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ARBORICULTURAL IMPACT ASSESSMENT

18 Boronia Rd Bellevue Hill, NSW 2023.

Revision A

Prepared by:

Graham Brooks dip arb

Arboriculture Australia Consulting Arborist

Tree care and Consultancy

Commissioned by David Mekler on behalf of

18 Boronia Road Pty Ltd.

21/03/2021

Executive Summary

Graham Brooks Arboricultural Tree Services Pty Ltd has been commissioned by Mr. David Meckler on behalf of 18 Boronia Road Pty Ltd to undertake an Arboricultural Impact Assessment (AIA) report in regards to the proposed development of 18 Boronia Rd Bellevue Hill, NSW 2023 (the subject site).

This AIA report will include information relating to 21 trees located within and adjacent to the subject site.

Following an assessment of construction impacts from the proposed development (Section 7) it is concluded and recommended that;

The appointment of a project arborist (AQF Level 5) for the duration of the project, must be made prior to the commencement of any site works (including demolition), to provide arboricultural management during the construction process. Section 10 of this report details the tree protection process to be followed and specifications for tree protection measures.

The removal of Trees 2,3 & 4 (subject to approval from Woollahra council) will be required to facilitate the proposed development. The removal of trees 20 & 21 (exempt species) will also be required to facilitate the proposed development. Removal must be undertaken by a qualified Arborist (AQF 3) following the guidelines provided in the Amenity Tree Industry – Work Cover Code of Practice 1998 Safe work Australia’s “Guide to managing risks of tree trimming and removal work” (July 2016). All tree waste is to be removed from site including timber, mulch and stump grindings.

Trees 1 & 5 are to be retained and protected. Due to their location, no specific tree protection measures are recommended. Trees 6 – 19 are to be retained and protected. It is recommended that tree protection fencing and signage is installed prior to demolition/excavation for trees 6 - 19 in accordance with the specification provided in section 10.5 of this report. Tree protection fencing is to be installed at the top of the existing retaining wall within the TPZ’s that extend into the subject site. Due to site constraints tree protection fencing may not be able to be installed. In this instance, it is recommended that the TPZ is identified by an alternative method by the site arborist.

The project arborist is to supervise demolition and excavation works within the TPZ’s of any retained tree and conduct and document root pruning as necessary. Adventitious roots only are expected to be encountered due to existing structures within the TPZ.

T5 will require selective pruning of 3rd and 4th order branches <50mm in diameter to facilitate the proposed development. <10% of total canopy will be required to be removed. It is recommended that all pruning is in accordance with AS4373-2007 The Pruning of Amenity Trees.

Yours faithfully,
Arboricultural Tree Services Pty Ltd



Graham Brooks dip arb
Managing director

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1. Introduction

- 1.1 Graham Brooks Arboricultural Tree Services Pty Ltd has been commissioned by Mr. David Meckler on behalf of 18 Boronia Road Pty Ltd. to undertake an Arboricultural Impact Assessment (AIA) report in regards to the proposed development of 18 Boronia Rd Bellevue Hill, NSW 2023 (the subject site).
- 1.2 This AIA report will include information relating to 7 trees located within and adjacent to the subject site.

2. Relevant Legislation and development controls

- 2.1 Lot 12/G/DP8103, 18 Boronia Rd Bellevue Hill, NSW 2023, is zoned R3 – Medium Density Residential (NSW Planning Portal, n.d.)
- 2.2 State Environmental Planning Policy (Vegetation in Non–Rural Areas) 2017 (NSW Government, 2017) has been considered in the preparation of this report. The aims of the policy are to;
 - *“(a) to protect the biodiversity values of trees and other vegetation in non-rural areas of the State, and*
 - *(b) to preserve the amenity of non-rural areas of the State through the preservation of trees and other vegetation.”*
- 2.3 Sections 3.7.2 & 3.8 of the Woollahra Tree Management Policy (Woollahra Municipal Council, 2011) have been considered as part of this report.
- 2.4 Section 3.2.1 of Woollahra Council Development Control Plan (Woollahra Municipal Council, 2015) has also been considered, in particular the definition of a prescribed tree, being;
 - “1. Any tree or palm, whether of indigenous, endemic, exotic or introduced species with a diameter spread of branches greater than 3m or with a height greater than 5m, irrespective of the spread of branches, and that is not identified in this chapter as exempt.
 2. Any tree, whether of indigenous, endemic, exotic or introduced species with roots greater than 50mm diameter, but only if root pruning is proposed.
 3. Any tree or palm identified in Council's Significant Tree Register.
 4. Any tree or palm identified in Schedule 5 Environmental Heritage of Woollahra LEP, or located on land identified in Schedule 5 including: a) a tree listed as a heritage item; b) a tree located on land identified as containing a heritage item; or c) a tree on land within a heritage conservation area.
 5. Any bushland as defined in State Environmental Planning Policy 19 – Bushland in Urban Areas.”

3.The Site

3.1 The subject site is 18 Boronia Rd Bellevue Hill, NSW 2023. The subject site can be seen below in figure 1 outlined in red.



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

4. Method

- 4.1 The tree and site were visually assessed from ground level on the 12th of August 2021. The Genus and species of the tree was recorded as well as the dimensions for diameter at breast height (DBH), diameter at root crown and canopy width. Height and age of the tree were estimated as well as the percentage of deadwood, the tree was given a vigour rating and signs and symptoms of pests and diseases were looked for. Comments/Structural defects were also recorded.
- 4.2 Calculations have been made using guidelines supplied in AS4970-2009 Protection of Trees on Development Sites (Standards Australia, 2009) for the;
- Tree Protection Zone (TPZ),
 - Structural Root Zone (SRZ),
 - Live Crown Ratio (LCR),
 - Live Crown Size (LCS),
 - Height/Diameter ratio (H/D).
- 4.3 The subject tree has been allocated a landscape significance rating of Low, Medium or High using the *IACA Significance of a Tree, Assessment Rating System (STARS)*© (IACA, 2010). Stars assessment criteria includes:
- Condition and Vigour
 - Form, species specific
 - Provenance, age and botanical significance
 - Heritage and Ecological significance
 - Size, shape, and local amenity value
 - Restrictions to tree growth

Appendix A contains the assessment criteria in full.

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

5. Observations

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

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

Tree No.	Genus/Species & Common Names	Vigour	Dead wood %	Structural Defects/ Comments	Pests/ Disease	Pruning/ Wounds
1	<i>Syzygium paniculatum</i> Lilly Pilly	Fair	5-10%	Co-dominant at 1.7m above ground level. Located in retained garden bed.	None visible	Previously lopped at property boundary.
2	<i>Archontopheonix cunninghamiana</i> Bangalow Palm	Fair	<5%	None visible	None visible	None visible
3	<i>Archontopheonix cunninghamiana</i> Bangalow Palm	Fair	<5%	None visible	None visible	None visible
4	<i>Archontopheonix cunninghamiana</i> Bangalow Palm	Fair	<5%	None visible	None visible	None visible
5	<i>Ulmus parvifolia</i> Chinese Elm	Fair	15-20%	Located in retained garden bed.	None visible	Northern and Western canopy previously lopped.
6	<i>Syzygium australe</i> Lilly Pilly	Good	<5%	None visible	None visible	None visible

Tree No.	Genus/Species & Common Names	Vigour	Dead wood %	Structural Defects/ Comments	Pests/ Disease	Pruning/ Wounds
7	<i>Syzygium australe</i> Lilly Pilly	Good	<5%	None visible	None visible	None visible
8	<i>Syzygium australe</i> Lilly Pilly	Good	<5%	None visible	None visible	None visible
9	<i>Syzygium australe</i> Lilly Pilly	Good	<5%	None visible	None visible	None visible
10	<i>Stenocarpus sinuatus</i> QLD Firewheel Tree	Good	5-10%	None visible	None visible	None visible
11	<i>Magnolia grandiflora</i> Bull Bay Magnolia	Good	5-10%	None visible	None visible	None visible
12	<i>Cupressocyparys leylandii</i> Leightons Green Conifer	Good	<5%	Exempt species within Woollahra LGA	None visible	None visible
13	<i>Cupressocyparys leylandii</i> Leightons Green Conifer	Good	<5%	Exempt species within Woollahra LGA	None visible	None visible
14	<i>Cupressocyparys leylandii</i> Leightons Green Conifer	Good	<5%	Exempt species within Woollahra LGA	None visible	None visible
15	<i>Cupressocyparys leylandii</i> Leightons Green Conifer	Good	<5%	Exempt species within Woollahra LGA	None visible	None visible

Tree No.	Genus/Species & Common Names	Vigour	Dead wood %	Structural Defects/ Comments	Pests/ Disease	Pruning/ Wounds
16	<i>Cupressocyparys leylandii</i> Leightons Green Conifer	Good	<5%	Exempt species within Woollahra LGA	None visible	None visible
17	<i>Cupressocyparys leylandii</i> Leightons Green Conifer	Good	<5%	Exempt species within Woollahra LGA	None visible	None visible
18	<i>Cupressocyparys leylandii</i> Leightons Green Conifer	Good	<5%	Exempt species within Woollahra LGA	None visible	None visible
19	<i>Cupressocyparys leylandii</i> Leightons Green Conifer	Good	<5%	Exempt species within Woollahra LGA	None visible	None visible
20	<i>Cupressocyparys leylandii</i> Leightons Green Conifer	Good	<5%	Exempt species within Woollahra LGA	None visible	None visible
21	<i>Cupressocyparys leylandii</i> Leightons Green Conifer	Good	<5%	Exempt species within Woollahra LGA	None visible	None visible

TABLE 1: TREE OBSERVATIONS

5.2 Listed in Table 2 below are measurements¹ from the subject trees relating to;

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

Tree Number	Species	Maturity	Height (m)	Lowest Scaffold (m)	Spread (m)				DBH / Multi (cm)	DAB (cm)
					N	S	E	W		
1	<i>Syzygium paniculatum</i>	Mature	10	2	7	5	4	5	62	62
2	<i>Archontopheonix cunninghamiana</i>	Mature	9	8	2	2	2	2	20	20
3	<i>Archontopheonix cunninghamiana</i>	Mature	9	8	2	2	2	2	20	25
4	<i>Archontopheonix cunninghamiana</i>	Mature	6	5	1.5	1.5	1.5	1.5	15	32
5	<i>Ulmus parvifolia</i>	Mature	9	3.5	3	10	4	7	31	40
6	<i>Syzygium australe</i>	Mature	6	1	1.5	1.5	1.5	1	11	15
7	<i>Syzygium australe</i>	Mature	6	1	1.5	1.5	1	1	12	15
8	<i>Syzygium australe</i>	Mature	7	1	1.5	1.5	1	1.5	14	20
9	<i>Syzygium australe</i>	Mature	7	1	1.5	1.5	1	1.5	10	15
10	<i>Stenocarpus sinuatus</i>	Mature	9	4	4	4	4	4	30	45
11	<i>Magnolia grandiflora</i>	Mature	12	4	8	8	8	8	50	60
12	<i>Cupressocyparys leylandii</i>	Mature	5	1	0.5	1	0.5	0.5	6	8
13	<i>Cupressocyparys leylandii</i>	Mature	5	1	0.5	1	0.5	0.5	8	10
14	<i>Cupressocyparys leylandii</i>	Mature	5	1	0.5	1	0.5	0.5	9	11
15	<i>Cupressocyparys leylandii</i>	Mature	5	1	0.5	1	0.5	0.5	12	16
16	<i>Cupressocyparys leylandii</i>	Mature	5	1	0.5	1	0.5	0.5	17	20
17	<i>Cupressocyparys leylandii</i>	Mature	5	1	0.5	1	0.5	0.5	11	13
18	<i>Cupressocyparys leylandii</i>	Mature	4	1	0.5	1	0.5	0.5	8	10
19	<i>Cupressocyparys leylandii</i>	Mature	4	1	0.5	1	0.5	0.5	6	7
20	<i>Cupressocyparys leylandii</i>	Mature	4	1	0.5	1	0.5	0.5	6	8
21	<i>Cupressocyparys leylandii</i>	Mature	3	1	0.5	1	0.5	0.5	6	8

TABLE 2: TREE MEASUREMENTS

¹ Where access to a neighbouring tree was not available, measurements have been estimated as accurately as possible.

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

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

Tree Number	Species	TPZ (m)	SRZ(m)	H/D Ratio	Live Crown Size (m2)	Live Crown Ratio (%)
1	<i>Syzygium paniculatum</i>	7.4	2.71	16	84	80%
2	<i>Archontopheonix cunninghamiana</i>	3	NA	45	4	11%
3	<i>Archontopheonix cunninghamiana</i>	3	NA	45	4	11%
4	<i>Archontopheonix cunninghamiana</i>	2.5	NA	40	3	17%
5	<i>Ulmus parvifolia</i>	3.7	2.25	29	66	61%
6	<i>Syzygium australe</i>	2	1.5	56	14	83%
7	<i>Syzygium australe</i>	2	1.5	51	13	83%
8	<i>Syzygium australe</i>	2	1.68	49	17	86%
9	<i>Syzygium australe</i>	2	1.5	70	17	86%
10	<i>Stenocarpus sinuatus</i>	3.6	2.37	30	40	56%
11	<i>Magnolia grandiflora</i>	6	2.67	24	128	67%
12	<i>Cupressocyparys leylandii</i>	2	1.5	83	5	80%
13	<i>Cupressocyparys leylandii</i>	2	1.5	63	5	80%
14	<i>Cupressocyparys leylandii</i>	2	1.5	56	5	80%
15	<i>Cupressocyparys leylandii</i>	2	1.53	42	5	80%
16	<i>Cupressocyparys leylandii</i>	2	1.68	29	5	80%
17	<i>Cupressocyparys leylandii</i>	2	1.5	45	5	80%
18	<i>Cupressocyparys leylandii</i>	2	1.5	50	4	75%
19	<i>Cupressocyparys leylandii</i>	2	1.5	67	4	75%
20	<i>Cupressocyparys leylandii</i>	2	1.5	67	4	75%
21	<i>Cupressocyparys leylandii</i>	2	1.5	50	3	67%

TABLE 3: CALCULATIONS FROM THE SUBJECT TREES

6. Tree Retention Values

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

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

Tree Number	Species	Landscape Significance Rating	Useful Life Expectancy	Retention Value
1	<i>Syzygium paniculatum</i>	Medium	Medium (15-40)	Medium
2	<i>Archontopheonix cunninghamiana</i>	Low	Medium (15-40)	Low-Medium
3	<i>Archontopheonix cunninghamiana</i>	Low	Medium (15-40)	Low-Medium
4	<i>Archontopheonix cunninghamiana</i>	Low	Medium (15-40)	Low-Medium
5	<i>Ulmus parvifolia</i>	Medium	Medium (15-40)	Medium
6	<i>Syzygium australe</i>	Low	Medium (15-40)	Low-Medium
7	<i>Syzygium australe</i>	Low	Medium (15-40)	Low-Medium
8	<i>Syzygium australe</i>	Low	Medium (15-40)	Low-Medium

Tree Number	Species	Landscape Significance Rating	Useful Life Expectancy	Retention Value
9	<i>Syzygium australe</i>	Low	Medium (15-40)	Low-Medium
10	<i>Stenocarpus sinuatus</i>	Medium	Medium (15-40)	Medium
11	<i>Magnolia grandiflora</i>	Medium	Medium (15-40)	Medium
12	<i>Cupressocyparys leylandii</i>	Low	Medium (15-40)	Low
13	<i>Cupressocyparys leylandii</i>	Low	Medium (15-40)	Low
14	<i>Cupressocyparys leylandii</i>	Low	Medium (15-40)	Low
15	<i>Cupressocyparys leylandii</i>	Low	Medium (15-40)	Low
16	<i>Cupressocyparys leylandii</i>	Low	Medium (15-40)	Low
17	<i>Cupressocyparys leylandii</i>	Low	Medium (15-40)	Low
18	<i>Cupressocyparys leylandii</i>	Low	Medium (15-40)	Low
19	<i>Cupressocyparys leylandii</i>	Low	Medium (15-40)	Low
20	<i>Cupressocyparys leylandii</i>	Low	Medium (15-40)	Low
21	<i>Cupressocyparys leylandii</i>	Low	Medium (15-40)	Low

TABLE 4: TREE RETENTION VALUES

7. Construction Impacts

All trees detailed below are identified on the attached TPZ/SRZ Plan.

- 7.1 Trees 1 and 5 are located within the neighbouring property (16 Boronia Rd. Bellevue Hill). Both trees have major encroachments proposed within their calculated TPZ's and SRZ's (see figure 2 below).

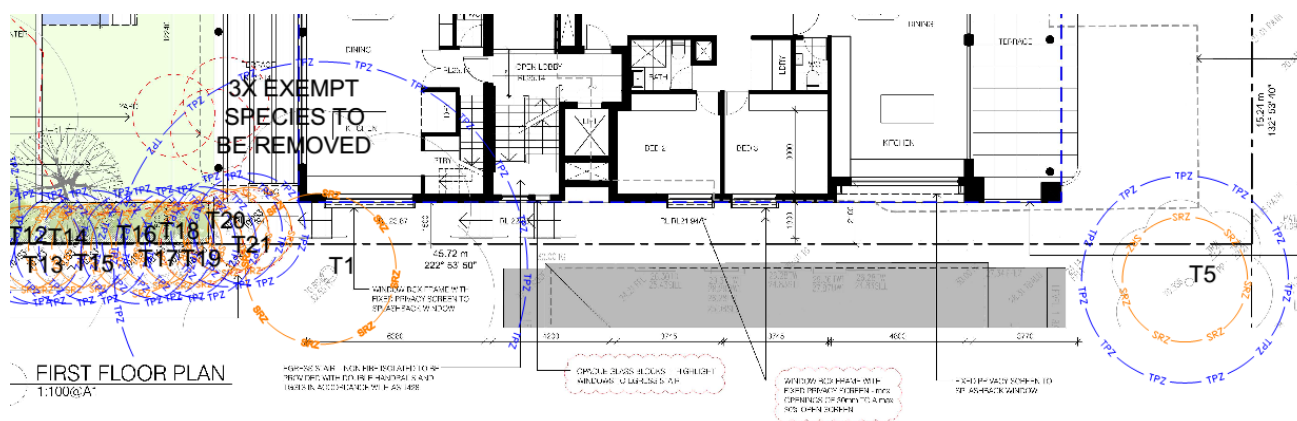


FIGURE 2: TREES 1 AND 5

- 7.2 Although encroachments are within the calculated TPZ and SRZ radii of trees 1 and 5, their root growth is expected to have been limited by existing structures adjacent to both trees. T1 is located within a raised garden bed retained by a concrete wall on the property boundary. T5 is also located within a retained garden bed adjacent to the existing laundry that extends to the property boundary. No detrimental impacts are expected from the proposed development due to the existing structures. TPZ encroachment considerations have been made in accordance with sections 3.3.4 (f) & (g) of AS4970 – 2009 Protection of trees on development sites (Consideration of topography and existing structures/obstacles that affect root growth).
- 7.3 Previous pruning of T5 to provide building clearance for the existing house on the subject site means that proposed encroachments to the canopy will be less than 10%. 3rd and 4th order branches <50mm in diameter will be required to be pruned to facilitate the proposed development.
- 7.4 Trees 2,3 & 4 are within the footprint of the proposed development and will be required to be removed to facilitate construction.
- 7.5 Trees 6,7,8 & 9 will have minor encroachments of <5% to their TPZ's from proposed landscaping. No detrimental impacts are expected from the proposed development. Trees 6,7,8 & 9 are to be retained and protected.
- 7.6 Trees 10 and 11 will have minor encroachments of <10% to their TPZ's from proposed landscaping. The Landscape Plan (Group Architects 11/03/2022) states "Maintain existing ground levels at boundaries to rear yard". No detrimental impacts are expected from the proposed development. Trees 10 and 11 are to be retained and protected.

- 7.7 Trees 12,13 & 14 will have minor encroachments of <5% to their TPZ's from proposed landscaping. No detrimental impacts are expected from the proposed development. Trees 12,13 & 14 are to be retained and protected.
- 7.8 Trees 15,16,17,18 & 19 have major encroachments proposed due to SRZ encroachment. (see figure 3 below).

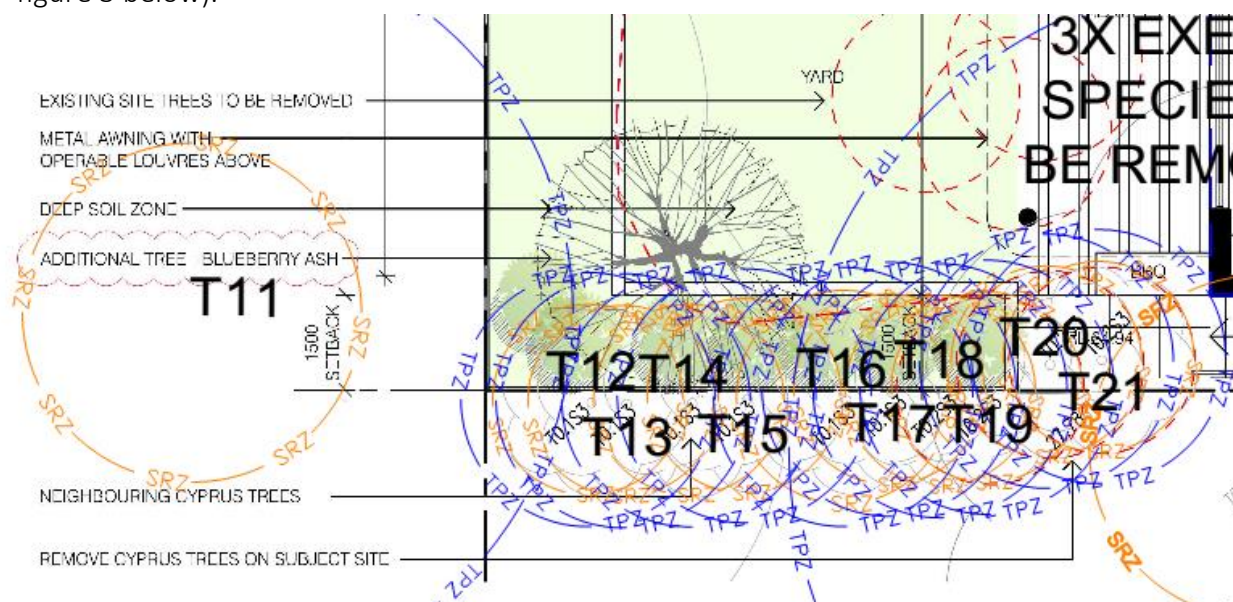


FIGURE 3: TREES 15,16,17,18 & 19

- 7.9 Although encroachments are within the calculated TPZ and SRZ radii of trees 15,16,17,18 & 19, their root growth is expected to have been limited by an existing retaining wall (shown dashed in red) and an existing pool equipment storage shed adjacent to the trees. No detrimental impacts are expected from the proposed development due to the existing structures. TPZ encroachment considerations have been made in accordance with sections 3.3.4 (f) & (g) of AS4970 – 2009 Protection of trees on development sites Consideration of topography and existing structures/obstacles that affect root growth).
- 7.10 Trees 20 & 21 are exempt species and are to be removed to facilitate the proposed development.

8. Documents used in the Preparation of this report

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

Document type	Source/ Author	Title	Date	Summary
Plan	Geo Strata	Survey Plan	23/05/2021 REV: 02 – 1/3/2022	Plan showing details and levels over 18 Boronia Rd Bellevue Hill, NSW 2023
Plan	Group Architects	Site Plan and Roof	11/03/2022	Plan showing detail of the proposed site at 18 Boronia Rd Bellevue Hill, NSW 2023
Plan	Group Architects	Garage and Ground floor plans	11/03/2022	Plan showing detail of the proposed Garage and Ground Floor at 18 Boronia Rd Bellevue Hill, NSW 2023
Plan	Group Architects	First Floor and Second Floor Plans	11/03/2022	Plan showing detail of the proposed first and second floor at 18 Boronia Rd Bellevue Hill, NSW 2023
Plan	Group Architects	Elevations	11/03/2022	Plans showing detail of the proposed Elevations at 18 Boronia Rd Bellevue Hill, NSW 2023
Plan	Group Architects	Sections	11/03/2022	Plans showing detail of the proposed sections at 18 Boronia Rd Bellevue Hill, NSW 2023
Plan	Group Architects	Landscape Plan	11/03/2022	Plans showing detail of the proposed landscaping at 18 Boronia Rd Bellevue Hill, NSW 2023 (TPZ's and SRZ's shown)
Plan Overlay	Graham Brooks Arboricultural Tree Services	TPZ & SRZ Plan	21/03/2022	Plan overlay showing Tree Protection Zones and Structural Root Zones to Scale.
Australian Standard	Standards Australia Limited	AS 4970-2009 Protection of trees on development sites.	2009	Guidelines for the protection of trees on development sites.

TABLE 5: DOCUMENTS USED IN THE PREPARATION OF THIS REPORT

9. Conclusion & Recommendations

- 9.1 The appointment of a project arborist (AQF Level 5) for the duration of the project, must be made prior to the commencement of any site works (including demolition), to provide arboricultural management during the construction process. Section 10 of this report details the tree protection process to be followed and specifications for tree protection measures.
- 9.2 The removal of Trees 2,3 & 4 (subject to approval from Woollahra council) will be required to facilitate the proposed development. The removal of trees 20 & 21 (exempt species) will also be required. Removal must be undertaken by a qualified Arborist (AQF 3) following the guidelines provided in the Amenity Tree Industry – Work Cover Code of Practice 1998 Safe work Australia’s “Guide to managing risks of tree trimming and removal work” (July 2016). All tree waste is to be removed from site including timber, mulch and stump grindings.
- 9.3 Trees 1 & 5 are to be retained and protected. Due to their location, no specific tree protection measures are recommended. Trees 6 – 19 are to be retained and protected. It is recommended that tree protection fencing and signage is installed prior to demolition/excavation for trees 16-19 in accordance with the specification provided in section 10.5 of this report. Tree protection fencing is to be installed at the top of the existing retaining wall within the TPZ’s that extend into the subject site. Due to site constraints tree protection fencing may not be able to be installed. In this instance, it is recommended that the TPZ is identified by an alternative method by the site arborist.
- 9.4 The project arborist is to supervise demolition and excavation works within the TPZ’s of any retained tree and conduct and document root pruning as necessary. Adventitious roots only are expected to be encountered due to existing structures within the TPZ.
- 9.5 T5 will require selective pruning of 3rd and 4th order branches <50mm in diameter to facilitate the proposed development. <10% of total canopy will be required to be removed. It is recommended that all pruning is in accordance with AS4373-2007 The Pruning of Amenity Trees.

Yours faithfully,
Arboricultural Tree Services Pty Ltd



Graham Brooks dip arb

Managing director

Arboriculture Australia Approved Consulting Arborist No: 1983 Member International Society of Arboriculture Mem No: 173140 ISA Tree Risk Assessment Qualified 2014-2019

10. Tree Protection Specification – As Per AS4970 – 2009

Tree Protection will be undertaken in the three stages listed below.

10.1 Pre - Development

10.1.1 Prior to any tree removal an AQF level 5 arborist must be engaged as site arborist to oversee all arboricultural aspects of the project including identifying trees for removal.

10.1.2 Tree protection should be installed by a minimum AQF level 3 arborist and be supervised by an AQF level 5 arborist in accordance with the guidelines from AS4970-2009 Protection of trees on development sites (Standards Australia, 2009), and the information provided in sections 10.4, 10.5 and 10.6 of this report.

10.1.3 All trees on site should be visually assessed and their current health and condition recorded. Tree protection measures should be inspected.

10.1.4 Certifying of Pre-Construction Tree Protection by the site arborist will conclude the pre-construction phase of development. It is recommended that Construction does not commence until Pre-Construction tree protection has been certified by the site arborist.

10.2 Development Stage

10.2.1 Tree protection measures must remain in place during this stage. They cannot be removed intermittently for access and any modifications to Tree Protection Fencing Location must be authorised, recorded and carried out by the site arborist.

10.2.2 The site arborist will conduct regular visits in accordance to visually assess and record the health and condition of the trees being retained for the duration of the development.

10.2.3 Tree protection measures will also be assessed regularly to ensure they are functioning correctly. Any maintenance required for Tree Protection measures will also be performed.

10.2.4 A stop work notice will be issued to the compliance officer if any Tree Protection Measures are not found to be complying with the Tree Protection Plan.

10.2.5 Any incidents relating to retained trees must be reported immediately to the site arborist to be documented and a plan for remediation put in place.

10.3 Conclusion of Development

10.3.1 Final visit from the site arborist to report on the health and condition of the trees that have been retained and the removal of tree protection. Incidents documented during the development stage will be included in this report.

10.3.2 Any remedial work necessary upon the completion of development will be recommended in the final report.

10.4 Tree Protection zone requirements

Tree Protection Zones (TPZs), will be set out before the commencement of construction works.

According to AS 4970-2009, activities excluded from the TPZ include but are not limited to:-

- (a) machine excavation including trenching
- (b) excavation for silt fencing
- (c) cultivation
- (d) storage
- (e) preparation of chemicals, including preparation of cement products
- (f) parking of vehicles and plant
- (g) refuelling
- (h) dumping of waste
- (i) wash down and cleaning of equipment
- (j) placement of fill
- (k) lighting of fires
- (l) soil level changes
- (m) temporary or permanent installation of utilities and signs
- (n) physical damage to the tree.

Source Australian Standard *AS 4970-2009 Protection of trees on development sites*.

A TPZ sign with contact details of the site arborist must be fixed to the TPZ fencing, see example below.



An Example of a TPZ sign.

Source, *Australian Standard AS 4970-2009 Protection of trees on development sites*

10.5 Tree Protection Fencing Requirements

10.5.1 Tree protection Fencing must be a minimum of 1.8 metres in height and be held in place with locking clamps and concrete feet between each panel, see Figure 2 below. All temporary fencing should also comply with AS 4687-2007 Temporary fencing and hoardings.



An Example of Temporary Fencing

11. References

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

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

Available at: www.iaca.org.au

[Accessed 19 June 2015].

NSW Government, 2017. *State Environmental Planning Policy (Vegetation in Non-Rural Areas)*. [Online]

Available at: <https://www.legislation.nsw.gov.au/#/view/EPI/2017/454/part1/cl3>

[Accessed 26th October 2017].

NSW Planning Portal, n.d. *Property Report*. [Online]

Available at: <https://www.planningportal.nsw.gov.au/propertyreports/a8290e8f-2215-47f2-9f19-a4359432e47c.pdf>

[Accessed 17th August 2021].

SIX Maps, n.d. [Online]

Available at: <https://maps.six.nsw.gov.au/>

[Accessed 17th August 2021].

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

[Accessed 27th December 2015].

Sydney City Council, 2012. *Sydney Local Environment Plan*. [Online]

Available at: <http://www.legislation.nsw.gov.au/maintop/view/inforce/epi+628+2012+cd+0+N>

[Accessed 9th March 2016].

12. Glossary of Terms

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

Age Class- assessment of the trees current age.

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

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

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

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

Height -estimated overall height of the tree.

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

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

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

Structural root zone (SRZ) – the structural root zone is the area required for the trees stability. A larger area is required to maintain a viable tree. The SRZ is only needed to be calculated when a major encroachment into the TPZ is proposed. There are many factors that affect the size of the SRZ (e.g. tree height, crown area, soil type, soil moisture).The SRZ may also be influenced by natural or built structures, such as rock and footings.

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

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

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

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

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

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

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

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

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

AGL – Above Ground level.

13. Relevant Appendices

Appendix 1 - STARS© Rating System

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

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

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

Tree Significance - Assessment Criteria



High Significance in landscape

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

Medium Significance in landscape

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

Low Significance in landscape

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

Environmental Pest / Noxious Weed Species

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

Hazardous/Irreversible Decline

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

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

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

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

Table 1.0 Tree Retention Value - Priority Matrix.

		Significance				
		1. High	2. Medium	3. Low		
		Significance in Landscape	Significance in Landscape	Significance in Landscape	Environmental Pest / Noxious Weed Species	Hazardous / Irreversible Decline
Estimated Life Expectancy	1. Long >40 years					
	2. Medium 15-40 Years					
	3. Short <1-15 Years					
	Dead					

Legend for Matrix Assessment



	Priority for Retention (High) - These trees are considered important for retention and should be retained and protected. Design modification or re-location of building/s should be considered to accommodate the setbacks as prescribed by the Australian Standard AS4970 <i>Protection of trees on development sites</i> . Tree sensitive construction measures must be implemented e.g. pier and beam etc if works are to proceed within the Tree Protection Zone.
	Consider for Retention (Medium) - These trees may be retained and protected. These are considered less critical; however their retention should remain priority with removal considered only if adversely affecting the proposed building/works and all other alternatives have been considered and exhausted.
	Consider for Removal (Low) - These trees are not considered important for retention, nor require special works or design modification to be implemented for their retention.
	Priority for Removal - These trees are considered hazardous, or in irreversible decline, or weeds and should be removed irrespective of development.

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

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

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

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