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# ARBORICULTURAL OPINION

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## PROPOSED SUBDIVISION of 31 BELLARA AVENUE NORTH NARRABEEN

Prepared  
for

**Mr Eric Sanderson  
C/- CMS Surveyors Pty Ltd  
2/99A South Creek Road, Dee Why, NSW**

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Statement prepared by Catriona Mackenzie

**28 July 2019**

1. My name is Catriona Mackenzie. I own and operate an arboricultural and landscape design consulting business called Urban Forestry Australia. I am a qualified arboriculturist. My curriculum vitae is attached at Annexure A.
2. I have been engaged by the owner of 31 Bellara Avenue North Narrabeen ('the site') to review the preliminary arborist report and proposed subdivision plans, attend the site to confirm species identification and assessment impacts, and provide an opinion on the outcome of the proposed building and driveway footprints on tree retention.
3. I have prepared this report in full knowledge that it may be used as evidence in the Land and Environment Court of New South Wales (the Court). I have read Division 2 of Pt 31 of the Uniform Civil Procedure Rules 2005 (UCPR) and the Expert Witness Code of Conduct in Schedule 7 of the UCPR and agree to be bound by these provisions. I accept that my duty is to the Court.
4. I have referred to the following material in preparation of this report:
  - Survey Plan of Proposed Subdivision, Issue 4, prepared by CMS Surveyors, dated 25 March 2019.
  - Plans 1 – 6, by Raise the Roof, dated 16 April 2019
  - Preliminary Tree Assessment prepared by Owen Tebbutt of Plateau Tree Services ('Tree Report'), dated 27 June 2018
  - Arboricultural Comment by Owen Tebbutt of Plateau Trees, dated 19 July 2018
  - SRV Vehicle Manoeuvring Path by Terraffic Pty Ltd
  - Australian Standard 4970-2009 Protection of trees on development sites (AS4970)
5. In preparing this report I have also included the following annexures:
  - A. Curriculum vitae of Catriona Mackenzie
  - B. STARS – A system for determining the Retention Value (RV) of Trees.
  - C. Tree Plan including tree RV's, built footprints, proposed tree removals and drainage line.
6. At my site inspections on 13 March and 2 April 2019, I placed silver metal identifier tags on those trees identified as High Retention Value (RV) trees and blue metal tags on those identified as Medium RV trees. in accordance with the Tree Report.
7. At page 3 of the Tree Report a table of the Retention Value (RV) of each assessed tree (56 in total) is provided.

**Table from page 3 of Tree Report**

<b>Dead/dying trees or noxious weed species</b>	<b>Trees with low retention value</b>	<b>Trees with medium retention value</b>	<b>Trees with high retention value</b>	<b>Trees that may be transplanted</b>
5, 20, 33, 52	1, 2, 3, 4, 6, 7, 8, 10, 17, 23, 24, 39, 48, 56	6, 9, 13, 22, 25, 28, 29, 30, 35, 36, 37, 40, 41, 42, 44, 46, 49, 50, 51, 53, 54, 55	11, 12, 14, 15, 16, 18, 19, 26, 27, 31, 34, 38, 43, 45	21, 32, 47,

8. Based on my on-site assessments and, using the same STARS system as the author of the Tree Report for determining the RV of trees, I have found some differences that affect the RV of some of the assessed trees. My comments in Table 1 below shown as in columns headed 'CM'.

**Table 1 – Amended Retention Value of trees following site inspections.**

Tree No.	Tree species	Tree Report RV	CM's RV	CM's reason for disagreement with Tree Report
6	<i>Brachychiton acerifolius</i> <b>Illawarra Flame Tree</b>	M	L	This species is exempt from protection, i.e. <i>species is suitable for removal without consent unless identified as a Heritage item or within a Heritage area.</i>
12	<i>Eucalyptus punctata</i> <b>Grey Gum</b>	H	M	Medium at best. Not high landscape significance and small, young tree with suppressed crown.
14	<i>Angophora costata</i> <b>Smooth-barked Apple</b>	H	M	Medium at best. Overtopped, spindly, suppressed with crown bias to the north/northwest
15	<i>Corymbia maculata</i> <b>Spotted Gum</b>	H	M	Overtopped, poorly form stem.
19	<i>Eucalyptus sideroxylon</i> <b>Mugga Ironbark</b>	H	L	Is not Mugga Ironbark, but <i>Eucalyptus paniculata</i> (Grey Ironbark) Has substantial damage to mid stem area with bark popping, kinking, wounding, etc. Not suitable for retention near a dwelling.
20	Dead Pittosporum (identified by CM as <i>Glochidion ferdinandi</i> – <b>Cheese Tree</b> )	L	M	Slightly suppressed. No special problems visibly apparent at time of inspection.
29	<i>Myrsine howittiana</i> syn. <i>Rapanea howittiana</i> <b>Brush Muttonwood</b>	M	H	This is a good specimen. No special problems visibly apparent at time of inspection.
34	<i>Angophora costata</i> <b>Smooth-barked Apple</b>	H	L-M	Appears to be in affected by <i>Armillaria</i> , although likely to be in early stages due to generally vigorous crown. Tree Report shows image of fruiting bodies (mushrooms) in buttress root sinus at base of tree. <i>Armillaria</i> is a root-rot disease with no known successful treatment.
35	<i>Eucalyptus umbra</i> <b>Broad-leaved White Mahogany</b>	M-H	H	Prominent tree with generally good vigour and form. Identified in Tree Report as Turpentine.
45	<i>Eucalyptus botryoides</i> <b>Bangalay</b>	H	M	Heavily suppressed with epicormics, etc.
48	<i>Allocasuarina littoralis</i> <b>Black She-oak</b>	M	L	One stem dead, bracket fungi in living stems, dead, broken limbs.

9. The table below is a result of my tree assessments and using the Institute of Australian Consulting Arboriculturists STARS system for determining the RV of trees.

**Table 2 – RV of all assessed trees.**

Retention Value	Tree No	Trees proposed to be removed
<b>Low</b>	1, 2, 3, 4, 5, 6, 7, 8,10, 17, 19, 23, 24, 33, 36, 39, 48, 52, 56 (19 trees)	7, 8, 10, 19, 23, 33, 34 (7 trees)
<b>Medium</b>	9, 12, 13, 14, 15, 20, 22, 28, 30, 36, 37, 40, 41, 42, 43, 44, 45, 46, 49, 50, 51, 53, 54, 55 (24 trees)	9, 12, 13, 14, 20, 22, 30, 36, 37 (9 trees)
<b>High</b>	11, 16, 18, 26, 27, 29, 31, 35, 38, 43 (10 trees)	35 (1 tree)
<b>Palms</b>	21, 32, 47 (3 palms)	32 (1 palm)

10. A total of 18 of the fifty-six assessed trees would be removed, one of which is a High RV tree (T35). This tree stands in the proposed vehicle turning area at the end of Bellara Avenue. I understand this turning area must be constructed to satisfy Council's Traffic Officers in providing a turning bay for the use of other residents in Bellara Avenue, my client having agreed at a "non-prejudice meeting" to provide part of his land for this purpose.
11. The original plans provided to me indicated a higher number of tree removals would have occurred as the internal driveway was too close to a High RV adjoining tree (T31) and a Medium RV tree on the site. As a result of advice and re-design, the driveway allows for retention of both trees.
12. The indicative building footprint includes an area where excavation would occur at the northeast corner affecting Trees 7, 8, 9 and 10. The excavation does not extend across the northwest area where the large rock outcrop and High RV tree 11 are located. Tree 11 is at RL35.11; the proposed upper floor level is around RL38.90
13. It appears quite possible that support footings can be placed outside the tree's Structural Root Zone (SRZ) and its 7.8m radius Tree Protection Zone (TPZ) will be outside the proposed excavation.
14. High RV trees 16 and 29 are close to the indicative building, however the proposed building will be fully elevated with only isolated footings occurring within the root zones. It is possible these footings may have to be located within the SRZ of either or both trees. Hand digging will be required to identify the locations for footings, however, the actual TPZ encroachments will be minimal. Detailed recommendations can be incorporated into a Tree Protection Plan for the management of trees prior to construction.
15. The indicative driveway is approximately 3.4m from the centre of High RV tree 27. This is outside the tree's notional 2.5m SRZ radius and the TPZ encroachment represents approximately 5.3m<sup>2</sup> or 7.3% of the tree's 72m<sup>2</sup> TPZ area. This is a minor encroachment under AS4970 and is quite supportable from an arboricultural perspective.
16. The indicative driveway is approximately 3m from the centre of High RV tree 31, on the adjoining property. This is outside the tree's notional 2.2m SRZ radius and the TPZ encroachment represents approximately 2.4m<sup>2</sup> or 5% of the tree's 41m<sup>2</sup> TPZ area. This is a minor encroachment under AS4970 and is quite supportable from an arboricultural perspective.
17. The indicative driveway is approximately 4.6m from the centre of Medium RV tree 40. This is outside the tree's notional 2.8m SRZ radius and the TPZ encroachment represents approximately 4.5m<sup>2</sup> or 3.2% of the tree's 137m<sup>2</sup> TPZ area. This is a minor encroachment under AS4970 and is quite supportable from an arboricultural perspective.
18. Due to the existing tree density, most of the upper canopy trees have high crowns that are well above the roof height of the indicative building. Pruning of trees is unlikely, although there may be some lower limbs requiring removal or reduction to clear the building line.
19. In regard to the draining of stormwater runoff from the proposed building to the street, and from an arboricultural perspective, please refer to the Tree Plan, Annexure C, for the proposed pipeline location.

## CONCLUSIONS AND RECOMMENDATIONS

20. One High RV tree would require removal to accommodate the required turning head at the end of Bellara Avenue.
21. The estimated tree removal for the indicative building and driveway footprints consists of 1 x palm (tree 32), 9 x Medium RV trees (Trees 9, 12, 13, 14, 20, 22, 30, 36 and 37), and 7 x Low RV trees (Trees 7, 8, 10, 19, 23, 33, 36).
22. If the proposed subdivision is approved, a Tree Protection Plan (TPP) should be prepared for Construction Certificate. The TPP must include tree and site specific protection measures to ensure those trees to be retained are managed appropriate during site construction activities, including locations for stockpiling and ground protection devices.

Catriona Mackenzie



## **ANNEXURE A**

### **Curriculum vitae**

## **CURRICULUM VITAE – Catriona Mackenzie**

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### **Academic Qualifications:**

**2014** ISA Tree Risk Assessment Qualification (TRAQ)

**2003 –2004** Diploma of Horticulture (Arboriculture) AQF5 Ryde TAFE. *Distinction*

**1998 – 2000** Associate Diploma of Applied Science (Landscape Design) at Ryde TAFE. *Distinction*

**1983 – 1985** Certificate of Horticulture, Ryde School of Horticulture, Ryde TAFE. *Honours*

### **Current Professional Memberships:**

Member of the Australian Institute of Horticulture

Member of the International Society of Arboriculture

Founding, Accredited Member and past President (2013–2016) of the Institute of Australian Consulting Arboriculturists.

### **Background:**

Catriona Mackenzie has been involved in the horticultural, landscape design and arboricultural industry since 1981. Catriona has always maintained a 'hands-on' approach to her landscape and arboricultural projects from the initial stages of design through to managing the landscape and the protection of significant trees and vegetation. Her experience with managing long term landscapes comes from her own landscape design and management business, which she operated for 10 years from 1989 to 2000. Her experience in the arboricultural field encompasses a wide range of tree related work including employment in Local Government (i.e. former Warringah, and Pittwater Councils) and established arboricultural contracting/consulting firms, and as principal consultant for an established arboricultural consulting business (Urban Forestry Australia). Ms. Mackenzie has also worked as a part time teacher at Ryde TAFE, teaching arboricultural and landscape subjects, i.e. Laws and Regulations, Site Grading, Landscape Graphics, and some relief teaching in Protection of Trees on Construction Sites.

Ms. Mackenzie routinely attends the Arboriculture conferences held in Australia each year and attends the TREENET symposiums held in Adelaide each September. She has attended various seminars and workshops over the past years relating to the arboricultural and landscape professions. Ms. Mackenzie continues to contribute time and effort to the profession and practice of arboriculture and landscape design and is a former President of the Institute of Australian Consulting Arboriculturists.

### **Professional Experience 1981 – 2019**

#### **Works include:**

Arboricultural, horticultural and landscape heritage assessments.

Landscape plans, specifications and documentation for development applications.

Landscape amenity assessments and sustainability plans.

Development Assessments.

Protection and preservation of trees on construction sites.

Risk and Hazard Assessments.

Tree Valuations. Tree auditing and tree management programs.

Plans of Management for city parks.

Consultancy to private, commercial, religious and educational organizations, state and local government bodies.

#### **Expert Witness**

Class 1 Proceedings

Class 2 Proceedings

Class 3 Proceedings

Class 4 Proceedings

District Court

Local Court

New South Wales Coroner's Court

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## **ANNEXURE B**

### **STARS – Significance of a Tree, Assessment Rating System**



## Part 1 of 3—Useful Life Expectancy (ULE)

In a planning context, the time a tree can expect to be usefully retained is the most important long-term consideration. ULE i.e. a system designed to classify trees into a number of categories so that information regarding tree retention can be concisely communicated in a non-technical manner. ULE categories are easily verifiable by experienced personnel without great disparity.

A tree's ULE category is the life expectancy of the tree modified first by its age, health, condition, safety and location (to give the life expectancy); then by economics (i.e. cost of maintenance - retaining trees at an excessive management cost is not normally acceptable); and finally, effects on better trees, and sustained amenity (i.e. establishing a range of age classes in a local population).

ULE assessments are not static but may be modified as dictated by changes in tree health and environment. Trees with a short ULE may at present be making a contribution to the landscape, but their value to the local amenity will decrease rapidly towards the end of this period, prior to them being removed for safety or aesthetic reasons.

**ULE categories (modified from Barrell 2001)** The five categories and their sub-groups are as follows:

- 1. Long ULE** - tree appeared retainable at the time of assessment for over 40 years with an acceptable degree of risk, assuming reasonable maintenance:
  - A. structurally sound trees located in positions that can accommodate future growth
  - B. trees which could be made suitable for long term retention by remedial care
  - C. trees of special significance which would warrant extraordinary efforts to secure their long term retention
- 2. Medium ULE** - tree appeared to be retainable at the time of assessment for 15 to 40 years with an acceptable degree of risk, assuming reasonable maintenance:
  - A. trees which may only live from 15 to 40 years
  - B. trees which may live for more than 40 years but would be removed for safety or nuisance reasons
  - C. 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
  - D. trees which could be made suitable for retention in the medium term by remedial care
- 3. Short ULE** - tree appeared to be retainable at the time of assessment for 5 to 15 years with an acceptable degree of risk, assuming reasonable maintenance:
  - A. trees which may only live from 5 to 15 years
  - B. trees which may live for more than 15 years but would be removed for safety or nuisance reasons
  - C. 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
  - D. trees which require substantial remediation and are only suitable for retention in the short term
- 4. Removal** - trees which should be removed within the next 5 years.
  - A. dead, dying, suppressed or declining trees because of disease or inhospitable conditions.
  - B. dangerous trees through instability or recent loss of adjacent trees
  - C. dangerous trees because of structural defects including cavities, decay, included bark, wounds or poor form.
  - D. damaged trees that are clearly not safe to retain.
  - E. trees which may live for more than 5 years but would be removed to prevent interference with more suitable individuals or to provide space for new planting.
  - F. trees which are damaging or may cause damage to existing structures within the next 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.
- 5. Small, young or regularly pruned** - Trees that can be reliably moved or replaced.
  - A. small trees less than 5m in height.
  - B. young trees less than 15 years old but over 5m in height.
  - C. formal hedges and trees intended for regular pruning to artificially control growth

## Part 2 of 3—IACA Significance of a Tree, Assessment Rating System (STARS)©

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.

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.



### Tree Significance - Assessment Criteria

<b>1. HIGH SIGNIFICANCE IN LANDSCAPE</b>
The tree is in good condition and good vigour
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 <i>in situ</i> - tree is appropriate to the site conditions
<b>2. MEDIUM SIGNIFICANCE IN LANDSCAPE</b>
The tree is in fair-good condition and good or low vigour
The tree has a form typical or atypical for the species
The tree is a planted locally indigenous or a common species with its taxa commonly planted in the 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 and/or below ground influences, reducing its ability to reach dimensions typical for the taxa <i>in situ</i> .
<b>3. LOW SIGNIFICANCE IN LANDSCAPE</b>
The tree is in fair-poor condition and good or low vigour
The tree has a form atypical for 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 <i>in situ</i> - 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.
<b>Environmental Pest / Noxious Weed Species</b>
-The tree is an Environmental Pest Species due to its invasiveness or poisonous/ allergenic properties
-The tree is a declared noxious weed by legislation
<b>Hazardous/Irreversible Decline</b>
-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.

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

In the development of this document IACA acknowledges the contribution and original concept of the Tree Significance & Retention Value Matrix, developed by Footprint Green Pty Ltd and Andrew Morton in June 2001.

### Part 3 of 3—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	[Vertical lines]						[Horizontal lines]		[White]		[Grey]
	2. Medium 15–40 years	[Vertical lines]			[Horizontal lines]			[White]		[White]		[Grey]
	3. Short <1–15 years	[White]			[White]			[White]		[White]		[Grey]
	Dead	[White]			[Grey]			[White]		[White]		[Grey]
LEGEND FOR MATRIX ASSESSMENT												
[Vertical lines]		<b>Priority for Retention (High)</b> -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 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.										
[Horizontal lines]		<b>Consider for Retention (Medium)</b> -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.										
[White]		<b>Consider for Removal (Low)</b> -These trees are not considered important for retention, nor require special works or design modification to be implemented for their retention.										
[Grey]		<b>Consider for Removal (Low)</b> -These trees are not considered important for retention, nor require special works or design modification to be implemented for their retention.										



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

#### REFERENCES

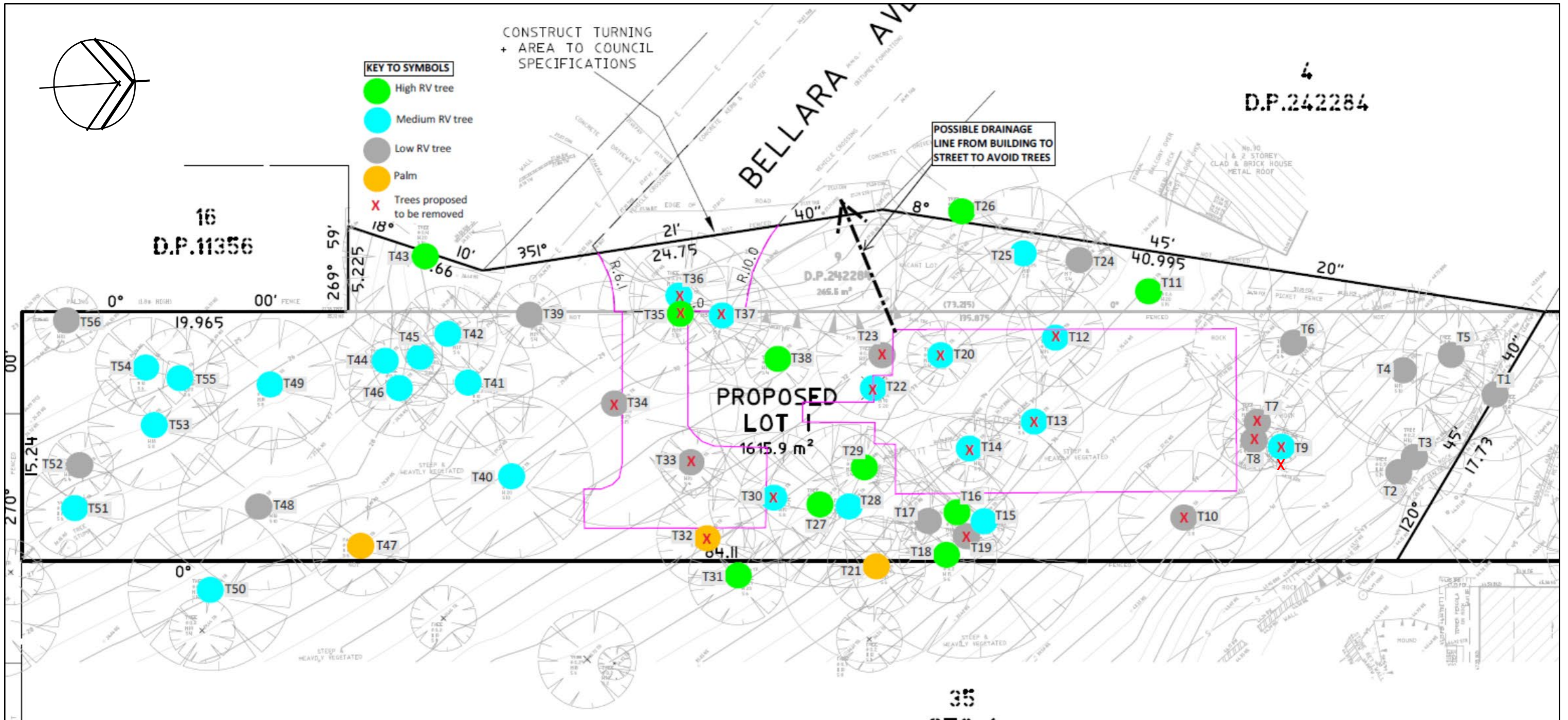
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Draper BD and Richards PA 2009, *Dictionary for Managing Trees in Urban Environments*, Institute of Australian Consulting Arboriculturists (IACA), CSIRO Publishing, Collingwood, Victoria, Australia.

Footprint Green Pty Ltd 2001, *Footprint Green Tree Significance & Retention Value Matrix*, Avalon, NSW Australia, [www.footprintgreen.com.au](http://www.footprintgreen.com.au)

## **ANNEXURE C**

### **TREE PLAN**



**TREE PLAN** showing tree Retention Values (as amended by Catriona Mackenzie following site visits and tree assessments), and those trees proposed to be removed. The indicative driveway and building footprints are shown as pink outlines on the above plan.

Source: Excerpt of Survey Plan prepared by CMS Surveyors, dated 25/03/2019, marked up by C. Mackenzie. July, 2019. Not to scale.