

REVISION: A

PROJECT ADDRESS:

53B Amourin Street, North Manly NSW
Consulting Arboricultural Assessment Report



PURPOSE:

This arboricultural assessment is for ten (10) trees or groups of trees or shrubs or palms that are located on 53B Amourin Street, North Manly, within The Northern Beaches Council, under the Warringah DCP 2011, Part E¹.

This arborist assessment includes a summary table of the tree assessment data, site plan as well as this report proposal with recommendations.

The trees and their context were assessed on the 25th February 2021, by Elke Haege Thorvaldson, AQF Level 5 consulting arborist.

PROJECT TEAM:

Client: *David Dally and Stephen Dally*

Architect: *Bewoner Studio*

Consulting arborist AQF Level 5: *Elke Haege Thorvaldson*

This assessment report may be reproduced only for the purposes of this project's development and management if the author, title, and date are referenced.

The information contained in this assessment report is considered accurate at the time of tree inspection. The condition of the trees and site conditions may change over time.

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¹ [DCP \(nsw.gov.au\)](https://www.nsw.gov.au/dcp)

<https://eservices.northernbeaches.nsw.gov.au/ePlanning/live/pages/plan/book.aspx?exhibit=DCP>
Arboricultural Development Impact Assessment. Elke Haege Landscape Architect and Consulting Arborist AQF 5.

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1 [Abstract/ Summary](#)

- 1.1 Six in total trees or shrubs are proposed for removal. Four of the shrubs and proposed for removal are Lilly Pilly and are less than 4.5m in height. The two other trees proposed for removal are a Jacaranda and a Cocus Palm (both listed as exempt species under the Warringah DCP 2011, Part E1. Table 1.).
 - 1.2 The land mapping for the property shows this site as being 40% 'landscaped open space and bushland setting'. The site is not shown as having threatened or high conservation habitat², not a wildlife corridor, not with native vegetation mapped, nor as a coastal zone, not as a waterways and riparian lands, and not as biodiversity certified land³.
 - 1.3 The site is a flat battle-axe style lot with a detached residential dwelling and an existing swimming pool.
 - 1.4 New replacement landscape is proposed in the architectural development application package.
 - 1.5 Table A outlines the trees' condition and calculations. Refer to [Table A: Tree Schedules](#)
 - 1.6 Refer to the arborist combined plan [Arb_601 and 602](#). The tree numbers correlate with the above table numbers and tree numbers within this report.
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² <https://services.northernbeaches.nsw.gov.au/icongis/index.html>

³ <https://services.northernbeaches.nsw.gov.au/icongis/index.html>

2 Introduction

- 2.1 Elke Haege visually assessed and inspected the trees from ground level on the **25 February 2021**. The Visual Tree Assessment Method was used (*after Mattheck 8.4 p 118, fig. 74*).
- 2.2 Soil/ Geology: The soil is predominantly dry and sandy and well drained. To the sites western garden zone, the garden has been upgraded some years ago (approx. 8 years) and there has been soil improvements. The garden bed with T8-10 appears unimproved with noticeable root crown base upheaval displacing soil and garden bed.
- 2.3

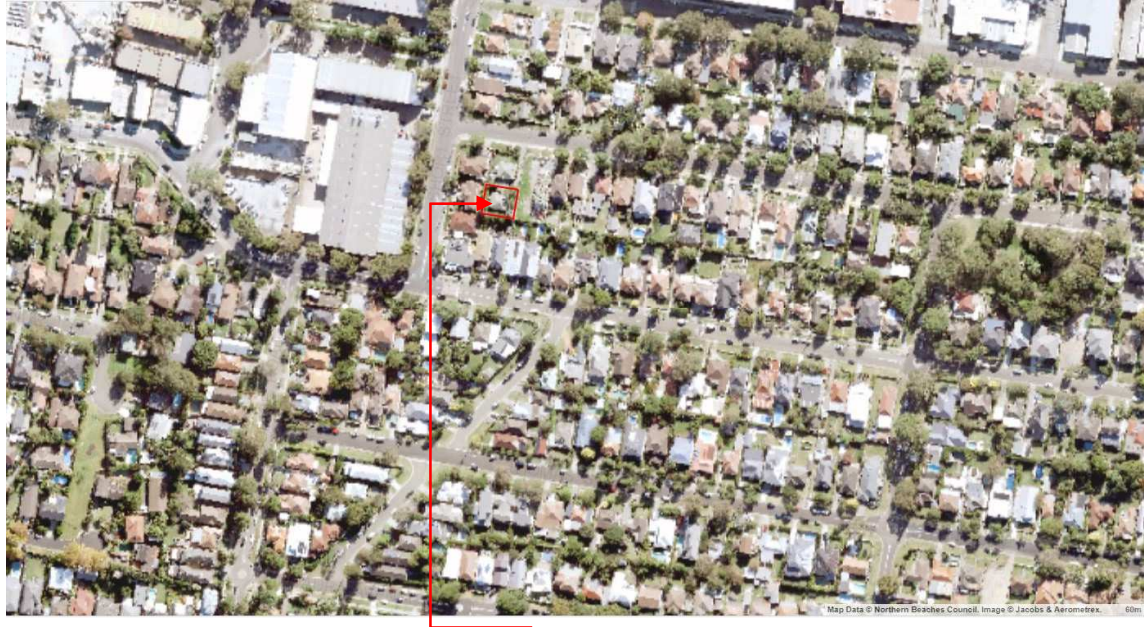


Figure 1 An aerial map showign the site and context. Source: The Northern Beaches Council mapping. Date Accessed: 11.03.21. The site is approximately shown Outlined in red. The red arrow points to the site.



Figure 2. The approximate site shown in yellow with red box outline. Note: site is a battle axe block with shared access driveway to Amourin St (north of site). Source: Six Maps, NSW Government. Date accessed: 11.03.21.

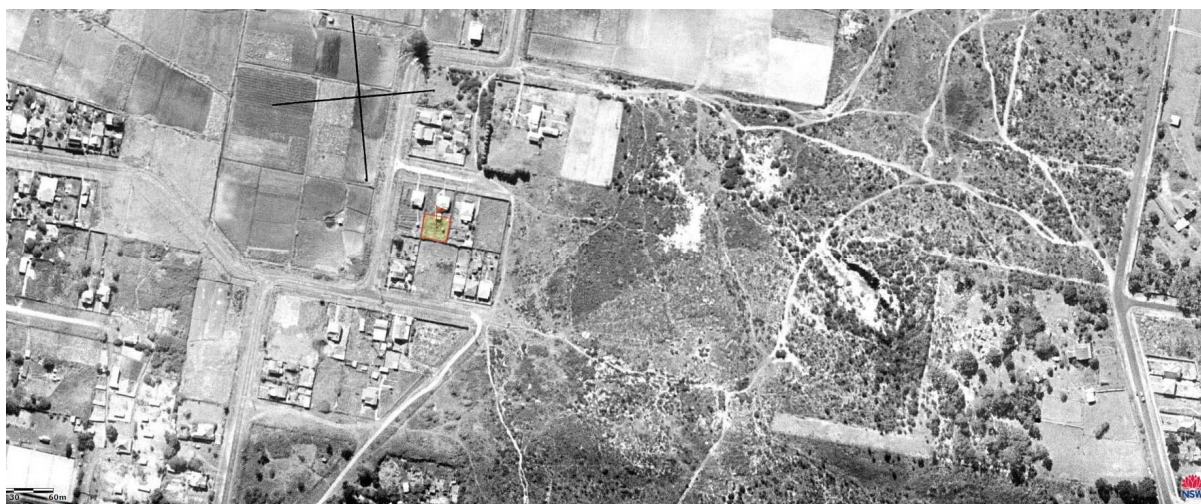


Figure 3 Date of aerial photo: 1943. The approximate site shown in yellow with red box outline. This map shows the site was formerly the rear garden of a single residential lot. Note: site is now a battle axe block with shared access driveway to Amourin St (north of site). Also to note, there is little in way of established trees on or within the vicinity of the site. Source: Six Maps, NSW Government. Date accessed: 11.03.21.

3 [Assessment Methodology](#)

The following industry accepted, and recognised methodologies have been used to visually assess the health and condition of the tree. Results are shown in [Table A](#).

SUMMARY OUTLINE OF TREE ASSESSMENT METHODOLOGIES			
Refer to:	Category of Assessment	Methodology Name + description	Sources
Table A Arb_601	Visual Tree Assessment (VTA). On site measurements and calculations	Visual Tree Assessment (VTA) Procedure and strategy. Refer to Table A ⁴	Claus Mattheck and Breloer 2006. And David Lonsdale's Tree Assessment Strategy.
Table A	Landscape Significance Rating	Determining Landscape Significance Rating	Developed from: Earthscape Horticultural Services, December 2011
Table A	SULE	Safe Useful Life Expectancy Procedure	Jeremy Barrell 1996 from BS5837
Arb_601 Table A	Retention Value	Determining Retention Value	Developed from: Earthscape Horticultural Services, December 2011⁵
Arb_601 Table A	Tree Protection Zones	Tree Protection Zones (TPZ's) and Structural Root Zones (SRZ's)	AS 4970, Protection of Trees on Development Sites.
Table A	Tree Retention Priorities	Analysing the implications for Proposed Development	Earthscape Horticultural Services, December 2011

⁴ [Claus Mattheck and Helge Breloer. Visual Tree Assessment and David Lonsdale's Tree Assessment Strategy.](#)

⁵ Modified from: Couston, Mark and Howden, Melanie, 2001, Tree Retention Values table, Footprint Green Pty., Ltd., Sydney, Australia.

	Australian Standards AS4790-2009	Protection of Trees on Development Sites. Determining permissible tree protection zones, encroachments, protection, fencing, incursions, terminology, and recommendations	AS 4790-2009
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1. Table above outlines the Methodologies used.

Australian Standards and Data Collection Documents

- 3.1 The Australian Standard, [AS 4790-2009 'Protection of Trees on Development Sites'](#) has been used as the guiding standard reference to provide recommendations of the assessed trees.
- 3.2 The Australian Standard, [AS 4373-2007 'Pruning of Amenity Trees'](#) has also been referred to in this assessment letter within the recommendations section.

Not Assessed:

- 3.3 A visual tree assessment inspection from ground only was conducted. No invasive or destructive testing was conducted. Any changes to the proposed works will need tree re-assessment. Trees and vegetation on the site of 48 Howard Street was not assessed as part of this assessment.

4 Tree Data.

Refer to the [Table A Schedule](#) on the following page for the tree condition description and tree data. Provided on the next page in this report is the following schedule:

- a. [Table A: Tree Schedule – A3 size, 1 sheet.](#)
Provides tree reference numbers, detail on health and structure, SULE rating, landscape, and retention rating, SRZ's, TPZ's⁶ and relevant encroachment percentages.

Refer also to the ['Recommendations + Discussion'](#) chapter.

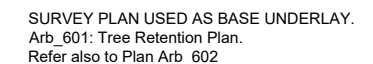
5 Tree Assessment Plan:

- b. [Arborist Plan 601 and 602 on one sheet: A3 size at 1:200 scale:](#)
 - i. [Arb 601: Tree Retention Rating Plan](#)
 - ii. [Arb 602: Tree Impact Plan.](#)

⁶ TPZ and SRZ's are calculated using AS4970-2009 (adapted from Matheney and Clarke's British Standard adaption method, 1991).

Reference			(m)	(m)	AREA (m)											Refer to Appendix 4a and 4b				Refer to report.			
Id #	Species, Common Name	Age class	Estimated Height (m)	Trunk Diameter 1.4m DBH	Proposal to: retain and protect or remove	Canopy spread (m)				Diameter above root crown (RCB)	Health and Structural Condition	SULE (Appendix 2)	Landscape Rating (Appendix 1)	Retention Rating (Appendix 5)	Site Location	TPZ (m) Radius	TPZ (m2) Area	SRZ Radius (m)	SRZ (m2) Area zone	% TPZ Encroac hment	% SRZ encroach ment		
						N	E	S	W														
1	<i>Elaeocarpus reticulatus</i>	J-SM	5	0.11	Retain and Protect	2	1.5	1.8	2	0.11	Tri-dominant form at DBH. Appears visually healthy and in good form for juvenile state. Provides visual screening.	M-L	M	M	E	1.32	5.47	1.31	5.39	0%	0%		
	Blueberry Ash													4									
2	<i>Banksia integrifolia</i>	J	9	0.08	Retain and Protect	1.6	1.6	1.6	1.6	0.14	Upright, tall and slender form. Tree is in flower. Tree tends towards the east. Uplift (feature) in rear garden.	L	M	M	E	0.96	2.90	1.45	6.60	0%	0%		
	Coastal Banksia													4									
3	<i>Livistona australis</i>	M	0.14	0.28	Retain and Protect	1.75	1.75	1.75	1.75	0.5	Tall, straight bole. Upright and visually appears robust and in good health. Currently in fruit. Prominent specimen.	L	M	H	P	3.36	35.47	2.47	19.22	0%	0%		
	Cabbage Tree Palm													3									
4	<i>2 x Backhousia citriodora</i>	SM	5	0.05	Retain and Protect	1	1	1	1	0.08	Hedged screen shrubs. In flower. Visually appears healthy and sound.	M to L	M	M	E	0.60	1.13	1.15	4.12	0%	0%		
	2 x Lemon Myrtle													4									
5	<i>7 x Dyspis lutescens</i>	SM	2.6	na	Retain and Protect	0.4	0.4	0.4	0.4	na	Undersized and exempt. Located within pool enclosure along boundary fence					12.00	452.39	#VALUE!	#VALUE!	0%	0%		
	7 x Golden Cane Palms																						
6	<i>9 x Syzigium leuhmanii 'Cascade'</i>	M	5	0.09	Retain and Protect	1	1	1	1	0.12	Shrubs forming a hedge along boundary. Lower zones are less foliated due to lower light conditions. Provides visual screen and green outlook to garden.	M	M	M	E	1.08	3.66	1.36	5.80	0%	0%		
	9 x Lilly Pilly cultivar hedge													4									
7	<i>8 x Syzigium cvs</i>	SM	3	0.02	Proposal to Remove 2 out of 7.	0.5	0.5	0.5	0.5	0.05	Hedged shrubs along side boundary providing visual screen and green outlook to garden. Proposal to remove 2 of these shrubs due to proposed new glass door to connect to rear garden (refer plan Arb_602)	M	M	M	E	0.24	0.18	0.94	2.78	0%	0%		
	8 x Lilly pilly													4									
8	<i>Syagrus romanzoffiana</i>	M	14	0.26	Proposal to Remove. (Exempt)	3	3	3	3	0.52	Exempt species under Warringah DCP, 2011, Part E1. Table 1. Root crown base tapers significantly and indication of upheaval at root crown base and at root ball indicating either shallow underground growing conditions and/or competition or general upheaval at maturity of palm specimen.	M	Ex.	L	E, WP.	3.12	30.58	2.51	19.86	over	over		
	Cocus Palm													6									
9	<i>Jacaranda mimosifolia</i>	M	11	0.45	Proposal to Remove. (Exempt)	8	3	1.5	6	0.59	Exempt species under Warringah DCP, 2011, Part E1. Table 1. Tree form is asymmetrical tending north and east. Pruned during its lifetime and development. Adjacent concrete slab is lifting by 70mm at highest (at trees root crown base). Tree also has localised root crown base upheaval. Foliage appears healthy and sound. Tree location to west side of house is 3m.	M	M	M	E, WP, P	5.40	91.61	2.65	22.09	over	over		
	Jacaranda													3									
10	<i>2 x Syzigium sp.</i>	M	4.5	0.095	Proposal to Remove.	2	0.5	1	2	0.13	Two specimens, shrub like in form and supressed by T9. Heavy infestation of large white scale and browsed moderately heavily, most likely by possums. Overall condition is poor and visual signs are present of low performance and stresses to these two shrubs. New screen trees are recommended and proposed (with new soil improvements).	S	L	L	partly WP, E	1.14	4.08	1.40	6.20	over	over		
	2 x Lilly pilly.													6									
<div>Age Class</div> <div>ST (Senescent)</div> <div>OM (Over Mature)</div> <div>M (Mature)</div> <div>SM (Semi-Mature)</div> <div>J (Juvenile)</div>		(Diameter at Breast Height) DBH is used in TPZ calculation.				Dia. RCB is used in SRZ calculation		<div>Crown Density PFC</div> <div>Dense >90%</div> <div>Normal 70-90%</div> <div>Slightly thin'g 60-70%</div> <div>Thinning 40-60%</div> <div>SP sparse <40%</div> <div>PFC = projected foliage cover</div>		<div>SULE</div> <div>L ong(> 40 Years)</div> <div>m edium(15-40 Years)</div> <div>s hort(5-15 Years)</div> <div>τ (Transient < 5)</div> <div>h (Hazardous/Dead)</div>		<div>LANDSCAPE RATING</div> <div>S (Significant)</div> <div>VH (Very High)</div> <div>H (High)</div> <div>M (Moderate)</div> <div>L (Low)</div> <div>VL (Very Low)</div> <div>IN (Insignificant)</div> <div>Ex (Exempt TPO)</div> <div>T (Threatened S)</div>		<div>Retention</div> <div>H - high</div> <div>Priority retain</div> <div>M - moderate</div> <div>Consider retain</div> <div>L -low</div> <div>Consider Removal</div> <div>VL - very low</div> <div>Priority Removal</div>		<div>Rating</div> <div>1 to 3</div> <div>4 to 5</div> <div>6</div> <div>7</div>		<div>Site Location</div> <div>O Inconspicuous /obscured location</div> <div>M Moderate location, not obscuring</div> <div>P Prominent position</div> <div>HV Highly Visible from street/surrounds</div> <div>E (Edges) Periphery of site</div> <div>WP Within Development Potential</div> <div>OB Outside Boundary</div>		Measured in CAD. Encroachment based on root zone encroached as a % of TPZ. Canopy incursion based on incursion as a % of canopy. Refer arborist report for details.			

- Table A Arboricultural Tree Evaluation Table (A3 sheet)
- Report Arboricultural Impact Assessment Report (A4)



PROJECT: 53B Amourin St, North Manly

Consulting Arborist Package for Development Application:

- Arb_601 Arboricultural Retention Rating Assessment Plan (Existing) 1:200 at A3.
- Arb_602 Arboricultural Impact Assessment Plan (Proposed) 1:200 at A3.
- Table A Arboricultural Tree Evaluation Table (A3 sheet)
- Report Arboricultural Impact Assessment Report (A4)

T5: 7x Golden Cane Palms within pool zone

T6: 9 total: 3x Lilly Pilly within pool zone and 6 additional along west fenceline.

Coastal Banksia
Cabbage Tree Palm

Blueberry Ash T1.

T5. T5.

T5. T5.

T5. T5.

T5. T5.

T6. T6.

T6. T6.

6xT6.

T2.

T3.

T6.

New frangipani

New citrus

T4. T4.
2 x Lemon myrtle

T7.
7 x Lilly Pilly Hedge

2 out of 7 proposed to remove due to new glass door to connect to garden

T10. T10: 2x Lilly Pilly

T9. Jacaranda

T8. Cocus Palm

ARCHITECTURAL PROPOSAL PLAN USED AS BASE UNDERLAY.
Arb_602: Tree Impact Plan.
Refer also to Plan Arb_601: Tree Retention Plan

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The contractor shall check and verify all work on site (including work by others) before commencing the landscape installation. Any discrepancies are to be reported to the Project Manager or Landscape Architect prior to commencing work. Do not scale this drawing. Any required dimensions not shown must be referred to the Landscape Architect for confirmation. The Contractor must not construct from this drawing unless it marked 'Issue for Construction'. The Contractor acknowledges this drawing may be one of a number of drawings which together document the landscape design and works.

B	Development Application	11.03.21
A	Development Application	08.03.21
Issue	Revision Description	Date

LEGEND

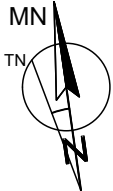


Assessed Trees numbers (Refer to Arborist Assessment Report)
Calculated Tree Protection Zone (TPZ) (blue) and Structural Root Zone (light purple)

Existing Tree recommended for Retention and Protection
Existing Tree proposed to be removed.

Tree Protection Fencing. No entry in this zone. Refer to arborist report. (to AS 4970-2007)

Proposed encroachment/impact into TPZ from the Proposed works.



Development Application

Client: Mr S. Dally
Architect: Howe Architects
Consulting Arborist: Elke Consulting Arborist
Project: 53B Amourin Street North Manly, NSW

Drawing Name: Consulting Arboricultural Tree Impact Plan.
This sheet forms part of the Consulting Arboricultural DA Package

Scale: 1: 200 @A3
Scale bar: 0 1 2 3 5m
Drawn: EDH
Job Number: 2102_a
Approved: EDH
Drawing Number: Arb_601
Issue: B

6 Impact, Discussion and Recommendations

- 6.1 The proposed alterations and additions encroach and impact upon 6 trees or shrubs. 4 of those are Lilly Pilly shrubs, of which at least 3 new Lilly Pilly shrubs are proposed as replacements. Two of the trees proposed for removal are a jacaranda and a Cocus palm (T9 and T8 respectively). Both these species are listed as exempt.
- 6.2 Given the development application is concentrated in the south eastern portion of the site, the landscape and trees in the western and north western portion of the property are to remain unchanged and not impacted by the development proposal. This is illustrated on the architectural plan showing the proposed landscape in the screenshot below.

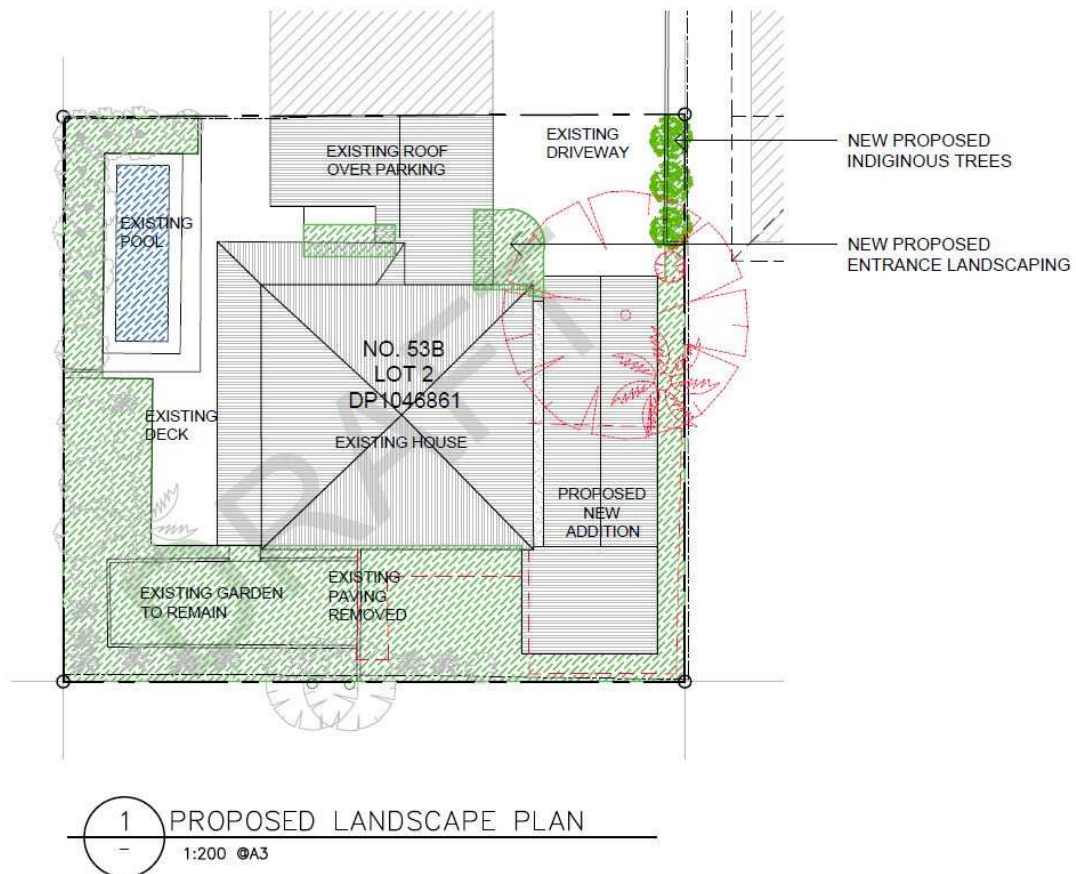


Figure 4. A portion of the proposed architectural proposed landscape plan showing the proposed new addition as the works scope. Note also, the three new proposed indigenous shrubs proposed along the eastern boundary as replacement shrubs.

- 6.3 The proposed architectural plan shows opportunity for new landscape planting along the eastern boundary in a new garden bed along with a new garden bed at the proposed new entrance to the house.
 - 6.4 The site contains one large Cabbage Tree palm (T3) which has been assessed as having a high retention value and is proposed for retention. No impact is envisaged for this palm with the proposed works.
 - 6.5 The land mapping for the property shows this site as being 40% 'landscaped open space and bushland setting'. The site is not shown as having threatened or high conservation habitat⁷, not a wildlife corridor, not with native vegetation mapped, nor as a coastal zone, not as a waterways and riparian lands, and not as biodiversity certified land⁸.
 - 6.6 The site is a flat battle-axe style lot with a detached residential dwelling and an existing swimming pool.
 - 6.7 New replacement landscape is proposed in the architectural development application package.
 - 6.8 It is recommended that the replacement shrub species along the eastern boundary in the proposed newly formed garden bed be either three Lilly Pilly (to replace the Lilly Pilly shrubs) or *Callistemon viminalis* (bottlebrush) or dwarf flowering Gums.
 - 6.9 Given the nature of the proposed works and the arrangement of the existing house to the existing garden to be retained, no tree protection fencing is proposed.
-

7 Site Photos.

All site photos were taken on the 25th February by Elke, consulting arborist during the site assessment.

⁷ <https://services.northernbeaches.nsw.gov.au/icongis/index.html>

⁸ <https://services.northernbeaches.nsw.gov.au/icongis/index.html>



Figure 5. Photo showing the entrance to the site (down battle axe handle). T8, T9 and T10 visible in background.



Figure 6. T5, 7 x Golden Cane Palms around pool zone. T6 (Lilly Pilly visible far left of photo). Photo looks towards west boundary.



Figure 7. T3, Cabbage Palm. to be retained (photo top left). Photo top right: T1, Blueberry ash to be retained.

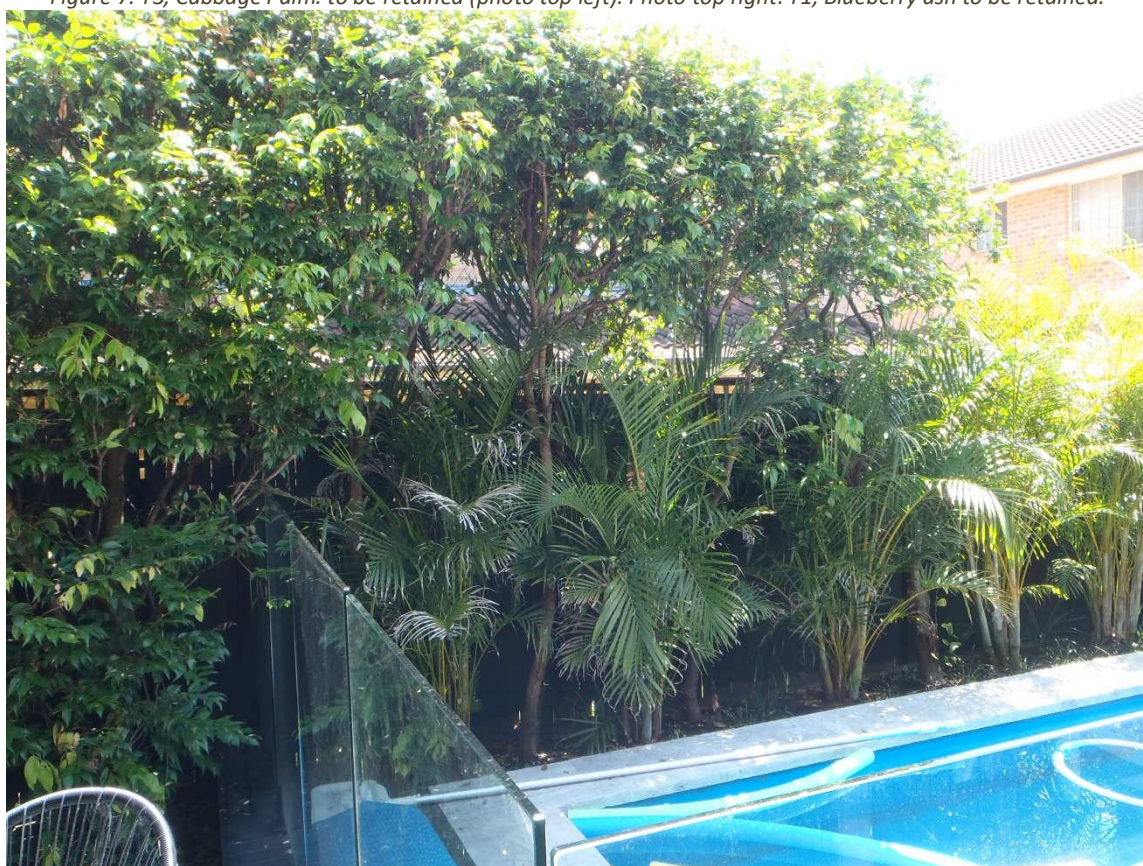


Figure 8. T6, Lilly Pilly continues along western boundary. To be retained.



Figure 9. T2: Coastal banksia. Photo looking north-northwest along west boundary. T2 to be retained.

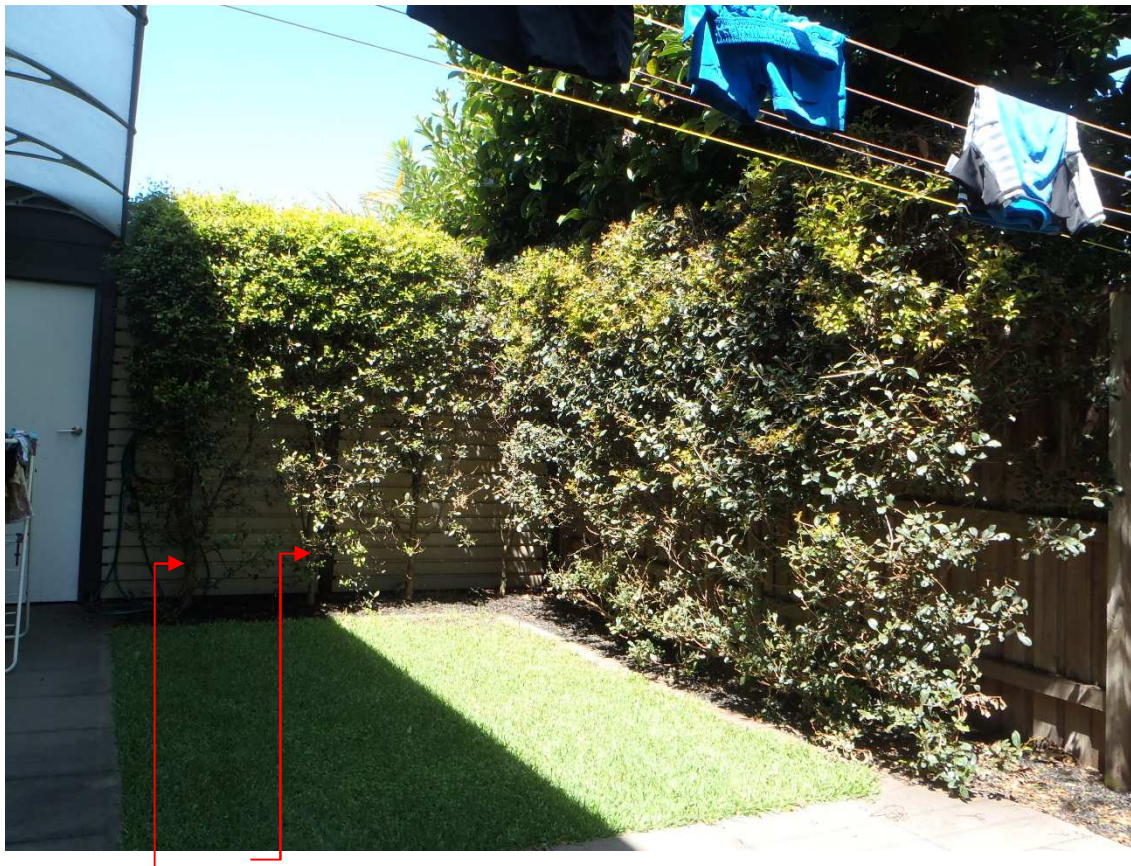


Figure 10. T7 showing the Lilly Pilly hedge (7 shrubs in total). The two shrubs on far left are proposed for removal due to proposed glass door. These 2 shrubs proposed for removal are shown approximately with the two red arrows.



Figure 11. Photo looking south with T10: two Lilly Pilly shrubs, T9: Jacaranda and T8: Cocus Palm in garden bed on left side of photo and in front of existing garage door. Note: pavement lifting of 70mm in photo just above red arrow.



Figure 12. T9 Jacaranda in photo on left. T8: Cocus Palm in photo on right.



Figure 13. Close up of wax scale and browsing on leaves to T10 (two lilly pillies) proposed for removal..

8 Discussion and Conclusion

- 8.1 The exempt trees proposed for removal theoretically could be removed without approval. With this in consideration, the proposal only really needs to consider the proposal of the removal of four Lilly Pilly shrubs which also are under the height definition of a tree, albeit they are native cultivars. Notwithstanding, three replacement plants with new garden bed are proposed. The overall outcome in my opinion is that of neutral (net zero gain/loss).
- 8.2 Overall, the proposal has little general and overall impact on the landscape generally with very minimal visual change as viewed from the street.

9 References

- *Australian Standard AS4970-2009, Protection of trees on Development Sites. Standards Australia.*
- *Australian Standard AS 4373 – 1996, Pruning of Amenity Trees, Standards Australia.*
- *Australian Standard AS 4454 – 2003, Composts, soil conditioners and mulches.*
- *Barrell, Jeremy, 1996, Pre-development Tree Assessment, SULE Categories and Sub-Categories, Proceedings of the International Conference on Trees and Building Sites (Chicago), International Society of arboriculture, Illinois, USA*
- *Barrell, J, 2009, Draft for Practical Tree AZ version 9.02 A+NZ, Barrel Tree Consultancy, Bridge House, Ringwood BH24 1EX*
- *Craul, P.J. 1985. A description of urban soils and their desired characteristics, Journal of Arboriculture 11(11):330-339.*
- *Draper and Richards, 2009, Dictionary for Managing Trees in Urban Environments, CSIRO Publishing.*
- *Leake S and Haege E, 2014, Soils for Landscape Development, Selection, Specification and Validation, CSIRO Publishing.*
- *International Society of Arboriculture, 2009, The Landscape Below Ground III, Proceedings for a Third International Workshop on Tree Root Development in Urban soils, ISA, Champaign, Illinois, USA.*
- *Mattheck C. and Breloer H., 2001, The Body Language of Trees - A handbook for failure analysis – Sixth impression (2001), The Stationery Office, London, U.K. Fig 120, Page 196.*
- *Mattheck C., and Breloer H., 2010, The Body Language of Trees – A Handbook for Failure Analysis – 11th impression, The Stationery Office (TSO), London UK*

10 Relevant Appendices

Appendix 1: Landscape Significance Rating

Refer to next page. As well this rating takes into consideration the context and relationship of the tree to its surrounds and contribution to the streetscape/site surrounds and character of the site.

Appendix 6: ISA Tree Risk Assessment

Methodology: ISA (International Society of Arboriculture, 2013)⁹. Hazard potential (Risk rating matrix)

Likelihood of Failure and Impact	Consequences of Failure			
	Negligible	Minor	Significant	Severe
Very likely	Low	Moderate	High	Extreme
Likely	Low	Moderate	High	High
Somewhat likely	Low	Low	Moderate	Moderate
Unlikely	Low	Low	Low	Low

Appendix 2: Safe Useful Life Expectancy

Refer to next page

The following worksheet template shows the categories for SULE as derived from the attached appendices.

Life expectancy (LE)				Safe Life Expectancy LE				Safe Useful Life Expectancy			Final SULE	SULE Category
Age of tree	Average Lifespan	Lifespan modified by local factors	Life expectancy	LE modified by health	structure	LE modified by location	SLE	exposure	Interference	Space for planting		
1	2	3	4	5	6	7	8	9	10	11	12	

*The SULE categories and classifications are subjective and based on the knowledge, experience and expertise of the assessor.

⁹ <http://www.isa-arbor.com/education/onlineresources/basictreeriskassessmentform.aspx>
Arboricultural Development Impact Assessment. Elke Haeger Landscape Architect and Consulting Arborist AQF 5.

Sule Categories and Sub-Categories

	1	2	3	4	5
	Long SULE:	Medium SULE:	Short SULE:	Remove:	Small, Young or regularly clipped:
	Trees that appeared to be retainable at the time of assessment for more than 40 years with and acceptable level of risk	Trees that appeared to be retainable at the time of assessment for 15 to 40 years with and acceptable level of risk	Trees that appeared to be retainable at the time of assessment for 5 to 15 years with and acceptable level of risk	Trees that should be removed within the next 5 years	Trees that can be reliably transplanted or replaced
A	Structurally sound trees located in positions that can accommodate future growth	Trees that may only live for between 15 and 40 more years	Trees that may only live for between 5 and 15 more years	Dead, dying, suppressed or declining trees through disease or inhospitable conditions	Small trees less than 5 metres in height
B	Trees that could be made suitable for retention in the long term by remedial Care	Trees that may live for more than 40 years, but would need to be removed for safety or nuisance reasons	Trees that may live for more than 15 years, but would need to be removed for safety or nuisance reasons	Dangerous trees through instability or recent loss of adjacent trees	Young trees less than 15 years old but over 5 metres in height
C	Trees of special significance for historical, commemorative or rarity reasons that would warrant extraordinary efforts to secure their long term retention	Trees that may live for more than 40 years, but should be removed to prevent interference with more suitable individuals or to provide space for new planting	Trees that may live for more than 15 years, but should be removed to prevent interference with more suitable individuals or to provide space for new planting	Dangerous trees through structural defects including cavities, decay, included bark, wounds or poor form	Trees that have been regularly pruned to artificially control growth
D		Trees that could be made suitable for retention in the medium term by remedial Care	Trees that require substantial remedial care and are only suitable for retention in the short term	Damaged trees that are clearly not safe to retain	
E				Trees that may live for more than 5 years, but should be removed to prevent interference with more suitable individuals or to provide space for new planting	
F				Trees that may cause damage to existing structures within 5 years	
G				Trees that will become dangerous after removal of other trees for reasons given in 1A-1F	

Ref: Barrell, Jeremy (1996)

Pre-development Tree Assessment

Proceedings of the International Conference on Trees and Building Sites (Chicago)

International Society of arboriculture, Illinois, USA

Appendix 3. Retention Rating

Tree retention priority. Refer to Plan 2.

	Landscape Significance Rating							
SULE	1	2	3	4	5	6	7	
Long >40yrs	High Retention Value							
Medium 15-40 years			Moderate Retention Value					
Short 5-15 yrs				Low Retention Value				
Transient <5years				Very Low Retention Value				
Dead or Hazardous								

Reference modified from: Earthscape and Couston, Mark and Howden, Melanie, 2001, Tree Retention Values table, Footprint Green Pty. Ltd., Sydney Australia

Appendix 4a. AS 4970. Development of Trees on Protection Sites:

Tree Protection Zone (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. The TPZ incorporates the structural root zone (SRZ)

Determining the TPZ

The radius of the TPZ is calculated for each tree by multiplying its DBH \times 12.

TPZ = DBH \times 12 where DBH = trunk diameter measured at 1.4 m above ground

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

A TPZ should not be less than 2 m nor greater than 15 m (except where crown protection is required). Clause 3.3 covers variations to the TPZ. The TPZ of palms, other monocots, cycads and tree ferns should not be less than 1 m outside the crown projection.

Structural Root Zone (SRZ)

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

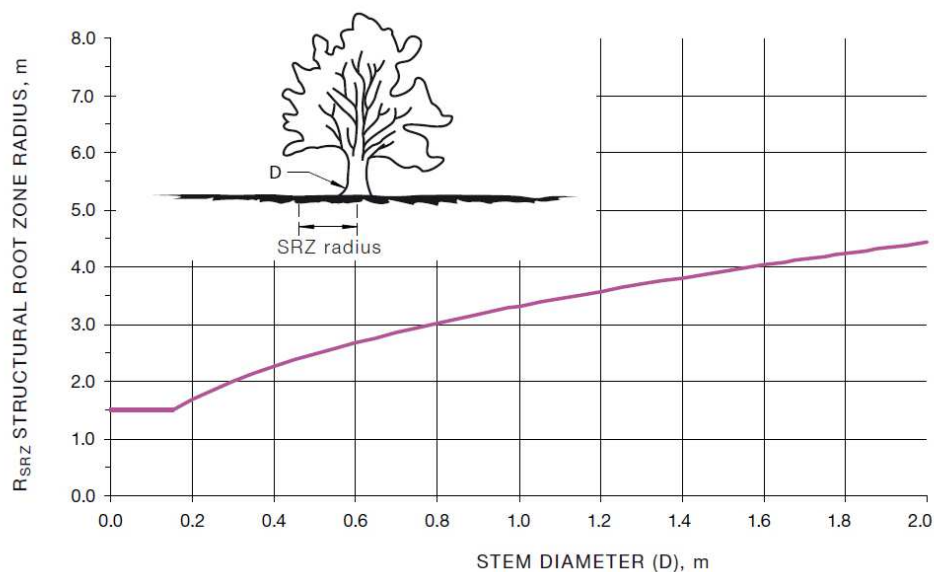
The SRZ only needs to be calculated when major encroachment into a TPZ is proposed.

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



The curve can be expressed by the following formula:
 $R_{SRZ} = (D \times 50)^{0.42} \times 0.64$

NOTES:

- 1 R_{SRZ} is the calculated structural root zone radius (SRZ radius).
- 2 D is the stem diameter measured immediately above root buttress.
- 3 The R_{SRZ} for trees less than 0.15 m diameter is 1.5 m.
- 4 The R_{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.

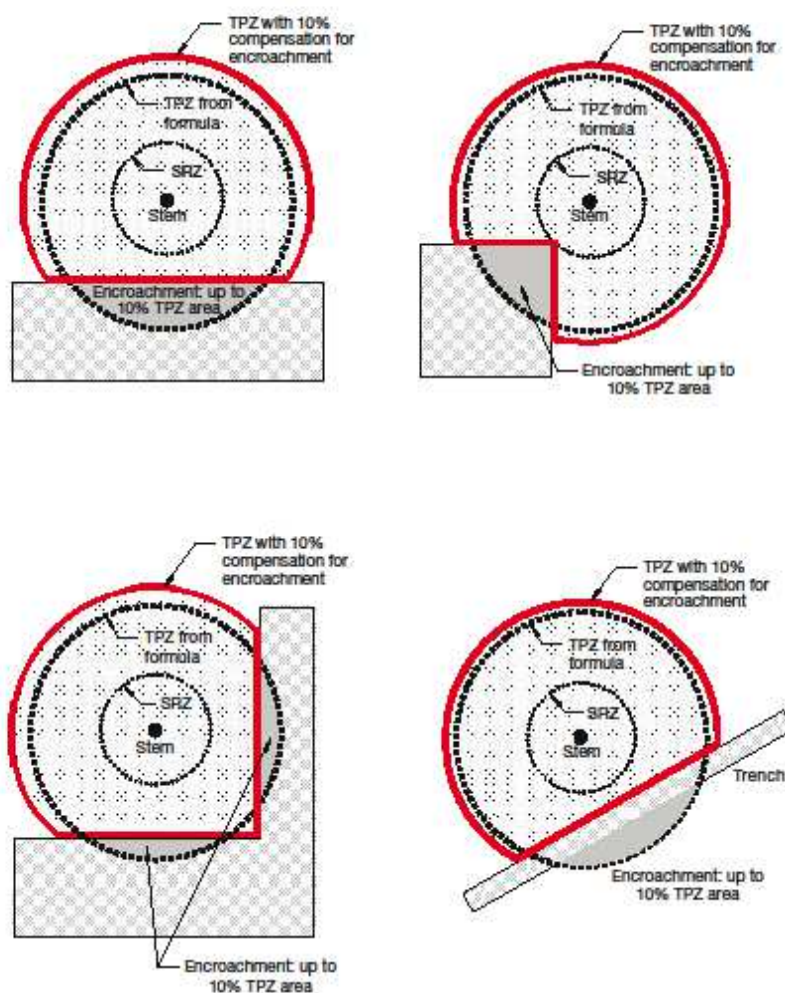
FIGURE 1 STRUCTURAL ROOT ZONE CALCULATION

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

APPENDIX D ENCROACHMENT INTO TREE PROTECTION ZONE (Informative)

Encroachment into the tree protection zone (TPZ) is sometimes unavoidable. Figure D1 provides examples of TPZ encroachment by area, to assist in reducing the impact of such incursions.



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

FIGURE D1 EXAMPLES OF MINOR ENCROACHMENT INTO TPZ

Appendix 5: Tree Retention Priorities

The following table describes the implications of the Retention Values on site layout and design. Refer to Plan 2: Tree Retention Values for direct correlations to table below.

Appendix 5

	Tree Retention Priorities
Retention Value	Recommended Action
"High"	<ul style="list-style-type: none">• These trees are considered worthy of preservation; as such careful consideration, should be given to their retention as a priority.• Proposed site design and placement of buildings and infrastructure should consider the Tree Protection Zones as discussed in the following section to minimise any adverse impact.• In addition to Tree Protection Zones, the extent of the canopy (canopy drip line) should also be considered, particularly in relation to high rise developments. Significant pruning of the trees to accommodate the building envelope or temporary scaffolding is generally not acceptable.
"Moderate"	<ul style="list-style-type: none">• The retention of these trees is desirable.• These trees should be retained as part of any proposed development if possible; however, they trees are considered less critical for retention.• If these trees must be removed, replacement planting should be considered in accordance with Council's Tree Replacement Policy to compensate for loss of amenity.
"Low"	<ul style="list-style-type: none">• These trees are not considered to worthy of any special measures to ensure their preservation, due to current health, condition or suitability. They do not have any special ecological, heritage or amenity value, or these values are substantially diminished due to their SULE.• These trees should not be considered as a constraint to the future development of the site.
"Very Low"	<ul style="list-style-type: none">• These trees are considered potentially hazardous or very poor specimens, or may be environmental or noxious weeds.• The removal of these trees is therefore recommended regardless of the implications of any proposed development.

Source: Derived from: Earthscape Horticultural Services, December 2011
