

Arboricultural Impact Assessment For Proposed Residential Development (Strata Subdivision & Seniors Living) At 9-11 Birdwood Avenue COLLAROY

Prepared for:

Birdwood Projects Pty Ltd PO Box 542 COLLAROY NSW 2097

Ref: 2652AIA

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Peter Castor **Director** 

BSc (For.) Member: IACA, AA, ISA, LGTRA, PIA, UDIA, MAE (UK) 16 April 2020



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- D. Tree Protection Requirements (Generic)
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### 1. EXECUTIVE SUMMARY

#### 1.1 THE PROPOSED DEVELOPMENT

- 1.1.1 This Arboricultural Impact Assessment (AIA) was prepared for Birdwood Projects Pty Ltd in relation to the Strata Subdivision and Seniors Living residential development at 9-11 Birdwood Avenue, Collaroy (the subject site).
- **1.1.2** The proposed development is as indicated on the Architectural Drawings dated 1.04.2020 prepared by EDAA and other Landscape and Stormwater drawings as listed at 3.3.1 below.
- 1.1.3 This AIA acknowledges the Biodiversity and SEPP Seniors comments in Council's Prelodgement Advice (*PLM2019/0218*) following meeting of 12 November, 2019.

#### 1.2 TREE IMPACTS

- **1.2.1** Of the seventeen (17) assessed trees, two trees (Trees 15 & 16) are located on adjoining property #7 Birdwood Avenue and three trees (Trees 1, 2 & 17) are located on the Council verge.
- **1.2.2** Of the seventeen (17) assessed trees, four (4) are to be retained and thirteen (13) are to be removed.
- 1.2.3 Of the thirteen (13) trees to be removed, ten (10) are Exempt under the Warringah DCP 2011 either because they are Exempt species or they are less than five metres in height. The assessed trees on and adjacent to the site were generally of low landscape significance: five (5) trees were ©Retention Value C and five (5) were ©Retention Value D.
- **1.2.4** With the exception of Tree 17 (Oleander, *Nerium oleander*) located on the verge, no trees on adjoining properties or on the verge are to be removed.
- 1.2.5 Tree 15, Coast Banksia, *Banksia integrifolia* located at #7 Birdwood Avenue is the only assessed ©Retention Value A tree and it is to be retained and protected. The pedestrian entrance adjacent Tree 15 has been amended to be suspended within the SRZ/TPZ. The roots which have grown onto the subject site (Photos D & E) are to be retained and protected. Minor crown pruning is required as illustrated in Photos F and G.
- **1.2.6** The Landscape Plan proposes twenty four (24) new trees and palms with some superadvanced 400 litre stock.
- **1.2.7** We are of the opinion that the Objectives of *E1* of the *WDCP 2011* are satisfied given the retention of Tree 15 and the twenty four replacement native trees and palms proposed in the Landscape Plan.
- **1.2.8** We are of the opinion that *Clause 33(f)* of the *Seniors SEPP* is satisfied and that it is reasonable to remove all the trees from within the site boundary in this instance given their general low quality.



### 2. BACKGROUND

#### 2.1 INTRODUCTION

- 2.1.1 This Arboricultural Impact Assessment (AIA) was prepared for Birdwood Projects Pty Ltd in relation to the Strata Subdivision and Seniors Living residential development at 9-11 Birdwood Avenue, Collaroy (the subject site).
- 2.1.2 The purpose of this AIA is to describe and categorise the existing trees on and adjacent to the subject site and to assess the impact of the proposed development on these trees. Preliminary advice has been provided in the form of a Tree Schedule and Arboricultural Implications Plan, to give arboricultural guidelines for development layout.
- **2.1.3** This AIA will assist in the preparation of the Statement of Environmental Effects forming part of the Development Application (DA) to Northern Beaches Council.
- 2.1.4 Australian Standard AS4970-2009 Protection of trees on development sites has been used as a benchmark in the preparation of this Report. This AIA complies with 2.3.5 Arboricultural Impact Assessment of AS4970-2009.
- 2.1.5 This AIA acknowledges the Biodiversity and SEPP Seniors comments in Council's Prelodgement Advice (*PLM2019/0218*) following meeting of 12 November, 2019.
- 2.1.6 This DA is to be assessed under E1 Preservation of Trees or Bushland Vegetation of the Warringah DCP 2011. The Objectives of E1 are acknowledged and addressed in this AIA. No Vegetation Clearing Permit has been sought, rather vegetation removal is sought for works required under the DA.
- **2.1.7** The Tree Protection Plan enclosed at Attachment E complies with *Appendix 12 Tree Protection Plan* of the WDCP.

#### 2.2 THE SUBJECT SITE

- **2.2.1** The subject site currently consists of a two-storey rendered and fibro clad residence, a timber Garage with metal roof, various paving and scattered trees within areas of sloping lawn (Photo A).
- **2.2.2** The existing development adjoining the site is residential. The subject site is opposite the Collaroy Beach Playground and associated carparking and Collaroy Surf Life Saving Club facilities (Photo B).
- **2.2.3** The subject site has a north-northeasterly aspect characterised by a change in a grade from a high point of 10.66 in the southwestern corner to a low point of 4.17 in the northeastern corner.
- **2.2.4** There is no remnant vegetation on the site due to past clearing and establishment of lawns and scattered plantings.
- **2.2.5** Refer to the *Level and Detail Survey (the Survey) 110190.DWG*, dated 5.7.19 prepared by Byrne & Associates for further details of existing site features.



2.2.6 The pre-development Soil Landscape<sup>1</sup> for the site is indicated as Newport (9130np) which is characterised by: *"gently undulating plains to rolling rises of Holocene sands mantling other soil materials or bedrock."* The site soils have been variously altered by the existing development on the site. The only existing tree species on the site, typically found on this Soil Landscape is Coast Banksia, *Banksia integrifolia.* The Coast Banksia on the site all appear to have been planted rather than being self-seeded bushland remnants.



Locality Aerial Photo (source SixMaps)

#### 2.3 THE SUBJECT TREES

- **2.3.1** The general findings and data collected for each of the seventeen (17) subject trees are contained in Tree Schedule (Attachment A). The trees are numbered and located on the Tree Protection Plan (Attachment E).
- 2.3.2 Trees assessed were those indicated on the supplied Level and Detail Survey.
- **2.3.3** Trees 1 and 2, Frangipani are located on the verge adjacent the site but are not indicated on the Survey. Tree 16 located at #7 Birdwood Ave, was not indicated on the Survey.

<sup>&</sup>lt;sup>1</sup>Chapman, G.A. and Murphy, C.L. (1989). Soil Landscapes of the Sydney 1:100000 Sheet. Soil Conservation Service of NSW, Sydney.

- 2.3.4 The tree indicated on the Survey on the verge at existing RL4.49, does not exist.
- **2.3.5** The "*area of thick vegetation*" adjacent to the existing Garage is indicated on the TPP as Tree 14.
- **2.3.6** Tree 15, Coast Banksia and Tree 16, Weeping Bottlebrush are located at #7 Birdwood Avenue (Photo C).
- **2.3.7** The subject trees are all planted and comprised a mix of natives and exotics.
- 2.3.8 The Coast Banksia, *Banksia integrifolia* (Trees 3, 4, 5, 11, 12 and 15) are the only tree species on the site that are locally indigenous, however all appear to have been planted rather than being remnant vegetation. With the exception of Tree 15 located at #7 Birdwood Ave, Trees 3, 4, 5, 11 & 12 are not prominent in the landscape/streetscape being located towards the rear of the subject site.
- **2.3.9** There is a row of mature Norfolk Island Pines on the northern side of Birdwood Avenue opposite the site which are significant streetscape elements.
- **2.3.10** Not all assessed trees are protected under *Clause 3* of the *WDCP* being less than 5 metres in height.
- **2.3.11** Not all assessed trees are "*significant trees*" as described in the *Note to E1* of the *WDCP*. The Note in part states:

"A 'significant tree' is a tree that is over 5.0m in height and, impacts on the streetscape by virtue of its size, appearance, type, age, condition and heritage/cultural significance. It includes hollow-bearing trees and/or trees of conservation significance or habitat value."

- **2.3.12** Tree 15 (Coast Banksia, *Banksia integrifolia*) is the only ©Retention Value *A* tree assessed (*Should be Retained*) given its size and proximity to the street. In our opinion Tree 15 is the only "significant tree" assessed and is to be retained.
- 2.3.13 Ten (10) of the seventeen (17) trees assessed are Exempt under the WDCP 2011 either because they are listed on Table 1 Exempt Species of the WDCP (Trees 6, 8, 9, 10, 13, 14 and 17) or Clause 3 of the WDCP they are less than 5m in height (Trees 1, 2 and 4).

#### 2.4 THE PROPOSAL

- **2.4.1** The proposed development is for the demolition of the existing structures, Strata Subdivision and construction of a four-unit Seniors Living development with Basement Carparking and landscaping.
- **2.4.2** The proposed development is as indicated on the Architectural drawings dated 1.04.2020 prepared by EDAA and other Landscape and Stormwater drawings as listed at 3.3.1 below.
- **2.4.3** The recommendations and comments in this Report assume the following:
  - A high quality, shady, outdoor environment is desired.
  - The amenity of the adjoining neighbours needs to be considered.
  - Existing landscape character should be retained where possible through the retention of existing significant trees.
  - Objectives of E1 Preservation of Tree and Bushland Vegetation of the WDCP 2011 are considered.
  - Clause 33(f) of the Seniors SEPP is considered.

### 3. METHODOLOGY

### 3.1 DATA COLLECTION

- 3.1.1 In preparation of this Report a ground level, visual tree assessment (VTA)<sup>2</sup> was undertaken on 6.2.2020 and on 5.3.2020. No aerial (climbing) inspections or woody tissue testing were undertaken as part of these assessments. Shallow, preliminary root mapping was undertaken to confirm the extent of root growth from Tree 15 beyond the masonry planter adjacent the western boundary of the subject site.
- 3.1.2 Attachment B provides definition of terms used in this Report. Tree heights were estimated. Trunk diameter at breast height (DBH) was measured at 1.4 metres above ground level (unless otherwise stated) and rounded to the nearest 0.01 metre. Structural Root Zones (SRZ) and Tree Protection Zones (TPZ) were rounded to the nearest 0.1 metre.
- 3.1.3 All tree offsets mentioned in this Report are to centre of trunk unless otherwise stated.

### 3.2 IDENTIFICATION OF SUBJECT TREES

- 3.2.1 The seventeen (17) subject trees are those indicated on the Tree Protection Plan (TPP) and Tree Schedule. There were three (3) trees (Trees 1, 2 and 17) not plotted on the Detail Survey and their approximate locations have been indicated on the Tree Protection Plan (TPP). Trees 15 and 16 were located on neighbouring properties. Trees 1, 2 and 17 are located on the verge.
- **3.2.2** The subject trees were numbered and labelled on site with white plastic tags to assist others.

#### 3.3 DOCUMENTS AND PLANS REFERENCED

- **3.3.1** The conclusions and recommendations in this Report are based on the findings from the site inspections, discussions with the client, project architect, landscape architect and stormwater engineer and review of the following Plans and documents:
  - Level and Detail Survey, A1-110190, dated 5.7.19 prepared by Byrne & Associates.
  - Architecturals DA 02- DA07, dated 1.04.20 prepared by EDAA.
  - Landscape Plans BB 1245, dated 30.3.20 prepared by Black Beetle
  - General Arrangement Plan Ground Floor 19685\_DA\_C101/05 and General Arrangement Plan – Basement 19695\_DA\_100/05, dated 30.3.20 prepared by Henry & Hymas
  - Biodiversity Letter Report Ref C11653 Rev A dated 15/4/2020 prepared by Total
    Earth Care Pty Ltd

<sup>&</sup>lt;sup>2</sup>VTA – Visual Tree Assessment, undertaken by tree professionals, is a recognised (International Society of Arboriculture, Journal of Arboriculture, Vol. 22 No. 6, Nov. 1996) systematic method of identifying tree characteristics and hazard potential. VTA is also an assessment method described by Claus Mattheck in *The Body Language of Trees – A handbook for failure analysis*. The Stationery Office, London (1994)

#### 3.4 AUSTRALIAN STANDARD AS4970-2009

- 3.4.1 The Australian Standard *AS4970–2009 Protection of trees on development sites* has been used as a benchmark in the preparation of this Report and the terminology and impact assessment methodology have been adopted from this document. This AIA complies with *2.3.5 Arboricultural Impact Assessment* of *AS4970-2009*.
- 3.4.2 Recommendations have been based on tree ©Retention Value, Vigour, Condition, ULE and construction offsets (refer to Attachment B). Trees with ©Retention Value "A" should be given greater priority for retention than trees with ©Retention Value "B" or "C". Trees with Long (40 years +) ULE should be given greater priority for retention than trees with Short (5-15 years) ULE (refer to Attachment B).
- **3.4.3** Tree Protection Zones (TPZ) and Structural Root Zones (SRZ) are as per *Section 3* of *AS4970-2009* and are defined at Attachment B of this Report.
- **3.4.4** "Construction" for the purpose of this AIA means excavation (greater than 100mm), compacted fill or machine trenching<sup>3</sup>. "Excavation" includes cut batters, boxing–out for the various pavement types, trenching for utilities and footings for retaining walls.
- 3.4.5 Trees within proposed construction footprints are recommended for removal (Rm).
- **3.4.6** Where construction is proposed within Structural Root Zone (SRZ) offsets, those trees have been similarly recommended for removal (**Rm**). Fully elevated, pier and beam type construction or hand dug services trenches (or horizontal boring) is however possible within a SRZ.
- **3.4.7** Trees with greater than 25% of the Tree Protection Zone (TPZ) impacted by construction are generally recommended for removal (**Rm**). There are however different types of construction encroachments possible (e.g. compacted fill, permanent basement cut, temporary services trenching, different pavement types, different retaining wall types) with varying tree impacts likely. Existing constraints to root development also vary the TPZ. Compacted fill can be equally as damaging to tree longevity: root development is restricted within heavily compacted soils.
- **3.4.8** Trees to be retained with construction impacting less than 25% of the TPZ area were rated as Retain Plus (**R+**). Specific construction monitoring will be required for the Retain (**R+**) trees (refer to Recommendations).
- 3.4.9 TPZ encroachments of >10% are defined (3.3.3 of AS4970) as 'major'. This does not mean that the tree will be fatally injured, but that 'the project arborist must demonstrate that the tree(s) would remain viable'. Refer to Section 5.3 of this Report for explanation of tree retention recommendations and consideration of tree-factors listed at 3.3.4 of AS4970.
- **3.4.10** Where construction is proposed beyond the TPZ, those trees are rated as Retain (**R**) with no specific tree protection design or tree protection monitoring required (refer to Attachment D).



<sup>&</sup>lt;sup>3</sup>"Construction" is equivalent to "works" as defined at 1.4.9 of AS4970-2009.

### 4. TREE IMPACTS

#### 4.1 SUMMARY

- **4.1.1** Of the seventeen (17) assessed trees, two (Trees 15 & 16) are located on adjoining property #7 Birdwood Avenue and three (Trees 1, 2 & 17) are located on the Council verge.
- **4.1.2** Of the seventeen (17) assessed trees, four (4) are to be retained and thirteen (13) are to be removed.
- 4.1.3 Of the thirteen (13) trees to be removed, ten (10) are Exempt under the Warringah DCP 2011 either because they are Exempt species or they are less than five metres in height. The assessed trees on and adjacent to the site were generally of low landscape significance: five trees were ©Retention Value C and five (5) were ©Retention Value D.
- **4.1.4** With the exception of Tree 17 located on the verge, no trees on adjoining properties or on the verge are to be removed.
- **4.1.5** Tree 15, Coast Banksia, *Banksia integrifolia* located at #7 Birdwood Avenue is the only assessed ©Retention Value A tree and it is to be retained and protected. The pedestrian entrance adjacent Tree 15 has been amended to be suspended within the SRZ/TPZ. The roots which have grown onto the subject site (Photos D & E) are to be retained and protected. Minor crown pruning is required as illustrated in Photos F and G.
- **4.1.6** The Landscape Plan proposes twenty four (24) new trees and palms with some superadvanced 400 litre stock.

### 4.2 CLAUSE 33(F) SENIORS SEPP

**4.2.1** Clause 33(f) of the Seniors SEPP requires the development to:

"retain, wherever reasonable, major existing trees."

Although there is no definition of "*major trees*" in the Seniors SEPP it could be equated to ©Retention Value *A* trees of which there is only one (Tree 15, Coast Banksia) which is to be retained. There are lower quality, ©Retention Value *B* trees of the same species (Trees 3, 4, 5 and 12) which are less prominent, being setback further from the street.

The retention of Trees 3, 4 and 5, considering the extent of their TPZs, would probably not enable four Units to be constructed on the site; this could be regarded as unreasonable. In any event if Trees 3, 4 and 5 were to be retained, these trees would be retained at the rear of the new building and would not be visible from the street.

The current layout complies with the required 30% landscaped area.

**4.2.2** We are of the opinion that *Clause 33(f)* of the *Seniors SEPP* is satisfied and that it is reasonable to remove all the trees from within the site boundary in this instance given their overall low quality.



#### 4.3 E1 - PRESERVATION OF TREES AND BUSHLAND VEGETATION (WDCP 2011)

- 4.3.1 Trees in non-rural areas are protected under the SEPP (Vegetation in Non-Rural Areas) (the Vegetation SEPP). Part 3 of the Vegetation SEPP invokes a DCP to define tree and vegetation clearance rules. The WDCP 2011, Clause E1 Preservation of Trees and Bushland Vegetation applies to the subject site.
- **4.3.2** There is no bushland or remnant vegetation within the subject site. The Coast Banksias (Trees 3, 4, 5, 11, 12 and 15) have all been planted but are representative of species indigenous to the locality.
- 4.3.3 Assessment of ecological impacts of this development are not assessed in this AIA.
- 4.3.4 Clause 3 of E1 allows for the removal of trees less than 5m in height without a Vegetation Clearance Permit. This being the case the following trees located within the subject site could have been removed without contacting Northern Beaches Council: Trees 7 and 13.
- **4.3.5** Table 1 of E1 is a list of Exempt species. The following trees within the subject site are Exempt species: Trees 6, 7, 8, 9, 10, 13 and 14.
- **4.3.6** The site contains no Priority Weeds as defined by the Biosecurity Act 2015. The Biosecurity Act 2015 repealed the Noxious Weeds Act 1995.
- **4.3.7** Additionally, Trees 1, 2 and 17 are Exempt under the WDCP and would require Council approval for removal being located on the verge. Trees 1 and 2 are proposed to be retained.
- **4.3.8** We are of the opinion that the Objectives of *E1* of the *WDCP 2011* are satisfied given the retention of Tree 15 and the twenty four replacement native trees and palms proposed in the Landscape Plan.

#### 4.4 LANDSCAPE PLANS

- **4.4.1** Landscape Plan set (*Not for Construction*) dated 30.3.2020 prepared by Black Beetle has been reviewed.
- **4.4.2** Trees 1, 2, 15 and 16 are shown to be retained coordinating with the Tree Protection Plan.
- **4.4.3** Twenty four (24) new, predominantly native trees and palms are to replace the thirteen (13) trees proposed to be removed.
- 4.4.4 No tree impacts arise from hard landscape works.

#### 4.5 STORMWATER PLANS

- 4.5.1 General Arrangement Plan Ground Floor 19685\_DA\_C101/05 and General Arrangement Plan Basement 19695\_DA\_100/05, dated 30.3.20 prepared by Henry & Hymas have been reviewed.
- **4.5.2** The 225Ø stormwater pipe, accommodating the possible 1 in 100 year overland flows from upstream properties is being piped from the southwestern, rear corner, via the Basement to the street.
- **4.5.3** No tree impacts arise from the proposed stormwater works.



### 5. RECOMMENDATIONS FOR TREE MANAGEMENT

#### 5.1 ARBORIST INVOLVEMENT

- 5.1.1 An Arborist (the Project Arborist) experienced in tree protection on construction sites should be engaged prior to the commencement of construction work on the site. The Project Arborist shall monitor and report regularly to the Principal Certifying Authority (PCA) and the Applicant on the condition and protection of the retained trees during the construction works. The Project Arborist is to monitor any excavation, machine trenching or compacted fill placed within the TPZ of all retained trees.
- **5.1.2** The schedule of works for the development must acknowledge the role of the Project Arborist and the need to protect the retained trees. Sufficient notice must be given to the Arborist where his/her attendance is required. Should the proposed design change from that reviewed, additional arboricultural assessment will be required.
- **5.1.3** The Project Arborist should certify tree protection measures at key stages of the construction. Copies of the certification should be sent to PCA.

#### 5.2 TREE RETENTION

- 5.2.1 Trees 1, 2, 15 and 16 are to be retained.
- **5.2.2** Tree 15 will require particular tree protection measures during the construction as detailed below.

#### 5.3 TREE RETENTION RECOMMENDATIONS FOR TREE 15 (COAST BANKSIA)

#### 5.3.1 Bulk Earthworks

The bulk earthworks for the Basement is to be shored vertically within the Tree Protection Zone radius of 7.1m to minimise root disturbance. There is to be no benching or battering of soils within the TPZ.

There is to be no topsoil stripping or regrading of existing soils (excluding removal of the grass layer) within the TPZ.

#### 5.3.2 Elevated/Suspended Entrance Path/Stairs

The proposed elevated/suspended entrance Path/Stairs within the TPZ are to be constructed above existing ground lines. They are to be supported on isolated piers of the smallest cross-sectional area feasible.

The piers within the SRZ (2.7m radius) are to be hand dug to 500mm and all major roots greater than 50mm diameter are to be retained uncut. The centre of the piers may need to be altered to retain major roots. If concrete poured piers are proposed, the pier holes are to be lined with a 'Formatude' liner or equivalent to limit concrete contact with roots.

#### 5.3.3 Planter Box Indicated on the Ground Floor Stormwater Plan

The Planter Box indicated on the Ground Floor Stormwater Plan is to be deleted within the TPZ or constructed with isolated footings. No strip footing is to be used within the TPZ.

ARBORICULTURAL CONSULTANCY



#### 5.3.4 Scaffolding

If scaffold is required for construction the retained branches are to be protected and scaffold installed around branches. Branches and the trunk may need to be protected as indicated on *Figure 04* and *Figure 05* of the TPP (Sheet 2 of 2).

#### 5.3.5 Crown Pruning

The crown pruning as indicated in Photos F & G is to be undertaken with tree owner's consent under the DA Consent. The height staff indicated in Photos F & G is at 6.0m above ground level at the approximate corner of the Lower Roof at RL 11.4. The final pruning cut at branch collar is approximately 200mm diameter. This pruning represents approximately 10% of the total leaf area of the tree.

Minor laterals may need to be pruned from the other branch growing to the east in front of proposed Unit 2 (Photo G) depending upon the need for scaffolding.

Crown pruning is to comply with Australian Standard AS4373-2007: Pruning of Amenity Trees.

Crown pruning is to undertaken by contracting Arborists with minimum AQF Level 3 qualifications. The pruning of Tree 15 should be undertaken as part of the tree removal contract.

#### 5.4 TREE RETENTION RECOMMENDATIONS FOR ALL TREES

#### 5.4.1 Tree Protection Fencing

Tree protection fencing as indicated on the TPP (Attachment E) is to be erected prior to commencement of demolition or site preparation works around all retained trees. The alignment of the fencing will need to be altered during construction. The Project Arborist is to certify installation of the tree protection fencing and any required realignment.

The area within the fencing is to be mulched with aged, partly composted mulch (e.g. ANL's- Greenlife® Compost and Mulch or equivalent) to control weeds and to reduce water loss.

#### 5.4.2 Other Tree Protection Measures

Other tree protection measures (Attachment D) including temporary irrigation, scaffolding protection, prevention of soil compaction and prevention of soil profile inversion should be implemented as required and as directed by the Project Arborist.

#### 5.4.3 Tree Protection Plan

The Tree Protection Plan (Attachment E) should be updated as part of the CC documentation. The Updated TPP is to be kept in the Site Office during the construction period to guide tree protection procedures. The recommendations contained in the TPP should be incorporated into the Construction Management Plan and Sediment Control Plan.

#### 5.5 TREE REMOVAL

- **5.5.1** The following trees need to be removed: Trees 3 14 and Tree 17.
- **5.5.2** Tree 17 is a 1.5m tall Oleander located on the Council verge. Separate Approval may be required for removal of Tree 17.
- 5.5.3 All tree removal works must comply with the Safe Work Australia "Guide to Managing Risks of Tree Trimming and Removal Work" July, 2016.

Attachment A: Tree Schedule



#### AIA Tree Schedule -9-11 Birdwood Ave, Collaroy

TREE No.	COMMON NAME/ GENUS SPECIES	DBH (cm)	НЕІСНТ (m)	CANOPY RADIUS (m)	AGE CLASS	VIGOUR	CONDITION	SRZ RADIUS (m)	TPZ RADIUS (m)	% TPZ ENCROACHMENT	SPOT LEVEL (m)	ULE	©SIG RATING	©RETENTION INDEX	RECOMMENDATION	COMMENTS	
1	Frangipani, Plumeria acutifolia	20 @g	2	2	SM	G	G	1.7	2.4	0%	NA	L	3	В	R	Retain. Verge tree. Not indicated on Survey. Exempt under WDCP being <5m in height. Five other Frangipanis to 1.5m in height on verge.	
2	Frangipani, Plumeria acutifolia	13, 16	3	3	м	G	G	1.8	2.4	0%	NA	М	3	В	R	Retain. Verge tree. Not indicated on Survey. Exempt under WDCP being <5m in height.	
3	Coast Banksia, Banksia integrifolia	28, 28	9	3	SM	G	G	2.4	4.8	100%	9.88	L	3	В	Rm	Remove. Located within the development footprint.	
4	Coast Banksia, Banksia integrifolia	21, 28	7	3	SM	G	G	2.3	4.8	100%	10.18	L	3	В	Rm	Remove. Bougainvillea in lower crown. Located within the development footprint.	
5	Coast Banksia, Banksia integrifolia	37	7	5	м	G	F	2.3	4.4	100%	10.07	М	3	В	Rm	Remove. Crown skew to N. Base surrounded by timber decking. Recent pruning of 1st Order limb on N side @ 1.8m a.g. Located within the development footprint.	
6	Sengal Date Palm, Phoenix reclinata	40	8	4	м	F	F	1.0	5.0	100%	9.28	S	3	с	Rm	Remove. Multi-stem clump approx. 3m in diameter. WDCP Exempt species. Located within the development footprint.	
7	Madagascar Dragon Tree, Dracaena marginata	15, 20, 20, 20	4	3	М	G	G	2.3	4.8	100%	10.38	S	4	D	Rm	Remove. Cape Honeysuckle vine throughout crown. WDCP Exempt species. Located within the development footprint.	
8	Oleander, Nerium oleander	20 @g	5	3	м	G	G	1.7	2.4	5%	10.42	S	4	D	Rm	Remove. WDCP Exempt species.	
9	Weeping Fig, Ficus benjamina	60 @1.0	8	5	м	F	F	2.7	7.2	20%	10.74	S	3	с	Rm	Remove. Heavy crown skew to NNE. Previously lopped at 1.5m a.g. Crown in contact with existing dwelling. WDCP Exempt species. Major TPZ encroachment.	
10	Umbrella Tree, Schefflera actinophylla	30 @g	5	2	м	G	F	1.0	3.0	100%	10.25	S	4	D	Rm	Remove. Multi-stemmed from ground level. WDCP Exempt pecies. Competition from clumping bamboo on N side. Located vithin development footprint (external path).	
11	Coast Banksia, Banksia integrifolia	15	8	2	SM	G	F	1.6	2.0	100%	9.82	S	4	D	Rm	Remove. Heavily suppressed upright form. Located within the levelopment footprint.	
12	Coast Banksia, Banksia integrifolia	30 @g	7	3	SM	G	F	2.0	3.6	100%	9.75	М	3	В	Rm	Remove. Heavy Bougainvillea growth throughout crown. Located within the development footprint.	

#### AIA Tree Schedule -9-11 Birdwood Ave, Collaroy

TREE No.	COMMON NAME/ GENUS SPECIES	DBH (cm)	неюнт (m)	CANOPY RADIUS (m)	AGE CLASS	VIGOUR	CONDITION	SRZ RADIUS (m)	TPZ RADIUS (m)	% TPZ ENCROACHMENT	SPOT LEVEL (m)	NLE	©SIG RATING	©RETENTION INDEX	RECOMMENDATION	COMMENTS	
13	Hills Fig, Ficus microcarpa var. Hillii	32 @g	4	5	SM	G	F	2.1	3.8	100%	9.13	s	3	с	Rm	Remove. Potential mature growth likely to cause problems with neighbours dwelling. Row of 5 Umbrella Palms adjacent to boundary to N also to be removed. WDCP Exempt species. Located within the development footprint.	
14	Giant Bird of Paradise, Strelitzia nicolai	40	5	3	SM	G	F	2.3	4.8	100%	5.85	S	3	с	Rm	Remove. Small Leaved Lilly Pilly 3m tall within 2m also to be removed. WDCP Exempt species (Palm). Located within the development footprint.	
15	Coast Banksia, Banksia integrifolia	59 @1.0	7	6	М	G	G	2.7	7.1	15%	5.72	м	2	A	R+	Retain. On adjacent property (#7 Birdwood Ave). Growing in raised masonry planter however roots have grown onto the subje site. Previous minor pruning for views and to clear o/head wires. Minor crown pruning required for the proposed Lower Roof. Pedestrian entrance to be suspended within TPZ. Basement bulk earthworks to be shored vertically to limit TPZ excavation. Project Arborist to certify all works within TPZ.	
16	Weeping Bottlebrush, Callistemon viminalis	10, 10, 15	5	2	М	F	F	1.8	2.4	0%	5.53	S	3	С	R	etain. On adjacent property (#7 Birdwood Ave). Growing in aised masonry planter.	
17	Oleander, Nerium oleander	20 @g	1	1	SM	G	F	1.7	2.4	0%	NA	S	4	D	Rm	Remove. Verge tree. Not on Survey. WDCP Exempt species. Adjacent tree indicated at RL4.99 on Survey does not exist.	
17																	

### AIA Tree Schedule -9-11 Birdwood Ave, Collaroy

#### Summary Data

©RETENTION INDEX	NO. OF TREES
А	1
В	6
С	5
D	5
Total	17

RECOMMENDATION	NO. OF TREES
R	3
R+	1
Т	0
Rm	13
Total	17

	RECOMMENDATION									
	R	R+	Т	Rm						
А	0	1	0	0						
В	2	0	0	4						
С	1	0	0	4						
D	0	0	0	5						

## Attachment B: Definition of Terms



**COMMON NAME/GENUS SPECIES CULTIVAR** – Common names can vary with selected texts. Where species is unknown, "*sp*." indicated after genus. Where cultivar is unknown "*cv*" indicated after species.

**DBH – Diameter at Breast Height.** Tree trunk diameter measured at breast height (1.4 metres above ground level). Fabric diameter tape is used which assumes a circular cross section. Multiple measurements indicate multiple trunks. Where DBH measurement cannot be taken at 1.4m the height at which it has been taken is indicated.

**CANOPY SPREAD RADIUS** – Average canopy radius (widest + narrowest ÷ 2). Circular canopy depictions on Tree Plan/Survey are indicative only. Where canopy spread was significantly skewed, all four cardinal point measurements were recorded.

AGE CLASS – Immature (IM), Semi-mature (SM), Mature (M), Over-mature (OM). Assessment of the tree's current Age. A Mature (M) tree has reached a near stable size (biomass) above and below ground. Trees can have a *Mature* age class for >90% of life span. Over-mature (OM) trees show symptoms of irreversible decline and decreasing biomass.

**VIGOUR – Good (G), Fair (F) or Poor (P).** The general appearance of the canopy/foliage of the tree at the time of inspection. Vigour can vary with the season and rainfall frequency. A tree can have *Good* vigour but be hazardous due to *Poor* condition. A tree in *Good* vigour has the ability to sustain its life processes. Vigour is synonymous with health.

**CONDITION – Good (G), Fair (F) or Poor (P).** The general form and structure of the trunk/s and branching. Trunk lean, trunk/branch structural defects, canopy skewness or other hazard features are considered.

**SRZ RADIUS – Structural Root Zone.** The area around a tree required for tree stability. Earthworks should be prohibited within the SRZ. The area is calculated from the formula and graph at Figure 1 of *AS4970-2009.* The SRZ graph has been adapted from the work of Claus Mattheck (1994). DBH + 10% has been used for the calculation of SRZ. Where DBH is measured at grade or at a height other than 1.4m above grade, 10% has not been added.

**TPZ RADIUS – Tree Protection Zone.** Radial offset (m) of twelve times (12x) trunk DBH measured from centre of trunk (for trees less than 0.3 metre DBH minimum TPZ is 2.0 metres). To satisfactorily retain the tree, construction activity (both soil cut and fill) must be restricted within this offset. TPZ offsets are rounded to the nearest 0.1 metre. Existing constraints to root spread can vary. Generally an area equivalent to the TPZ should be available to the tree post development. Encroachment occupying up to 10% of the TPZ area is acceptable without detailed rootzone assessment. Encroachments greater than 10% require specific arboricultural assessment as per 3.3.3 and 3.3.4 of Australian Standard *AS4970-2009 Protection of trees on development sites*.

**TPZ ENCROACHMENT –** The cut or compacted fill encroachment within the notional TPZ. The Tree Protection Zone is X12 trunk diameter (DBH) as per *3.2 of AS4970-2009*. Refer to the Tree Retention section of the AIA for methods/design used to minimise encroachments.

**ULE – Useful Life Expectancy.** The length of time from the date of inspection that the Arborist estimates the tree will live and provide a useful positive contribution to the landscape amenity of the site. ULE ratings are **Long** (retainable for 40 years or more), **Medium** (retainable for 16-39 years), **Short** (retainable for 5-15 years) and **Removal** (tree requiring immediate removal due to imminent risk or absolute unsuitability).

©SIG. RATING – ©Significance Rating Scale (see notes over)

#### ©RETENTION INDEX (see notes over)

RECOMMENDATIONS – Retain (R) No TPZ encroachments; Retain Plus (R+) Acceptable levels of TPZ encroachment; Transplant (T) or Remove (Rm).

**COMMENTS** – Comments relating to the location, surroundings and hazard potential of the trees at the time of inspection and where applicable the reason for removal.



©SIG. RATING – ©Significance Rating Scale. A site specific qualitative evaluation of a tree relative to the existing land use developed by Tree Wise Men® Australia Pty Ltd. Takes into consideration the impact of the tree on the surrounding landscape, streetscape and bushland. Rarity, habitat value, historical/cultural value and structural form of the tree are considered in this rating system. It is possible for a tree to have a *Short* ULE and a ©Significance Rating of 1. Likewise it is possible for a tree to be given a *Long* ULE and a ©Significance Rating of 4 (e.g. weed species). The ©Significance Ratings used in this Report are as outlined in Table 1.

Rating	Significance	Characteristics (some or all)
©Sig. Rating 1	Exceptional	<ul> <li>Major contribution to site amenity</li> <li>Remnant specimen</li> <li>Heritage Listed</li> <li>Listed on Significant Tree Register</li> <li>Threatened Species</li> <li><i>Good</i> vigour and condition</li> <li>Cultural significance</li> <li>Possible habitat tree for threatened fauna</li> <li>Excellent, well formed specimen</li> <li>Rare or unusual species</li> <li>Large above ground biomass</li> <li>Unique within the site and surrounds</li> </ul>
©Sig. Rating 2	High	<ul> <li>Considerable contribution to site amenity</li> <li>Remnant specimen</li> <li><i>Good</i> vigour and condition</li> <li>Threatened Species</li> <li>Cultural significance</li> <li>Possible habitat tree for threatened fauna</li> <li>Well formed specimen</li> <li>Rare or unusual species</li> <li>Large or moderate above ground biomass</li> <li>Other specimens with similar characteristics within the site and surrounds</li> </ul>
©Sig. Rating 3	Moderate	<ul> <li>Minor contribution to site amenity</li> <li>Remnant or planted</li> <li><i>Fair</i> or <i>Poor</i> vigour and condition</li> <li>Potential for growth</li> <li>Well formed or asymmetrical form</li> <li>Other specimens with similar characteristics within the site and surrounds</li> </ul>
©Sig. Rating 4	Low	<ul> <li>Small/poor specimen</li> <li><i>Poor</i> vigour and condition</li> <li>Inappropriate for the location</li> <li>Minor contribution to landscape amenity</li> <li>Easily replaced</li> <li>Weed species or TPO Exempt</li> <li>Hazardous</li> <li>Previously ©Sig. Rating 5 tree</li> </ul>

 Table 1:
 ©Significance Rating Characteristics

©**RETENTION INDEX.** A site specific assessment of an individual tree's retention value developed by Tree Wise Men® Australia Pty Ltd. Incorporating ULE and ©Significance Rating each tree is allocated a ©Retention Value of A, B, C or D. The ©Retention Index values can be described as follows:

©Retention Value A	Should be retained	<ul> <li>Major redesign may be required (e.g. movement of building footprint, re-alignment of roadway).</li> </ul>					
©Retention Value B	Could be retained	<ul> <li>Minor redesign may be required (e.g. level changes, pavement detail).</li> </ul>					
©Retention Value C	Could be removed	<ul> <li>Should not constrain proposed development.</li> </ul>					
	Should be removed (irrespective of development layout.)	<ul> <li>Should not constrain proposed development.</li> <li>Remove ULE should be removed irrespective of development layout.</li> </ul>					
	Should be removed or permanently fenced off	<ul> <li>Should not constrain proposed development</li> <li>Short ULE could be retained pending landscape proposal.</li> </ul>					

		©Significance Rating							
©Ret	ention Index	1	2	3	4				
	Long (40+ years)	L	A	в	C				
Rating	Medium (15-40 years)		•	-	-				
ULEF	Short (5-15 years)	E	3	С	D				
	Remove (< 5 years)	D							



Attachment C: Site Photographs





**Photo A:** Subject site and adjoining properties showing general (distorted) view of the existing landscape features.



**Photo B:** View to the north from the subject site showing general (distorted) view of the existing landscape features opposite.



Photo C: Trees 15 and 16 to be retained on adjoining property #7 Birdwood Avenue.



Photo D: Tree 15 Coast Banksia located at #7 Birdwood Avenue showing roots which have grown beyond the masonry planter and into the subject site.



Photo E: Tree 15 Coast Banksia located at #7 Birdwood Avenue showing roots which have grown beyond the masonry planter and into the subject site.



**Photo F:** Tree 15 Coast Banksia located at #7 Birdwood Avenue showing crown pruning required for construction. The height staff is at the corner of the Lower Roof at approximately RL11.4 at 1.8m from centre of trunk.



Photo G: Tree 15 Coast Banksia located at #7 Birdwood Avenue (looking east) showing crown pruning required for construction. The height staff is at the corner of the Lower roof at approximately RL11.4 at 1.8m from centre of trunk.



# Attachment D: Tree Protection Requirements (Generic)





#### **TREE PROTECTION REQUIREMENTS (GENERIC)**

The following generic tree protection requirements (1-12) should be implemented to minimise the impact of the proposed development on the retained trees. These requirements shall be implemented during the construction period in the event that no site-specific requirements are detailed in this document. Tree Protection Requirements should comply with Section 4 Tree Protection Measures of AS4970-2009 Protection of trees on development sites and the Tree Protection Plan (TPP) attached to this document.

**1. Arborist Involvement** – An Arborist (the project Arborist) with minimum AQF Level 5 qualifications, experienced in tree protection on construction sites shall be engaged prior to the commencement of work on the site. The Arborist's tasks will be to monitor and report regularly to the PCA and the Applicant on the condition of the retained trees for the duration of works on site. The Project Arborist shall be present to certify tree protection measures and to supervise any excavation, trenching or tunnelling within the TPZ of any retained trees.

The schedule of works for the development shall acknowledge the role of the Project Arborist and the need to protect the retained trees. Sufficient notice shall be given to the Project Arborist where his/her attendance is required. Should the proposed design change from that reviewed, additional arboricultural assessment will be required.

**2. Tree Pruning and Removal –** All tree pruning (including root pruning) and tree removal shall be carried out by a qualified and experienced Arborist (minimum AQF Level 3 qualification) to Australian Standard *AS4373-2007 Pruning of amenity trees* and the Safe Work Australia "*Guide to Managing Risks of Tree Trimming and Removal Work*" July, 2016.

When tree stumps are within the TPZ of retained trees, stump grinding of rootballs shall be performed rather than complete "grubbing". This will minimise unnecessary root damage to the retained trees. Unnecessary damage often occurs to retained trees when undertaken by earthmoving machinery.

**3. Mulching** – If construction activity is proposed within TPZ offsets mulching is required. Mulch to a depth of 100 millimetres using partially composted green waste mulch. The mulch should be free of weed seeds and other contaminants. Should constant access be required within the trees' TPZs, outside the protective fencing, heavier mulch should be spread to a depth no greater than 100 millimetres to reduce soil compaction.



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**4. Temporary Irrigation –** Where construction related activity or root cutting is proposed within the TPZ of retained trees, temporary irrigation or water cart access may need to be provided to the remaining unimpacted TPZ areas to maintain adequate soil moisture levels. Delivery volumes are to allow for mulch layer and recent rainfall. The Project Arborist is to monitor soil moisture levels.

**5. Tree Protection Fencing** – The retained trees shall be protected by means of fencing as per Figure 3 of *AS4970-2009* or as detailed in the TPP prior to commencement of demolition or bulk earthworks.

It should be constructed from 1.8 metre high chain link wire or welded mesh suspended by galvanised steel pipe or equivalent and enclose as much of the TPZ as practicable allowing for building alignments.

The location of the fence may need to be altered from that indicated on the Tree Protection Plan at a project meeting between the Civil Contractor and the Project Arborist. The area enclosed shall be mulched (3) and irrigated (4) and kept free from all building materials, contaminants and other debris and shall not be used for storage of any building materials or parking of vehicles or plant. If scaffolding (8) is required within a tree protection zone, the ground is to be mulched prior to erection of scaffolding.

**6. Trunk Protection** – Trunk and branch protection is to comply with *Figure 4* of *AS4970-2009* or as detailed in the TPP. Lengths of timber (75mm x 50mm x 2000mm) shall be used to protect a tree's trunk if construction or traffic is proposed within its SRZ and the tree cannot be fenced. The lengths of timber should be fastened around the trunk at 200 millimetre centres with hoop iron strapping or similar.

**7. Signs** – Signs complying with *Figure C1* of *AS4970-2009* should be placed at regular intervals (min. 1 per 15 metres) on tree protection fencing.

**8. Scaffolding** – If scaffolding or hoarding is required within the TPZ, install as per *Figure 5* of *AS4970-2009* or as detailed in the TPP. Installation is to be prior to demolition or bulk earthworks.

**9. Bulk Earthworks –** To prevent unnecessary root damage, walk machinery within defined haul routes beyond TPZs wherever possible. The excavation shall be carried out under the supervision of the Project Arborist. All roots within TPZ of retained trees are to be hand cut prior to machine cutting. Immediately following excavation, the face of the cut within the TPZ shall be draped and maintained moist until backfilled. This should be done using a 10mm thick jute matting or equivalent, pinned at ground level and allowed to cover the full depth of the rootzone excavation.

There is to be no soil battering or unnecessary over excavation within TPZ offsets. Topsoil stripping should be prohibited within TPZ offsets unless approved by the Project Arborist.

**10. Prevention of Soil Compaction –** During the construction period there may be considerable traffic movement associated with general building activities. The resultant soil compaction and possible contamination of the soil can have an equally detrimental impact on the tree as the severing of roots during excavation.

Specific machinery access tracks should be determined through consultation between the Civil Contractor and the project Arborist. Should heavy vehicle movement be required within a retained tree's TPZ, a track should be formed at grade using large diameter (up to 100mm) aggregate over geofabric or a corduroy of heavy timbers.

**11. Prevention of Soil Inversion –** Care shall be taken to avoid inversion of the soil layers on the site and particularly within TPZs. Clays placed over coarse textured soils reduces water infiltration, creating a perched water table, resulting in decline and/or death of underlying tree roots due to moisture stress.

**12. Services –** Trenching for services is to be regarded as "construction". Trenching within TPZ offsets should be avoided wherever possible to ensure <25% root loss (of TPZ) occurs on retained trees. Directional ("trenchless") boring or suspension of services should be used wherever possible. Where trenching is to occur within TPZ offsets, it is to be undertaken by hand to rock with no roots >50mm to be cut, under supervision of the Project Arborist.

# Attachment E: Tree Protection Plan







# TREE WISE MEN

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Iotes: I. Tree Impact assessment has been considered in relation to AS4970-2009 Protection of trees on development sites.

2. This Tree Protection Plan is equivalent to the Development Submission Plan Identified in Table 1, AS4970-2009.

3. This *Tree Protection Plan* should be incorporated into the site Construction Management Plan and the Sediment Control Plan.

Tree impact assessment includes likely impacts from development including: building platforms, driveways/ accessways, services/infrastructure installation and cut/fill batters.

5. The extent of TPZ shown on this plan does not reflect any confinement of roots by existing structures, buildings, walls, topography, etc

6. A Project Arborist with minimum AQF Level 5 qualifications is to be engaged to supervise works within TPZ areas and monitor and report regularly on the condition of

7. Tree Protection Fencing as Indicated, should be Installed prior to demolition of existing structures and other site preparation works. Tree Protection Fencing should comprise of

chainlink wire or wire mesh panels as per Figure 03 of the TPP. If the location of the Charana where or was intest parents as particular build on the nin a finite bockhord the fercing needs to be altered, this shall be determined at a project meeting between the Civil Contractor and the Project Artorist. The following activities are to be prohibited within the protection fencing; topol stripping, excavation, placement of soil fill, storage of any materials, placement of alte sheds/offices, parking of heavy machinery, placement of machinery haul roads.

8. If scaffolding is required within TPZ, install as shown in Figure 05 of the TPP.

9. Services installation should be supervised by the Project Arborist, using directional borng wherever possible or manual excavation where trenching is to occur. No roots greater than 50mm diameter are to be cut or damaged. Services should be routed beyond TPZ wherever possible.

10. *Trunk battening* and *ground protection* to be Installed to trees where works are required within Tree Protection Fencing. Battening to comply with Figure 04 of the TPP.

11. All tree pruning is to comply with AS4373-2007, Pruning of amenity trees. All approved tree removal is to comply with WorkCover Code of Practice for the Amenity Tree Industry. All tree pruning and removal shall be carried out by a qualified and experienced Arbordst (minimum AQF Level 3 qualification).

12. Mulch is to be spread to a depth of 100mm within the TPZs if construction activity Is proposed within TPZ offsets. Where TPZs are greater than 5 metres or where native seedling regeneration would be prohibited by the mulch, seek advice from the Project

#### Arborist and Ecologist.

13. Over-excavation or battering towards trees is to be avoided unless indicated or Approved earthworks or services drawings and approved by the Project Arborist.

14. Contiguous strip footings are to be avoided wherever possible. discontinuous pler and beam type footings or other lightweight construction for walling and fencing within TPZs.

15. Temporary irrigation, hand watering or water cart may be required to maintain adequate soil moisture levels. The Project Arborist is to monitor soil moisture levels and advise on delivery volumes and frequency.
16. Temporary haul roads may be required to be installed where heavy machinery movements are proposed within TP2s of trees to minimise compaction. Woodchip mulch should be used as a minimum. Recycled concrete or other aggregate placed over a geofabric may be required for heavy use areas.



No excavation, construction activity, grade materials of any kind is permitted within the TPZ.

#### Option 1 - Fencing

1.8m high chain wire mesh panels with shade cloth attached (if required), held in place with concrete feet.

Tree Protection Zone (TPZ) sign



#### Option 2 - Fencing

Plywood or wooden panel paling fence. This type of fencing material also prevents building materials or soil entering the TPZ.

Installation of supports should avoid damaging roots.

Bracing is permissible within the TPZ.

Maximum 100mm and minimum 50mm depth mulch or aggregate layer installed across surface of TPZ.

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