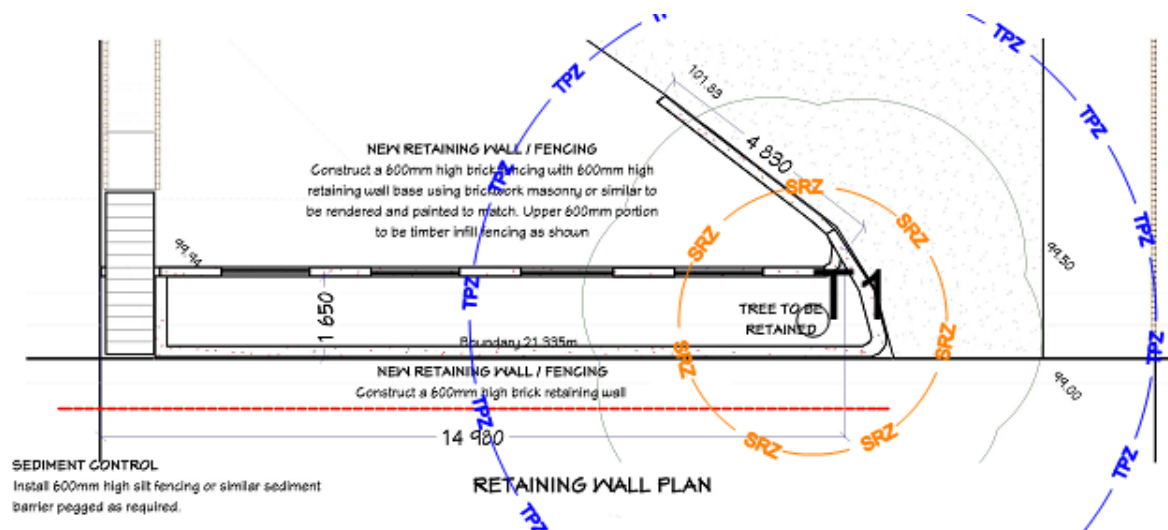


FIGURE 3: RETAINING WALL PLAN WITH TPZ AND SRZ OVERLAYED.

- 7.2 While existing exposed rock could be used for the majority of the footings of the proposed retaining walls, it is likely that some root impact would still occur. T1 has been allocated a Low retention value due to its poor form, structural defects and short longevity. It is recommended that T1 is removed and replaced to facilitate construction.

8. Documents used in the Preparation of this report

- 8.1 Listed in table 6 below are documents used in the preparation of this report. Any plan overlays referenced in table 6 below are available as attachments at the end of this report.

Document type	Source/ Author	Title	Date
Plan	Planning 2 build	Cover Page	24/11/2021
Plan	Planning 2 build	Site Plan	24/11/2021
Plan	Planning 2 build	Retaining Wall Plan	24/11/2021
Australian Standard	Standards Australia Limited	AS 4970-2009 Protection of trees on development sites.	2009

TABLE 6: DOCUMENTS USED IN THE PREPARATION OF THIS REPORT

9. Conclusion & Recommendations

- 9.1 The removal of T1 is recommended (subject to approval from Northern Beaches Council) to facilitate the proposed development. Removal must be undertaken by a qualified Arborist (AQF 3) and following the guidelines provided in the Amenity Tree Industry – Work Cover Code of Practice 1998 Safe work Australia’s “Guide to managing risks of tree trimming and removal work” (July 2016). All tree waste is to be removed from site, including timber, mulch and stump grindings.
- 9.3 It is recommended that 2 small replacement trees (capable of reaching maturity under existing power lines without pruning) are planted within the front garden bed. It is preferred that locally indigenous species are used to maintain the biodiversity of the local area.

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10. References

Claus Mattheck, H. B., 2006. *The Body Language of Trees: A handbook for failure analysis*. London: The Stationary office.

IACA, 2010. *IACA Significance of a Tree, Assessment Rating System (STARS)*, Institute of Australian Consulting Arboriculturists, Australia. [Online]

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[Accessed 26th October 2017].

NSW Government, n.d. *Planning & Environment - Property Report*. [Online]

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[Accessed 22nd February 2022].

Pittwater Council, 2014. *Pittwater 21 Development Control Plan*. [Online]

Available at: <http://portal.pittwater.nsw.gov.au/Pages/Plan/Book.aspx?vid=10075%2c10449>

[Accessed 18th September 2017].

SIX Maps, n.d. [Online]

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[Accessed 22nd February 2022].

Standards Australia, 2009. *AS 4970-2009 Protection of trees on development sites*. Sydney: Standards Australia.

11. Glossary of Terms

Common name/genus - the common name and genus/ species of the tree.

Age Class- assessment of the trees current age.

Immature (IM) - refers to a tree at growth stages between immaturity and full size.

Semi-mature (SM) - refers to a full sized tree with some capacity for further growth.

Mature (M)-refers to a full sized tree with some capacity for further growth.

Over-mature (OM) - a mature tree has reached a near stable size (biomass) above and below the ground .Trees can have a Mature Age Class for > 90% of their life span. Over-mature (OM) trees show symptoms of irreversible decline and decreasing biomass.

Height -estimated overall height of the tree.

Tree Protection Zone (TPZ) - is a “No Go Zone” surrounding a tree to aid in its ability to cope with disturbances associated with construction works. Tree protection involves minimising root damage that is caused by activities such as construction. Tree protection also reduces the chance of a tree’s decline in health or death & the possibly damage to structural stability of the tree from root damage.

Diameter at Breast Height (DBH) - the trunk diameter at breast height (in metres) of the tree, 1.4 meters above ground level.

Diameter above the Buttress (DAB) - refers to the tree trunk diameter measured above the root buttress and is used to calculate the radius of the SRZ.

Structural root zone (SRZ) – the structural root zone is the area required for the trees stability. A larger area is required to maintain a viable tree. The SRZ is only needed to be calculated when a major encroachment into the 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 rock and footings.

Vigour - Good (G), Fair (F) or Poor (P) - the general appearance of the canopy of the tree at the time of inspection. Vigour can vary with the season and rainfall frequency

Health – Excellent (E), Very Good (VG), Good (G), Fair (F), Declining (D), Poor (P),Very Poor (VP).this refers to the tree’s form & growth habit, as modified by its environment (aspect suppression by other tree/s, soils,) & the state of the scaffold (i.e. trunk & major branches),including structural defects such as cavities, crooked trunks or weak trunk/branch junctions. These are not directly connected with health & it is possible for a tree to be healthy but in poor condition/vigour.

Deadwood – this refers to any whole limb that no longer contains living issues (i.e. living leaves & /or bark).Some dead wood is common in a number of species.

Crown Spread - the greatest width from drip line to drip line of a branch across the trees crown.

Crown Form -the density of foliage (expressed as a percentage), that would be expected to be displayed in a tree of its genus/species. Many factors such as the presence of pests and/or diseases, drought and other associated environmental conditions contribute to crown form.

Epicormic Growth - these are advantageous shoots that grow from secondary bud development. They are an indicator that the tree has/or is under stress.

Live Crown Ratio (LCR) -the height of a trees crown, relative to the total height of the tree. Often used as an indicator of overall stability.

Live Crown Size (LCS) - the area of the crown as viewed from one aspect.

Australian Height Datum (AHD) – A Geodetic measurement for altitude in Australia.

AGL – Above Ground level.

12. Relevant Appendices

Appendix 1 - STARS© Rating System

Significance of a Tree, Assessment Rating System* (IACA 2010) – S.T.A.R.S. ©

The landscape significance of a tree is an essential criterion to establish the importance that a particular tree may have on a site. However, rating the significance of a tree becomes subjective and difficult to ascertain in a consistent and repetitive fashion due to assessor bias. It is therefore necessary to have a rating system utilising structured qualitative criteria to assist in determining the retention value for a tree. To assist this process all definitions for terms used in the *Tree Significance - Assessment Criteria* and *Tree Retention Value - Priority Matrix*, are taken from the IACA Dictionary for Managing Trees in Urban Environments 2009.

This rating system will assist in the planning processes for proposed works, above and below ground where trees are to be retained on or adjacent a development site. The system uses a scale of *High*, *Medium* and *Low* significance in the landscape. Once the landscape significance of an individual tree has been defined, the retention value can be determined. An example of its use in an Arboricultural report is shown as Appendix A.

Tree Significance - Assessment Criteria



High Significance in landscape

- The tree is in *Good condition* and *Good vigor*;
- The tree has a form typical for the species;
- The tree is a remnant or is a planted locally indigenous specimen and/or is rare or uncommon in the local area or of botanical interest or of substantial age;
- The tree is listed as a Heritage Item, Threatened Species or part of an Endangered ecological community or listed on Councils significant Tree Register;
- The tree is visually prominent and visible from a considerable distance when viewed from most directions within the landscape due to its size and scale and makes a positive contribution to the local amenity;
- The tree supports social and cultural sentiments or spiritual associations, reflected by the broader population or community group or has commemorative values;
- The tree's growth is unrestricted by above and below ground influences, supporting its ability to reach dimensions typical for the taxa *in situ* - tree is appropriate to the site conditions.

Medium Significance in landscape

- The tree is in *Fair-Good condition* and *Good or Low vigor*;
- The tree has form typical or atypical of the species;
- The tree is a planted locally indigenous or a common species with its taxa commonly planted in the local area
- The tree is visible from surrounding properties, although not visually prominent as partially obstructed by other vegetation or buildings when viewed from the street,
- The tree provides a fair contribution to the visual character and amenity of the local area,
- The tree's growth is moderately restricted by above or below ground influences, reducing its ability to reach dimensions typical for the taxa *in situ*.

Low Significance in landscape

- The tree is in fair-poor condition and good or low vigor;
- The tree has form atypical of the species;
- The tree is not visible or is partly visible from surrounding properties as obstructed by other vegetation or buildings,
- The tree provides a minor contribution or has a negative impact on the visual character and amenity of the local area,
- The tree is a young specimen which may or may not have reached dimension to be protected by local Tree Preservation orders or similar protection mechanisms and can easily be replaced with a suitable specimen,
- The tree's growth is severely restricted by above or below ground influences, unlikely to reach dimensions typical for the taxa *in situ* - tree is inappropriate to the site conditions,
- The tree is listed as exempt under the provisions of the local Council Tree Preservation Order or similar protection mechanisms,
- The tree has a wound or defect that has potential to become structurally unsound.

Environmental Pest / Noxious Weed Species

- The tree is an Environmental Pest Species due to its invasiveness or poisonous/ allergenic properties,
- The tree is a declared noxious weed by legislation.

Hazardous/Irreversible Decline


- The tree is structurally unsound and/or unstable and is considered potentially dangerous,
- The tree is dead, or is in irreversible decline, or has the potential to fail or collapse in full or part in the immediate to short term.

The tree is to have a minimum of three (3) criteria in a category to be classified in that group.

Note: The assessment criteria are for individual trees only, however, can be applied to a monocultural stand in its entirety e.g. hedge.

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

Table 1.0 Tree Retention Value - Priority Matrix.

		Significance				
		1. High	2. Medium	3. Low		
		Significance in Landscape	Significance in Landscape	Significance in Landscape	Environmental Pest / Noxious Weed Species	Hazardous / Irreversible Decline
Estimated Life Expectancy	1. Long >40 years					
	2. Medium 15-40 Years					
	3. Short <1-15 Years					
	Dead					
Legend for Matrix Assessment 						
	Priority for Retention (High) - These trees are considered important for retention and should be retained and protected. Design modification or re-location of building/s should be considered to accommodate the setbacks as prescribed by the Australian Standard AS4970 <i>Protection of trees on development sites</i> . Tree sensitive construction measures must be implemented e.g. pier and beam etc if works are to proceed within the Tree Protection Zone.					
	Consider for Retention (Medium) - These trees may be retained and protected. These are considered less critical; however their retention should remain priority with removal considered only if adversely affecting the proposed building/works and all other alternatives have been considered and exhausted.					
	Consider for Removal (Low) - These trees are not considered important for retention, nor require special works or design modification to be implemented for their retention.					
	Priority for Removal - These trees are considered hazardous, or in irreversible decline, or weeds and should be removed irrespective of development.					

USE OF THIS DOCUMENT AND REFERENCING The IACA Significance of a Tree, Assessment Rating System (STARS) is free to use, but only in its entirety and must be cited as follows:

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

REFERENCES Australia ICOMOS Inc. 1999, *The Burra Charter – The Australian ICOMOS Charter for Places of Cultural Significance*, International Council of Monuments and Sites, www.icomos.org/australia Draper BD and Richards PA 2009, *Dictionary for Managing Trees in Urban Environments*, Institute of Australian Consulting Arboriculturists (IACA), CSIRO Publishing, Collingwood, Victoria, Australia. Footprint Green Pty Ltd 2001, *Footprint Green Tree Significance & Retention Value Matrix*, Avalon, NSW Australia, www.footprintgreen.com.au

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