Arboricultural Impact Assessment and Tree Protection Plan

Lizzie the Arborist

Site Address:	2/-/DP536605 1 Mcpherson Avenue, Punchbowl NSW 2196
Client:	RESOLUT *On behalf of Bassim Omar*
LGA:	Canterbury Bankstown Council
Report Date:	26.NOV.2024
Inspection Date:	25.NOV.2024
Report REF#	2024.1125-001
Prepared by:	Elizabeth Cowan T/A – Lizzie the Arborist Diploma Arboriculture – AQF Level 5 0401 301 233 info@lizziethearborist.com.au ABN: 85 603 187 540

RESOLUT on behalf of Bassim Omar
1 Mcpherson Avenue
Punchbowl NSW 2196

25th November 2024

Our Reference #:2024.1125-001
Version #: 1

RE: Arboricultural Impact Assessment and Tree Protection Plan

The Arboricultural Impact Assessment and Tree Protection Plan for trees in proximity to proposed development works at 1 Mcpherson Avenue, Punchbowl NSW 2196 is enclosed.

The recommendations and guidelines within this report have been guided by the Australian Standard AS4970-2009 Protection of Trees on Development Sites. This report refers to this Australian Standard as AS4970-2009 and will provide the Section in reference to the information provided in italic and underlined.

Twelve Tree Data Table in Section 8 but not physically tagged per *AS4970-2009 Clause 4.5.2 Tree trunk and branch protection*. To assist with tree identification on site and to provide context for the discussion within this report please refer to the supporting images in Appendix 1. A Tree Protection / Management Plan has been provided in Appendix 2 that provides guidelines for the protection, monitoring and certification for trees suitable to be retained and protected per *AS4970-2009 Section 5 Monitoring and Certification (all)*.

Trees recommended for removal and replacement:
Trees # 1, 2, 7, 8, 9, 10, 11, and 12 (NOTE: Trees 7 and 12 are exempt species).

Trees recommended to be retained:
Neighbouring Trees # 3, 4, 5, and 6.

I appreciate the opportunity to be involved with your project and understand the importance of such assessments in the context of responsible and sustainable development within New South Wales. I am committed to providing you with the highest arboricultural expertise that works towards integration between trees and construction.

The use of this report is explicitly authorised under the conditions outlined in the accompanying Disclaimer and acknowledgment of Section 4: Limitations.

Please contact me with any questions on 0401 301 233 or info@lizziethearborist.com.au.

Yours sincerely

Elizabeth Cowan

Elizabeth Cowan
Consulting Arborist
AQF Level 5, Diploma Arboriculture
Registered QTRA user (No. 6654)

0401 301 233 | info@lizziethearborist.com.au
www.lizziethearborist.com.au | ABN: 85 603 187 540

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0401 301 233 | info@lizziethearborist.com.au
www.lizziethearborist.com.au | ABN: 85 603 187 540

1. Introduction

1.1 Lizzie the Arborist was commissioned by RESOLUT on behalf of Bassim Omar (the client) to produce this Arboricultural Impact Assessment and Tree Protection Plan for trees in proximity to proposed development work at 1 Mcpherson Avenue, Punchbowl NSW 2196 (the subject site). A ground-based Level 1 **V**isual **T**ree **A**ssessment (VTA) was conducted on Monday, 25th November 2024, by Elizabeth Cowan, AQF Level 5 Consulting Arborist, to collect the required site and tree information to produce this report.

1.2 The client intends to submit a Development Application with Canterbury Bankstown Council to demolish the existing structures on the site and construct five (5) units accessed via an access handle along the southern boundary of the site (see the Proposed Site Plan in Section 9).

1.3 The proposed plans are in proximity to mature trees and vegetation; as such, the client requested this report to identify the Arboricultural impacts the proposed development may have on the site and to provide recommendations for compliance with *AS 4970-2009 Protection of trees on development sites* with regard to tree protection, monitoring, and certification requirements.

1.4 Twelve (12) trees that meet the definition of a tree per the *Canterbury-Bankstown DCP 2023 – Chapter 2.3 Part 2.3* have been included in this report. Exempt trees per Part 2.5 of the DCP have been noted in the Arborist Comments column of the Tree Schedule in Section 8. No trees north of the subject site were surveyed due to the stormwater drainage infrastructure dividing the lots (see Appendix 1: Image 18). Exempt small vegetation were found on the subject site, primarily along the northern boundary adjacent to the existing secondary structure (see Appendix 1: Images 9, 10, 12, and 13). Neighbouring trees in the front yard of 3 McPherson Ave were not included in this report as they are located an adequate distance away from the proposed work and therefore are not impacted and do not require protection per *AS4970-2009 Section 4 Tree Protection Measures* (see Appendix 1: Images 2 and 3).

2. Legislation / Documents Reviewed

2.1 The following documents were supplied to produce this report and are included in Appendix 3.

NAME OF DOCUMENT	REV/DATE	AUTHOR
Proposed Multi Dwelling Housing DA Set	Rev H / 06.09.2024	RESOLUT
Stormwater Drainage Plan	19.08.2024	AE Consulting
Plan Showing Detail and Levels	03.05.2024	Masri Surveying Group Pty Ltd

Table 1: Documents provided to produce this report

2.2 The following legislative documents were researched to produce this report:

- Australia Standard: AS:4373-2007 *Pruning of amenity trees*
- Australia Standard: AS:4970-2009 *Protection of trees on development sites*
- Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)
- Canterbury Bankstown Development Control Plan 2023 (DCP)
- Canterbury-Bankstown Local Environmental Plan 2023 (LEP)
- State Environmental Planning Policy (Biodiversity and Conservation) 2021
- State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017
- Threatened Species Conservation Act 1995

3. Scope

3.1 The following activities summarise the scope of work carried out:

1. Review all site plans and site-specific planning controls.
2. Conduct a Level 1 **V**isual **T**ree **A**ssessment (VTA) of all trees within 5 m of development that meet the Canterbury Bankstown Council definition of a tree.
3. Discuss the potential development impacts from direct encroachment (defined *within AS4970-2009 3.3.1 Variations to the TPZ – General*) as machine trenching, excavation, and compacted fill) and indirect impacts (contamination, physical tree damage, root compaction, etc.). Discuss potential options to mitigate the impacts on trees.
4. Make recommendations for tree retention and/or tree removal for the consideration of Canterbury Bankstown Council when determining arboricultural-related conditions and provide a Tree Protection Plan that includes specifications for tree protection measures and tree-sensitive construction methods for each stage of the construction process.

0401 301 233 | info@lizziethearborist.com.au
www.lizziethearborist.com.au | ABN: 85 603 187 540

4. Limitations

4.1 This report is not intended to be a comprehensive Tree Risk Assessment Report, and the site assessment did not include penetrative/internal tree part testing, diagnostic testing, tree aerial assessment, soil testing, root mapping, or underground tree part assessment unless specifically stated.

4.2 Only what was accessible at the time of the site inspection was assessed. Therefore, assessment of tree health and structure was limited to the observations from ground level on the above-ground parts of each tree on that particular occasion. Where trees on adjoining sites have been assessed, all dimensions have been estimated unless otherwise specified.

5. Method

5.1 Tree Data Collection

5.1.1 Elizabeth Cowan (AQF Level 5 Arborist) conducted a Level 1 **V**isual **T**ree **A**ssessment (VTA) from ground level on Monday, 25th November 2024. Tree locations were geo-located using a Garmin eTrex 22X handheld data collector, and tree data was collected with written notes. All trees have been numbered in the Tree Data Table in Section 8 but not physically tagged per the Australian Standard *AS 4970-2009 Section 4.5.2* Tree trunk and branch protection. The data collected included:

- Tree species
- Tree location
- Approximate height (m)
- Approximate crown spread (m)
- Diameter at Breast Height (mm) (DBH)
- Diameter at Base (mm) (DAB)
- Tree age class
- Tree health and vigour
- Tree structure
- Tree defects
- Estimated Life Expectancy (ELE)
- Tree Significance & Retention value (STARS)

5.1.2 The VTA method is based on observing trees' biological and mechanical characteristics and is designed to detect and diagnose defects and weaknesses in tree structure. The VTA method is a step-by-step process for observing and interpreting the signs and symptoms of tree defects. Where required, further testing may be required that includes various diagnostic tools and techniques, such as using sonic and resistance measurements to detect decay. More information on VTA is available in Appendix 5.

5.1.3 Diameter at Breast Height (DBH) was measured at 1.4m from ground level, and Diameter at Base (DAB) was measured over bark at ground level, using diameter tape where access permitted. Heights and crown spreads referenced are approximations unless otherwise stated.

5.1.4 Any photographs within this report were taken by Elizabeth Cowan using an iPhone 15 Pro. Photographs may have been altered to adjust brightness and clarity only. Other images within this report may have been sourced online and referenced.

5.2 Tree Significance and Retention Values

5.2.1 A high, medium, or low retention value rating has been allocated to each subject tree using the Institute of Australian Consulting Arborists' (IACA) Significance of a Tree Assessment Rating System (STARS). In the development of this document, IACA acknowledges the contribution and original concept of the Footprint Green Tree Significance & Retention Value Matrix, developed by Footprint Green Pty Ltd and Andrew Morton in June 2001. The full method is listed in Appendix 5.

RETENTION VALUE	DESCRIPTION
HIGH ***Priority for Retention***	These trees are considered important for retention and should be retained and protected. Design modification or relocation of building/s should be regarded as accommodating the setbacks as prescribed by the Australian Standard AS4970 Protection of trees on development sites. Tree-sensitive construction measures, e.g., pier and beam, etc., must be implemented if works are to proceed within the Tree Protection Zone.
MEDIUM ***Consider for Retention***	These trees may be retained and protected. They are considered less critical; however, their retention should remain a priority, with removal considered only if it adversely affects the proposed building/works and all other alternatives have been considered and exhausted.
LOW ***Consider for Removal***	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, in irreversible decline, or weeds and should be removed irrespective of their development.

Table 2: Tree Retention Value Definitions (STARS).

0401 301 233 | info@lizziethearborist.com.au
www.lizziethearborist.com.au | ABN: 85 603 187 540

5.3 Tree Vigour and Structure

5.3.1 The vigour and structure of each subject tree have been classified as Very Good, Good, Fair, or Poor per the below classifications. Observations have been listed within the Notes column of the Tree Data Table.

CLASSIFICATION	VIGOUR	STRUCTURE
Very Good	Form typical of species, normal foliage size, colour and density, no pests or disease, no deadwood or epicormic shoots.	Good structural integrity, no evidence of instability, no defects or damage
Good	Form typical of species, normal foliage size, colour and density, no pests or disease, little deadwood and epicormic shoots.	Good structural integrity, minor structural defects that can be remedied
Fair	Form typical of species, fair health and vigour, maybe slightly thinning/sparse, moderate levels of deadwood and epicormic shoots, low to moderate pest and disease.	Fair structural integrity, minor-moderate defects that can be remedied or managed
Poor	Abnormal foliage size, colour and density, major levels of deadwood and epicormic shoots, moderate to severe pest infestation	Poor structural integrity, major structural defects that cannot be remedied

Table 3: Lizzie the Arborist Tree Vigour and Structure Rating Definitions

5.4 Methodology of the Arboricultural Impact Assessment

5.4.1 AS4970-2009 provides guidelines on how an Arborist is to determine if, and to what extent, a tree will be impacted by nearby development work, how to protect trees, and what monitoring and certification is required. These guidelines take into account the canopy spread of the tree, the position of the tree trunk, the likely location of roots, the age and vigour of the tree, and the species tolerance to construction stress. Most of these variables can be determined from above ground level except the number, size, and distribution of the tree's physical roots. A common misconception is that a tree root system extends to the dripline of the canopy (the outer edges), but in reality, it develops must further past this point and is influenced by variables such as rocks, underground infrastructure, and existing hard stands that may limit root growth potential from reduced water, oxygen, and nutrients. It is the role of the Arborist to calculate the estimated root area using *AS4970-2009 Section 3.2 Determining the Tree Protection Zone (TPZ).*

5.4.2 According to Mark Hartley from The Arborist Network (2024), there are four (4) stages of root development that comprise a TPZ area including;

1. Pioneer roots (growing into new soil)
2. Absorbing roots (absorbs water and nutrients)
3. Woody roots (underground branches)
4. Structural roots (woody roots that provide direct support to the tree)

5.4.3 The radius of the TPZ is calculated for each tree by multiplying its DBH x 12 per *AS4970-2009 Clause 3.1 Tree Protection* Zone and is the radial area around each tree trunk where all four of these roots are likely to be located. If the proposed encroachment is less than 10% of the area of the TPZ and is outside the Structural Root Zone (SRZ), detailed root investigations should not be required, and the impact is considered manageable in conjunction with the guidelines of *AS 4970-2009 Section 4 Tree Protection Measures and Section 5 Monitoring and Certification.* The area lost to the encroachment should be compensated for elsewhere and contiguous with the TPZ.

5.4.4 The radius of the SRZ is calculated where more than 10% of the TPZ will be encroached as a result of the proposed work per *AS4970-2009 Section 3.3.5 Structural Root Zone (SRZ).* This Arboricultural Impact Assessment will report on and display the SRZ area for every tree regardless of the proposed encroachment as has become the expectation from Council's. The SRZ is calculated as *(Diameter (m) measured above the root buttress* x 50)042 x 0.64. This is only an indicative radial area in which the Structural Roots (#4 from Section 5.4.2) are located. There are many factors that affect the size of the SRZ (e.g. tree height, crown area, soil type, soil moisture). The SRZ may also be influenced by natural or built structures, such as rocks and footings. The SRZ is the area required for tree stability and therefore no encroachment into this area is permissible without detailed root investigations.

5.4.5 Should the encroachment into the TPZ of any tree be more than 10% of the area, or is within the SRZ area, then the Arborist considers its retention value and if the loss of the tree is easily replaceable. If the tree has significance to the site, and efforts are worthwhile to retention the tree, then *AS 4970-2009 Clause 3.3.4 TPZ Encroachment Considerations* states that the Arborist must assess the following considerations:

0401 301 233 | info@lizziethearborist.com.au
www.lizziethearborist.com.au | ABN: 85 603 187 540

a) Location and distribution of the roots to be determined through non-destructive investigation methods (pneumatic, hydraulic, hand digging or ground penetrating radar). Photographs should be taken and a root zone map prepared for inclusion as an appendix to the Arboricultural Impact Assessment.
NOTE: Regardless of the method, roots must not be cut, bruised or frayed during the process. It is imperative that exposed roots are kept moist and the excavation back filled as soon as possible.
b) The potential loss of root mass resulting from the encroachment: number and size of roots.
c) Tree species and tolerance to root disturbance.
d) Age, vigour and size of the tree.
e) Lean and stability of the tree.
NOTE: Roots on the tension side are likely to be most important for supporting the tree and are likely to extend for a greater distance.
f) Soil characteristics and volume, topography and drainage.
g) The presence of existing or past structures or obstacles affecting root growth.
h) Design factors.

5.5 Tree Protection Measures

5.5.1 The Tree Protection / Management Plan is a preliminary document provided for Canterbury Bankstown Council to review when determining the tree removal and retention schedule. The Tree Protection / Management Plan has been guided by the principals of *AS4970-2009 Section 5 Monitoring and Certification*.

5.5.2 The Tree Protection Measures Map has been created in QGIS at a scale of 1:200 (or otherwise stated). The provided plans have been overlaid to create one plan showing all proposed works for the purposes of determining proposed encroachment. Each tree is represented on the map with a circle marker and the applicable tree protection method is drawn up to scale i.e. TPZ Fencing, Trunk and Branch Protection, and/or Ground Protection.

5.5.3 All Tree Protection Measures recommended have been guided by *AS4970-2009 Section 4 Tree Protection Measures*. All Project Arborist inspections, monitoring, supervision, and compliance recommendations have been guided by *AS4970-2009 Section 5 Monitoring and Compliance.*

0401 301 233 | info@lizziethearborist.com.au
www.lizziethearborist.com.au | ABN: 85 603 187 540

6. Site Context

6.1 Site Details

Address:	1 Mcpherson Avenue, Punchbowl NSW 2196
Lot/Section/DP:	2/-/DP536605
Council:	Canterbury Bankstown Council
Zoning:	R3: Medium Density Residential
Lot Size:	1,453 m^2
Relevant Planning Controls:	• Canterbury Bankstown Development Control Plan 2023 (DCP) • Canterbury-Bankstown Local Environmental Plan 2023 (LEP) • State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017

Image 1: 1 Mcpherson Avenue, Punchbowl NSW 2196 local context (Six Maps 2024)

6.2 Soil and Vegetation Profile

6.2.1 The subject site is located on the Blacktown Soil landscape. Soils are expected to be shallow to moderately deep (<100 cm) Red and Brown Podzolic Soils (Dr3.21, Dr3.11, Db2.11) on crests, upper slopes and well-drained areas; deep (150?300 cm) Yellow Podzolic Soils and Soloths (Dy2.11, Dy3.11) on lower slopes and in areas of poor drainage.

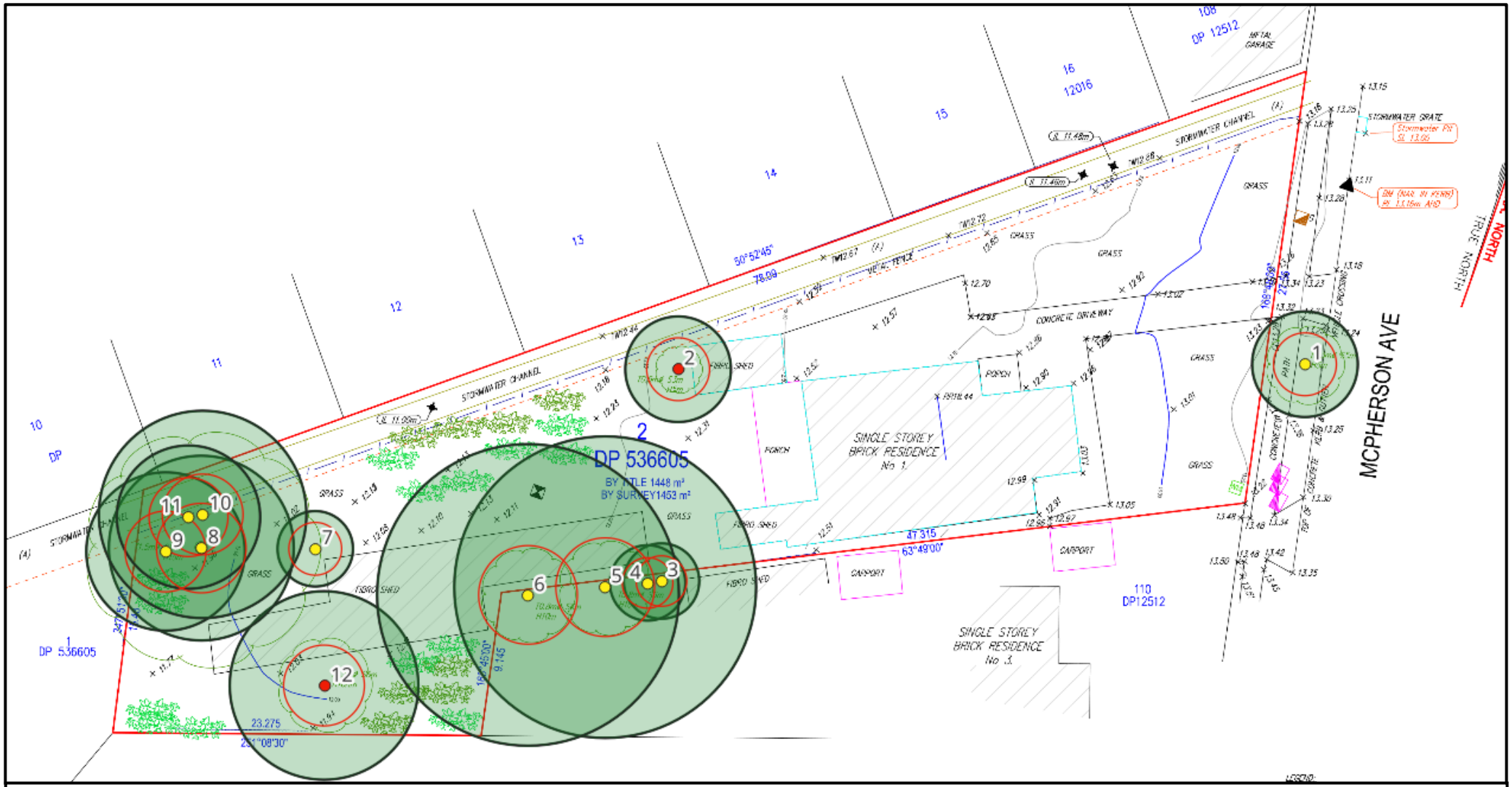
6.2.2 The original vegetation profile is almost completely cleared of tall open-forest (wet sclerophyll forest) and open-woodland (dry sclerophyll forest). The original woodland and open-forest in drier areas to the west were dominated by *Eucalyptus tereticornis*, *Eucalyptus crebra* and *Eucalyptus moluccana*. This has been almost completely cleared.

6.3 Legislative Requirements for Tree Works

6.3.1 The approval of Development Applications that include tree pruning, tree removal, and/or root pruning, is determined by Canterbury Bankstown Council against the requirements of the Canterbury Bankstown Development Control Plan 2023 (DCP) and the State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017. Where additional planning instruments are applicable, Canterbury Bankstown Council may refer the Development Application for further assessment to relevant government bodies, i.e. for tree removal in significant biodiversity areas.

0401 301 233 | info@lizziethearborist.com.au
www.lizziethearborist.com.au | ABN: 85 603 187 540

7. Tree Location Map



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Address:	1 Mcpherson Avenue, Punchbowl NSW 2196
Client Name:	RESOLUT on behalf of Bassim Omar
Council LGA:	Canterbury Bankstown Council
Author:	Elizabeth Cowan **Scale:** 1:350 Date:26.11.2024

0401 301 233
info@lizziethearborist.com.au
www.lizziethearborist.com.au
ABN: 85 603 187 540

MAP LEGEND ©	
High Retention Value Tree	Tree Protection Zone (TPZ)
Med Retention Value Tree	Structural Root Zone (SRZ)
Low Retention Value Tree	
Remove Tree	

8. Tree Schedule

8.1 The below table lists the trees assessed for the purpose of producing this report. The table includes all trees that meet the definition of a tree per the DCP 2023 – Chapter 2.3 Part 2.3. Where trees are exempt per Part 2.5 of the DCP this has been noted in the Arborist Comments column.

Tree Information					Tree Dimensions						Tree Condition						STARS ©		Arborist Comments
Tree #	Botanical and Common Names	Location	Species Type	Protected?	Height (m)	Spread (m)	DBH (mm)	DAB (mm)	TPZ Radius (m)	SRZ Radius (m)	Age Class	Pest / Disease	Pruning Works	Overall Vigour	Overall Structure	Significance	Est. Life Expectancy	Retention Value	
1	*Tristaniopsis laurina* (Water Gum)	Council tree	N	Yes	5	4	280	300	3.36	2.00	M	N	N	G	G	M	M	M	No defects noted. See Appendix 1 Image 1
2	*Olea europaea* (Olive Tree)	Site	Ex	Yes	7	5	280	300	3.36	2.00	M	N	N	G	F	L	M	L	Resting on fibro shed. See Appendix 1 Image 4
3	*Camellia oleifera* 'Abel' (Tea Oil Camellia)	3 McPherson Ave	Ex	Yes	8	2	200	180	2.40	1.61	M	N	N	G	G	M	M	M	Trees 3 – 6 are neighbouring trees. No access was permitted, therefore, all measurements are estimated and/or taken from the provided site survey. See Appendix 1 Images 5 - 8
4	*Camellia oleifera* 'Abel' (Tea Oil Camellia)	3 McPherson Ave	Ex	Yes	8	2	200	180	2.40	1.61	M	N	N	G	G	M	M	M	
5	*Syzygium paniculatum* (Magenta Lilly Pilly)	3 McPherson Ave	N	Yes	14	6	550	800	6.60	3.01	M	N	N	G	G	M	M	M	
6	*Syzygium zeylanicum* (Spicate Eugenia)	3 McPherson Ave	N	Yes	12	6	550	800	6.60	3.01	M	N	N	G	G	M	M	M	
7	*Musa x paradisiaca* (Edible Banana)	Site	Ex	No	5	7	200	200	2.40	1.68	M	N	N	G	G	L	M	L	*EXEMPT TREE SPECIES* No defects noted. See Appendix 1 Image 11
8	*Melaleuca alternifolia* (Narrow-Leaved Paperbark)	Site	N	Yes	15	12	490	700	5.88	2.85	M	Y	Y	F	F	M	M	M	Some borer activity, invasive vine growing on trunk, thinning crown, limited access to base and trunk due to site conditions. See Appendix 1 Image 14-16
9	*Melaleuca alternifolia* (Narrow-Leaved Paperbark)	Site	N	Yes	8	4	420	550	5.04	2.57	M	Y	Y	F	F	M	M	M	Leaning to rear , some borer activity, thinning crown, invasive vine growing on trunk and on canopy, limited access to base and trunk due to site conditions. See Appendix 1 Image 14-16
10	*Melaleuca alternifolia* (Narrow-Leaved Paperbark)	Site	N	Yes	14	10	550	550	6.60	2.57	M	Y	Y	F	F	M	M	M	Leaning north, thinning crown, limited access to trunk and base due to site conditions. See Appendix 1 Image 14-16

0401 301 233 | info@lizziethearborist.com.au
www.lizziethearborist.com.au | ABN: 85 603 187 540

11	*Melaleuca alternifolia* (Narrow-Leaved Paperbark)	Site	N	Yes	14	8	380	520	4.56	2.51	M	Y	Y	F	F	M	M	M	Co-dominant stems with included bark union at 1 m, thinning crown, limited access to the trunk and base due to site conditions. *See Appendix 1 Image 14-16*
12	*Ligustrum lucidum* (Broad-Leaved Privet)	Site	Ex	No	10	6	500	550	6.00	2.57	M	N	N	G	G	L	M	L	*EXEMPT TREE SPECIES* No defects noted however access was limited. *See Appendix 1 Image 18*

Table 4: Tree Data Table

8.2 Exempt small vegetation were found on the subject site, primarily along the northern boundary adjacent to the existing secondary structure. This included;

- *Anredera cordifolia* (Madeira-Vine)
- *Cestrum parqui* (Chilean Jessamine) – dominant species
- *Morus rubra* (Red Mulberry)
- *Melia azedarach* (Persian Lilac)
- *Triadica sebifera* (Popcorntree)

Tree Information:
Species Type: N = Native to Australia | En = Endemic to LGA | Ex = Exotic | W = Weed
Protected: Y = Requires an approved permit to remove or significantly prune | N = Exempt

Tree Dimensions:
Height (m) & Canopy Spread (m) = Measured with a range finder
DBH = *Diameter at breast height* (1.4m)
DAB = *Diameter at base*
TPZ Radius (from the centre of the tree trunk) = *Tree Protection Zone* (refer to 5.2.1)
SRZ Radius (from the centre of the tree trunk) = *Structural Root Zone* (refer to 5.2.2)

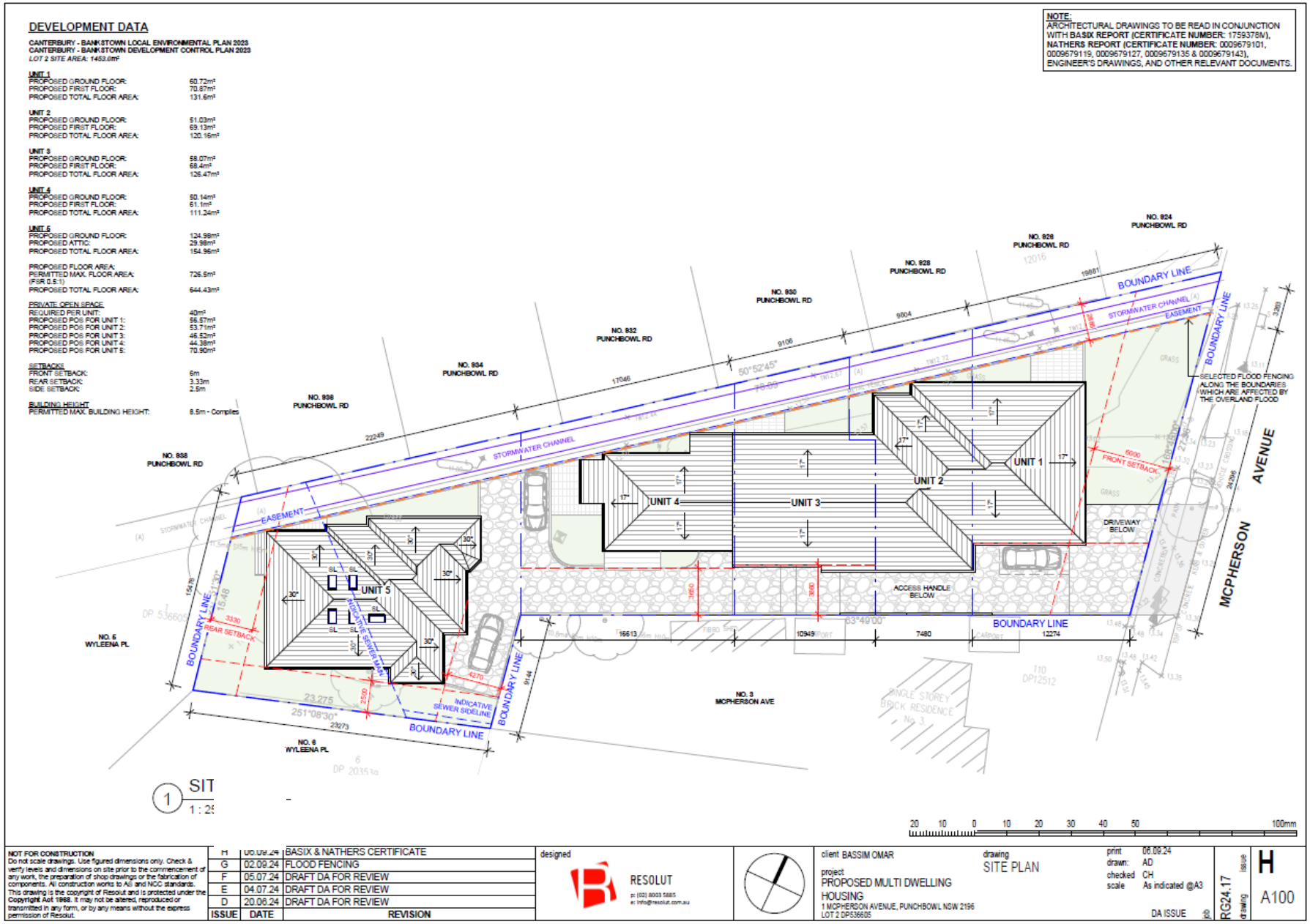
Tree Condition:
Vigour: VG = Very Good | G = Good | F = Fair | P = Poor
Structure: VG = Very Good | G = Good | F = Fair | P = Poor
Age Class: Immature = <20% of life expectancy for species | Semi-mature = 20-50% of life expectancy for species | Mature = 50-80% of life expectancy for species | Over-mature = >80% of life expectancy for species

Tree Condition:
Pruning: DP = Pruning causing damage | HP = Heavily Pruned | PP = Previously Pruned Within Tolerable Limits | LC = Pruned for powerline clearance

STARS©: IACA Significance of a Tree, Assessment Rating System (STARS):
Estimated Life Expectancy: Long = > 40 years | Medium = 15 - 40 years | Short = 5 - 15 years
Retention Value (STARS ©): High = priority for retention | Medium = may be retained and protected, considered less critical | Low = not considered important for retention

0401 301 233 | info@lizziethearborist.com.au
www.lizziethearborist.com.au | ABN: 85 603 187 540

9. Proposed Plans



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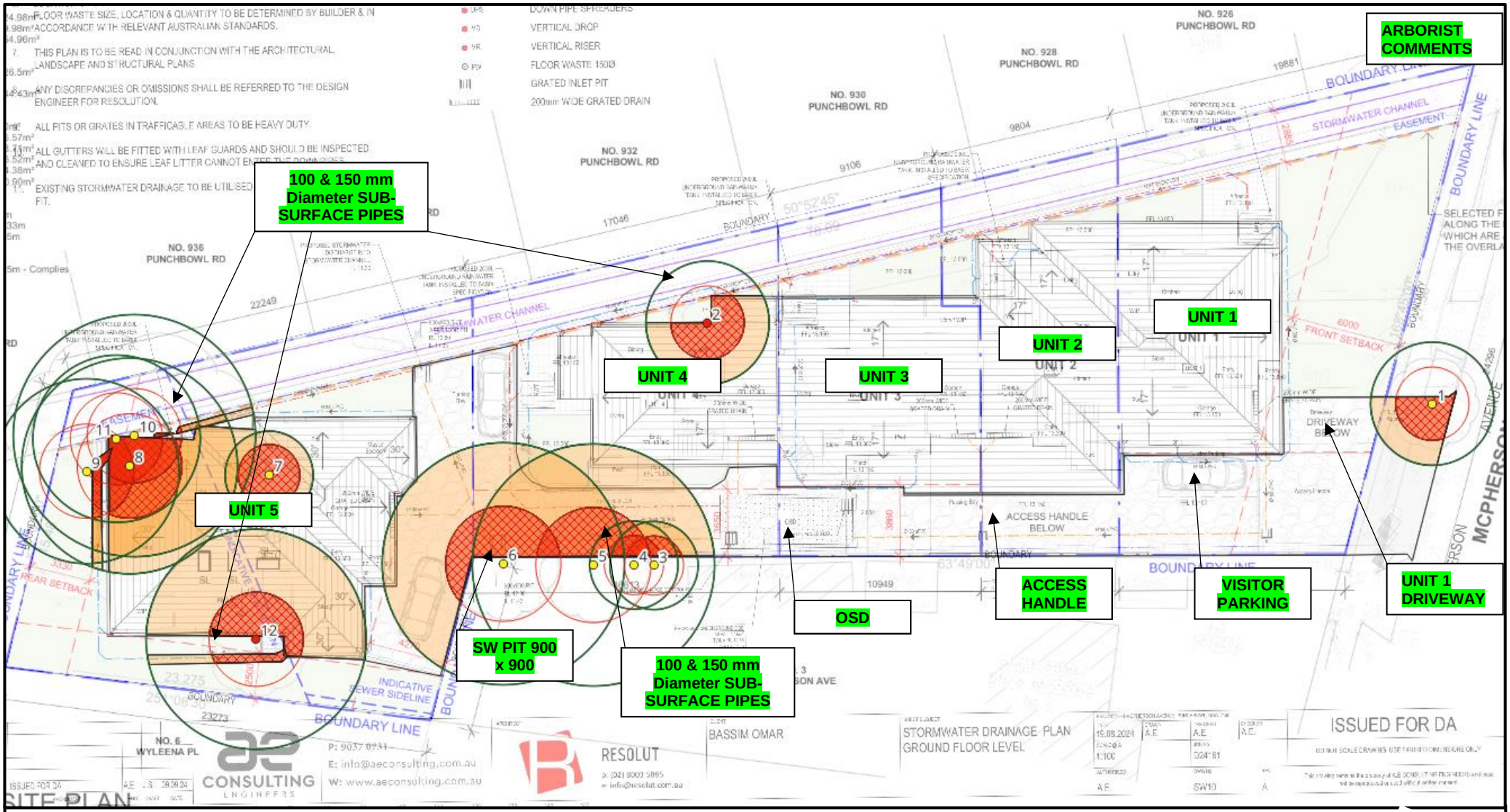
www.lizziethearborist.com.au | ABN: 85 603 187 540

10. Impact Assessment Map



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Address:	1 Mcpherson Avenue, Punchbowl NSW 2196		
Client Name:	RESOLUT on behalf of Bassim Omar		
Council LGA:	Canterbury Bankstown Council		
Author:	Elizabeth Cowan	**Scale:** 1:230	Date: 26.11.2024

0401 301 233
info@lizziethearborist.com.au
www.lizziethearborist.com.au
ABN: 85 603 187 540

MAP LEGEND ©	
High Retention Value Tree	Tree Protection Zone (TPZ)
Med Retention Value Tree	Structural Root Zone (SRZ)
Low Retention Value Tree	Canopy Area (if required)
Remove (weed/hazard/exempt)	TPZ Encroachment Area
	SRZ Encroachment Area

Lizzie the Arborist

11. Impact Assessment Schedule

TREE #	VARIATIONS PROPOSED TO THE TPZ/SRZ/CROWN			SUITABILITY TO BE INTEGRATED INTO DEVELOPMENT WORKS	PROPOSED FOR REMOVAL OR RETENTION
	POTENTIAL ENCROACHMENT	TPZ %	SRZ %		
High Retention Value Trees					
N/A					
Medium Retention Value Trees					
1	This mature *Tristaniopsis laurina* (Water Gum) is a council street tree located inside the footprint of the proposed driveway for Unit 1.	100%	100%	This tree would need to be removed if the plans are approved in their current format. Depending on other planning controls, it may be possible to retain the tree by decreasing the width of the driveway from the north so that it is as wide as the access handle only, and moving the garage and driveway for Unit 1 to the north side of the unit, as opposed to the south side.	Remove and replace
3, 4	These mature *Camellia oleifera* 'Abel' (Tea Oil Camellia) are neighbouring trees located flush against the existing fence west of the subject site. They weren't included on the survey, likely because their trunks are hidden and their canopy span is shared with trees 5 and 6. Trenching to install a 100 mm diameter SW uPVC underneath a new driveway is proposed. These works will occur within the footprint of the existing secondary structure which has a concrete slab to be removed.	36.14%	29.90%	Although the encroachment is major per *AS4970-2009 Clause 3.3.3 Major Encroachment*, non-destructive root mapping is not possible due to the existing hard stands within the locations proposed to be trenched and developed into units and driveway. These hardstands are likely to have influenced the development of SRZ areas per *AS4970-2009 Clause 3.3.5 Structural Root Zone (SRZ).* Instead, it will be recommended that the trees and works inside their TPZ areas be monitored by a Project Arborist throughout and beyond the development. This allows the health and condition of the trees to be monitored on an ongoing basis, and for the supervision of key work inside the TPZ areas (e.g. demolition, stormwater/drainage installation, construction, and landscaping), so that the impact the works may have on the trees is managed in stages using best-practices for tree protection. Tree-sensitive methods to manage this impact include; - Removal of secondary structure concrete slab under the supervision of a Project Arborist to monitor for significant roots that require protection or roots that require remedial pruning. - Non-destructive root exploration conducted by an AQF Level 5 Arborist post-removal of the secondary structure to determine if any significant tree roots exist. Root protection and watering. Installation of ground protection per *AS4970-2009 Clause 4.5.3 Ground Protection.*	Protect with ongoing supervision, monitoring, and compliance checks by a Project Arborist.
5	This mature *Syzygium paniculatum* (Magenta Lilly Pilly) is a neighbouring tree located flush against the existing fence west of the subject site. Trenching to install a 100 mm diameter SW uPVC and a 150 mm diameter overflow pipe underneath a new driveway is proposed as well as the construction of a small part of Unit 4 including the front landscape area. These works will occur within and beyond the footprint of the existing secondary structure which has a concrete slab to be removed.	45.46%	40.48%		
6	This mature *Syzygium zeylanicum* (Spicate Eugenia) is a neighbouring tree located flush against the existing fence west of the subject site. Trenching to install a 100 mm diameter SW uPVC and a 150 mm diameter overflow pipe underneath a new driveway is proposed as well as the construction of a small part of Unit 5.	60.47%	49.29%		

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	These works will occur within and beyond the footprint of the existing secondary structure which has a concrete slab to be removed.			- Project Arborist supervision of excavation to install the 100 & 150 mm diameter SW pipes. Method of excavation depends on the number, size, and location of roots found during the non-destructive root exploration. - Supervision of the driveway construction. Permeable concrete / paving is not considered a requirement for root vitality in this context as any tree roots that exist under the current hardstands are already under non-permeable concrete slab. However, a paved driveway or permeable concrete driveway is considered a preferred option to allow water and oxygen to filter to the soils below. - If there is non-compliance with tree protection measures or if trees have been damaged, a timeframe for compliance and remedial works should be specified by the Project Arborist.	
8, 9, 10, 11	These mature *Melaleuca alternifolia* (Narrow-Leaved Paperbark) that appear to be somewhat growing from a lignotuber base. These trees are in varying states of vigour. The trees are inside the footprint of Unit 5.	100%	100%	These trees would require removal if the plans are approved in their current format.	Remove and replace
Low Retention Value Trees					
2	This mature *Olea europaea* (Olive Tree) is located west of the existing fibro shed. It is located inside the footprint of Unit 2.	100%	100%	This tree would require removal if the plans are approved in their current format.	Remove and replace
7	This mature *Musa x paradisiaca* (Edible Banana) is an exempt tree located within the footprint of Unit 5.	100%	100%	This tree would require removal if the plans are approved in their current format.	Remove and replace
12	This mature *Ligustrum lucidum* (Broad-Leaved Privet) is an exempt tree located within the footprint of Unit 5.	100%	100%	This tree would require removal if the plans are approved in their current format.	Remove and replace

Table 5: Tree Impact Assessment Table

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12. Discussion / Results

12.1 The Arboricultural Impact Assessment

12.1.1 Variations to the TPZ, SRZ and Crown areas resulting from the proposed development are visually mapped in *Section 11 Impact Assessment Map* and discussed in *Section 12 Discussion*. This has been completed by finding the intersection between established tree roots (*Section 5.5 Impact Assessment Method*), and proposed encroachment has been highlighted.

12.1.2 The methodology used to produce the Arboricultural Impact Assessment is detailed in *Section 5.4.*

12.2 How Trees on Development Sites can be Damaged (AS4970-2009 B3)

12.2.1 Urban tree canopy and green cover play an important role in creating healthy, cooler and liveable neighbourhoods (NSW Government Planning 2024). A living tree is a dynamic organism that needs specific environmental conditions to continue healthy, stable growth.

12.2.2 Tree protection must be taken into account at the earliest planning stage. Most trees will take many years and possibly decades to establish but can be injured or killed quickly as their vulnerability is commonly misunderstood. This is especially true concerning tree root systems that cannot usually be seen.

12.2.3 Successful long-term retention of trees on development sites depends on accepting and acknowledging the constraints and benefits that existing trees generate (AS4970-2009). Protecting trees per AS4970-2009 may influence design and construction costs, which should be considered in project budgets and contracts. Procedures must be in place to protect trees at every stage of the development process.

12.2.4 **Potential for Crown Damage:** The canopy of trees can be directly or indirectly damaged. Usually, foliage may be lost or damaged on development sites by pruning or mechanical injury by trucks, cranes, excavators and so on. The removal of leaves reduces the level of photosynthesis and thus the production of sugars. This in turn reduces the tree's capacity to function normally and to withstand stresses imposed by a change in its environment. Incorrect techniques of pruning such as lopping or flush cutting may produce wounds that are susceptible to infection by wood decay organisms. Similarly, mechanical damage to branches by machinery, etc. will also create wounds. Trees automatically respond to wounding and in doing so use stored sugars. Any wound places an additional load on trees that will inevitably be stressed during construction.

12.2.5 **Potential for Trunk Damage:** Trunks of trees may be wounded mechanically during demolition and construction work. This not only predisposes a tree to potential decay, but it also interferes with the transport of water, nutrients and sugars throughout the tree. Serious impacts may structurally weaken the tree.

12.2.6 **Potential for Root Damage:** Root damage is the most common cause of damage to trees on development sites. Roots are far more extensive and closer to the surface than commonly thought. Roots can be damaged in the following ways:

(a) Removed during grading, excavation and trenching for foundations services, etc.
(b) Mechanically wounded, crushed or torn .
(c) Compaction by machinery, storage of materials, and installation of work sheds.
(d) Soil buildup.
(e) Laying of pavements.
(f) Chemical contamination of the soil by solvents, fuel, oil, diesel, herbicides, cement waste, etc.
(g) Changes in air levels through changes in drainage patterns.
(h) Changes in available water.

Apart from the actual removal of roots during excavation or trenching, soil compaction is one of the major causes of root damage on development sites. Compaction is defined as the loss of large pore spaces (macropores) within the soil with a net loss of total pore space. Macropores are essential for the exchange of gases between the soil air and the atmosphere (aeration) and the removal of excess water from the soil (drainage).

Compaction results from loads or stress forces applied to the soil as well as shear forces. Both foot traffic and vehicle traffic exert both forces on soils. Vehicle traffic may cause significant compaction at depths of 150-200 mm (the area in which most absorbing roots are located). The degree of compaction will depend on weight of vehicles, number of movements, soil moisture levels and clay content. Soil handling, stockpiling and transporting also tend to lead to the breakdown of soil structure and thus to compaction. Vibration as a result of frequent traffic or adjacent construction activities will also compact soils. The effects of compaction include-

(a) reduced aeration (oxygen levels decrease and carbon dioxide concentration increases to perhaps toxic levels);
(b) low oxygen levels discourage root growth and thus the uptake of water and nutrients;
(c) reduced infiltration of water into the soil and more run-off;
(d) increased run-off increases soil losses by erosion;
(e) low oxygen levels also lead to chemical changes 111 the soil which can reduce the availability of some plant nutrients; and
(f) the reduction in the number and diversity of beneficial soil organisms (including mycorrhizal fungi).

The effects of root loss or damage by any means could include;

(a) loss of stability if structural woody roots or even lower order woody roots are cut;
(b) reduction in water and nutrient uptake;
(c) an eventual loss of leaves, reduced photosynthesis is and thus sugar production;
(d) decay as a result of wounding; and
(e) predisposition to soil borne pathogens.

12.3 Trees with Major Encroachment:

12.3.1 The following trees will incur a major development encroachment as a result of the proposed development works:

Tree #	Retention Value	Encroachment	Recommendation
1	Medium	Major	Remove and replace
2	Low	Major	Remove and replace
3	Medium	Major	Manage under the supervision of a Project Arborist
4	Medium	Major	Manage under the supervision of a Project Arborist
5	Medium	Major	Manage under the supervision of a Project Arborist
6	Medium	Major	Manage under the supervision of a Project Arborist
7	Low	Major	Remove
8	Medium	Major	Remove and replace
9	Medium	Major	Remove and replace
10	Medium	Major	Remove and replace
11	Medium	Major	Remove and replace
12	Low	Major	Remove

Table 6: Trees with a Major Encroachment per AS4970-2009 Section 3.3.3 Major Encroachment

12.3.2 Tree 1 is a mature *Tristaniopsis laurina* (Water Gum) is a council street tree located inside the footprint of the proposed driveway for Unit 1. This tree would need to be removed if the plans are approved in their current format. Depending on other planning controls, it may be possible to retain the tree by decreasing the width of the driveway from the north so that it is as wide as the access handle only, and moving the garage and driveway for Unit 1 to the north side of the unit, as opposed to the south side. Refer to Image 1 in Appendix 1.

12.3.3 Trees 2, 7, and 12 all require removal for the proposed work to proceed and have a low retention value. These trees will be recommended for removal without consideration for their retention. Refer to Images 4, 11, and 18 in Appendix 1.

12.3.4 Trees 3 and 4 mature *Camellia oleifera* 'Abel' (Tea Oil Camellia) are neighbouring trees located flush against the existing fence west of the subject site. Refer to Images 5 – 8 in Appendix 1.They weren't included on the survey, likely because their trunks are hidden, and their canopy span is shared with trees 5 and 6. The work proposed within the TPZ and SRZ area includes trenching to install a 100 mm diameter SW uPVC underneath a new driveway. These works will occur within the footprint of the existing secondary structure which has a concrete slab to be removed. Per Section 5.4.4 of this report, the SRZ is only an indicative radial area in which the Structural Roots (#4 from Section 5.4.2) are located. There are many factors that affect the size of the SRZ (e.g. tree height, crown area, soil type, soil moisture). The SRZ may also be influenced by natural or built structures, such as rocks and footings. It is likely that the existing secondary structure has contributed to an atypical SRZ area and it is possible that no woody roots from these two trees protrude into the subject site. Although the encroachment is major per *AS4970-2009 Clause 3.3.3 Major Encroachment*, non-destructive root mapping is not possible due to the existing hard stands within the locations proposed to be trenched and developed into units and driveway. This is discussed further in Section 12.3.5 as it also relates to Trees 5 and 6.

12.3.5 Tree 5 is a mature *Syzygium paniculatum* (Magenta Lilly Pilly) and Tree 6 is a mature *Syzygium zeylanicum* (Spicate Eugenia). Refer to Images 5 – 8 in Appendix 1.. The works proposed inside the TPZ and SRZ areas include trenching to install a 100 mm diameter SW uPVC and a 150 mm diameter overflow pipe underneath a

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new driveway as well as the construction of a small part of Units 4 and 5. These works will occur within and beyond the footprint of the existing secondary structure which has a concrete slab to be removed.

12.3.6 As there is no opportunity to conduct detailed root investigations per Section 5.4.6 of this report prior to the removal of the secondary structure (the structure can be seen in Appendix 1 Images 5, 7, 10, 12), it will be recommended that the DA is approved with the works inside the TPZ area of Trees 3, 4, 5, and 6 on the condition they be monitored by a Project Arborist throughout and beyond the development. This allows the health and condition of the trees to be monitored on an ongoing basis, and for the supervision of key work inside the TPZ areas (e.g. demolition, stormwater/drainage installation, construction, and landscaping), so that the impact the works may have on the trees is managed in stages using best-practices for tree protection. Tree-sensitive methods to manage this impact include;

- Removal of secondary structure concrete slab under the supervision of a Project Arborist to monitor for significant roots that require protection or roots that require remedial pruning.
- Non-destructive root exploration conducted by an AQF Level 5 Arborist post-removal of the secondary structure to determine if any significant tree roots exist. Root protection and watering. Installation of ground protection per AS4970-2009 Clause 4.5.3 Ground Protection.
- Project Arborist supervision of excavation to install the 100 & 150 mm diameter SW pipes. Method of excavation depends on the number, size, and location of roots found during the non-destructive root exploration. Roots larger than 25 mm in diameter are to be assessed by the Project Arborist for suitability to be pruned prior to a clean sharp cut being made to prune them back. The final location of the pipes must be somewhat flexible to allow retention of significant woody roots important for the tree's stability. 100 mm clearance should be accommodated.
- Supervision of the driveway construction. Permeable concrete / paving is not considered a requirement for root vitality in this context as any tree roots that exist under the current hardstands are already under non-permeable concrete slab. However, a paved driveway or permeable concrete driveway is considered a preferred option to allow water and oxygen to filter to the soils below.
- If there is non-compliance with tree protection measures or if trees have been damaged, a timeframe for compliance and remedial works should be specified by the Project Arborist.

12.3.7 Trees 8, 9, 10, and 11 are mature *Melaleuca alternifolia* (Narrow-Leaved Paperbark) that appear to be somewhat growing from a lignotuber base. These trees are in varying states of vigour (See Appendix 1 Image 14-16 . The trees are inside the footprint of Unit 5. These trees would require removal if the plans are approved in their current format.

12.4 Tree Protection, Monitoring, and Certification Guidelines

12.4.1 There are many stages in the development process from site acquisition to completion where a Project Arborist is required to monitor or certify tree protection. *AS4970-2009 Section 5 Monitoring and Certification* summarizes the process and indicates the stages that normally require certification (a written statement of compliance).

12.4.2 A Tree Protection / Management Plan has been provided in Appendix 2 that provides guidelines for the protection, monitoring and certification for trees 3, 4, 5, and 6.

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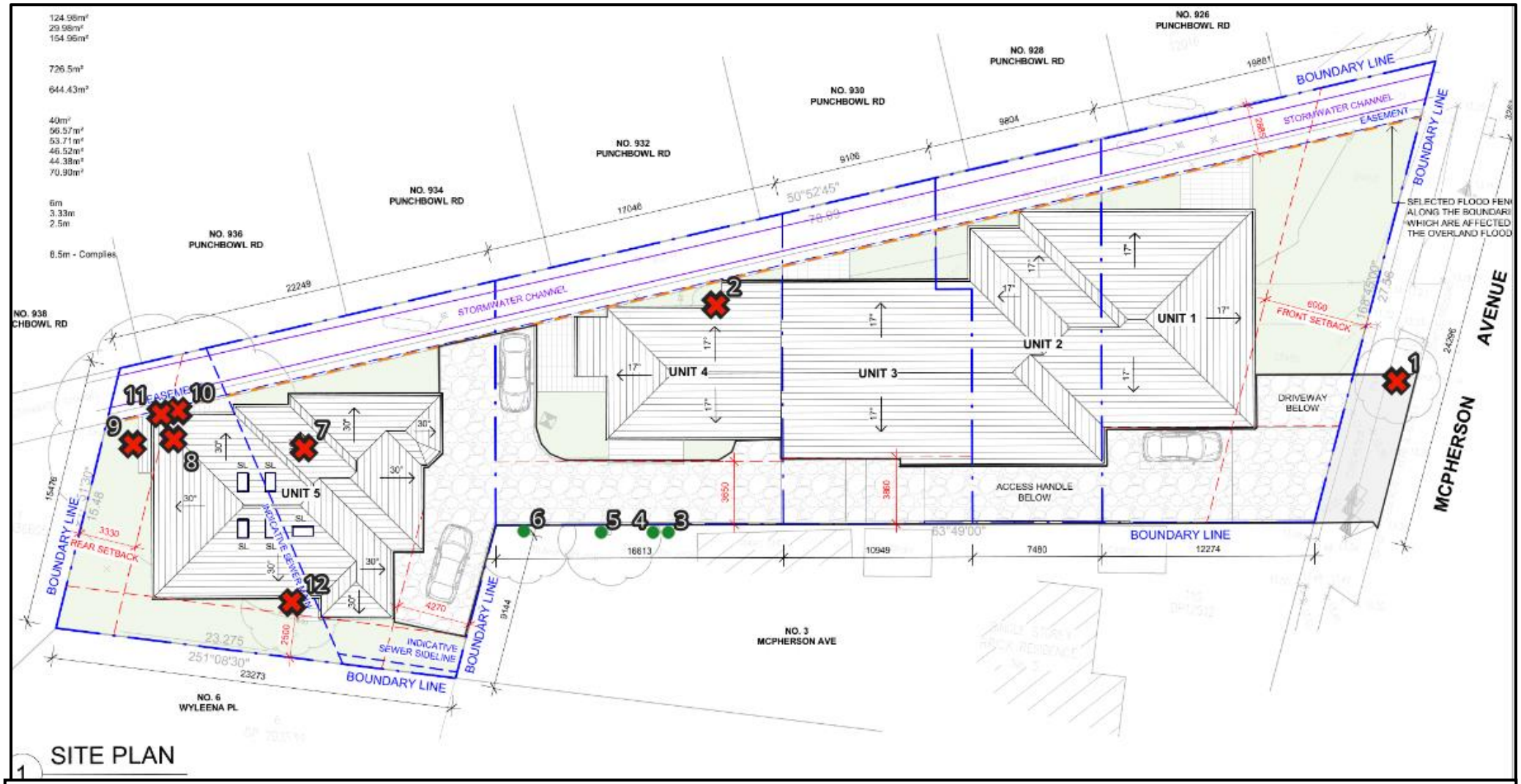
13. Tree Removal and Retention Map



Lot/Section/DP:	2/-/DP536605		
Address:	1 Mcpherson Avenue, Punchbowl NSW 2196		
Client Name:	RESOLUT on behalf of Bassim Omar		
Council LGA:	Canterbury Bankstown Council		
Author:	Elizabeth Cowan	**Scale:** 1:200	Date:25.11.2024

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MAP LEGEND ©
Tree Proposed for Retention
X Tree Proposed for Removal

14. Conclusion

14.1 RESOLUT on behalf of Bassim Omar commissioned this Arboricultural Impact Assessment to be submitted as supporting documentation for the proposed development works at 1 Mcpherson Avenue, Punchbowl NSW 2196. The information detailed within this report is intended to assist Canterbury Bankstown Council in determining arboricultural-related conditions. Twelve (12) trees were assessed at the time of the site inspection.

14.2 Nine (9) trees (# 1, 3, 4, 5, 6, 8, 9, 10, and 11) have a medium retention value per STARS. These trees are considered less critical; however, their retention should remain a priority, with removal considered only if it adversely affects the proposed building/works, and all other alternatives have been considered and exhausted. If retained, the setbacks as prescribed by the Australian Standard *AS4970-2009 Protection of trees on development sites* should be maintained.

14.3 Three (3) trees (# 1, 2, 3) have a low retention value per STARS. These trees are not considered important for retention, nor require special works or design modification to be implemented for their retention. If retained, the setbacks as prescribed by the Australian Standard *AS4970-2009 Protection of trees on development sites* should be maintained.

14.4 The secondary structure to the rear of the existing dwelling has created an obstacle to perform detailed root mapping to assess the viability of works inside the SRZ and TPZ of trees 3, 4, 5, and 6 (the structure can be seen in Appendix 1 Images 5, 7, 10, 12). As discussed, it is likely that no woody roots protrude into the site under the concrete slab of the structure, and therefore, the works are most likely to be viable without amendment. However, as this is based on the experience of the Arborist and guidelines of *AS4970-2009 Section 3.3.5 Structural Root Zone (SRZ)* only, there needs to be flexibility built into the final Stormwater Management Plan that allows for changes to the locations of underground pipes should significant roots be found. It will be recommended that root exploration per *AS4970-2009 Clause 3.3.4 TPZ Encroachment Considerations* occur after the removal of the concrete slab to confirm the location and distribution of the roots to be determined through non-destructive investigation methods (pneumatic, hydraulic, hand digging or ground penetrating radar) so that the potential loss of root mass resulting from the encroachment: number and size of roots, can be calculated. At that point, appropriate ground protection per *AS4970-2009 Clause 4.5.3 Ground Protection* and root protection per *AS4970-2009 Clause 4.5.4 Root Protection During Working Within the TPZ* should be installed by the Project Arborist as required until it is time to supervise the trenching to install the stormwater infrastructure and the construction of the driveway.

14.5 As all trees and vegetation on the subject site require removal for the work to proceed, it will be recommended that replacement trees are planted to offset the Arboricultural loss to the site.

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15. Recommendations

15.1 Tree Removal Recommendations and Guidelines

15.1.1 Trees 1, 2, 8, 9, 10, and 11 are recommended to be considered for removal by Canterbury Bankstown Council as a Condition of Consent. Trees 7 and 12 are exempt species and also require removal for the proposed works to proceed – these two trees can be removed at any time without approval from Canterbury Bankstown Council.

15.1.2 Upon approval of the Development Application, should any variation exist between these recommendations for tree removal and the approved tree removal schedule in the Condition of Consent documentation from Canterbury Bankstown Council, the Condition of Consent prevails. No protected trees shall be removed without consent from Canterbury Bankstown Council.

15.1.3 Approved tree removal should adhere to the guidelines of *AS4970-2009 Clause 5.3.1 Tree removal and pruning* including;

- Trees approved for removal should be physically marked onsite prior to their removal.
- The Project Arborist should confirm that all marked trees correspond with those approved within the Condition of Consent and the provided Tree Protection Plan (TPP).
- Tree removal should be carried out by an AQF Level 3 Arborist prior to the erection of any conditioned Tree Protection Measures and before any work commences on the site. The AQF Level 3 Contractors should be familiar with the relevant acts, guidelines, and standards that apply to tree removal works, such as the Work Health and Safety Act, the SafeWork NSW guidelines for tree work, and *AS4373-2007 Pruning of Amenity Trees*.
- Contractors should be instructed to avoid damage to trees within protection areas when removing trees. This may include restrictions on vehicle and equipment movements.
- Tree stumps to be removed from within a TPZ of a protected tree must be removed in a manner that avoids damaging or disturbing roots of trees to be retained.
- The Project Arborist should guide the approved tree removals and certify the works on completion.

15.2 Tree Retention

15.2.1 It is recommended that Canterbury Bankstown Council document neighbouring Trees # 3, 4, 5, and 6 for protection per *AS4970-2009 Section 4 Tree Protection Measures* and *Section 5 Monitoring and Certification* in perpetuity as a condition of the Conditions of Consent.

15.2.2 No pruning works are required for the proposed works to proceed. Should pruning works become required during the project, it should be guided by a Project Arborist. Tree pruning should adhere to the guidelines of *AS4970-2009 Protection of trees on development sites clause 5.3.1 tree removal and pruning* including;

- Tree pruning should be carried out by an AQF Level 3 Arborist who is familiar with the relevant acts, guidelines, and standards that apply to tree removal works, such as the Work Health and Safety Act, the SafeWork NSW guidelines for tree work, and *AS4373-2007 Pruning of Amenity Trees*.
- Contractors should be instructed to avoid damage to trees within protection areas when pruning trees. This may include restrictions on vehicle and equipment movements.
- The Project Arborist should guide tree pruning and certify the works on completion.

15.3 Works Within the Tree Protection Zone (TPZ)

15.3.1 Works inside the TPZ of trees 3, 4, 5, and 6 are recommended to be considered for approval by Canterbury Bankstown Council as a Condition of Consent on the condition that they are performed using tree-sensitive (non-destructive) methods under the supervision of a Project Arborist including:

- Project Arborist supervision of the removal of the concrete slab under the hardstands in the TPZ/SRZ areas to ensure any roots growing underneath are adequately protected and watered. Installation of appropriate ground and root protection.
- Non-destructive root exploration to confirm the number, size, and location of any roots and determine the actual TPZ and SRZ radius.
- The final location of the 100 mm & 150 mm diameter underground stormwater / drainage pipes must be outside the actual SRZ area (the final SRZ radius areas for Trees 3 – 6 are to be confirmed by the Project Arborist using non-destructive root exploration per the discussion in Section 11).
- Non-destructive trenching within TPZ areas under the supervision of a Project Arborist.
- Driveway to be constructed under the supervision of a Project Arborist.

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- The Project Arborist is to provide guidance and supervision for all per *AS4970-2009 Section 4 Tree Protection Measures* and compliance documentation per *AS4970-2009 Section 5 Monitoring and Certification*

15.3.2 The rationale for the recommended methodology for works inside the TPZ of these trees listed in 15.3.1 has been discussed in the Impact Assessment Schedule Table in Section 11 and further discussed in Section 12.3 Trees with Major Encroachment.

15.4 Tree Protection / Management Plan

15.4.1 A Tree Protection / Management Plan has been provided for the review of Canterbury Bankstown Council in Appendix 2. This Tree Protection / Management Plan is to be considered preliminary until the Condition of Consent is issued by Canterbury Bankstown Council and is based on the Guidelines of AS4970-2009 Protection of trees on development sites.

15.4.2 Where inconsistencies occur between the recommendations within the Tree Protection / Management Plan and the Conditions of Consent, the Conditions of Consent will prevail. It is recommended that the Tree Protection / Management Plan be updated after the Conditions of Consent are issued so that it can address any changes required for consistency across all documents.

15.4.3 Per *AS4970-2009 Clause 5.2 Tree Protection Plan*, the final updated Tree Protection / Management Plan must be available onsite prior to commencement and during works as it identifies key stages where monitoring and certification will be required. The site manager, the Project Arborist, and the contractors should attend a pre-construction meeting to introduce the Tree Protection / Management Plan and its requirements.

15.5 Tree Monitoring and Certification

15.5.1 It is recommended that a Project Arborist be commissioned to oversee all stages of the development in proximity to trees that are conditioned for retention and protection per *AS4970-2009 Section 5 Monitoring and Certification (all).*

15.5.2 Relevant hold points, including marking trees for removal, the certification of tree protection measures, supervision of any approved works within the Tree Protection Zones, monitoring of the health and condition of protected trees, and reporting of non-compliance, is documented within the provided Tree Protection Plan in Appendix 2.

Yours sincerely

Elizabeth Cowan

Elizabeth Cowan
Consulting Arborist - AQF Level 5, Diploma Arboriculture
Registered QTRA user (No. 6654)

0401 301 233 | info@lizziethearborist.com.au
www.lizziethearborist.com.au | ABN: 85 603 187 540

Appendix 1: Supporting Images

Image 1: Tree 1 is a mature Tristaniopsis laurina (Water Gum) council street tree located inside the footprint of the proposed driveway for Unit 1. It has been recommended for removal and replacement, and options for its retention has been provided in the discussion in Section 11.

Image 2: Trees located out the front of 3 McPherson Ave that are over 7 m away from the proposed development and will not be impacted and require no tree protection measures.

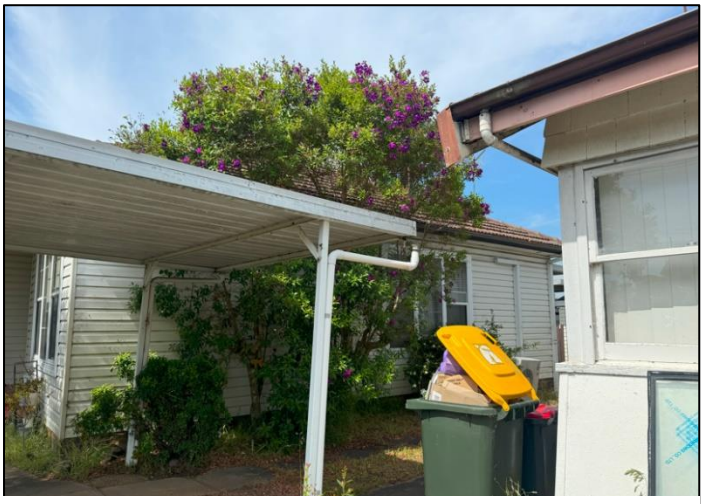

Image 3: A tree growing on the side of 3 McPherson Ave dwelling that is not likely to be impacted by the proposed work. It is 3 m away from the proposed driveway that will replace the existing dwelling.

Image 4: Tree 2 is a mature Olea europaea (Olive Tree) is located west of the existing fibro shed. It is located inside the footprint of Unit 2 and has been recommended for removal.

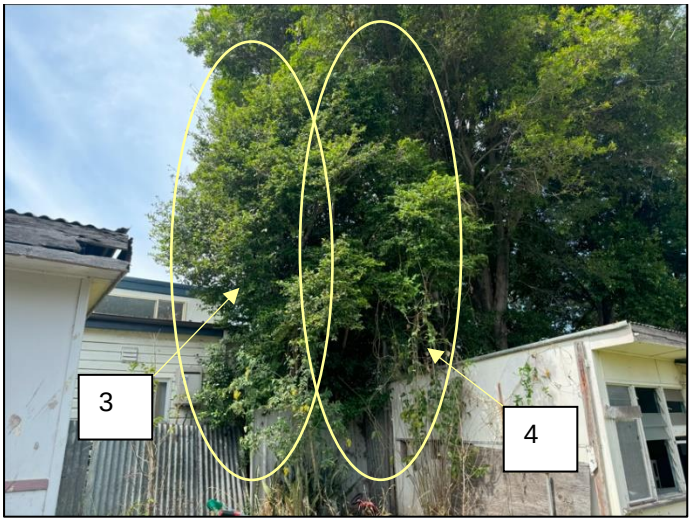

Image 5: Trees 3 and 4 are mature Camellia oleifera 'Abel' (Tea Oil Camellia) neighbouring trees (3 McPherson Ave) located flush against the existing fence west of the subject site. They weren't included on the survey, likely because their trunks are hidden and their canopy span is shared with trees 5 and 6. Works inside their TPZ have been recommended under Project Arborist supervision and guidance.

Image 6: The visible trunks of trees 3 and 4 as seen through a gap in the fence between the subject site and 3 McPherson Ave.

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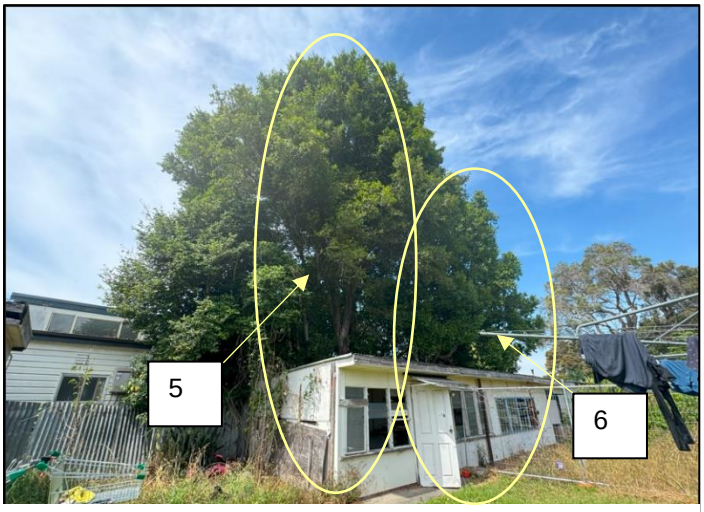

Image 7: Tree 5 is a mature Syzygium paniculatum (Magenta Lilly Pilly) and Tree 6 is a mature Syzygium zeylanicum (Spicate Eugenia). Works inside their TPZ have been recommended under Project Arborist supervision and guidance.

Image 8: The tree trunks of trees 5 (front of picture) and 6 (back of picture) as seen through a gap in the fence.,

Image 9: Exempt small vegetation including Anredera cordifolia (Maderia-Vine), Cestrum parqui (Chilean Jessamine) – dominant species, Morus rubra (Red Mulberry), Melia azedarach (Persian Lilac), and Triadica sebifera (Popcorntree)

Image 10: Exempt small vegetation including Anredera cordifolia (Maderia-Vine), Cestrum parqui (Chilean Jessamine) – dominant species, Morus rubra (Red Mulberry), Melia azedarach (Persian Lilac), and Triadica sebifera (Popcorntree)

Image 11: Tree 7 is a mature Musa x paradisiaca (Edible Banana) which is an exempt tree located within the footprint of Unit 5 that requires removal.

Image 12: An exempt Cestrum parqui (Chilean Jessamine) too small to meet the definition of a tree to be included in this report that will require removal.

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Image 13: : Exempt small vegetation including Anredera cordifolia (Maderia-Vine), Cestrum parqui (Chilean Jessamine) – dominant species, Morus rubra (Red Mulberry), Melia azedarach (Persian Lilac), and Triadica sebifera (Popcorntree)

Image 14: The base of Trees 8- 11 that are mature Melaleuca alternifolia (Narrow-Leaved Paperbark) that appear to be somewhat growing from a lignotuber base. These trees are in varying states of vigour. The trees are inside the footprint of Unit 5 and recommended for removal.

Image 15: Trees 8- 11

Image 16: Tree 9 seen leaning toward the rear lot and covered with invasive vine.

Image 17: Tree 12 is a mature Ligustrum lucidum (Broad-Leafed Privet) which is an exempt tree species located within the footprint of Unit 5.

Image 18: No trees north of the subject site were surveyed due to the stormwater drainage infrastructure dividing the lots.

0401 301 233 | info@lizziethearborist.com.au
www.lizziethearborist.com.au | ABN: 85 603 187 540

Appendix 2: Tree Protection (Management) Plan

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0401 301 233 | info@lizziethearborist.com.au
www.lizziethearborist.com.au | ABN: 85 603 187 540

PRELIMINARY TREE PROTECTION / MANAGEMENT PLAN (TPP)

Site Address: 2/-/DP536605
1 Mcpherson Avenue
Punchbowl NSW 2196

Client: RESOLUT on behalf of Bassim Omar

LGA: Canterbury Bankstown Council

Prepared by: Elizabeth Cowan
T/A – Lizzie the Arborist
Diploma Arboriculture – AQF Level 5
0401 301 233
info@lizziethearborist.com.au
ABN: 85 603 187 540

CONTENTS

DISCLAIMER:

1. This plan is only a preliminary plan for the purpose of a Development Application. Upon approval of the Development Application, any inconsistancy between the AIA, TPP, and the Conditions of Consent will result in the Conditions of Consent prevailing. This may require updates to the Tree Protection / Management Plan.
2. Drawings are for the purpose of tree protection and management only and are not for construction.
2. Drawings have been drawn in QGIS overlaid on the provided approved site plans. The refrenced scale is a reference only and all measurements must be verified on site.
2.
3. All work must be conducted per the relevant Australian Standards and the Conditions of Consent. All work preformed must be done so by a suitabilty qualified professional.
4. Lizzie the Arborist will not provide Certification related to any Hold Point unless the Project Arborist is consulted during the time of those works. Any changes to this schedule must be discussed and agreed upon exclusively with the Project Arborist.

GENERAL INFORMATION:

This Tree Protection Plan has been developed specifically for 1 Mcpherson Avenue, Punchbowl NSW 2196 based on the guidelines of AS 4970-2009 Protection of Trees on Development Sites. It outlines the necessary steps for all parties to ensure compliance with Australian Standard AS 4970-2009 Protection of trees on development sites.

The approved Final Tree Protection / Management Plan must be printed and kept on-site at all times. It should be included in site inductions.

The Project Arborist and the Principal Site/Project Manager are responsible for enforcing the required tree protection measures.

Sheet Name:	TPP01 – Cover Page
Address:	1 Mcpherson Avenue, Punchbowl NSW 2196
Client Name:	RESOLUT on behalf of Bassim Omar
Council LGA:	Canterbury Bankstown Council

0401 301 233
info@lizziethearborist.com.au
www.lizziethearborist.com.au
ABN: 85 603 187 540

Revision	Description	Author	Date
A	Proposed for DA	EC	27.11.2024

PRELIMINARY TREE **PROTECTION** / **TRANSPLANTING** SCHEDULE

TRESS RECOMMENDED FOR RETENTION / TRANSPLANTING BELOW CORRESPOND WITH THE ARBORICULTURAL IMPACT ASSESSMENT. THIS TABLE SERVES AS A BASELINE FOR TREE HEALTH AND CONDITION PIROR TO ANY WORK COMMENCING ON THE SITE TO BE REFERENCED IN FUTURE FREE INSPECTIONS. SITE SPECIFIC TREE PROTECTION MEASURES AND MONITORING / CERTIFICATION GUIDELINES ARE PROVIDED ON SHEET TPP05 AND SPECIFIED IN TPP APPENDIX 1 – 3.

Tree #	Botanical and Common Names	Height (m)	Spread (m)	DBH (mm)	TPZ (mm)	SRZ (mm)	Age	Health	Structure	Arborist Observations	As 4970-2009 Protection Guidelines
3	*Camellia oleifera* 'Abel' (Tea Oil Camellia)	8	2	200	2.40	1.61	M	G	G	Neighbouring trees located in the backyard of 3 McPherson Ave. No health concerns or structural defects noted on 25.11.2024.	At the direction of the Project Arborist – TPZ Fencing, Ground Protection, Ongoing Monitoring , Supervision of Works inside their TPZ, and Compliance Documentation.
4	*Camellia oleifera* 'Abel' (Tea Oil Camellia)	8	2	200	2.40	1.61	M	G	G		
5	*Syzygium paniculatum* (Magenta Lilly Pilly)	14	6	550	6.60	3.01	M	G	G		
6	*Syzygium zeylanicum* (Spicate Eugenia)	12	6	550	6.60	3.01	M	G	G		

Tree Dimensions:
Height (m) & Canopy Spread (m) = Measured with a range finder
DBH = *Diameter at breast height* (1.4m)
TPZ Radius (from the centre of the tree trunk) = *Tree Protection Zone* (refer to 5.2.1)
SRZ Radius (from the centre of the tree trunk) = *Structural Root Zone* (refer to 5.2.2)
Age Class: I-Immature = <20% of life expectancy for species | SM-Semi-mature = 20-50% of life expectancy for species | M-Mature = 50-80% of life expectancy for species | OM-Over-mature = >80% of life expectancy for species
Vigour: VG = Very Good | G = Good | F = Fair | P = Poor
Structure: VG = Very Good | G = Good | F = Fair | P = Poor

Image 5: Trees 3 and 4 are mature Camellia oleifera 'Abel' (Tea Oil Camellia) neighbouring trees (3 McPherson Ave) located flush against the existing fence west of the subject site. They weren't included on the survey, likely because their trunks are hidden and their canopy span is shared with trees 5 and 6. Works inside their TPZ have been recommended under Project Arborist supervision and guidance.

Image 7: Tree 5 is a mature Syzygium paniculatum (Magenta Lilly Pilly) and Tree 6 is a mature Syzygium zeylanicum (Spicate Eugenia). Works inside their TPZ have been recommended under Project Arborist supervision and guidance.

Sheet Name:	TPP02 – Proposed Tree Protection Schedule Table
Address:	1 Mcpherson Avenue, Punchbowl NSW 2196
Client Name:	RESOLUT on behalf of Bassim Omar
Council LGA:	Canterbury Bankstown Council

Lizzie the Arborist
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0401 301 233
info@lizziethearborist.com.au
www.lizziethearborist.com.au
ABN: 85 603 187 540

Revision	Description	Author	Date
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PRELIMINARY TREE **REMOVAL** SCHEDULE

TREES RECOMMENDED FOR REMOVAL BELOW CORRESPOND WITH THE ARBORICULTURAL IMPACT ASSESSMENT. UPON APPROVAL OF WORK, SHOULD ANY VARIATION EXIST BETWEEN THIS LIST AND THE APPROVED TREE REMOVAL LIST IN THE CONDITION OF CONSENT DOCUMENTATION, THE CONDIDTION OF CONSENT PREVAILS AND THIS SCHEDULE MUST BE UPDATED. TREES APPROVED FOR REMOVAL SHOULD BE PHYSICALLY MARKED ONSITE, THE PROJECT ARBORIST SHOULD CONFIRM THAT ALL MARKED TREES CORRESPOND WITH THOSE APPROVED WITHIN THE CONDITION OF CONSENT AND THIS UPDATED SCHEDULE PER AS4970-2009 PROTECTION OF TREES ON DEVELOPMENT SITES CLAUSE 5.3.1 TREE REMOVAL AND PRUNING.

Tree #	Botanical and Common Names	Height (m)	Spread (m)
1	*Tristaniopsis laurina* (Water Gum)	5	4
2	*Olea europaea* (Olive Tree)	7	5
3	*Jacaranda mimosifolia* (Jacaranda)	3	2
4	*Allocasuarina littoralis* (Black She-oak)	3	4
5	*Eucalyptus* sp.	10	10
7	*Musa x paradisiaca* (Edible Banana)	5	7
8	*Melaleuca alternifolia* (Narrow-Leaved Paperbark)	15	12
9	*Melaleuca alternifolia* (Narrow-Leaved Paperbark)	8	4
10	*Melaleuca alternifolia* (Narrow-Leaved Paperbark)	14	10
11	*Melaleuca alternifolia* (Narrow-Leaved Paperbark)	14	8
12	*Ligustrum lucidum* (Broad-Leaved Privet)	10	6

TREE REMOVAL SPECIFICATIONS PER AS4970-2009 CLAUSE 5.3.1:

1. UPON APPROVAL OF THE DEVELOPMENT APPLICATION, SHOULD ANY VARIATION EXIST BETWEEN THIS TREE REMOVAL SCHEDULE AND THE APPROVED TREE REMOVAL SCHEDULE IN THE CONDITION OF CONSENT DOCUMENTATION, THE CONDIDTION OF CONSENT PREVAILS AND THIS SCHEDULE MUST BE UPDATED.
2. TREES APPROVED FOR REMOVAL SHOULD BE PHYSICALLY MARKED ONSITE, THE PROJECT ARBORIST SHOULD CONFIRM THAT ALL MARKED TREES CORRESPOND WITH THOSE APPROVED WITHIN THE CONDITION OF CONSENT AND THIS UPDATED SCHEDULE PER AS4970-2009 PROTECTION OF TREES ON DEVELOPMENT SITES CLAUSE 5.3.1 TREE REMOVAL AND PRUNING.
3. TREE REMOVAL SHOULD BE CARRIED OUT BY AN AQF LEVEL 3 ARBORIST PRIOR TO ERECTION OF PROTECTION FENCING. CONTRACTORS SHOULD BE INSTRUCTED TO AVOID DAMAGE TO TREES WITHIN PROTECTION AREAS WHEN REMOVING OR PRUNING TREES. THIS MAY INCLUDE RESTRICTIONS OF VEHICLE MOVEMENTS.
4. STUMPS TO BE REMOVED FROM WITHIN A TPZ OF A PROTECTED TREE TO BE RETAINED MUST BE REMOVED IN A MANNER THAT AVOIDS DAMAGING OR DISTURBING ROOTS OF TREES TO BE RETAINED.
5. THE PROJECT ARBORIST SHOULD GUIDE THE APPROVED TREE REMOVALS AND CERTIFY THE WORKS ON COMPLETION.

Sheet Name:	TPP03 - Proposed Tree Removal Schedule & Specification
Address:	1 Mcpherson Avenue, Punchbowl NSW 2196
Client Name:	RESOLUT on behalf of Bassim Omar
Council LGA:	Canterbury Bankstown Council

0401 301 233
info@lizziethearborist.com.au
www.lizziethearborist.com.au
ABN: 85 603 187 540

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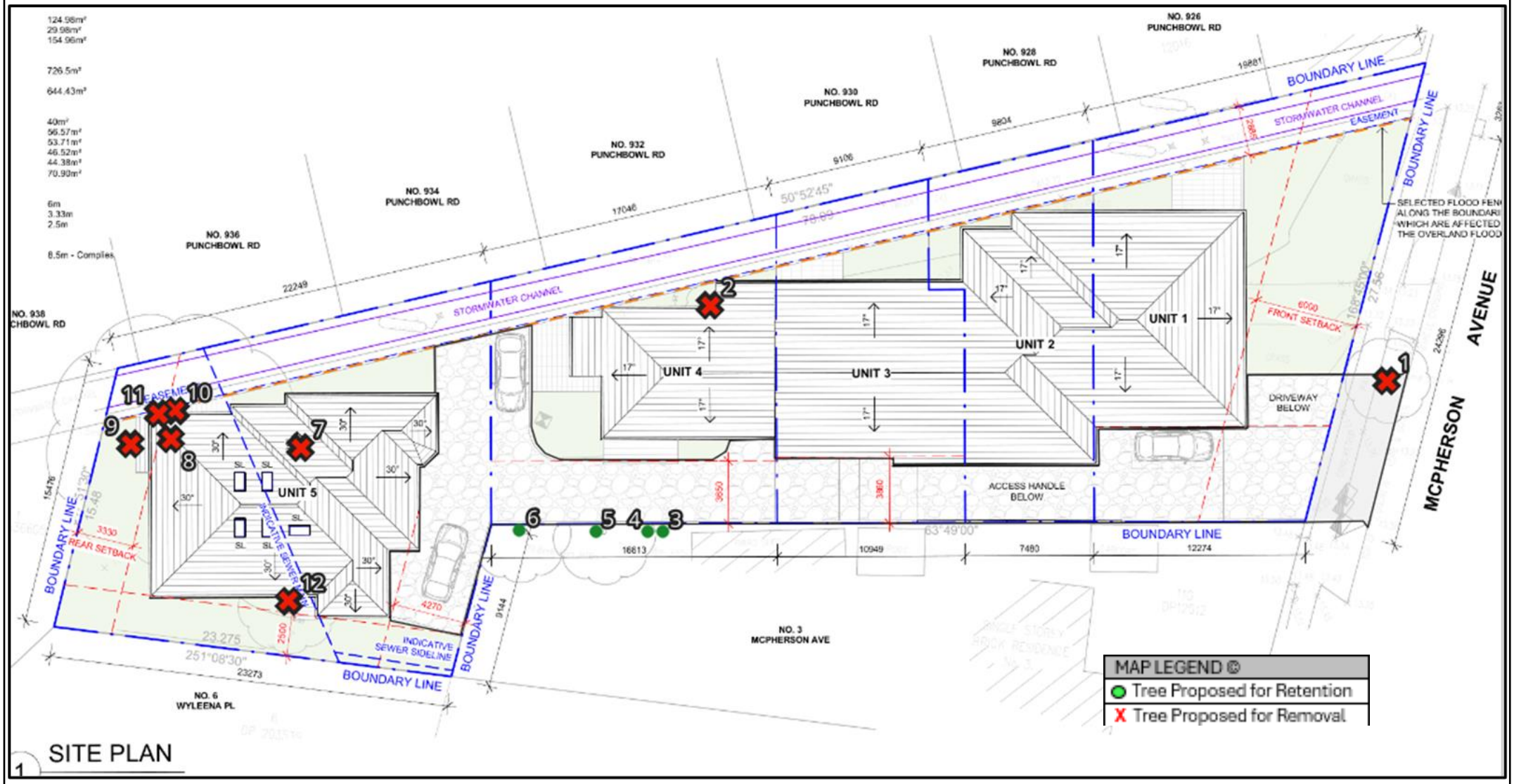
TREE REMOVA/?RETENTION MAP



Sheet Name:	TPP04 – Tree Removal/Retention Location Map
Address:	1 Mcpherson Avenue, Punchbowl NSW 2196
Client Name:	RESOLUT on behalf of Bassim Omar
Council LGA:	Canterbury Bankstown Council

Lizzie the Arborist

0401 301 233
info@lizziethearborist.com.au
www.lizziethearborist.com.au
ABN: 85 603 187 540

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PROPOSED TREE PROTECTION FENCING & OTHER PROTECTION MAP

LEGEND

TREES:

Tree to be retained with tree protection measures erected prior to works commencing

TREE PROTECTION:

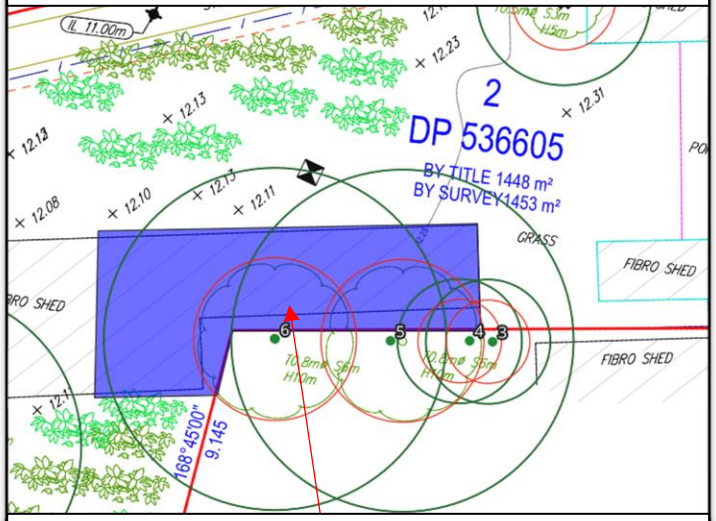
Tree Protection Fencing per AS 4970-2009 Clause 4.3. The area inside the protective fencing is subject to the guidelines per AS4970-2009 Clause 4.2 Restricted Activities and Clause 2.6 Maintaining the TPZ. See TPP Appendix 2 for detailed specifications.

Tree Protection Signage per AS 4970-2009 Section 4.4. See TPP Appendix 2 for detailed specifications.

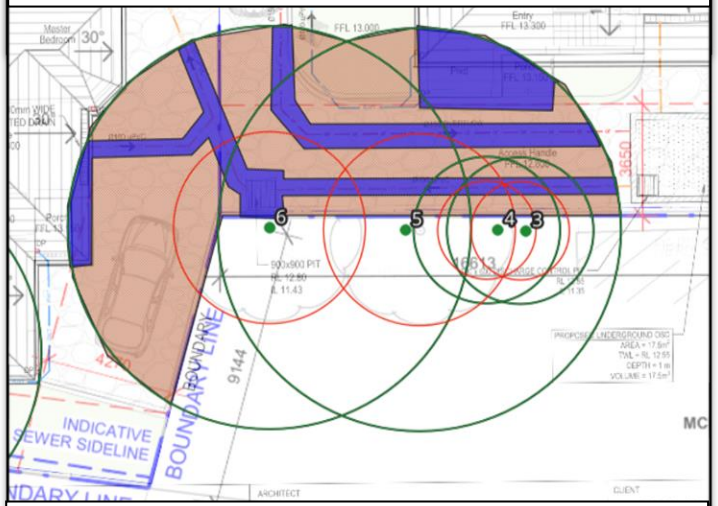
Supervision required by a Project Arborist to provide root protection services per AS 4970-2009 Section 4.5.4 (recommended to be completed under the supervision of a Project Arborist). See TPP Appendix 3 for detailed specifications.

Ground Protection: ground protection may be requested per AS 4970-2009 Clause 4.5.3 at the discretion of the Project Arborist. See TPP Appendix 2 for detailed specifications.

1. SITE ESTABLISHMENT MAP 1

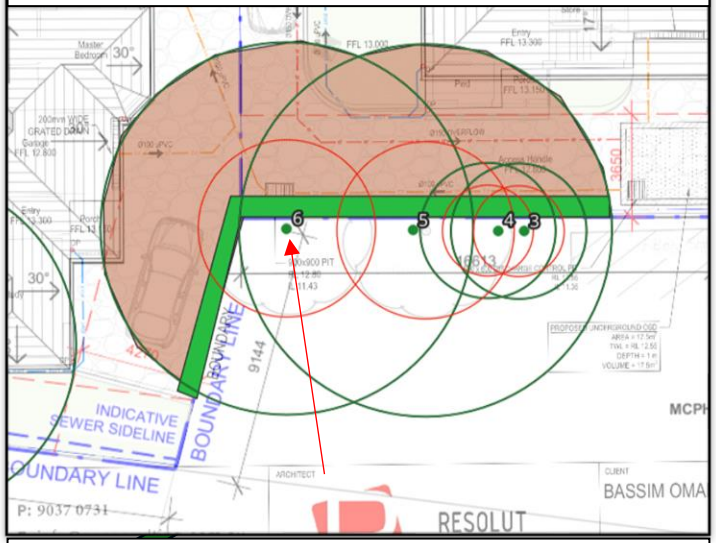


3. CONSTRUCTION MAP



GROUND PROTECTION TO REMAIN (IF REQUIRED) AND WORKS INSIDE CONFIRMED ROOT ZONES TO BE SUPERVISED BY THE PROJECT ARBORIST.

2. SITE ESTABLISHMENT MAP 2



AFTER DEMOLITION WORKS, THE PROJECT ARBORIST IS TO CONDUCT ROOT MAPPING WITHIN THE GREEN AREA TO DETERMINE LOCATION AND METHODOLOGY OF SW INFRASTRUCTURE. GROUND PROTECTION (BROWN) TO BE INSTALLED IF REQUIRED BY THE PROJECT ARBORIST.

See TPP Appendix 1 – 3 for information on required monitoring, supervision, and tree protection standards.

Sheet Name:	TPP05 – Tree Protection & Specification Map
Address:	1 Mcpherson Avenue, Punchbowl NSW 2196
Client Name:	RESOLUT on behalf of Bassim Omar
Council LGA:	Canterbury Bankstown Council

Lizzie the Arborist

0401 301 233
info@lizziethearborist.com.au
www.lizziethearborist.com.au
ABN: 85 603 187 540

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TPP Appendix 1: AS4970-2009 Summary of the Tree Management Process, including Monitoring and Certification Guidelines

PRE-CONSTRUCTION	
Actions	**Project Arborist Monitoring / Certification Guidelines**
Approved Tree Removal and/or Tree Pruning Works. *Includes tree transplanting* AS 4970-2009 Clause 5.3.1	• Trees approved for removal or transplanting should be marked on-site as per the approved TPP and Conditions of Consent. Before removal, the Project Arborist should confirm that all marked trees correspond with those shown on the schedule or plan. (AS 4970-2009 5.3.1) • The Project Arborist should supervise tree removal, transplanting and pruning and certify the works on completion. (AS 4970-2009 5.3.1)
Installing tree protection fencing and other protection measures AS 4970-2009 Clause 5.3.2	• Fencing and other protection measures are to be installed in compliance with the Conditions of Consent and the TPP; where there are inconsistencies, the Conditions of Consent issued by the determining authority will prevail. • Protection measures are to be certified by the Project Arborist.
CONSTRUCTION	
Site Establishment *Includes the installation of temporary infrastructure, demolition, bulk earthworks, and drainage.* AS 4970-2009 Clause 5.4.2	• The Project Arborist will monitor the impact of these actions on retained trees. • The construction management plan (site establishment plan) should be checked for compliance with the TPP. • At the completion of site establishment, the Project Arborist should certify that tree protection measures comply with the TPP.
Construction work *Critical stages typically include approved installation of above and below-ground services, footings and slabs, and scaffolding inside the TPZ of retained trees.* AS 4970-2009 Clause 5.4.3	• The Project Arborist will monitor the impacts of general construction works on retained trees (inside the TPZ area). • The Project Arborist should supervise any works within the TPZ area of retained trees. • The Project Arborist should specify any remedial works above and below ground. • Monitoring is to be recorded for inclusion in certification at practical completion.
Landscape work *Includes approved retaining walls, fencing, irrigation and lighting installation, topdressing, planting and paving inside the TPZ of retained trees.* AS 4970-2009 Clause 5.4.4	• The Project Arborist should check the landscape plan is in compliance with the TPP. • The Project Arborist may need to approve the staged removal of tree protection measures required to allow access for landscape works. • The Project Arborist should supervise any works within the TPZ area of retained trees. • The Project Arborist should specify any remedial works above and below ground. • Monitoring is to be recorded for inclusion in certification at practical completion.
Practical Completion AS 4970-2009 Clause 5.4.5	• Upon approval from the Project Arborist, all remaining tree protection measures should be removed. • The Project Arborist should assess tree condition and provide certification of tree protection.
POST-CONSTRUCTION	

0401 301 233 | info@lizziethearborist.com.au
www.lizziethearborist.com.au | ABN: 85 603 187 540

Defects liability period AS 4970-2009 Clause 5.5.1	• The completion of outstanding building or landscaping works following the construction period must not injure trees; particular care must be taken as Tree Protection Measures may have been removed.
Final certification AS 4970-2009 Clause 5.5.1	• The Project Arborist should assess the condition of trees and their growing environment and make recommendations for any necessary remedial actions. • Following the final inspection and the completion of any remedial works, the project arborist should certify (as appropriate) that the completed works have been carried out in compliance with the approved plans and specifications for tree protection. Certification should include a statement on the condition of the retained trees, details of any deviations from the approved tree protection measures and their impacts on trees.

0401 301 233 | info@lizziethearborist.com.au
www.lizziethearborist.com.au | ABN: 85 603 187 540

TPP Appendix 2: AS4970-2009 Section 4 Tree Protection Measures

A4.1 AS 4970-2009 Preface

A4.1.1 *AS 4970-2009 Protection of Trees on Development Sites* provides guidance for arborists, architects, builders, engineers, land managers, landscape architects and contractors, planners, building surveyors, those concerned with the care and protection of trees, and all others interested in integration between trees and construction. The document describes the best practices for the planning and protection of trees on development sites. The procedures described are based on plant biology and current best practices as covered in recently published literature.

A4.2 Clause 4.1 - General Protection Information

A4.2.1 Tree protection measures can include a range of activities and structures. These structures are used to identify and isolate each tree's Tree Protection Zone (TPZ) to create a restricted area. It is installed prior to site establishment and retained intact until completion of the works.

A4.2.2 Some works and activities within the TPZ area may be recommended to be authorized by the determining authority. These works must be supervised by a Project Arborist.

A4.2.3 A Project Arborist is the person responsible for carrying out the tree assessment, report preparation, consultation with designers, specifying tree protection measures, monitoring and certification. The Project Arborist must be suitably experienced and competent in arboriculture, having acquired through training, qualification (minimum Australian Qualification Framework (AQF) Level 5, Diploma of Horticulture (Arboriculture)) and/or equivalent experience, the knowledge and skills enabling that person to perform the tasks required by AS-4970-2009 Protection of Trees on Development Sites. Should any additional encroachment become necessary as the site works progress, the Project Arborist and the determining authority must be informed.

A4.2.4 Approved tree removal and pruning should be carried out before the installation of tree protection measures.

A4.3 Clause 4.2 - Restricted Activities within the Tree Protection Zone (TPZ)

A4.3.1 Activities generally 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;
U) placement of fill;
(k) lighting of fires;
(I) soil level changes;
(m) temporary or permanent installation of utilities and signs, and
(n) physical damage to the tree.

A4.4 Clause 4.3 - Tree Protection Zone (TPZ) Fencing

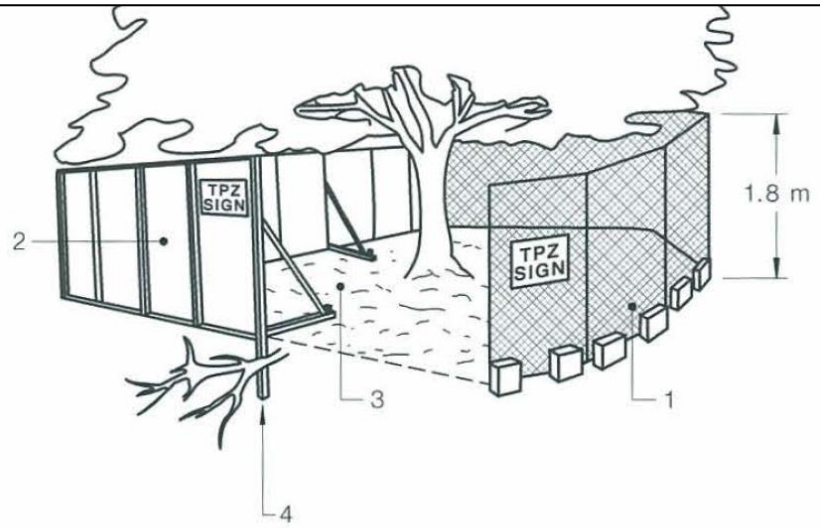
A4.4.1 Fencing should be erected before any machinery or materials are brought onto the site and before the commencement of works, including demolition. Once erected, protective fencing must not be removed or altered without approval by the project arborist. The TPZ should be secured to restrict access.

A4.4.2 Chain wire mesh panels 1.8 m high should be erected and held in place with feet positioned above ground level. The fencing shall be installed utilising chain wire mesh panels, minimum 1.8m tall, held in place with concrete feet. Where the TPZ is located within or below the tree's crown, the fencing should be extended outside the dripline by a minimum of 1m to allow crown protection. Where this is not possible, the Project Arborist reserves the right to request that ground protection (per 13.5) is installed.

0401 301 233 | info@lizziethearborist.com.au
www.lizziethearborist.com.au | ABN: 85 603 187 540

A4.5 Clause 4.4 - Signs

A4.5.1 Signs identifying the TPZ should be placed around the edge of the TPZ and be visible from within the development site (refer to AS4970-2009 Figure 3 below). The lettering on the sign should comply with AS 13 19. Appendix C provides an example of a suitable TPZ sign.



LEGEND:

1 Chain wire mesh panels with shade cloth (if required) attached, held in place with concrete feet.
2 Alternative plywood or wooden paling fence panels. This fencing material also prevents building materials or soil entering the TPZ.
3 Mulch installation across surface of TPZ (at the discretion of the project arborist). No excavation, construction activity, grade changes, surface treatment or storage of materials of any kind is permitted within the TPZ.
4 Bracing is permissible within the TPZ. Installation of supports should avoid damaging roots.

FIGURE 3 PROTECTIVE FENCING

AS4970-2009 Figure 3 – Tree Protection Fencing and Signage.

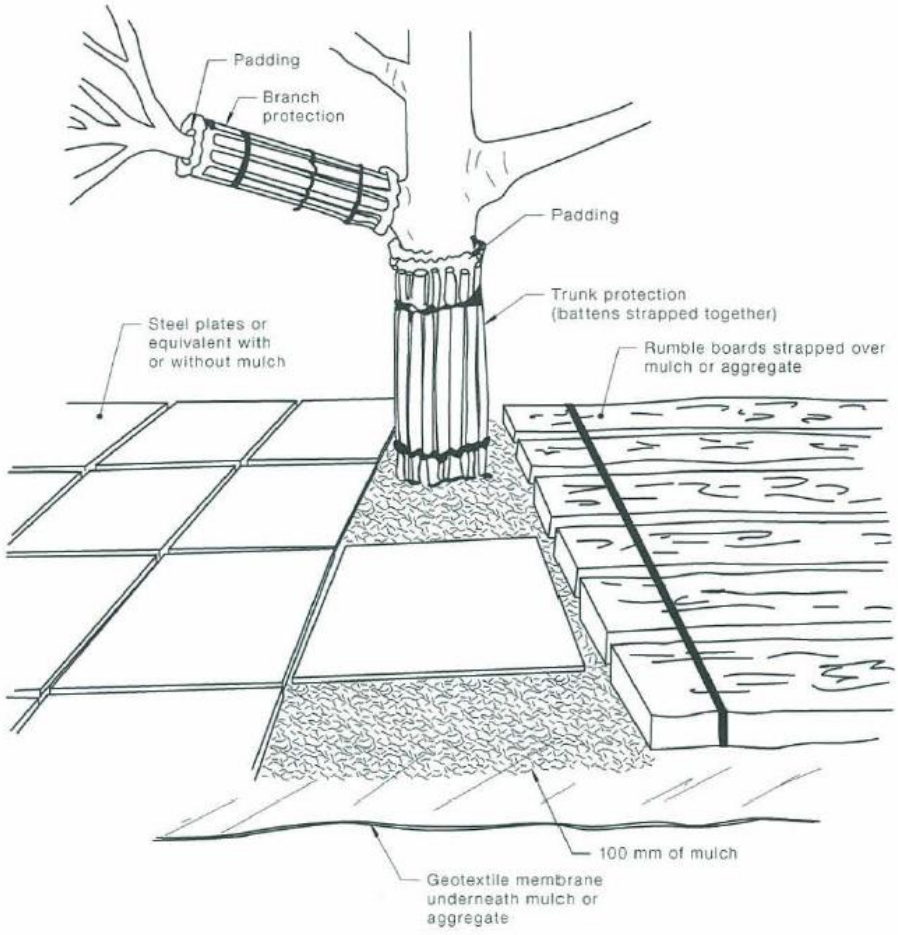
A4.6 Clause 4.5 – Other Tree Protection Measures

A4.6.1 **Clause 4.5.1 General**: Should the Tree Protection Fencing be deemed inappropriate due to site constraints or require temporary removal for any reason, the following protection measures should be used.

A4.6.2 **Clause 4.5.2 Trunk and branch protection:** Where necessary, install protection to the trunk and branches of trees as shown in Figure 4. The materials and positioning of protection are to be specified by the project arborist. A minimum height of 2 m is recommended. Do not attach temporary power lines, stays, guys and the like to the tree. Do not drive nails into the trunks or branches.

A4.6.3 **4.5.3 Ground protection:** If temporary access for machinery is required within the TPZ ground protection measures will be required. The purpose of ground protection is to prevent root damage and soil compaction within the TPZ. Measures may include a permeable membrane such as geotextile fabric beneath a layer of mulch or crushed rock below rumble boards as per Figure 4. These measures may be applied to root zones beyond the TPZ.

0401 301 233 | info@lizziethearborist.com.au
www.lizziethearborist.com.au | ABN: 85 603 187 540



NOTES:

1 For trunk and branch protection use boards and padding that will prevent damage to bark. Boards are to be strapped to trees, not nailed or screwed.

2 Rumble boards should be of a suitable thickness to prevent soil compaction and root damage.

FIGURE 4 EXAMPLES OF TRUNK, BRANCH AND GROUND PROTECTION

AS4970-2009 Figure 4 – Trunk, Branch and Ground Protection

A4.6.4: **Clause 4.5.4: Root protection during works within the TPZ:** Some approved works within the TPZ, such as regrading, installation of piers or landscaping may have the potential to damage roots. If the grade is to be raised the material should be coarser or more porous than the underlying material. Depth and compaction should be minimized. Manual excavation should be carried out under the supervision of the Project Arborist to identify roots critical to tree stability. Relocation or redesign of works may be required. Where the project arborist identifies roots to be pruned within or at the outer edge of the TPZ, they should be pruned with a final cut to undamaged wood. Pruning cuts should be made with sharp tools such as secateurs, pruners, handsaws or chainsaws. Pruning wounds should not be treated with dressings or paints. It is not acceptable for roots within the TPZ to be ' pruned' with machinery such as backhoes or excavators. Where roots within the TPZ are exposed by excavation, temporary root protection should be installed to prevent them drying out. This may include jute mesh or hessian sheeting as multiple layers over exposed roots and excavated soil profile, extending to the full depth of the root zone. Root protection sheeting should be pegged in place and kept moist during the period that the root zone is exposed . Other excavation works in proximity to trees, including landscape works such as paving, irrigation and planting can adversely affect root systems. Seek advice from the Project Arborist.

A4.6.5 **Clause 4.5.5 Installing underground services within TPZ**: All services should be routed outside the TPZ. If underground services must be routed within the TPZ, they should be installed by directional drilling or in manually excavated trenches. The directional drilling bore should be at least 600 mm deep. The Project Arborist should assess the likely impacts of boring and bore pits on retained trees. For manual excavation of trenches the project arborist should advise on roots to be retained and should monitor the works. Manual excavation may include the use of pneumatic and hydraulic tools. Refer Clause 4.5.3.

0401 301 233 | info@lizziethearborist.com.au
www.lizziethearborist.com.au | ABN: 85 603 187 540

TPP Appendix 3: AS4970-2009 Section 5 Monitoring and Certification Guidelines

A5.1 Clause 5.1 - General Monitoring Information

A5.1.2 There are many stages in the development process, from site acquisition to completion, where the Project Arborist is required to monitor or certify tree protection. Table 1 summarizes the process and indicates the stages that normally require certification (a written statement of compliance).

A5.2 Clause 5.2 - Tree Protection Plan (TPP)

A5.2.1 An approved TPP must be available onsite prior to the commencement of and during work. The TPP will identify key stages where monitoring and certification will be required. A pre-construction meeting should be attended by the site manager, the Project Arborist and contractors to introduce the tree protection plan and its requirements.

A5.3 Clause 5.3 - Pre-Construction Monitoring and Certification Guidelines

A5.3.1 **Clause 5.3.1 Tree Removal and/or Tree Pruning Works**: Trees for removal or transplanting should be marked on-site as per the approved tree protection plan. Before removal, the project arborist should confirm that all marked trees correspond with those shown on the schedule or plan. Other tree work may be specified in the tree protection plan. Tree removal should be carried out prior to the erection of protection fencing. Contractors should be instructed to avoid damage to trees within protection areas when removing or pruning trees. This may include restrictions on vehicle movements. Any approved pruning required to allow for work should be done at this stage. AS 4373 specifies requirements for pruning. Stumps to be removed from within a TPZ must be removed in a manner that avoids damaging or disturbing the roots of trees to be retained. The Project Arborist should supervise tree removal, transplanting and pruning and certify the works on completion.

A5.3.2 **Clause 5.3.2 Installing tree protection fencing and other protection measures:** Fencing and other protection measures are to be installed in compliance with Section 4 and as detailed in the TPP. Protection measures are to be certified by the project arborist.

A5.4 Clause 5.4 - Construction Monitoring and Certification Guidelines

A5.4.1 **Clause 5.4.1 General**: In order to ensure that protection measures are being adhered to during the pre-construction and construction stages, there should be a predetermined number of site inspections carried out by the project arborist. Matters to be monitored and reported should include tree condition, tree protection measures and the impact of site works which may arise from changes to the approved plans. If there is non-compliance with tree protection measures or if trees have been damaged, a timeframe for compliance and remedial works should be specified by the project arborist. The determining authority may need to be notified of non-compliance issues. Monitoring, reporting and certification should be carried out at the following critical stages of construction.

A5.4.2 **Clause 5.4.2 Site Establishment:** The Project Arborist will monitor the impacts of demolition, bulk earthworks, and installation of temporary infrastructure, including bunding, sediment control works, and drainage works. The construction management plan (site establishment plan) should be checked for compliance with the TPP. The construction management plan normally includes the location of site sheds, stockpile areas, temporary access roads and sediment control devices. At the completion of site establishment, the Project Arborist should certify that tree protection measures comply with the TPP.

A5.4.3 **Clause 5.4.3 Construction work:** The Project Arborist will monitor the impacts of general construction works on retained trees. Monitoring should be done at regular intervals or in consultation with the site manager. Monitoring is to be recorded for inclusion in certification at practical completion. Critical stages typically include the installation of services, footings and slabs, and scaffolding works within the TPZ and at the completion of building works.

A5.4.4 **Clause 5.4.4 Landscape works:** The landscape plan should be checked for compliance with the TPP. The Project Arborist may need to approve the staged removal of protection measures required to allow access for landscape works. The Project Arborist should supervise any works within TPZs, including retaining walls, irrigation and lighting installation, topdressing, planting and paving. The Project Arborist should specify any remedial works above and below ground. Monitoring is to be recorded for inclusion in certification at practical completion.

A5.4.5 **Clause 5.4.5 Practical completion:** Practical completion assumes that all construction and landscaping works are finished. At practical completion, all remaining tree protection measures should be removed. The project arborist should assess tree condition and provide certification of tree protection.

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A5.4 Clause 5.5 – Post-Construction Monitoring and Certification Guidelines

A5.4.1 **Clause 5.5.1 Defects liability period:** Completion of outstanding building or landscaping works following the construction period must not injure trees.

A5.4.2 Clause 5.5.2 Final certification: The project arborist should assess the condition of trees and their growing environment and make recommendations for any necessary remedial actions. Following the final inspection and the completion of any remedial works, the project arborist should certify (as appropriate) that the completed works have been carried out in compliance with the approved plans and specifications for tree protection. Certification should include a statement on the condition of the retained trees, details of any deviations from the approved tree protection measures and their impacts on trees.

0401 301 233 | info@lizziethearborist.com.au
www.lizziethearborist.com.au | ABN: 85 603 187 540

Appendix 3: Provided Plans

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Appendix 4: Glossary

Bark	All tissues outside the vascular cambium.
Botanical Name	A botanical name is the scientific name given to a particular plant species. It must conform to the system of botanical nomenclature as prescribed by the International Code of Nomenclature for algae, fungi, and plants (ICN).
Co-dominate stems/union	Stems or trunks of about the same size originating from the same position from the main stem.
Common Name	The local name given to a particular plant species, as opposed to the scientific Latin or Greek name, is used universally. (taxonomy) The colloquial name of a taxon or species that is in any language.
Crown	A tree's crown, also known as the canopy, refers to the uppermost part of the tree, comprising its branches, leaves, and twigs. The portion of the tree extends outward and upward from the trunk and represents the tree's overall shape and appearance.
Crown Lifting	The removal of the lower branches.
DBH	Diameter at breast height - The nominal trunk diameter at 1.4 m above ground level is determined from the trunk's circumference divided by pi.
DAB	Diameter at base - determined from the trunk's circumference divided by pi.
Decay	The process of degradation of woody tissues by microorganisms.
Dripline	A tree's dripline refers to the outermost edge of its canopy or crown. It is the imaginary line on the ground directly below the outermost reach of the tree's branches. When it rains, waterfalls on the branches and leaves drip off and fall to the ground, typically along this drip line.
Deadwooding	Removal of dead branches from the crown of a tree
Declining tree	A declining tree is a tree experiencing a gradual and sustained deterioration in health and Vigor. It shows signs of stress and exhibits various symptoms of decline over time. Declining trees may eventually reach a point where they cannot recover, leading to their eventual death if not addressed appropriately.
ELE	Estimated Life Expectancy (ELE) Long = > 40 years (Long) Medium = 15 - 40 years (Medium) Short = 5 - 15 years (Short) Remove = < 5 years (Remove)
Epicormic shoots	Shoots produced from epicormic buds at the cambium of trunks or branches.
Final cut	This is the final cut in the process of the reduction or removal of branches and stems. This final cut aims to reduce the risk of microorganism infection according to branch attachment and compartmentalisation principles to encourage even wound closure.
Flush cut	A flush cut to a tree refers to cutting a branch or limb completely flush with the main trunk or a larger branch. This means the cut is made very close to the point where the branch attaches to the tree, leaving no branch collar or branch bark ridge remaining.
Hanging branches	Unattached, cut or broken branches that are caught in the crown.
Height (m)	An estimate of a tree's overall height
Minor encroachment	If the proposed encroachment is less than 10% of the area of the TPZ and is outside the SRZ, detailed root investigations should not be required. The area lost to this encroachment should be compensated for elsewhere and contiguous with the TPZ.
Major encroachment	If the proposed encroachment is greater than 10% of the TPZ or inside the SRZ, the project arborist must demonstrate that the tree(s) would remain viable. The area lost to this encroachment should be compensated for elsewhere and contiguous with the TPZ. This may require root investigation by non-destructive methods.
Pathogen	A disease-causing organism.
Project arborist	The person responsible for carrying out the tree assessment, report preparation, consultation with designers, specifying tree protection measures, monitoring and certification. The project arborist will be suitably experienced and competent in arboriculture, having acquired through training, qualification (minimum Australian Qualification Framework (AQF) Level 5, Diploma of Horticulture (Arboriculture)) and equivalent experience, the knowledge and skills enabling that person to perform the tasks required by this Standard.
Remedial pruning	Removing damaged, diseased or lopped branches back to undamaged tissue to induce the production of shoots from latent or adventitious buds, from which a new crown will be established.

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Sparse crown	A sparse crown on a tree refers to a canopy or foliage that is thin, open, and has reduced density compared to a typical healthy tree of the same species and age. A tree with a sparse crown has fewer branches, leaves, and twigs, which can result in a less vibrant and full appearance.
Spread (m)	An estimate of the crown length from the longest driplines.
Structural root zone (SRZ) radius	The area around the base of a tree is required for the tree's stability in the ground. The woody root growth and soil cohesion in this area are necessary to hold the tree upright. The SRZ is nominally circular with the trunk at its centre and is expressed by its radius in metres. This zone considers a tree's structural stability only, not the root zone required for a tree's vigour and long-term viability, which will usually be a much larger area.
Structure	Very good (VG) = good structural integrity, no evidence of instability, no defects or damage Good (G) = good structural integrity, minor structural defects that can be remedied Fair (F) = fair structural integrity, minor-moderate defects that can be remedied or managed Poor (P) = poor structural integrity, major structural defects that cannot be remedied
Tree	Long-lived woody perennial plant greater than (or usually greater than) 3 m in height with one or relatively few main stems or trunks (or as defined by the determining authority).
Tree protection zone (TPZ) radius	A specified area above and below ground and at a given distance from the trunk set aside for the protection of a tree's roots and crown to provide for the viability and stability of a tree to be retained where it is potentially subject to damage by development.
Tree-sensitive construction measures	Tree-sensitive construction measures such as pier and beam, suspended slabs, cantilevered building sections, screw piles and contiguous piling can minimise the impact of encroachment. When siting a structure near a tree, the future growth of the tree, both above and below ground, should be considered. Precautions should be taken at the planning and design stage to minimise potential conflict between trees and new structures.

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Appendix 5: Method

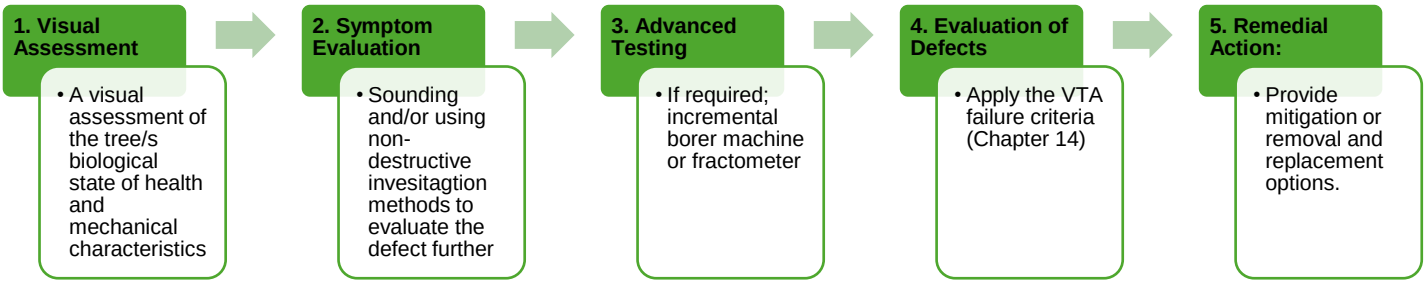
Visual Tree Assessment (Mattheck, D, & Breloer, H 1994)

Introduction

The Body Language of Trees: A Handbook for Failure Analysis is a publication by Claus Mattheck and Heinz Breloer (1994). The book is a comprehensive guide to tree failure analysis and includes a detailed Visual Tree Assessment (VTA) method description. The VTA method is based on observing trees' biological and mechanical characteristics and is designed to detect and diagnose defects and weaknesses in tree structure. The VTA method is a step-by-step process for observing and interpreting the signs and symptoms of tree defects. It includes various diagnostic tools and techniques, such as using sonic and resistance measurements to detect decay.

The VTA Process

Chapter 8.4 of “The body language of trees” (Mattheck, C., & Breloer, H. 1994) lists the VTA process as (page 118):



Biological and mechanical characteristics:

VTA Biological Characteristics Health Vigour	VTA Mechanical Characteristics Structural / Condition
• Suppressed species • Phototropic • Foliage size and colour • Sparse crown – photosynthetic area • Live crown ratio (%) • Defoliation • Dieback • Epicormic growth • Deadwood • Crown thinning • Bark delaminating/degraded/wounded • Saprophytes – cambial zone / periderm • Stem splits (increment growth) • Branches crossing/rubbing • Fauna browsing/damage • Kino or resin exudation • Pest (insect) and disease (pathogen) • Basal suckers • Soil compaction	• Deadwood (%) • Fungal fruiting bodies • Stem cracks/fractures • Stem taper • Subsiding branches • Excessive end weight • Branch attachments • Weak unions • Hangers • Inclusions – branch/stem • Codominant – crown/base • Previous failures • Pruning history – resulting health wounds/lesions/cankers cavities/decay/hollows • Stem bulges/swelling/ribs • Mechanical damage – stems / roots • Excessive lean / instability • Root inclusions • Root zone - soil upheaval

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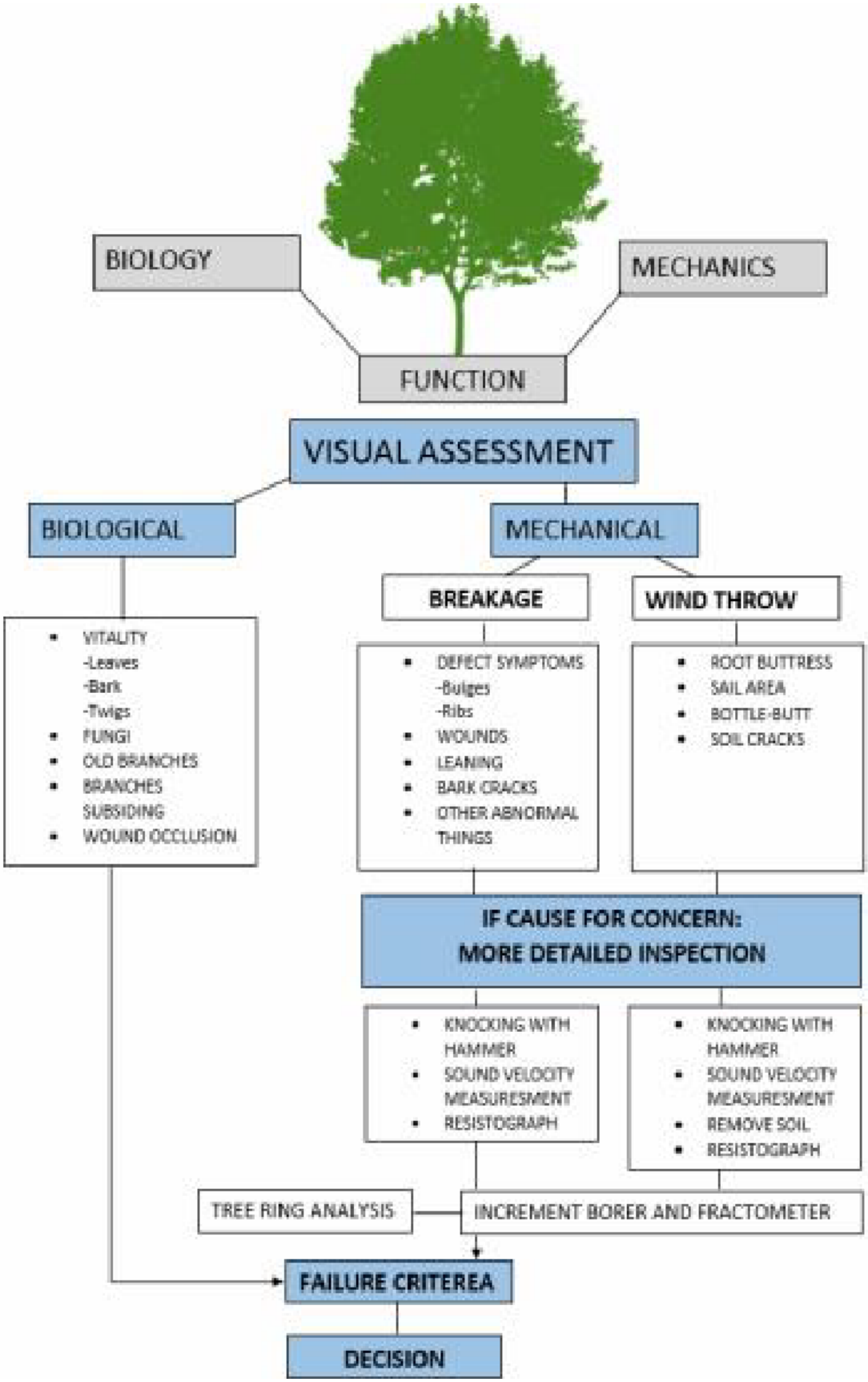

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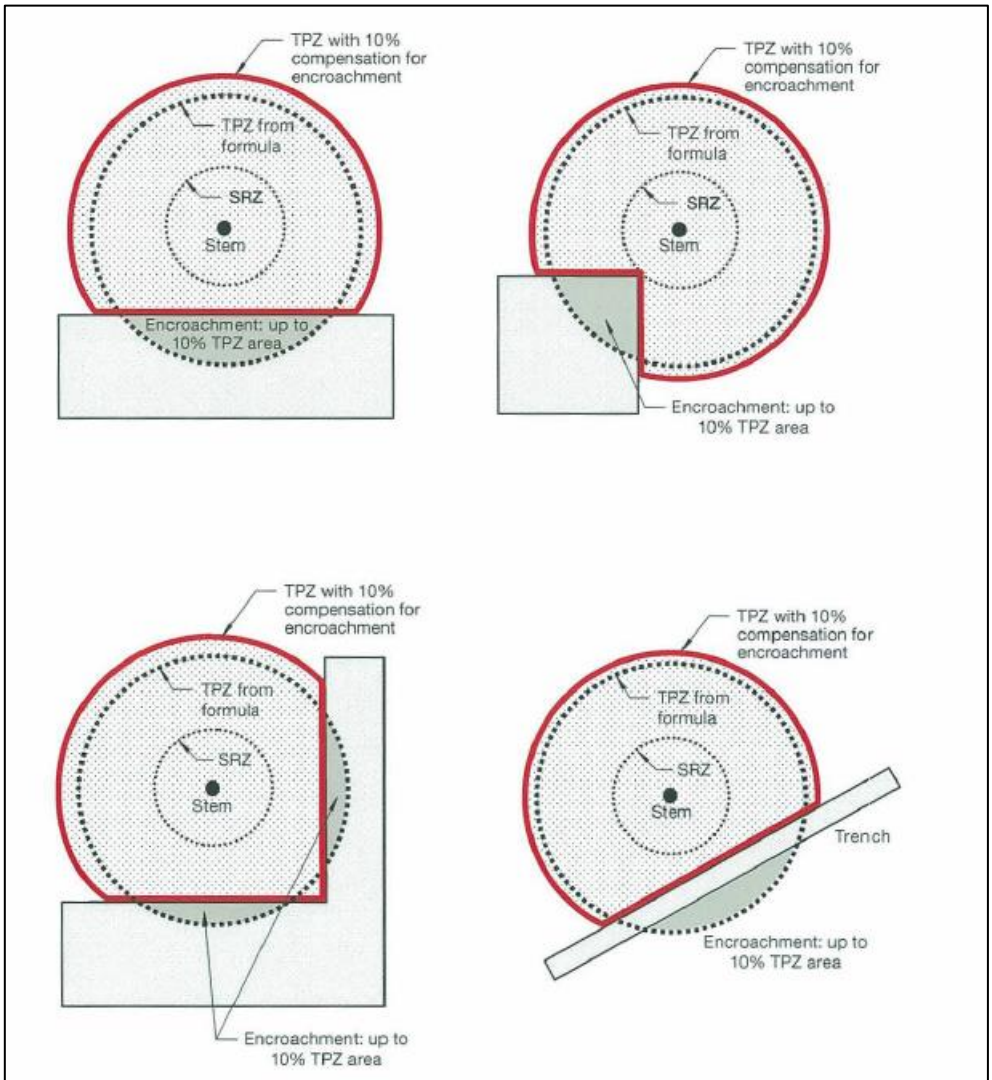
Tree Protection Zone (TPZ) & Structural Root Zone (SRZ) Calculations

Per *AS4970-2009 Section 3 Determining the Protection Zones of the Selected Trees Clause 3.1*, the radius of the TPZ is calculated for each tree by multiplying its DBH x 12 (AS4970-2009 Section 3.2). The radius is measured from the centre of the stem at ground level. For multi-stemmed trees the formula used is RTPZ = √[(DBH1)2 + (DBH2)2 + (DBH3)2].

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

Per AS 4970-2009 Protection of Trees on Development Sites, the SRZ radius is calculated by measuring the diameter of the stem close to ground level, just above the basal flare (D). SRZ = (Dx50)0.42 x 0.64 measured radially from the centre of the stem.

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



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

FIGURE D1 EXAMPLES OF MINOR ENCROACHMENT INTO TPZ

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IACA Significance of a Tree, Assessment Rating System (STARS):

High Significance in landscape

- The tree is in good condition and good vigour.
- The tree has a form typical for the species.
- The tree is a remnant or a planted locally indigenous specimen and is rare or uncommon in the local area, of botanical interest, or of substantial age.
- The tree is listed as a Heritage Item, Threatened Species or part of an Endangered ecological community on the Council's 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 contributes 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 to the taxa in situ – a tree is appropriate to the site conditions.

Medium Significance in landscape

- The tree is in fair-good condition and good or low vigour.
- The tree has a typical or atypical form of the species.
- The tree is a locally indigenous or a common species with its taxa commonly planted in the local area.
- The tree is not visible or is partly visible from surrounding properties as obstructed by other vegetation or buildings when viewed from the street.
- The tree contributes fairly 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 has good or low vigour.
- The tree has a form atypical of the species.
- The tree is not visible or is particularly visible from surrounding properties as obstructed by other vegetation or buildings.
- The tree provides a minor contribution or hurts the visual character and amenity of the local area.
- The tree is a young specimen that may or may not have reached the dimension to be protected by local Tree Preservation orders or similar protection mechanisms and can be easily replaced by a suitable specimen.
- The tree's growth is severely restricted by above or below-ground influences, unlikely to reach a dimension typical of the taxa in situ – a tree is appropriate 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 a defect that has the potential to become structurally unsound.

Environmental Pest / Noxious Weed Species

- The tree is an Environment Pest Species due to its invasiveness or poisonous/allergenic properties.
- The tree is declared an anxious weed by legislation.

Hazardous/Irreversible Decline

- The tree is structurally unsound and/or unstable and 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, they can be applied to a monocultural stand, e.g., hedge.

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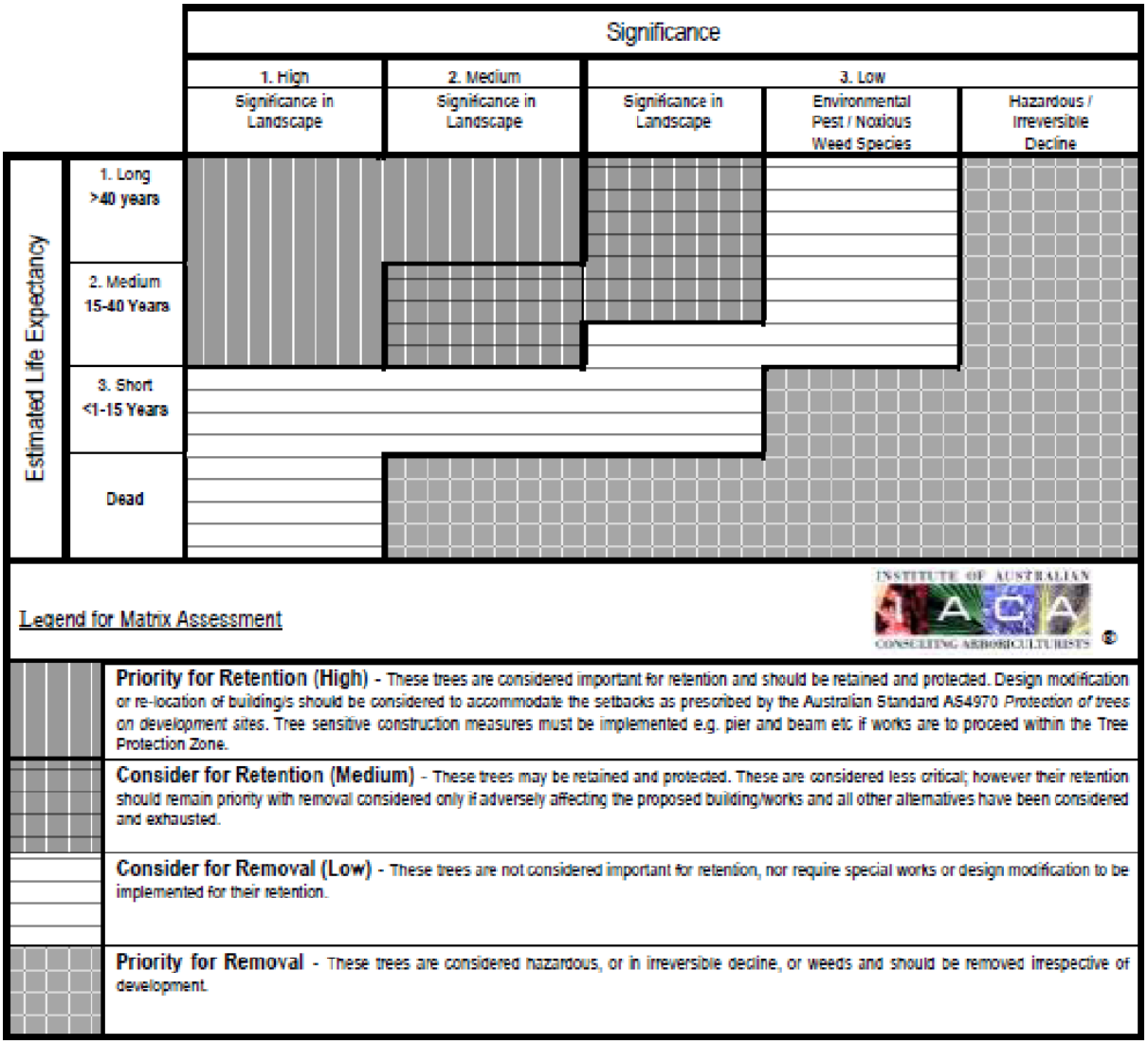
IACA Retention of a Tree, Assessment Rating System (STARS)



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0401 301 233 | info@lizziethearborist.com.au
www.lizziethearborist.com.au | ABN: 85 603 187 540

Appendix 7: Report Disclaimer

This report has been prepared per the scope of works agreed upon by Lizzie the Arborist and the client. This report is valid only from the date of publication documented on the cover page and in the footer of each page. This report supersedes any prior revisions pertaining to the subject site. This report becomes void should unauthorised amendments, new information, project revisions, events, or the like occur or become available after the date of this report's publication. It is assumed that any property/project does not violate any application codes, ordinances, statutes, or any other government regulations.

Lizzie the Arborist is suitably experienced and competent in arboriculture to perform the tasks required by *AS4970-2009 Protection of trees on development sites*. All care has been taken to ensure that the information collated and reported in this report has been obtained from reliable sources. Discussions and recommendations in this report are based on the observations of the trees examined during the inspection and within the specified conditions. Any sketches, diagrams, maps, or the like are intended as visual aids, are not necessarily in scale, and should not be constructed as engineering surveys.

Any statement, declaration, opinion or advice that is stated or indicated in this report is made in good faith but on the condition that Lizzie the Arborist is not liable (whether by negligence, lack of care or otherwise) to any person for any damage, injury, or loss which has occurred or may occur in relation to the interpretation of the information in this report. Lizzie the Arborist shall only be required to give testimony or attend court by reason of this report if subsequential contractual arrangements are made, including payment of an additional fee for such services.

A living tree's response to its environment constantly changes throughout its life cycle. It is influenced by many external factors, such as extreme climatic events and conditions, that are impossible to predict. While a visual tree assessment (VTA) can identify the external symptoms and defects of tree parts, it cannot guarantee that a tree is immune to failure due to unforeseen circumstances, and Lizzie the Arborist shall not be held liable for any damage, injury, or loss caused by unforeseen circumstances. This report cannot definitively recommend anything about parts of a tree's root system not exposed to visual inspection. Furthermore, it is not possible to assume that a tree will always be safe under all conditions in the future. No warranty is given to recommendations, expressed or implied, that the issues may not arise again.

The clients are responsible for obtaining the required permits for tree works, managing ongoing inspections, and managing the ongoing maintenance of the trees included in this report.

0401 301 233 | info@lizziethearborist.com.au
www.lizziethearborist.com.au | ABN: 85 603 187 540