Malcolm Bruce B. A,
(MacQuarrie University)
Diploma of Arboriculture
(Ryde College)
Consultant Arborist

ABN
97 363 043 490

Phone 02 9476 6643
Mobile 0450 753 735
Email malbruce@hotmail.com

ARBORICULTURAL IMPACT ASSESSMENT FOR TREES LOCATED ON OR NEAR ON 600 WARRINGAH ROAD, FORESTVILLE

Malcolm Bruce

Contents

1. Introduction

1.1. Location of the subject site (See Figure 1)

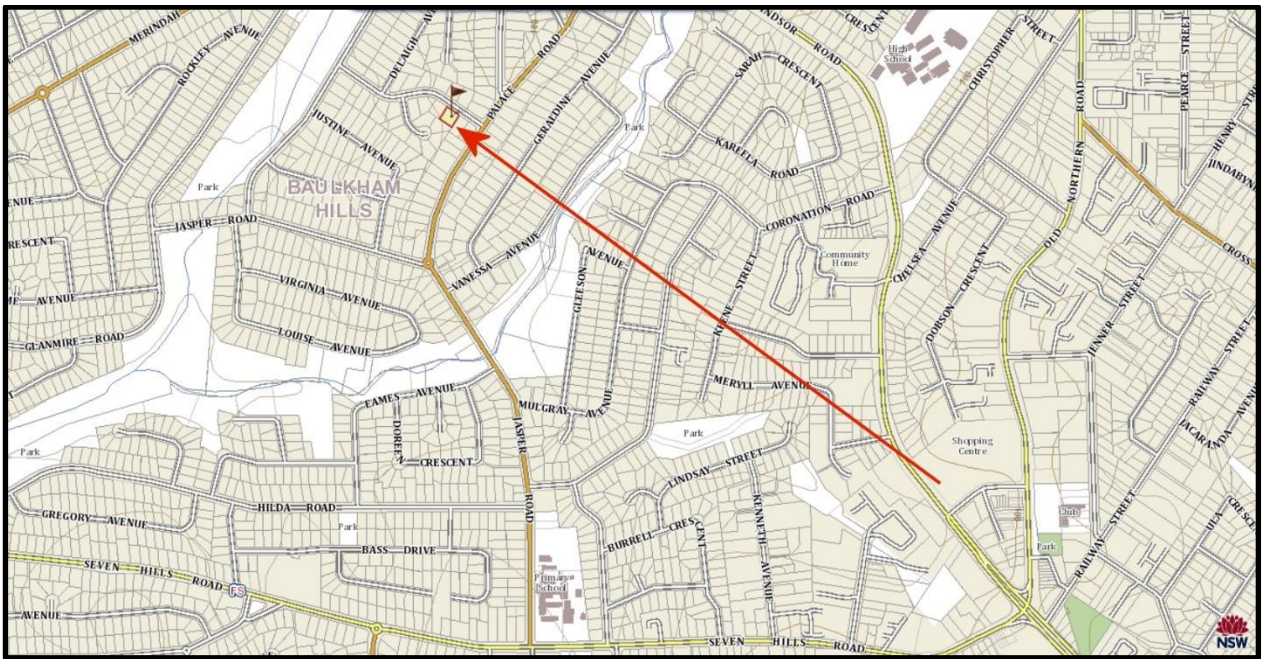

Figure 1: Location of Subject Site (From SixMaps viewed 2019)

1.2 The subject site was inspected on 5/8/2019;

1.3 This report was prepared for Clarendon Homes;

2 Aims

2.1 To examine the nominated trees and assess the trees' health, structure and environmental conditions;

2.2 To identify and describe any health, structural or environmental issues relating to the subject trees;

2.3 To assess the required Tree Protection Zone (TPZ) and Structural Root Zone (SRZ) for the trees;

2.4 To provide and recommend workable solutions to ameliorate and health, structural or environmental issue detected during the assessment process and to recommend suitable actions for the trees, if necessary.

3 Methods

3.1 The Crown Width was measured, by a laser distance measuring instrument, from the centre of the tree out to the edge of the crown along the four points of the compass, North, South, East and West;

3.2 The diameter of the trunk is measured at 1.4 metres above the soil by measuring the diameter using a diameter tape. This is the Diameter at Breast Height (DBH). (AS 4970-2009). Additionally, the diameter of the trunk at above the start of the root buttress is measured using a diameter tape. This Root Buttress Diameter (RBD) is for the calculation of the Structural Root Zone or Root Plate;

3.3 The height was calculated by multiplying the percentage angle, measured by a Suunto Inclinometer, by a distance from the tree, measured by a laser distance measuring instrument;

3.4 Tree Protection Zone (TPZ) is the principal means for protecting trees on development sites. It is an area isolated from the construction disturbance so that the tree remains viable.

The TPZ is calculated using the formula: -

TPZ = DBH (diameter at breast height) *x* 12

Where multiple trunks the DBH is calculated as:-

$$DBH = \sqrt{(DBH_1)^2 + (DBH_2)^2 + \text{+++} \;\; \text{++++} (DBH_x)^2}$$

The TPZ is the above formula expressed in terms of a radius from the trunk of the tree. For palms the TPZ is Crown Width plus 2 metres (From AS 4970-2009);

3.5 The Structural Root Zone (SRZ) is the area required for tree stability.

Structural Root Zone (SRZ) is calculated using the formula: -

SRA Radius = $(RBD \times 50)^{0.42} \times 0.64$

The SRA expressed in terms of a radius from the trunk of the tree. (From AS 4970-2009);

3.6 Health of the trunk and branches was assessed by examination for insect and pathogen invasion, scarring, bark splitting and excess shedding, death of major branches and known structural weakness indicators, using the Visual

Tree Assessment Method (VTA) to Stage 1, which includes use of a sounding (acoustic) hammer. (Mattheck & Breloer 1994, pp. 12–13, 145). No internal examination of any trees was conducted;

3.7 Crown Health was assessed by examination for excessive leaf drop, sparse crowing, small and medium branch death, yellow or discolouration of the leaves and insect and pathogen invasion of the leaves. Additionally, Crown Health was assigned a number based on comparison with illustrations in Figure 2: Crown Health Assessment. Within this comparison system the lower the number the better the health of the tree's crown. The assessed number has can be found in Table 3;

3.8 Soil compaction was arbitrarily assessed by pushing a 200mm flat bladed screwdriver into the soil;

3.9 The tree assessment has been conducted using the SULE method (Barrel 2001) (See Table 1);

3.10 The slenderness ratio is calculated by dividing height by the root buttress diameter (Mattheck 2007, P. 4)

3.11 Size of the impact has been calculated using the devise located in http://www.proofsafe.com.au/tpz_incursion_calculator.html

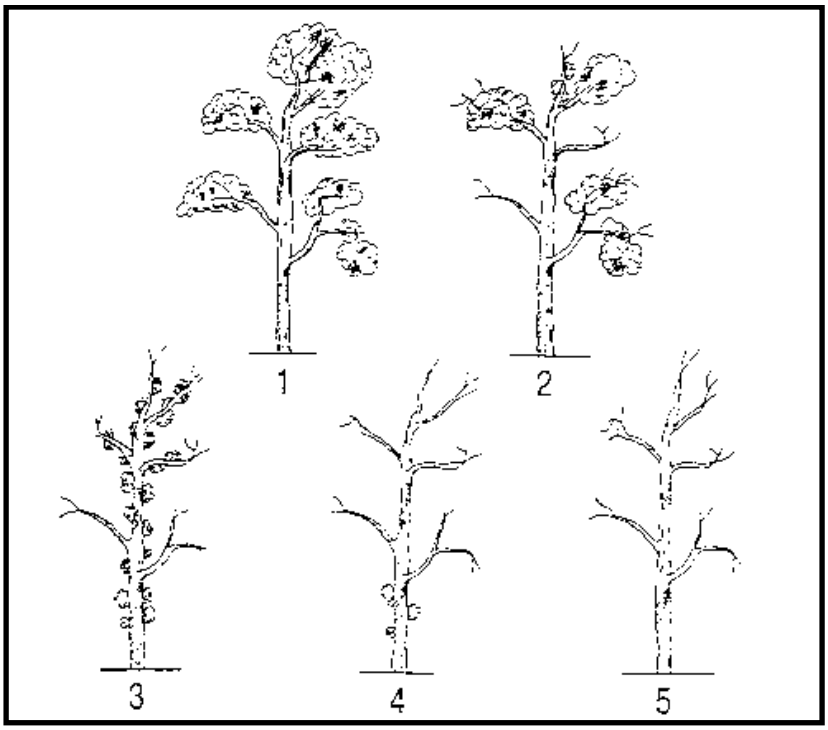

Figure 2: Crown Health Assessment

Table 1: SULE Table (After Barrel 2001)

	1	2	3	4	5
	Long:	**Medium:**	**Short:**	**Remove**	**Small, Young or Regularly Pruned**
	Trees that appeared to be retainable at the time of assessment for more than 40 years with an acceptable level of risk	**Trees that appeared to be retainable at the time of assessment for 15–40 years with an acceptable level of risk**	**Trees that appeared to be retainable at the time of assessment for 5–15 years with an acceptable level of risk**	**Trees which should be removed in the next 5 years**	**Tree that can be reliably removed moved or replaced**
A	Structurally sound trees in positions that can accommodate future growth	Trees which may only live between 15 and 40 years.	Trees which may only live between 5 and 15 years.	Dead, dying, suppressed or declining trees because of disease or inhospitable conditions	Small trees less than 5m in height
B	Trees which could be made suitable for long-term retention by remedial care	Tree which may live for more than 40 years but would be removed for safety or nuisance reasons	Trees which may live for more than 15 years but would be removed for safety or nuisance reasons.	Dangerous trees because of instability or recent loss of adjacent trees	Young trees less than 15 years old but over 5m 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 which may live for more than 40 years but would be removed to prevent interference with more suitable individuals or to provide space for new planting	Trees which may live for more than 15 years but would be removed to prevent interference with more suitable individuals or to provide space for new planting	Dangerous trees because of structural defects including cavities, decay, included bark, wounds or poor form	Formal hedges and trees intended for regular pruning to artificially control growth
D		Trees which could be made suitable for retention in the medium term by remedial care	Trees which require substantial remedial tree care and are only suitable for retention in the short term	Damaged trees that are clearly not safe to retain	Damaged trees that are clearly not safe to retain
E				Trees that could live for more than 5 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting	Trees that could live for more than 5 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting
F					Trees that are damaging or may cause damage to existing structures within 5 years
G					Trees that will become dangerous after removal of other trees for the reasons given in (a) to (f)
H					Trees in categories (a) to (g) that have a high wildlife habitat value and, with appropriate treatment, could be retained subject to regular review

4 Observations

4.1 Results

Table 2: Tree Data and TPZ and other Calculations

No	Scientific Name	Common Name	Estimate Age(years)	Tree Height (metres)	Crown Width (Metres)				Trunk Diameter (metres)	Calculated TPZ radius	Root Buttress Diameter	Calculated SRA radius
					N	S	E	W				
1	*Magnolia (Michelia) figo*	Port Wine Magnolia	40 Plus Years	5.4	1.36	1.35	2.63	2.29	0.12 0.13 0.1	2.4	0.42	2.3
2	*Pittosporum undulatum*	Native Frangipani	40 plus years	5.4	2.66	1.53	0.86	2.30	0.22	2.6	0.39	2.2
3	*Ligustrum lucidum*	Broad-leafed Privet	Exempt species and scheduled as priority weed under the Biosecurity Act 2015									
4	*Ligustrum sinense*	Small-leafed Privet	Exempt species and scheduled as priority weed under the Biosecurity Act 2015									
5	*Angophora costata*	Sydney red Gum	90 Plus Years	17.7	7.79	10.31	6.09	7.01	0.96 0.48	12.9	0.9	3.2

Table 3: Tree Health Assessment

No	Scientific Name	Common Name	Trunk and Branch Health	Crown Health	Crown health Assessment Code	Overall Health	SULE Rating	Observed Issues
1	*Magnolia (Michelia) figo*	Port Wine Magnolia	Poor	Fair	1	Fair	4C	Multiple trunks, less than 2metres from existing structure
2	*Pittosporum undulatum*	Native Frangipani	Poor	Poor	1	Poor	4C	Decay in trunk, crown dying
3	*Ligustrum lucidum*	Broad-leafed Privet	Exempt species and scheduled as priority weed under the Biosecurity Act 2015					
4	*Ligustrum sinense*	Small-leafed Privet	Exempt species and scheduled as priority weed under the Biosecurity Act 2015					
5	*Angophora costata*	Sydney red Gum	Good	Fair	1	Good	1A	On an adjoining allotment

4.2 Location of Tree

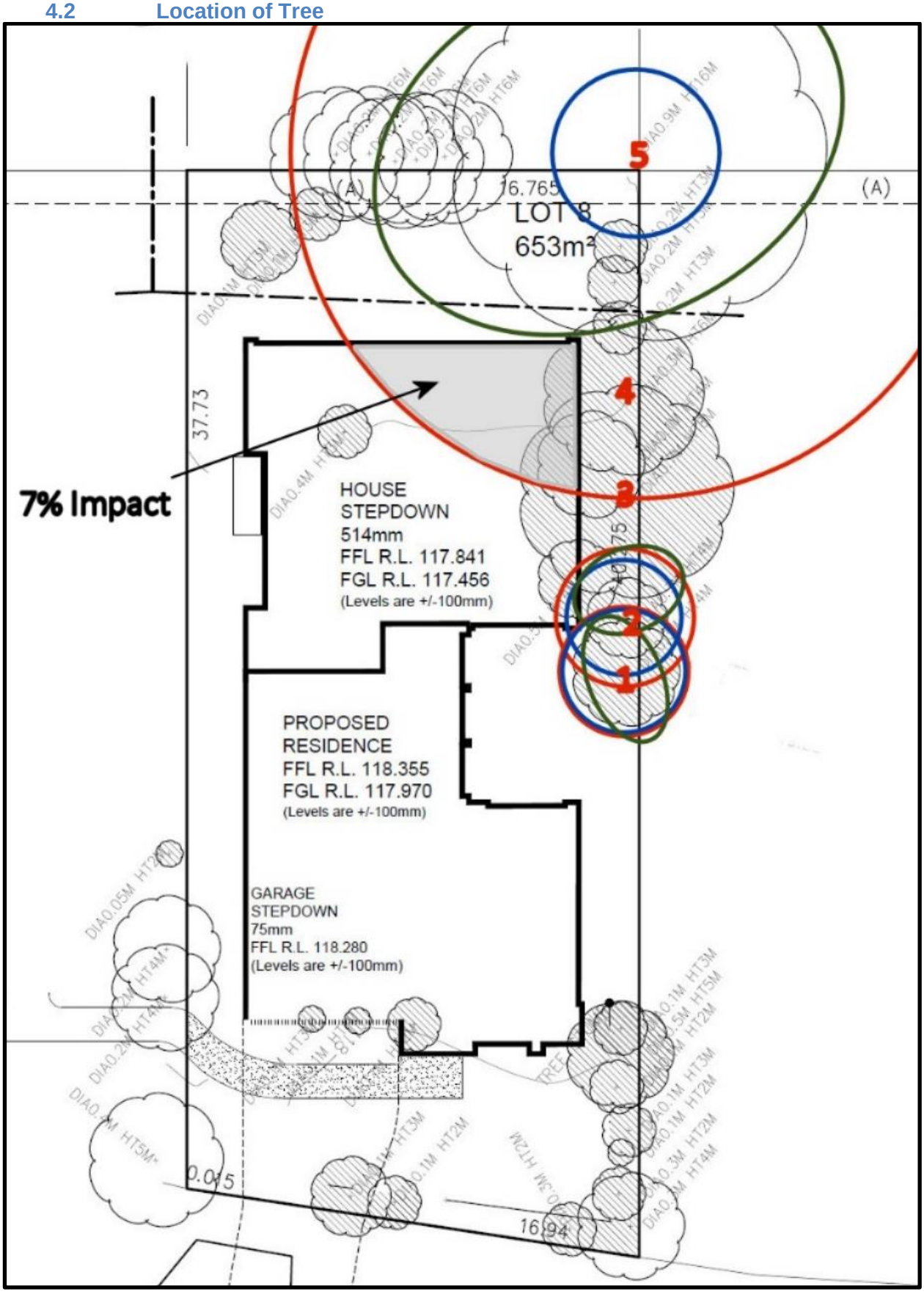

Figure 3: Position of the tree with calculated Tree Protection Zone outlined in red, the calculated Structural Root Zone outlined in blue and the crown limits in green, Scale 1:200. From Site Plan of 600 Warringah Road, Forestville, by Clarendon Homes dated 9/5/2019

5 Observations and Discussion of the Tree and Environment

5.1 Tree 1 is a multi-trunk *Magnolia (Michelia) figo* (Port-wine Magnolia). The tree has developed from several epicormic shoots, arising from near the base of the trunk, suggesting that the original leader was damaged or removed. (See Figure 4) The Port-wine Magnolia has developed a compression fork at the junction of the two codominant trunks. Mattheck (2007) P.131, describes this formation as a “low-level compression fork. This formation has a high chance of failure. Additionally, the tree is growing 1.89 metres from the existing structure. (See Figure 5) Northern Beaches Council (2019) sates that trees within 2 metres of such a structure can be removed without a permit;

Figure 4: Showing base of Tree1

Figure 5: Showing distance between existing structure and Tree 1

5.2 Tree 2 is an overly mature *Pittosporum undulatum* (Native Frangipani). This tree appears to have entered the “mortality spiral” (Harris et al 2004). The trunk is decaying and the majority of the crown has died. (See Figure 6 and Figure 7) This tree should be removed;

Figure 6: Showing declining and dead crown of Tree 2

Figure 7: Showing decaying trunk, Tree 2

5.3 Trees 3 and 4 are a *Ligustrum lucidum* (Broad-leafed Privet) and a *Ligustrum sinense* (Small-leafed Privet) both are listed as exempt species by Northern Beaches Council and can be removed without a permit. (Northern Beached 2017) Further, both species are scheduled as Priority Weeds for NSW under the Biosecurity Act (2015) (DPI 2017a and DPI 2017b). Both trees should be removed;

5.4 Tree 5 is mature *Angophora costata* (Sydney Red Gum). (See Figure 8) This tree is growing on the adjoining allotment, 11 Walkom Avenue. The tree is present in the Sixmaps' 1943 Aerial Photographs (Sixmaps 2019). The tree has a large calculated Tree Protection Zone (TPZ). The current proposal (dwelling) will impact on 7% of Tree 5's TPZ. (See Figure 3) This impact is acceptable and the project could proceed with this impact. A better option would be to move the house forward by 2 metres but this has the potential to increase traffic noise in the proposed residence. However, additional protection provisions will be required to ensure that impact does not become greater than 7%. This will require protection of the non-impacted TPZ with wood chip, rumble boards and fencing. This will be outlined in the Recommendations.

Figure 8: Tree 5

6 Recommendation

6.1 Trees 1 to 4 should be removed;

6.2 A tree protection fence should be erected two (2) metres from the position of the proposed external wall of the dwelling. The area between the proposed wall and the tree protection fence must be covered in 100mm of composted hardwood woodchip, which must then be covered in rumble boards or equivalent, as showing in Figure 9;

6.2.1 Tree Protection Zones within the Tree Protection Fences are where activities are restricted. These activities are listed in Australian Standard AS4970-2009, *Protection of trees on development sites* and include but are not limited to storage of fill, spoil, construction materials or machinery and disposal of any liquid or solid wastes. The Tree Protection Fences must be constructed using 1.8 metre high chain wire fences. Fences are to be mounted on 50mm galvanized Iron posts, mounted on concrete feet and at no more than 3 metres apart. Tree fences shall be erected before any demolition, grading, or construction begins and remain until final inspection of the site. “Warning” signs shall be prominently displayed on the protective fence. The sign shall be

a state the following: **TREE PROTECTION ZONE -This fence shall not be removed;**

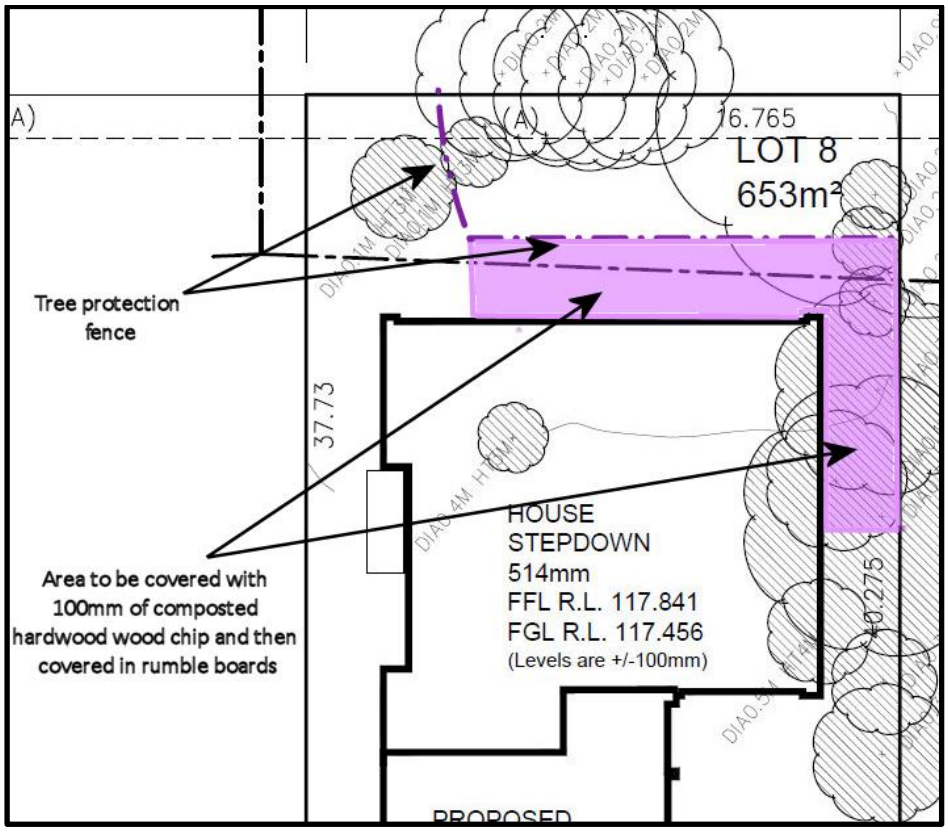

Figure 9: Showing position of tree protection fence, purple dashed line, and the area to cover in woodchip and rumble boards, shade in purple. Scale 1/200. From Site Plan of 600 Warringah Road, Forestville, by Clarendon Homes dated 9/5/2019

Malcolm Bruce

B.A. (MacQuarie) Land Management

Diploma of Arboriculture (Distinction) (Ryde TAFE) (AQF 5 Arborist)

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