Vertical
Tree Management & Consultancy

ARBORICULTURAL IMPACT ASSESSMENT AND TREE PROTECTION PLAN

COMMISSIONED BY:
REVELOP PTY LTD
Site: 22 Forest Way, Frenchs Forest, NSW 2086
Within: Northern Beaches Council
Date of Inspection: 20 April 2024
Version: 2.1

PREPARED BY:
Vertical Tree Management & Consultancy Pty Ltd
Level 5 Consulting Arborist, Derek Arnaiz (AQF Level 5)
QTRA – Quantified Tree Risk Assessment

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1 Introduction / Aims/ Objectives:

1.1 Introduction

This Arboricultural Impact Assessment, Version 2.1, has been prepared by Vertical Tree Management and Consultancy, represented by Derek Arnaiz, on behalf of the client, Revelop Pty Ltd. The report aims to assess the existing viability of the trees on the site, considering their retention value and risk assessment as observed during the inspection. The assessment will be conducted in relation to the alterations and addition and associated infrastructure.

The Northern Beaches Council have requested Trees 9, 10, 11 12, 14, 15, 16 & 18 be retained within the streetscape. Considerations should include setback distances free from ground disturbance and building works may include tree sensitive construction. Also noting the existing infrastructure that has influenced the trees development.

The site, located at allotment 20 DP1209801, 22 Forest Way, Frenchs Forest, NSW 2086, falls under the jurisdiction of the Northern Beaches Council and is subject to relevant local government regulations and legislation.

1.2 Aims

This report aims to:

- Assess the site trees and advise on acceptable setback distances and impacts within the Tree Protection Zones (TPZ).
- Provide details on the methodology used in tree evaluation, retention value assessment, and determination of Tree Protection Zones and Structural Root Zones (SRZ) (see page 4).
- Present a tree data table including retention values (see page 7).
- Include a scaled plan illustrating the location of trees on the site (see Appendix A).
- Assign a number to each tree (see page 7 and Appendix A).
- Provide measurements such as canopy spread, diameter at breast height, and ground level of each tree (see page 7).
- Indicate tree retention values, Tree Protection Zones (TPZ), Structural Root Zones (SRZ), and assess the impact of development on the environment (see page 7).

1.3 Objectives

The objectives of this assessment are to:

- Evaluate the condition of the trees.
- Determine the impact of development on the site trees.

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- Offer recommendations for management and protection strategies for site trees.

1.4 The site

Situated in the Northern Beaches Council (NBC) local government area, the site is zoned as E1 Local Centre. The site has been identified to have non-specific vegetation schedule throughout. This is consistent with urban plantings of the modern era where native and exotic species have been used. Other vegetation was observed on the site however does not form part of the report as it does not fulfill the criteria of being a tree under the definition.

A summary of land control checks can be found in Table 1 below. The information has been obtained from the NSW Government ePlanning Spatial Viewer website as of 26 April 2024.

Figure 1. Aerial photo of the site 22 Forest Way, Frenchs Forest, NSW 2086. Sixmaps, accessed 26 April 2024.

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Table 1: Outline of site control measures listed on the land 22 Forest Way, Frenchs Forest, NSW 2086.

Planning Control	Conditioned	Not Conditioned
Zoning	E1 Local Centre	
Heritage Listed Property		X
Heritage Conservation Area		X
Terrestrial Biodiversity (CEEC-EEC)		X
Bush Fire Prone Land	Vegetation Buffer	

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2 Methodology:

2.1 Site Inspection

Site inspection was undertaken by the author on the 20 April 2024.

2.2 Plans Provided

Assessment of potential impacts on the trees in the immediate vicinity of the development site was based on various PDF plans supplied by the client and include the following:

- Arboreport, Arboricultural Impact Assessment, 01/11/2023
- Nettleton Tribe Partnership Pty Ltd, Site Analysis, Dwg No 11993_DA-010, Issue P3, 06/11/2023
- Nettleton Tribe Partnership Pty Ltd, Site Plan, Dwg No 11993_DA-011, Issue P4, 06/11/2023
- Nettleton Tribe Partnership Pty Ltd, Demolition Plan, Dwg No 11993_DA-031, Issue P4, 06/11/2023
- Nettleton Tribe Partnership Pty Ltd, Proposed GA Plan (Basement 2), Dwg No 11993_DA-111, Issue P5, 06/11/2023
- Nettleton Tribe Partnership Pty Ltd, Proposed GA Plan (Basement 1), Dwg No 11993_DA-113, Issue P7, 06/11/2023
- Nettleton Tribe Partnership Pty Ltd, Proposed GA Plan (Ground Floor), Dwg No 11993_DA-115, Issue P7, 06/11/2023
- Nettleton Tribe Partnership Pty Ltd, Proposed GA Plan (Level 1), Dwg No 11993_DA-117, Issue P6, 06/11/2023
- Nettleton Tribe Partnership Pty Ltd, Proposed Roof Plan, Dwg No 11993_DA-161, Issue P6, 06/11/2023
- Nettleton Tribe Partnership Pty Ltd, Building Elevations Sheet 1, Dwg No 11993_DA-201, Issue P5, 06/11/2023
- Nettleton Tribe Partnership Pty Ltd, Building Elevations Sheet 2, Dwg No 11993_DA-202, Issue P7, 06/11/2023
- Nettleton Tribe Partnership Pty Ltd, Forest Way Street Elevation, Dwg No 11993_DA-203, Issue P5, 06/11/2023
- Nettleton Tribe Partnership Pty Ltd, Material Schedule, Dwg No 11993_DA-211, Issue P3, 06/11/2023
- Nettleton Tribe Partnership Pty Ltd, Sections, Dwg No 11993_DA-301, Issue P3, 06/11/2023
- Nettleton Tribe Partnership Pty Ltd, GFA Calculation, Dwg No 11993_DA-701, Issue P5, 06/11/2023

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- Nettleton Tribe Partnership Pty Ltd, Shadow Diagrams, Dwg No 11993_DA-901, Issue P3, 06/11/2023
- Nettleton Tribe Partnership Pty Ltd, Perspectives – Sheet 1, Dwg No 11993_DA-951, Issue P3, 06/11/2023
- Nettleton Tribe Partnership Pty Ltd, Perspectives – Sheet 2, Dwg No 11993_DA-952, Issue P3, 06/11/2023
- Nettleton Tribe Partnership Pty Ltd, Perspectives – Sheet 3, Dwg No 11993_DA-953, Issue P3, 06/11/2023
- TTW, Concept General Arrangement Plan, Dwg No SKC101, Rev P4, 11/08/2023
- TTW, Concept General Arrangement Plan with Image, Dwg No SKC102, Rev P3, 11/08/2023
- Redevelop, Construction Staging Plan, A100, 13/10/2023
- Landscape Officer, Request for Further Information
- Redevelop, Floor Plan, A101, 24/06/2024
- Redevelop, Tree Sectional Diagrams, A102, 24/06/2024

2.3 Tree Numbering System

A tree numbering system was assigned to the trees indicated in Appendix A.

2.4 Tree Protection Zone (TPZ)

TPZ was calculated using the Australian standard AS4970 - “Protection of Trees on Development Sites” formula.

2.5 Structural Root Zone (SRZ)

SRZ was calculated using the Australian standard AS4970 - “Protection of Trees on Development Sites” formula.

2.6 Amendments

Recommendations for amendments to the proposed development were based on Australian Standards for AS 4970 - 2009 “Protection of Trees on Development Sites”.

2.7 Incursions

Allowable incursions to Tree Protection Zones were based on Australian Standards for AS 4970 2009 “Protection of Trees on Development Sites” and the author’s extensive experience with trees on development sites.

2.8 Destabilisation

Potential destabilization from root severance within the Structural root Zone (SRZ) based on data compiled from findings of Matheck (1994).

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2.9 Plans and retention value

Plans showing canopy, retention value, Tree Protection Zone and Structural Root zone and tree protection device locations indicated in Appendix A.

2.10 Tree protection & specification

Tree protection & specification in accordance with AS4970-2009.

2.11 Assumptions

1. The information provided is accurate and true to the conditions of the site.
2. The information provided has been ground truth or has been otherwise stated.
3. The techniques for excavation, construction boring and dismantling are in keeping with traditional methods unless otherwise stated.

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3 Tree Assessment Data

Table 2. Tree Assessment Data for trees located in 22 Forest Way, Frenchs Forest, NSW 2086 from Arboricultural Impact Assessment Report by Arboreport 01/11/2023, accessed on 20 April 2024.

Number	Botanic Name	Common Name	Height	Width	*DBH (cm)	**DGL (cm)	***TPZ Radius (m)	^SRZ Radius (m)	Age Class	Health	Condition	Amenity	Retention Value	Notes
9	*Eucalyptus saligna*	Sydney blue gum	8	7	41	59	4.920	2.652	Mature	Fair	Fair	Medium	Medium	Exposed roots. Pruning wound at 500mm occluding to South. Pruned for overhead services and building clearance. Some epicormic growth present.
10	*Eucalyptus saligna*	Sydney blue gum	18	7	45	51	5.4	2.494	Mature	Average	Average	Medium	Medium	Exposed roots. Dead branch (Ø 80mm) at 2.5m to West. Natural bracing occurring between first and second order branches at 4m.
11	*Eucalyptus saligna*	Sydney blue gum	18	7	36	51	4.320	2.494	Mature	Average	Average	Medium	Medium	Exposed roots. Occluded wounds along main stem.
12	*Eucalyptus saligna*	Sydney blue gum	13	5	20	22	2.4	1.752	Semi mature	Average	Fair	Low	Low	Growing in group in garden bed. Trunk leans to Northeast.
13	*Eucalyptus saligna*	Sydney blue gum	17	6	35	40	4.2	2.252	Semi mature	Average	Average	Medium	Medium	Growing in a group in garden bed.
14	*Eucalyptus saligna*	Sydney blue gum	12	3	16	20	2	1.683	Young	Average	Fair	Low	Low	Growing in a group in garden bed.
15	*Eucalyptus saligna*	Sydney blue gum	12	3	15	19	2	1.647	Young	Average	Fair	Low	Low	Growing in a group in garden bed.

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Number	Botanic Name	Common Name	Height	Width	*DBH (cm)	**DGL (cm)	***TPZ Radius (m)	^SRZ Radius (m)	Age Class	Health	Condition	Amenity	Retention Value	Notes
16	*Eucalyptus saligna*	Sydney blue gum	13	5	20	23	2.4	1.785	Semi mature	Average	Average	Low	Low	Growing in a group in garden bed.
17	*Eucalyptus saligna*	Sydney blue gum	17	6	41.3	60	4.956	2.670	Mature	Average	Average	Medium	Medium	Growing in garden bed. 3 Codominant stems from base.
18	*Eucalyptus botryoides*	Southern mahogany	13	9	58	63	6.960	2.726	Mature	Average	Average	Medium	Medium	Canopy on northern side pruned for overhead service clearance. Trunk leans to South. Epicormic growth to North. Exposed roots to South for 2m.

***DBH – Diameter at Breast Height; **DGL – Diameter at Ground Level ***TPZ – Tree Protection Zone; ^SRZ – Structural Root Zone, ~ Approximately. Appendix B – Explanatory notes**

DW = Dead wood (%), CS = Clear stem - no branching (m), LC = Live Crown (%)

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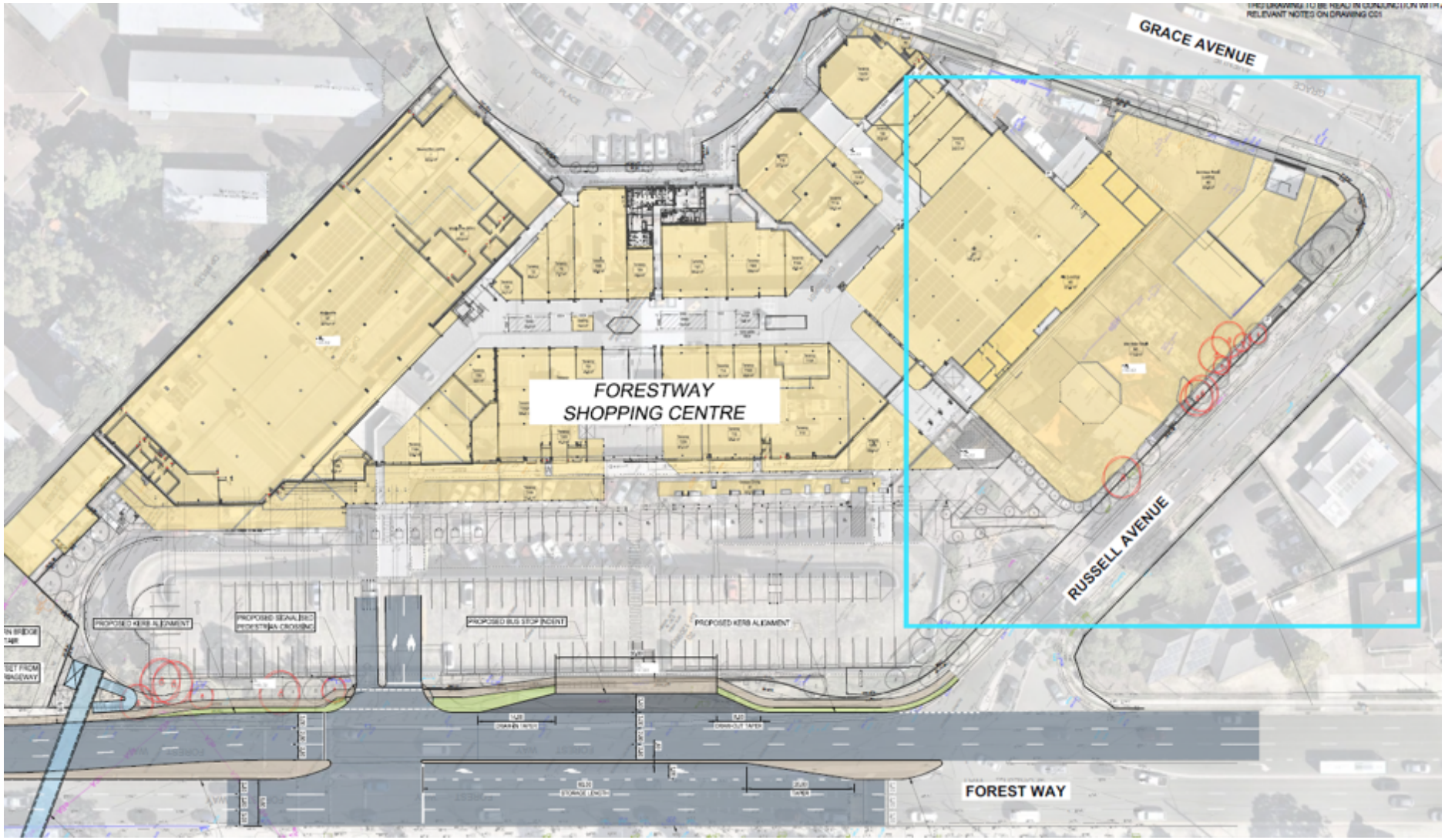

Figure 2. Tree Location Plan by Nettleton Tribe for 22 Forest Way, Frenchs Forest, NSW 2086.

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4 Tree Protection Zone & Structural Root Zone

4.1 Tree Protection Zone (TPZ)

The TPZ is the principal means of protecting trees on development sites. The TPZ is a combination of the root area and crown area requiring protection. It is an area isolated from construction disturbance, so that the tree remains viable.

The TPZ is calculated using the Australian standard AS4970 - "Protection of Trees on Development Sites" formula. Development encroachments are referred to as: 1) No impact (0%) incursion; 2) Low impact (<10%) of minor consequence; 3) Medium impact (<20%) incursion where the project arborist is to demonstrate the tree(s) remain viable by tree sensitive construction techniques; and 4) High level impact (>20%) where design changes or further information is required to manage tree vitality.

4.2 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. Variations can only be made by an AQF5 Consulting Arborist (Project Arborist).

4.3 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. this may require root investigation by non-destructive methods and consideration of relevant factors listed in AS4970 Clause 3.3.4.

4.4 Structural Root Zone (SRZ)

The SRZ is the area required for tree stability. A larger area is required to maintain a viable tree. The SRZ only needs to be calculated when major encroachment into a TPZ is proposed. The SRZ calculated using the Australian standard AS4970 - "Protection of Trees on Development Sites" formula. Excavation within the structural root zone should be avoided. In the event this cannot be avoided the site arborist (AQF level 5) must be present. Excavation must be non-destructive such as hand excavation or Airspade® or other.

The trees identified to have a major incursion within the calculated TPZ or SRZ by excavations, disturbance or soil fill will require an assessment of the impact to the tree. The incursion must be assessed and determined in accordance with AS4970 "Protection of Trees on Development Sites". Trees with major incursions may be adversely impacted with long term health and stability problems. Identification of work within the TPZ or SRZ will allow the site Arborist to recommend alternative solutions where possible.

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4.5 Variations of the TPZ

It may be possible to encroach into or make variations to the standard TPZ. Encroachment includes excavation, compacted fill, and machine trenching. Encroachment into the tree protection zone (TPZ) is sometimes unavoidable. Any loss of TPZ compensated for elsewhere.

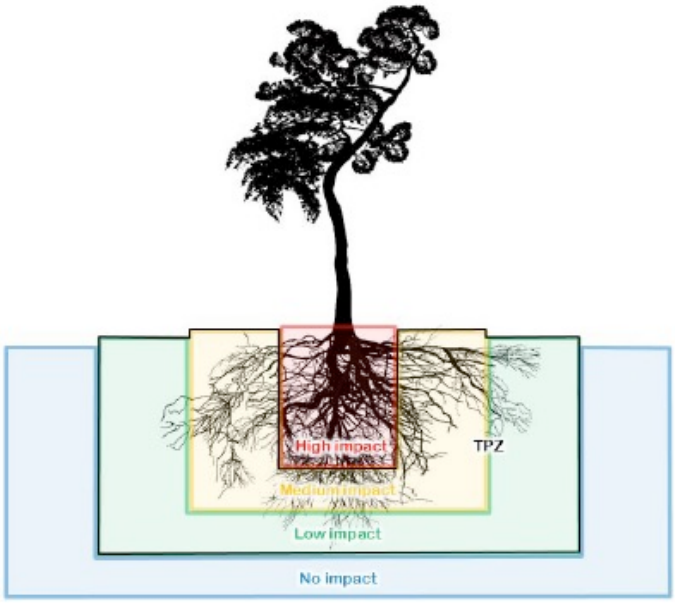

Figure 3. Image showing low, medium and high impact zones in reference to the tree.

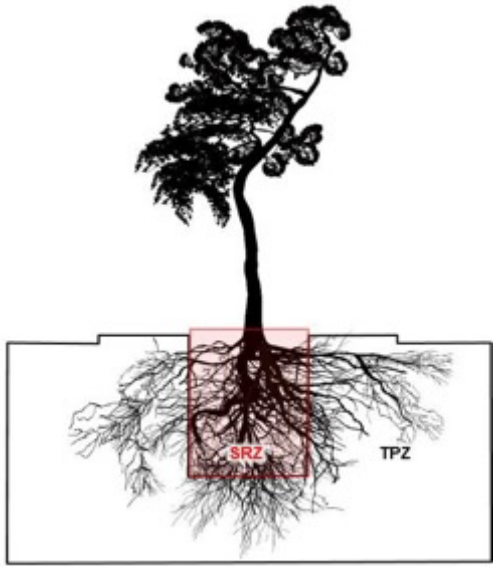

Figure 4. Image showing Structural Root Zone. This is the area required for tree stability.

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Table 3 – Tree Protection Zone (TPZ) & Structural Root Zone (SRZ) Calculations Table 22 Forest Way, Frenchs Forest, NSW 2086.

Number	Botanic Name	Common Name	TPZ (m) Radius from centre of the tree	SRZ (m) Radius from centre of the tree
9	*Eucalyptus saligna*	Sydney blue gum	4.9	2.6
10	*Eucalyptus saligna*	Sydney blue gum	5.4	2.4
11	*Eucalyptus saligna*	Sydney blue gum	4.3	2.4
12	*Eucalyptus saligna*	Sydney blue gum	2.4	1.7
13	*Eucalyptus saligna*	Sydney blue gum	4.2	2.2
14	*Eucalyptus saligna*	Sydney blue gum	2	1.6
15	*Eucalyptus saligna*	Sydney blue gum	2	1.6
16	*Eucalyptus saligna*	Sydney blue gum	2.4	1.7
17	*Eucalyptus saligna*	Sydney blue gum	4.9	2.6
18	*Eucalyptus botryoides*	Southern mahogany	6.9	2.7

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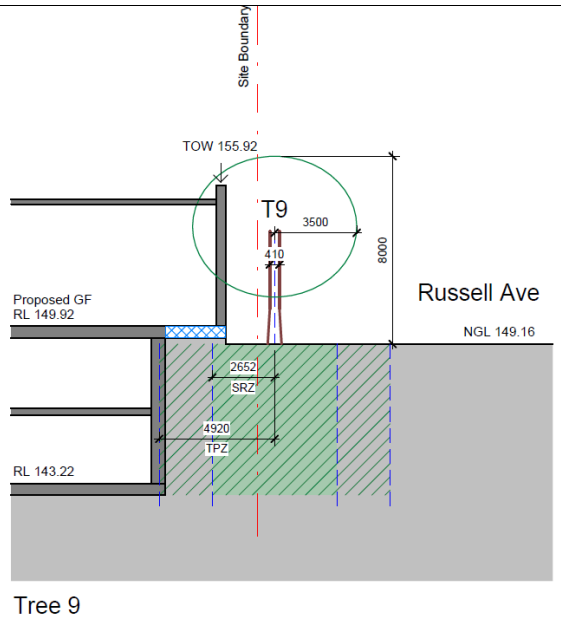

Figure 5.Cross section Tree 9 – construction works including a suspended slab (couter level) retain existing soil level. TPZ Incursion of 1.3%.

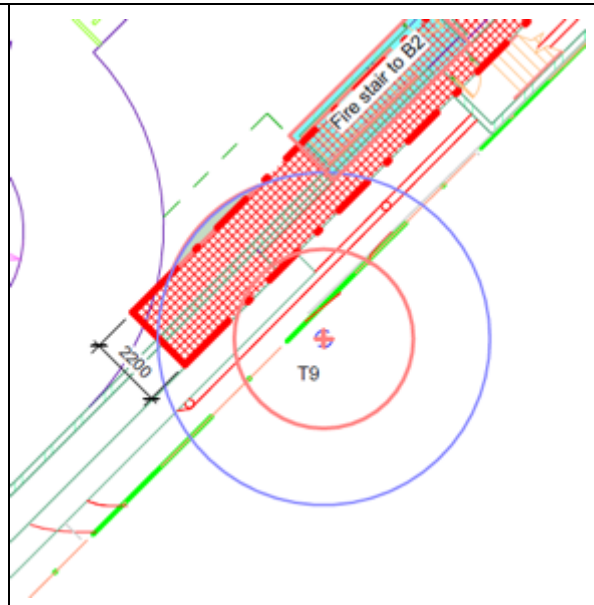

Figure 6. Basement 1 Plan – Tree 9 - Showing suspended slab (couter level).

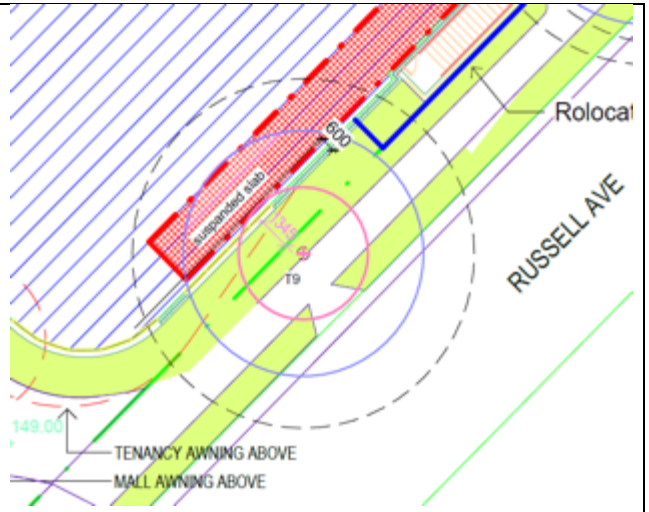

Figure 7. Level 0 Plan - Tree 9 Showing roof space, suspended slab (couter level).

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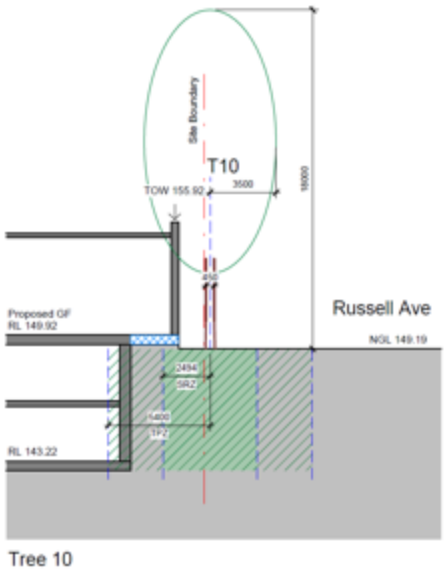

Figure 8. Cross section Tree 10 – construction works including a suspended slab (couter level) retain existing soil level. TPZ Incursion of 5.9%.

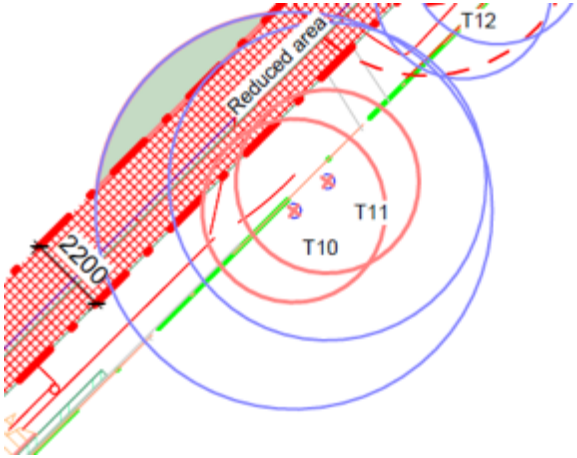

Figure 9. Basement 1 Plan – Tree 10 - Showing suspended slab (couter level).

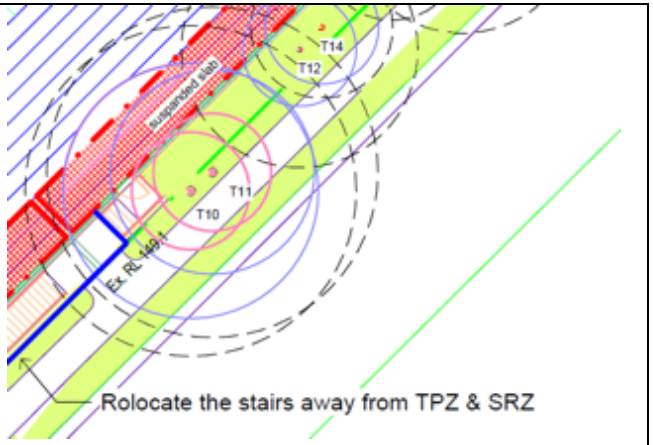

Figure 10. Level 0 Plan - Tree 10 Showing roof space, suspended slab (couter level).

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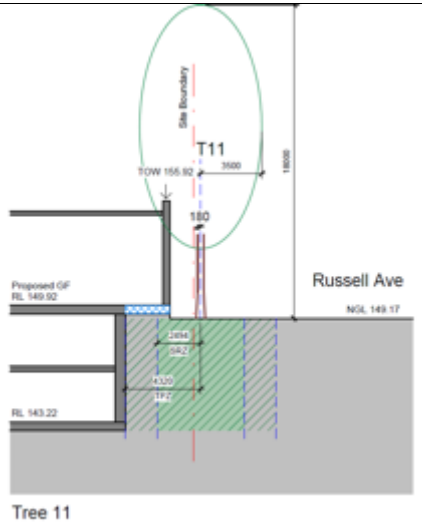

Figure 11. Cross section Tree 11 – construction works including a suspended slab (couter level) retain existing soil level.

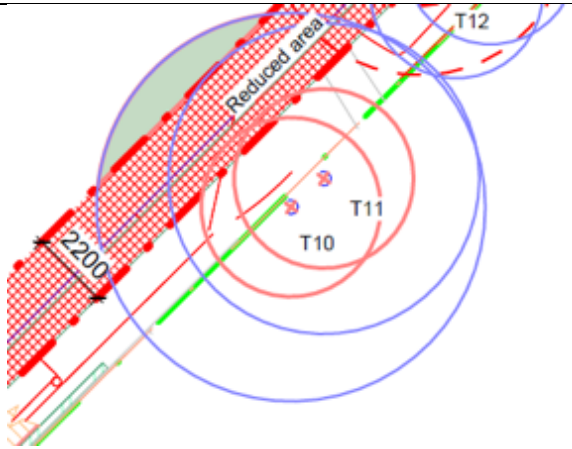

Figure 12. Basement 1 Plan – Tree 11 - Showing suspended slab (couter level).

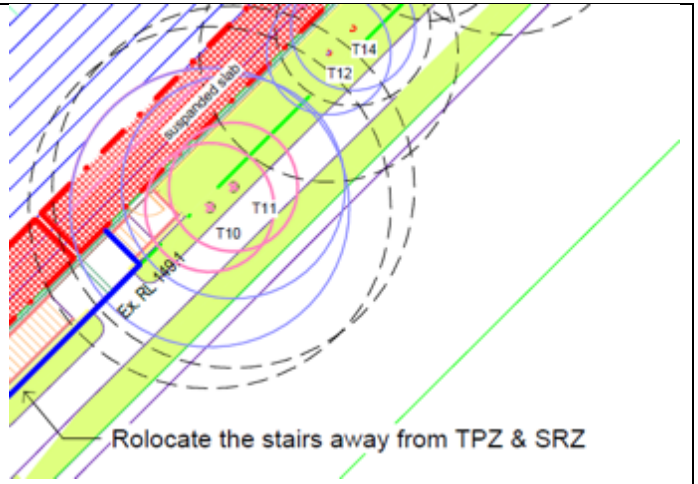

Figure 13. Level 0 Plan - Tree 11 Showing roof space, suspended slab (couter level).

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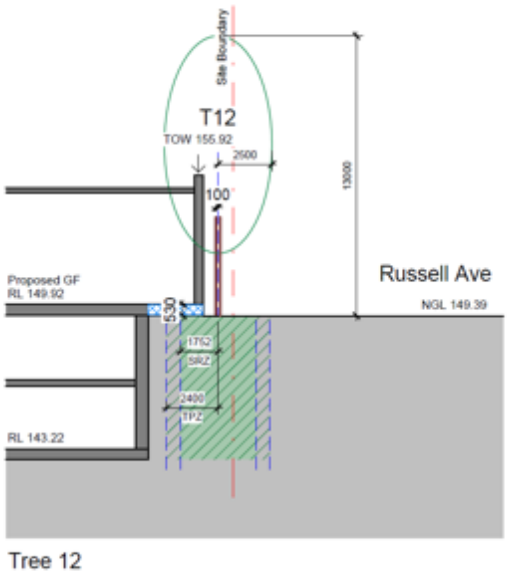

Figure 14. Cross section Tree 12 – construction works including a suspended slab (couter level) retain existing soil level.

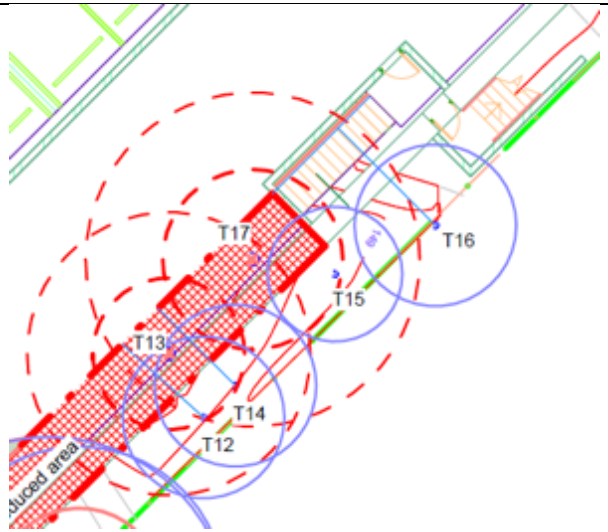

Figure 15. Basement 1 Plan – Tree 12 - Showing suspended slab (couter level).

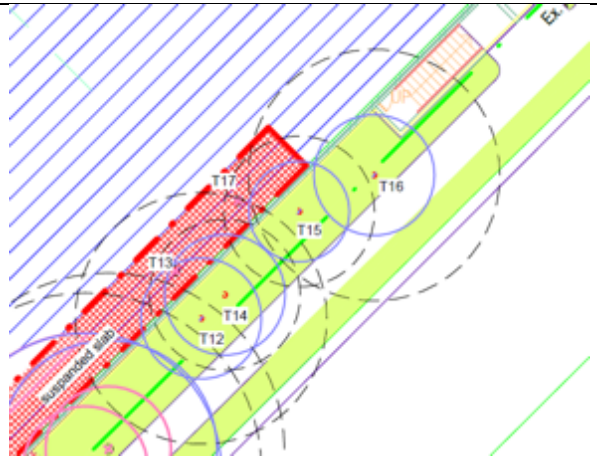

Figure 16. Level 0 Plan - Tree 12 Showing roof space, suspended slab (couter level)

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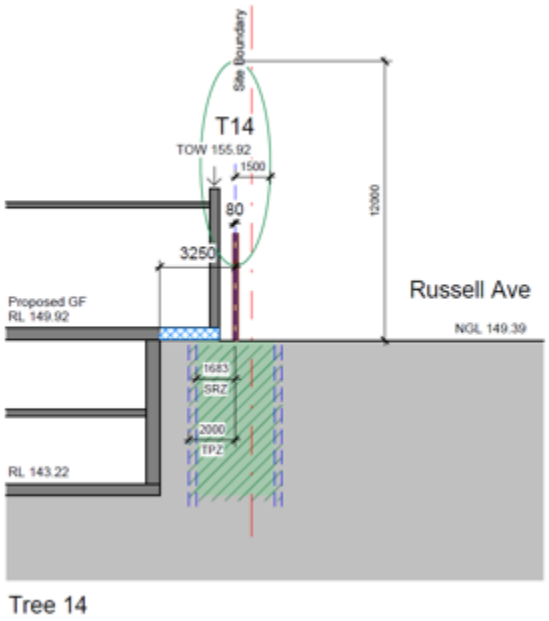

Figure 17. Cross section Tree 14 – construction works including a suspended slab (couter level) retain existing soil level.

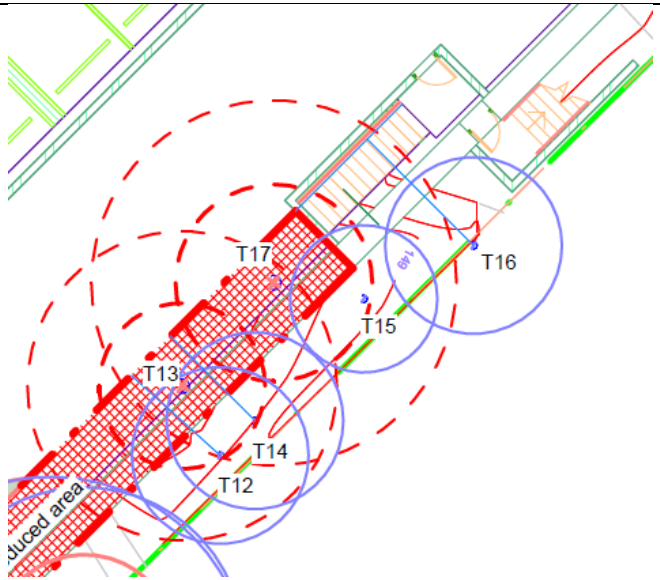

Figure 18. Basement 1 Plan – Tree 14 - Showing suspended slab (couter level).

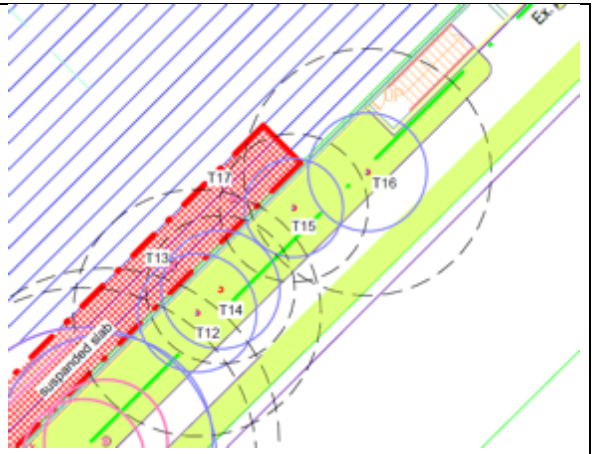

Figure 19. Level 0 Plan - Tree 14 Showing roof space, suspended slab (couter level)

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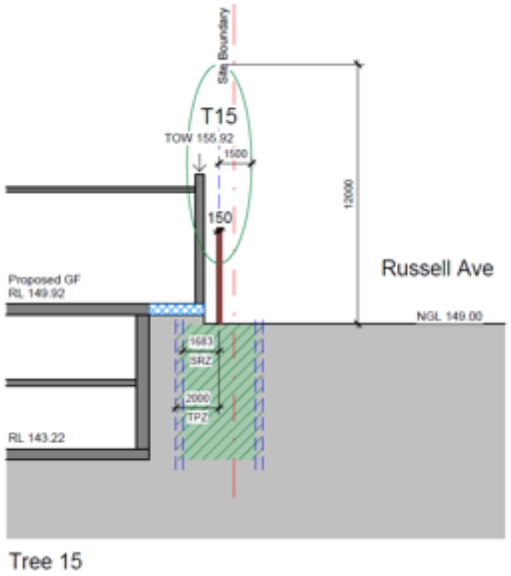

Figure 20. Cross section Tree 15 – construction works including a suspended slab (couter level) retain existing soil level.

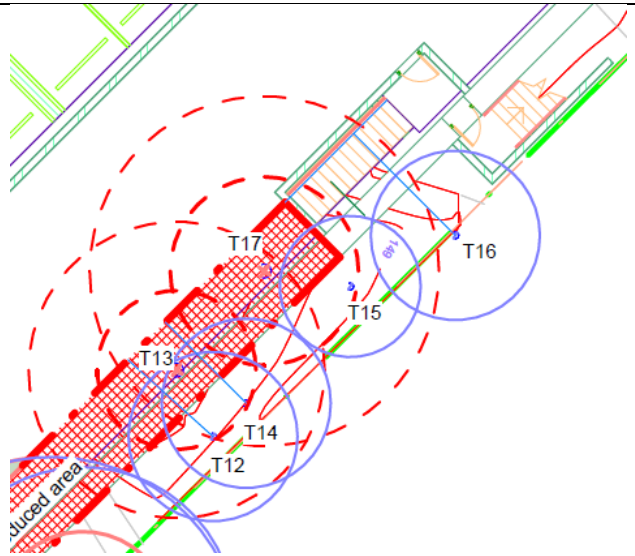

Figure 21. Basement 1 Plan – Tree 15 - Showing suspended slab (couter level).

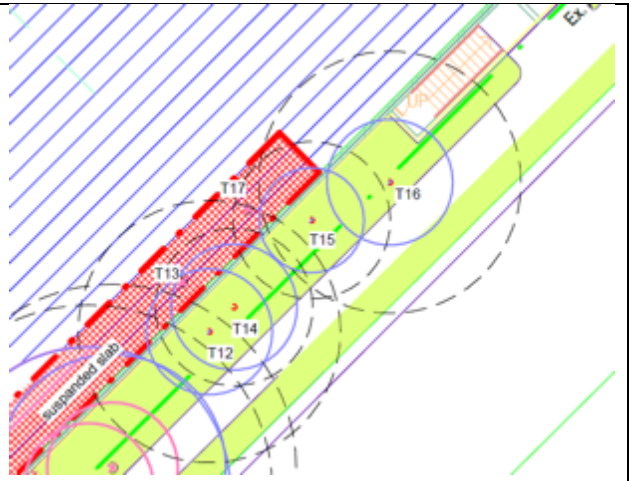

Figure 22. Level 0 Plan - Tree 15 Showing roof space, suspended slab (couter level).

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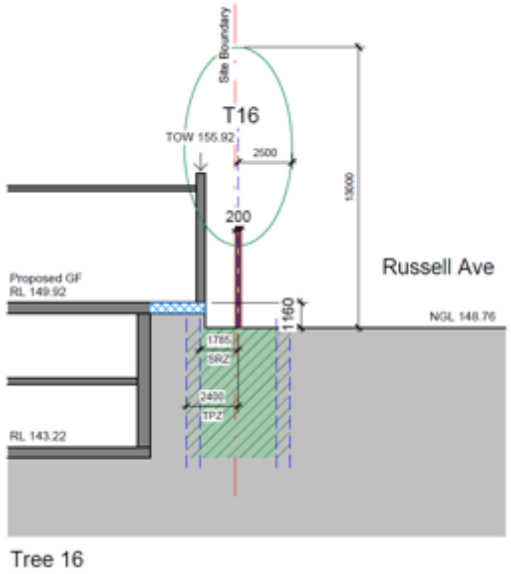

Figure 23. Cross section Tree 16 – construction works including a suspended slab (couter level) retain existing soil level.

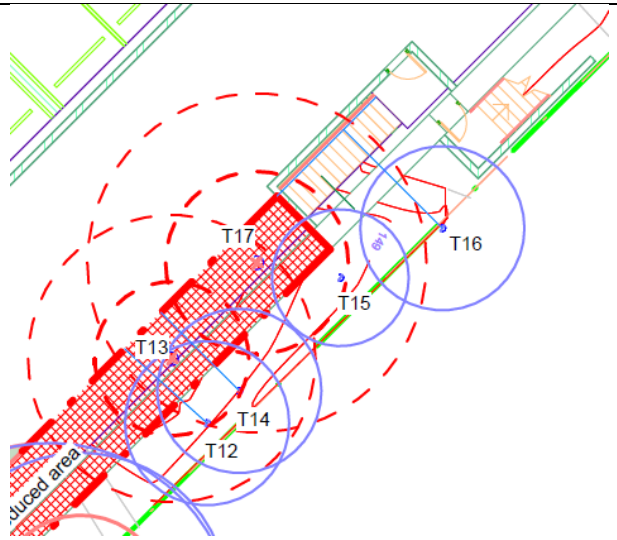

Figure 24. Basement 1 Plan – Tree 16 - Showing suspended slab (couter level).

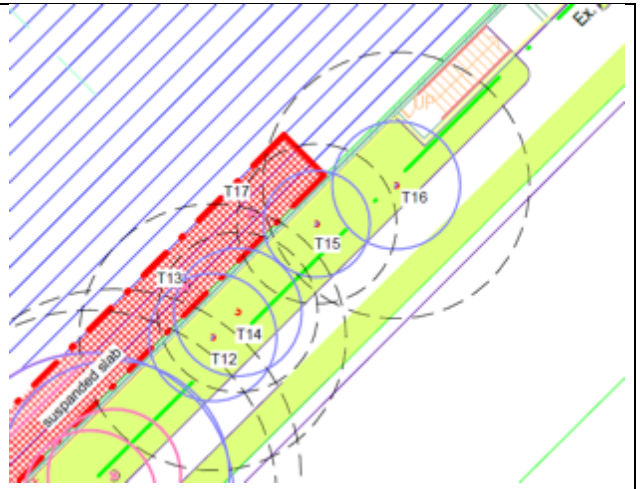

Figure 25. Level 0 Plan - Tree 16 Showing roof space, suspended slab (couter level).

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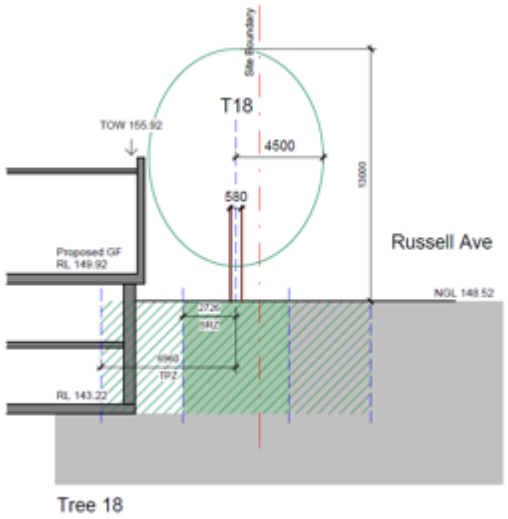

Figure 26. Cross section Tree 18 – construction works including a suspended slab (couter level) retain existing soil level. TPZ Incursion of 7%.

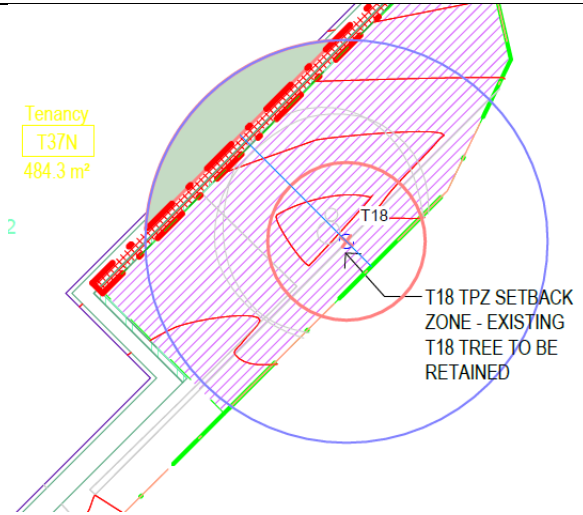

Figure 27. Basement 1 Plan – Tree 18 - Showing suspended slab (couter level).

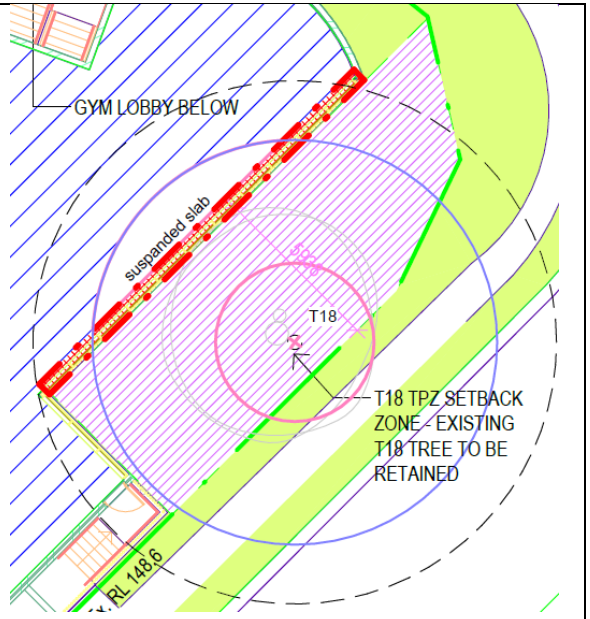

Figure 28. Level 0 Plan - Tree 18 Showing roof space, suspended slab (couter level).

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Table 4 – Tree Protection Zone (TPZ) & Structural Root Zone (SRZ) Incursion Calculations for **current design** Table 22 Forest Way, Frenchs Forest, NSW 2086.

Tree Number/ Species	Incursion Percentage TPZ	Incursion Percentage SRZ	Action	Notes
9 *Eucalyptus saligna*	1.31	0	Retain.	Low impact anticipated.
10 *Eucalyptus saligna*	5.93	0	Retain.	Low impact anticipated.
11 *Eucalyptus saligna*	0	0	Retain.	No impact anticipated.
12 *Eucalyptus saligna*	0	0	Retain.	No impact anticipated.
13 *Eucalyptus saligna*	100	0	Remove.	Major impact anticipated.
14 *Eucalyptus saligna*	0	0	Retain.	No impact anticipated.
15 *Eucalyptus saligna*	0	0	Retain.	No impact anticipated.
16 *Eucalyptus saligna*	0	0	Retain.	No impact anticipated.
17 *Eucalyptus saligna*	100	100	Remove.	Within Development footprint that will necessitate removal.
18 *Eucalyptus botryoides*	7.36	>3	Retain.	Impacted with minor incursion into the TPZ and SRZ.

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5 Discussion

Northern Beaches Council is prioritizing the preservation of trees within the streetscape, specifically Trees 9, 10, 11, 12, 14, 15, 16, and 18. This request comes from an understanding of the importance of these trees to the local environment, aesthetics, and Australian cultural significance. To be able to meet the council's request, several considerations should be taken into account:

Setback Distances:

For construction or ground disturbance activities, maintaining adequate setback distances from the trees is crucial to prevent damage to the tree roots and canopy, which are essential for the tree's health and stability. If the proposed encroachment is less than 10% of the area of the Tree Protection Zone (TPZ) and is outside the Structural Root Zone (SRZ), detailed root investigations are not required. However, variations from this rule can only be approved by an AQF5 Consulting Arborist (Project Arborist). If the proposed encroachment exceeds 10% of the TPZ or falls within the SRZ, the project arborist must demonstrate that the trees would remain viable. This may necessitate root investigation through non-destructive methods and consideration of relevant factors listed in AS4970 Clause 3.3.4.

Tree-Sensitive Construction:

Tree-sensitive construction methods have been employed to minimize impacts on the trees during building works. A suspended slab with pier footings may enable the structure to be located closer to the tree while still protecting its root system. Figures 5 to 28 show the o level building will be constructed above grade retaining soil levels and leaving a void for gaseous exchange.

It's essential to adequately protect the tree to prevent soil compaction and mechanical damage. Details of the protection will be outlined in the Tree Protection Plan.

Existing Infrastructure: Understanding how existing infrastructure, such as buildings and other infrastructure, influences tree development is crucial for planning construction or renovation projects without compromising tree health. During demolition or construction, careful techniques and the use of protective barriers are essential, with a site arborist monitoring the works to ensure minimal impact on trees. Long-term management should include regular inspections and adjustments to maintenance practices, integrating tree-friendly designs like permeable paving and strategic utility placement to foster a balanced relationship between infrastructure and tree health.

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Long-Term Maintenance: Develop a plan for ongoing maintenance and care of the trees after any construction or development is completed. This might include regular inspections, pruning, and watering to ensure the trees remain healthy and vibrant.

Revised plans for the assessment have been prepared in conjunction with the site arborist, considering the aforementioned measures for tree preservation. These revised plans incorporate details on setback distances, tree-sensitive construction methods, and any necessary variations based on the condition of the trees and their root systems.

The site arborist's expertise will be instrumental in ensuring that the plans effectively balance the requirements of construction with the need to protect and preserve the trees. Regular communication and collaboration between the project team and the arborist will help ensure that the revised plans meet the standards for tree preservation set forth by the Northern Beaches Council.

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6 Recommendations

Revised plans for the assessment have been prepared in conjunction with the site arborist, considering the aforementioned measures for tree preservation. The TPZ and SRZ have been provided in table 3. The calculation is a radius measured from the Centre of the tree.

These revised plans incorporate details on setback distances, tree-sensitive construction methods, and any necessary variations based on the condition of the trees and their root systems. The site arborist's expertise will be instrumental in ensuring that the plans effectively balance the requirements of construction with the need to protect and preserve the trees. Regular communication and collaboration between the project team and the arborist will help ensure that the revised plans meet the standards for tree preservation set forth by the Northern Beaches Council.

6.1 Trees identified for removal

Table 4 - Trees identified for removal at 22 Forest Way, Frenchs Forest, NSW 2086.

Tree Number/ Species	Action
13 *Eucalyptus saligna*	Remove
17 *Eucalyptus saligna*	Remove

6.2 Trees identified to be retained

Table 5 - Trees identified to be retained 22 Forest Way, Frenchs Forest, NSW 2086.

Tree Number/ Species	Action
9 *Eucalyptus saligna*	Retain
10 *Eucalyptus saligna*	Retain
11 *Eucalyptus saligna*	Retain
12 *Eucalyptus saligna*	Retain

Tree Number/ Species	Action
14 *Eucalyptus saligna*	Retain
15 *Eucalyptus saligna*	Retain
16 *Eucalyptus saligna*	Retain
18 *Eucalyptus botryoides*	Retain

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7 Standards

7.1 Owners/builders responsibilities

It is the responsibility of the owner/builder to make this report available to all contractors associated with the development at the site. The following Tree protection Plan, report version one should be adhered to ensure that the trees are viable into the future.

7.2 Tree related works

All tree related work relevant to this report is to be conducted in accordance with:

- The NSW Workcover Code of Practice: Amenity Tree Industry 1998.
- The AS4970-2007 “Protection of Trees on Development Sites”.
- All tree related work must be undertaken by an arborist with an Australian Qualification Framework Level 3 in Arboriculture or above.
- All tree related work carried out in the vicinity of overhead power lines must be undertaken by a qualified arborist with a current Power lines Awareness Certificate.

7.3 The Site Arborist (Vertical Tree Management & Consultancy)

The site arborist will record tree health prior to commencement of construction and provide a Tree Protection Plan setting out tree protection measures, methods and supervision requirements.

7.4 Certification of works

The site arborist will provide certification at three stages of the project, prior, during and at the final stages for the compliance of tree protection measures. Changes to the tree protection will also be recorded as required.

7.5 The Site Arborist

The arborist will oversee work and provide advice for tree work within the tree protection zone and Structural Root Zone. A report will be required for pruning tree roots greater than 40mm in diameter.

7.6 Consent for works

All tree related work must have written consent from the relevant control authority (local Council).

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8 Tree Protection Information & Specifications

To achieve the best possible outcome in protecting the relevant trees during the development, compliance with the tree protection measures is crucial in ensuring the long-term success of the site trees.

- The fundamental element for tree protection for this site is tree boarding and ground protection to safeguard the roots and lower trunk from physical damage during construction activities. This involves installing sturdy barriers around the Tree Protection Zone (TPZ) to prevent machinery and equipment from entering, thereby minimising soil compaction and root disturbance. Ground protection measures, such as laying down mulch, mats, or temporary walkways, help distribute weight and reduce the impact on the tree's root system, ensuring the tree remains healthy and undamaged throughout the project.
- The trees requiring protection include:

Tree Number/ Species	Action
9 *Eucalyptus saligna*	Retain
10 *Eucalyptus saligna*	Retain
11 *Eucalyptus saligna*	Retain
12 *Eucalyptus saligna*	Retain

Tree Number/ Species	Action
14 *Eucalyptus saligna*	Retain
15 *Eucalyptus saligna*	Retain
16 *Eucalyptus saligna*	Retain
18 *Eucalyptus botryoides*	Retain

- The Tree protection measures are to be implemented prior to commencement of construction and remain until post construction phases to ensure adequate protection for the retained trees on site, refer to Appendix E.
- The tree protection must be checked and certified by the site arborist, Vertical Tree Management & Consultancy during and after construction.
- No materials are to be stored within 3m of the neighbouring property trees.
- The effectiveness of the tree protection measures recommended depends on the degree of cooperation between the developer, construction contractor, and the site arborist.

Tree Protection Zone (TPZ) – The TPZ is a combination of the root area and crown area requiring protection. It is an area isolated from construction disturbance, so that the tree

remains viable. The TPZ is calculated using the Australian standard AS4970 - “Protection of Trees on Development Sites” formula.

Structural Root Zone (SRZ) – The SRZ only needs to be calculated when major encroachment into a TPZ is proposed. The SRZ is the area required for tree stability. A larger area is required to maintain a viable tree. The SRZ is calculated using the Australian standard AS4970 - “Protection of Trees on Development Sites” formula.

Tree Protection Measures and Recommendations within this report are in accordance with Australian Standard AS4970-2009 “Protection of Trees on Development Sites”.

Tree protection measures are to be implemented prior to commencement of demolition, during construction and post construction phases to ensure adequate protection for the retained trees on site.

8.1 Specification

8.1.1 Tree Protection Zones (TPZ)

TPZ are to be erected prior to any work or machinery entering the site. The TPZ will remain in place until all site works are complete (refer to Appendix A).

8.1.2 Tree Protection Fencing

Shall protect the tree from mechanical damage. Ensure no materials are stored at the base of the trees. It is the site foreman’s and owner’s responsibility to ensure this area is maintained throughout the development. The Tree Protection Fencing must be checked and Certified by the Site Arborist - Derek Arnaiz, Vertical Tree Management & Consultancy.

8.1.3 Tree Protection - Boarding

Trees, on a development site can be damaged by vehicles, heavy loaders and bobcats during the demolition and construction phase. Trees are easily protected by installing tree protection which usually consists of cordoning off the trees with temporary fencing panels. Where fencing is not possible due to site conditions tree protection boarding will prevent mechanical damage.

8.1.4 Tree Protection - rumble Boards or trac mats

Soil compaction can be caused by vehicles, heavy loaders and bobcats during the demolition and construction phase. Trees are easily protected by installing tree protection rumble Boards or trac mats which cover the ground frequently used by machinery. This will prevent soil compaction and prevent the tree from declining in health.

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8.1.5 Activities

No other activity is to take place within the TPZ. This includes and is not restricted to the following: silt fence excavation, soil level changes, storage of material or waste, run off from wash down, slurry etc., refuelling, parking, and various other activities (refer to AS4970-2009 4.2 pg 15)

8.1.6 Maintenance of the tree protection zones

During construction shall be completed by the site arborist. The site arborist shall make regular checks and maintain the tree protection structures during construction.

8.1.7 Adequate signs

Regarding the delegated areas of “TPZ” shall be clearly visible from within the development site. The area indicates the zone required for protecting trees and all of their parts. The sign shall be made from durable all-weather material and be securely fixed to the outer visible side of the tree protection fencing. The signage shall be visible from all areas of the work site and may include multiple signs.

8.1.8 Alterations

Alteration to the TPZs requires the site arborist approval.

8.1.9 Root pruning

Trees requiring root pruniung prior to excavation shall be done under the supervision of the site arborist. Roots equal to 10mm or greater shall require pruning by the site arborist. The root pruning cuts made shall be made at a 90 degree angel and use a clean sharp pruning implement.

8.1.10 Trenching and boring underground services

Trenching and boring within the TPZ shall be done under the supervision of the site arborist. Where possible all services should be routed outside the minimum set back distance. Where this is not possible the underground service should be installed by directional drilling at a depth of no less than 600mm or use manual excavation techniques. When the Structural Root Zone is affected the project arborist must demonstrate that the tree(s) would remain viable.

8.1.11 Tree pruning

Tree pruning, crown lifting, crown reduction, branch removal shall be carried out by an arborist with minimal qualification of certificate 3 (Australian Qualification Framework AQF Level 2) in arboriculture.

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8.1.12 Hold points

Requiring certification by the site arborist include:

- Installation of tree protection and signage.
- Excavation within TPZ/SRZ.
- Various unforeseen changes in the field.
- Mid construction
- Completion of construction works.

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Date	Version	Prepared by	Checked by
28 August 2024	2.1	Derek Arnaiz	Derek Arnaiz
1 July 2024	2	Derek Arnaiz	Derek Arnaiz
29 April 2024	1	Derek Arnaiz	Derek Arnaiz

Derek Arnaiz

Director and Principal Consultant
Vertical Tree Management & Consultancy PTY LTD
Diploma of Arboriculture, Level 5 consultant,
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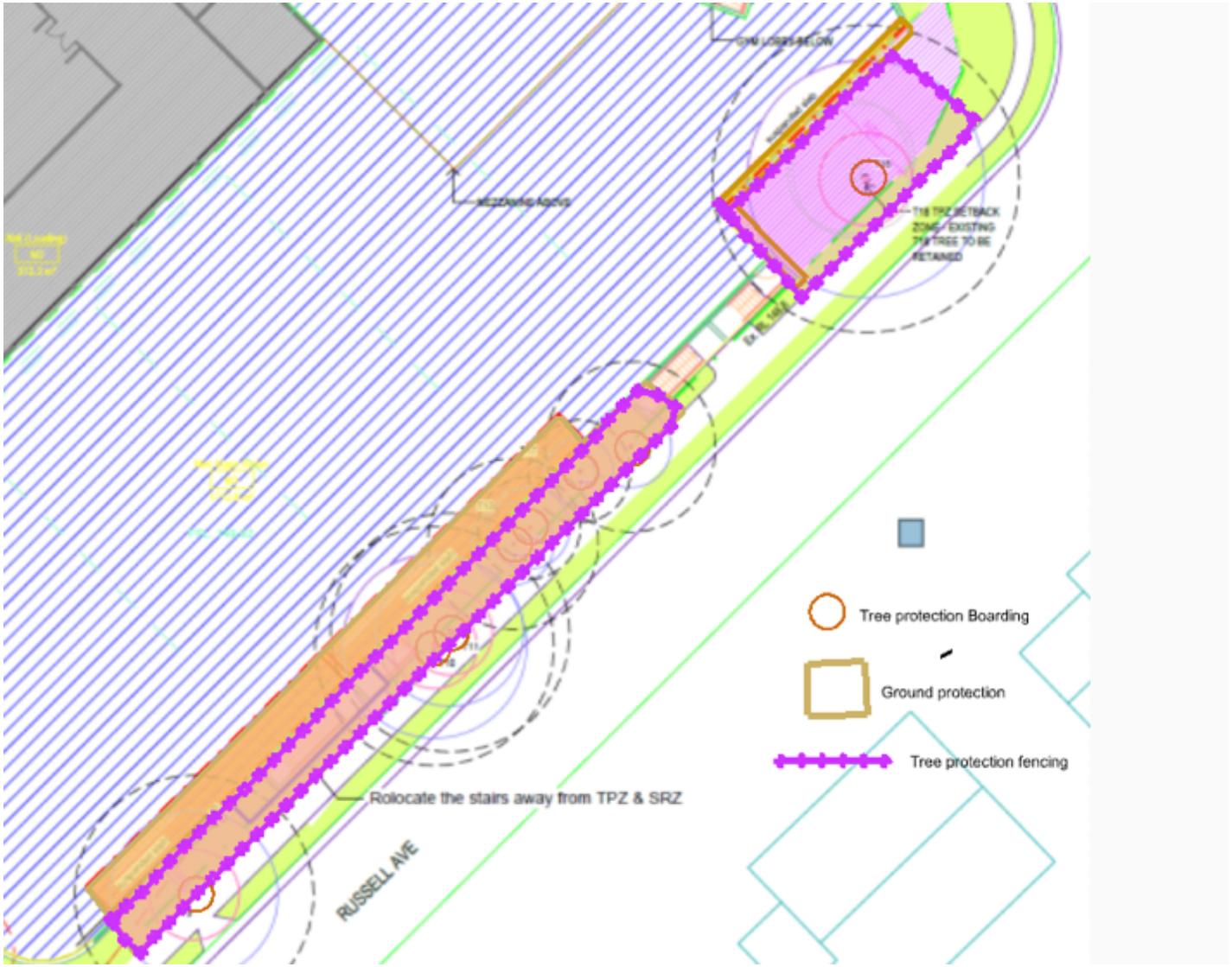
TREE CONSULTANCY / LANDSCAPE ARCHITECT
TREE ASSESSMENTS / TREE REPORTS / GPS SURVEYING / TREE PROTECTION / PEST & DISEASE/ TREE INJECTION / ROOT MAPPING / STUMP GRINDING /GARDEN DESIGN/ /TREE SUPPLY AND PLANTING
WEB SITE: https://verticaltreemanagement.com.au/

Disclaimer statement. The response of a living tree to its immediate environment is dynamic throughout its entire life cycle due to external influences giving each tree a unique natural variability. A visual tree assessment addresses the external symptoms presented by a tree. This cannot exclude a tree from the potential for failure due to unforeseen circumstances. This report cannot provide a conclusive recommendation regarding any part of a tree root system that is not exposed for visual inspection. Additionally, it cannot not be assumed, that a tree will be safe in all conditions in the future. Appropriate management, assessment, and maintenance aim to mitigate risks to an acceptable level. This report is the opinion, advise or recommendation based on the information supplied by the client or observation of the author.

Appendix A – Tree Protection Plan 22 Forest Way, Frenchs Forest, NSW 2086



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Appendix B - Tree Assessment Data 22 Forest Way, Frenchs Forest, NSW 2086 from Arboricultural Impact Assessment by Arboreport 06/11/2023

arboreport™ Vegetation Management Consultants

FORESTWAY SHOPING CENTRE, FRENCHS FOREST - TREE SURVEY DATA SHEET

DATE OF SURVEY: 29/06/18

High / Medium / Low

Retain / Remove

No impact / Minor encroachment / Major encroachment / Within development footprint

NO#	Botanic Name	Common Name	Height (m)	Spread (m)	Trunk Dia (mm)	Trunk Dia 2 (mm)	Trunk Dia 3 (mm)	Trunk Dia 4 (mm)	DBH (mm)	DRB (mm)	SRZ (mm)	TPZ (mm)	Age	Health	Crown Cond	Signif-cance	Am	Eco	Crown Form	Ret/ Rem	Development Setback and Encroachment	Comments
1	Platanus x acerifolia	London Plane	8	7	530				530	580	2633	6360	M	F	F	L	L	L	CD	Rem.	Located within development footprint - stairs to proposed footbridge	Growing 200mm West of retaining wall. Wall deflected from trunk base. Trunk lean to East with canopy biased to West. Exposed roots 1.5m long to North and South. Lowest FOBs previously removed on E side, leaving partially occluded pruning wounds (Ø 200mm x 180mm) at 1m and 1.6m to north and at 2m and 3m to East.
2	Corymbia maculata	Spotted Gum	16	8	410				410	520	2515	4920	M	F	Av	M	H	H	CD	Rem.	Located within development footprint - basement	Straight trunk. Canopy on top third of tree clear of parking building. Aerrillaria fruiting bodies growing at base. Canopy showing reduced density and lighter colour than comparison tree.
3	Corymbia maculata	Spotted Gum	15	8	470				470	540	2555	5640	M	Av	Av	H	H	H	CD	Rem.	Located within development footprint - basement	Trunk lean to West self correcting at 2m. Canopy biased to East because of clearance pruning for building on West. Canopy density and colour normal. No fungal fruiting bodies present.
4	Melaleuca quinquenervia	Broad-leaved Paperbark	10	6	370				370	440	2344	4440	SM	Av	Av	M	M	H	CD	Rem.	Located within development footprint - basement	Straight trunk. Canopy on top half of tree biased to west. Pruned on East for pole clearance. Exposed roots to West (2m) and East (1m). Pruning wound occluding at 1.3m on East.
5	Corymbia maculata	Spotted Gum	6	4	110	130			171	260	1879	2052	Y	Av	Av	L	L	M	CD, M	Rem.	Located 0.90m from proposed basement excavation providing 20% encroachment within the TPZ and encroachment within the SRZ.	Codominant from base. Skewed to Southeast.
6	Corymbia maculata	Spotted Gum	17	8	490				490	630	2726	5880	M	G	Av	H	H	H	D	Rem.	Located 0.90m from proposed basement excavation providing 42% encroachment within the TPZ and encroachment within the SRZ.	Codominant from 5m Junction appears sound without excessive lateral swelling.
7	Eucalyptus cinerea	Argyle apple	6	5	160	130	110	80	247	320	2051	2964	SM	Av	Av	L	L	M	CD, M	Rem.	Located 0.69m from proposed basement excavation providing 32% encroachment within the TPZ and encroachment within the SRZ.	Multitrunked from base. Previously topped at 2m. Located in garden bed. Crown in top third of tree.
8	Corymbia maculata	Spotted Gum	9	7	310				310	370	2180	3720	SM	Av	F	M	M	M	D	Rem.	Located within development footprint - public domain path	Pruning wounds to Northeast and Northwest at 2m and 4m respectively. Small deadwood present in canopy (Ø 50mm)
9	Eucalyptus saligna	Sydney Blue Gum	8	7	410				410	590	2652	4920	EM	F	F	M	M	H	D	Rem.	Located within development footprint - proposed basement excavation	Exposed roots. Pruning wound at 500mm occluding to South. Pruned for overhead services and building clearance. Some epicormic growth present.
10	Eucalyptus saligna	Sydney Blue Gum	18	7	450				450	510	2494	5400	EM	Av	Av	M	M	H	CD	Rem.	Located 0.46m from proposed basement excavation providing 42% encroachment within the TPZ and encroachment within the SRZ.	Exposed roots. Dead branch (Ø 80mm) at 2.5m to West. Natural bracing occuring between first and second order branches at 4m.
11	Eucalyptus saligna	Sydney Blue Gum	18	7	360				360	510	2494	4320	EM	Av	Av	M	M	H	CD	Rem.	Located 0.54m from proposed basement excavation providing 38% encroachment within the TPZ and encroachment within the SRZ.	Exposed roots. Occluded wounds along main stem.
12	Eucalyptus saligna	Sydney Blue Gum	13	5	200				200	220	1752	2400	SM	Av	F	L	L	H	CD	Rem.	Located within development footprint - proposed basement excavation	Growing in group ir garden bed. Trunk lean to Northeast.
13	Eucalyptus saligna	Sydney Blue Gum	17	6	350				350	400	2252	4200	SM	Av	Av	M	M	H	CD	Rem.	Located within development footprint - proposed basement excavation	Growing in a group in garden bed.
14	Eucalyptus saligna	Sydney Blue Gum	12	3	160				160	200	1683	2000	Y	Av	F	L	L	H	CD	Rem.	Located within development footprint - proposed basement excavation	Growing in a group in garden bed.
15	Eucalyptus saligna	Sydney Blue Gum	12	3	150				150	190	1647	2000	Y	Av	F	L	L	H	CD	Rem.	Located within development footprint - proposed basement excavation	Growing in a group in garden bed.
16	Eucalyptus saligna	Sydney Blue Gum	13	5	200				200	230	1785	2400	SM	Av	Av	L	L	H	CD	Rem.	Located 0.44m from proposed basement excavation providing 45% encroachment within the TPZ and encroachment within the SRZ.	Growing in a group in garden bed.
17	Eucalyptus saligna	Sydney Blue Gum	17	6	300	200	200		413	600	2670	4956	M	Av	Av	M	M	H	CD	Rem.	Located within development footprint - proposed basement excavation	Growing in garden bed. 3 Codominant stems from base.

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FORESTWAY SHOPING CENTRE, FRENCHS FOREST - TREE SURVEY DATA SHEET

DATE OF SURVEY: 29/06/18

High	Retain
Medium	Remove
Low	

No Impact	Minor encroachment
Major encroachment	Within development footprint

NO#	Botanic Name	Common Name	Height (m)	Spread (m)	Trunk Dia (mm)	Trunk Dia 2 (mm)	Trunk Dia 3 (mm)	Trunk Dia 4 (mm)	DBH (mm)	DRB (mm)	SRZ (mm)	TPZ (mm)	Age	Health	rowth Con	Signifi-cance	Am	Eco	Crown Form	Ret/ Rem	Development Setback and Encroachment	Comments
18	Eucalyptus bothyoides	Southern Mahogany	13	9	580				580	630	2726	6960	M	Av	Av	M	M	H	D	Ret.	Located 3.05m from proposed basement excavation providing 21% encroachment within the TPZ and encroachment within the SRZ. Located 2.04m from anticipated 1.5m wide scaffold to around 8m height providing an estimated 18% encroachment in lower crown (10% of crown volume).	Canopy on northern side pruned for overhead service clearance. Trunk lean to South. Epicormic growth to North. Exposed roots to South for 2m.
19	Eucalyptus sp.	eucalypt	7	6	450				450	490	2453	5400	M	Av	Av	M	M	H	CD	Ret.	No encroachment - no impact	Council owned tree. Codominant at 1.4m 1st order branch growing parallel to ground in a norther direction
20	Eucalyptus sp.	eucalypt	7	6	460				460	520	2515	5520	M	Av	Av	M	M	H	CD	Ret.	No encroachment - no impact	Council owned tree. Trunk lean to Northeast. Exposed roots. Several pruning wounds showing exposed heartwood at different stages of occlusion. Good vigour
21	Pinus radiata	Radiata Pine	6	5	240				240	260	1879	2880	M	P	P	L	M	L	CD	Ret.	No encroachment - no impact	Council owned tree. Trunk lean and canopy skewed to Northwest. Snapped main stem at 5m. Small dead stubs along main trunk
22	Pinus radiata	Radiata Pine	7	6	300				300	320	2051	3600	M	F	F	L	M	L	CD	Ret.	No encroachment - no impact	Council owned tree. Canopy skewed to Northwest. Smal diameter stubs along 3 codominant stems

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Appendix C - TREE ASSESSMENT TABLE EXPLANATORY NOTES Thyer Tree Valuation Method (1996)

AGE CLASS (Modified from *British Standard BS5837*-1991).
Immature (I): Young trees, less than 20% of life expectancy.
Semi-mature (S): Middle aged trees, 20-40% of life expectancy.
Mature (M): Trees between 40-80% of life expectancy.
Over-mature (O): Senescent trees, or those declining irreversibly. Less than 20% of life expectancy.

HEALTH - This evaluates a trees vitality and vigour as indicated by its crown density, leaf size, foliage colour and its ability to withstand wounding, pests, diseases, or changes to the growing environment.
Good: (G) Tree is generally healthy and showing signs of normal vigour and is expected to continue to remain so, provided conditions around the tree required for its survival do not change.
Average: (A) Tree is typical of the species, considering its age, without noticeable decline.
Fair: (F) Tree shows signs of normal vigour but shows some indications of decline due topsets and diseases or changes to its growing environment.
Poor: (P) Tree exhibits symptoms of advanced and irreversible decline due to fungal decay, severe dieback of branch and crown canopy, predation of pests, storm or lightning damage, root damage or instability of the tree and alterations to its growing environment.

STRUCTURAL CONDITION - This refers to the trees form, and growth habit modified by its environment, the state of the trunk and the main structural branches. It includes the presence of defects such as decay, weak branch junctions and other visible abnormalities. Although some trees without defects fail in storms, the presence of any defect will increase the chances of failure.
Good: (G) Trees with a single dominant trunk along which evenly spaced branches are spread. Branches have properly formed collars which provide strong attachment to the trunk and are about 25% of the trunk diameter. Minor structural defects may be present with low failure potential.
Average: (A) Trees which have structural defects and low failure potential.
Fair: (F) Trees with structural defects and medium failure potential, which require monitoring on an annual basis.
Poor: (P) Trees with defects which have failed, or have a high risk of failing soon, and corrective action must be taken as soon as possible.

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Appendix D - IACA Significance of a Tree, Assessment Rating System (STARS) © (IACA2010) ©

In the development of this document IACA acknowledges the contribution and original concept of the footprint green tree significance and retention value matrix, developed by Footprint Green Pty Ltd in June 2001.

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

This rating system will assist in the planning process for proposed works, above and below ground where trees are to be retained on or adjacent a development site. This system uses a scale of *High, Medium*, and *Low* significance in the landscape. Once the landscape significance of an individual tree has been defined, the retention value can be determined.

Tree Significance - Assessment Criteria

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

- The tree is visible from surrounding properties, although not visually prominent as partially obstructed by other vegetation or buildings when viewed from the street,
- The tree provides a fair contribution to the visual character and amenity of the local area,
- The tree's growth is moderately restricted by above or below ground influences, reducing its ability to reach dimensions typical for the taxa *in situ*.

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

Environmental Pest / Noxious Weed Species

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

Hazardous/Irreversible Decline

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

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

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

USE OF THIS DOCUMENT AND REFERENCING

The IACA significance of a tree assessment rating system is free to use, but only in its entirety and must be cited as follows:

IACA, 2010 IACA significance of a tree assessment rating systems, institute of Australian consulting arborists, Australia www.iaca.org.au

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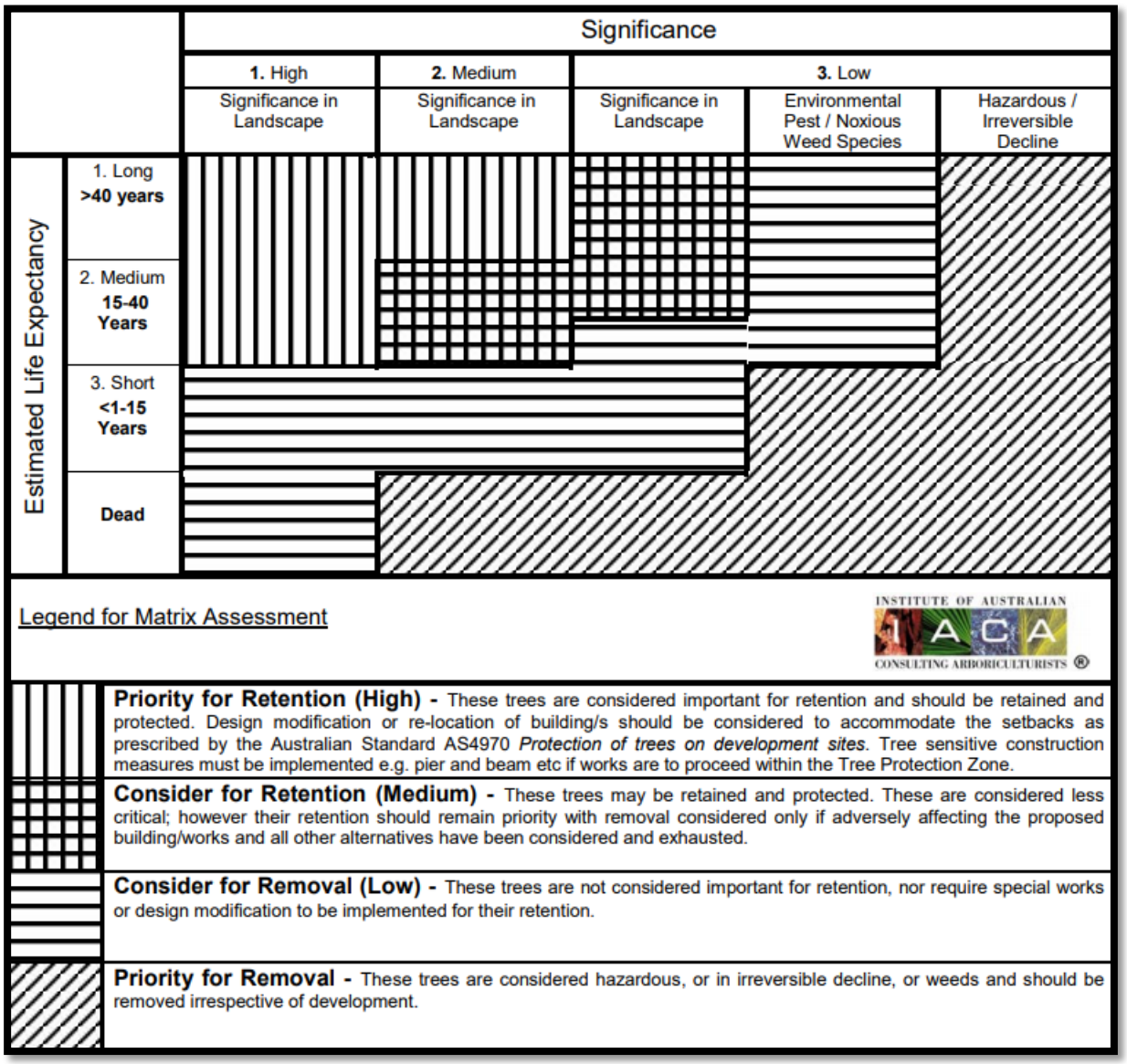
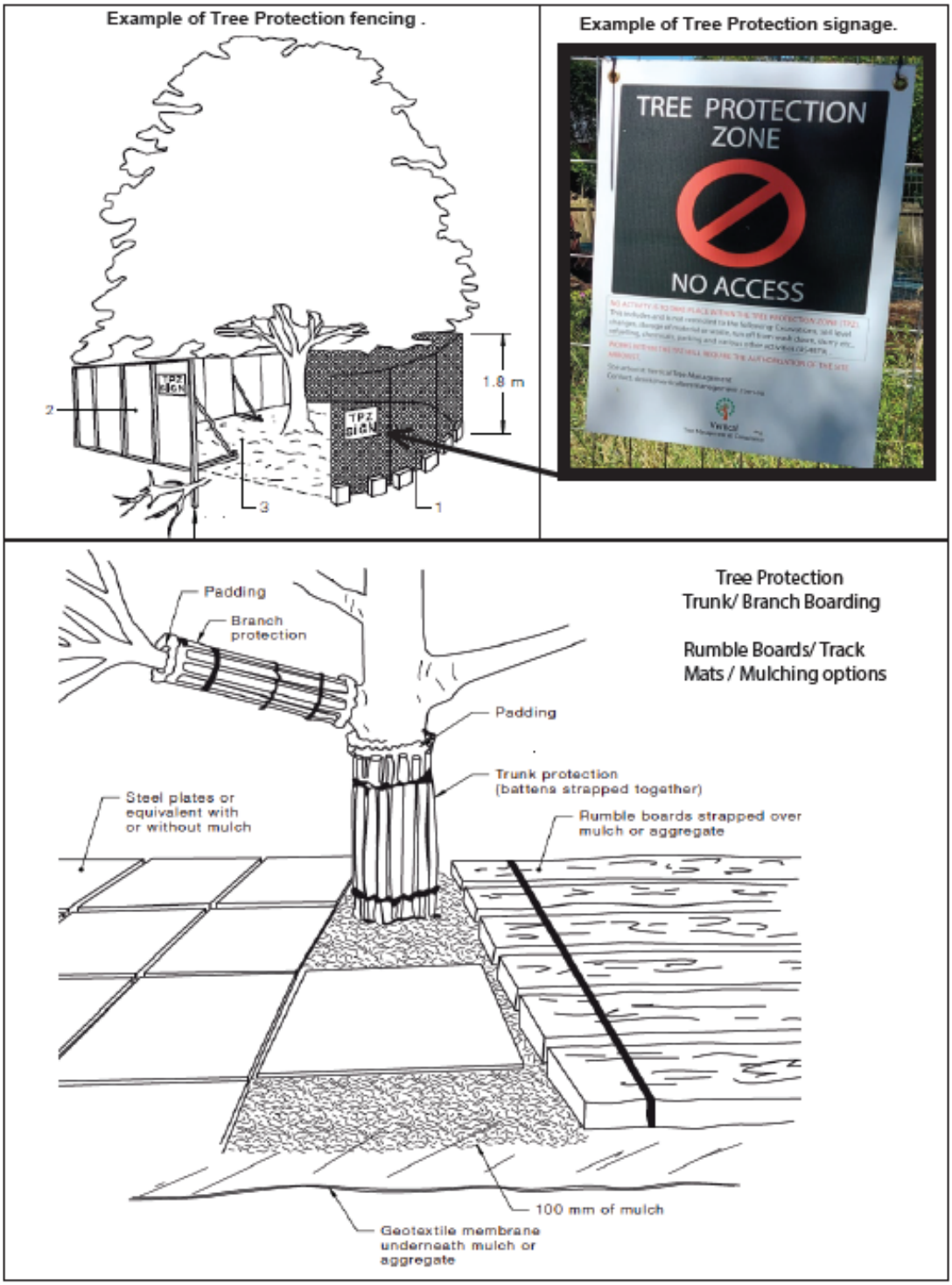
Table 6. Tree Retention Value – Priority Matrix



IACA2010, IACA Significance of a Tree Assessment Rating System (STARS), Institute of Australian Consulting Arborists. www.iaca.org.au

Appendix E - Tree protection



Vertical Tree – Vertical Tree Management & Consultancy

Appendix F – TPZ & SRZ Incursion table

	Requirements under AS 4970-2009	Impact	Mitigation measures
No encroachment (0%)	N/A	**No impact** (0%)	N/A
Minor encroachment (<10%)	• The area lost to this encroachment should be compensated for elsewhere, contiguous with the TPZ. • Detailed root investigations should not be required.	**Low impact** (<10%)	• The area lost to this encroachment should be compensated for elsewhere, contiguous with the TPZ. • Tree protection must be installed.
Major encroachment (>10%)	• The project arborist must demonstrate the tree(s) would remain viable. • Root investigation by non-destructive methods may be required. • Consideration of relevant factors including: Root location and distribution, tree species, condition, site constraints and design factors. • The area lost to this encroachment should be compensated for elsewhere, contiguous with the TPZ.	**Medium impact** (<20%)	• The area lost to this encroachment should be compensated for elsewhere, contiguous with the TPZ. • The project arborist will be required to supervise any works within the TPZ. • Tree protection must be installed.
		High impact (>20%)	• The project arborist must demonstrate the tree(s) would remain viable. • Non-destructive root investigation will be required for any trees proposed for retention. • The project arborist will be required to supervise any works within the TPZ. • Tree protection must be installed.

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GLOSSARY:

Aerial inspection - a close inspection of the aerial part of a tree, either by elevated work platform (EWP) or by an AQF level 3 arborist (climbing inspection).

Air spade - equipment providing a jet of compressed air to a hand-held device which helps to excavate roots almost non-destructively.

Amenity tree – a tree grown for purposes other than for production**.**

***AS4373*-2007** – Current Australian Standard for the Pruning of Amenity Trees**.**

AQF – Australian Qualification Framework for all educational and training purposes.

Axiom of uniform stress - is a self-optimizing structure because the growth of new wood tends to eliminate any stress concentrations, maintaining a uniform stress distribution.

Bacteria - one of the five kingdoms of living things. Some cause disease, many are decomposers and some are beneficial (such as nitrifying bacteria and those in the gut of animals).

Bark cambium (cork cambium, phellogen) - Layers of meristematic cells on the outer side of the phloem that give rise to the bark.

Branch order - The seedling axis, typically giving rise to the main stem, has a branch order of 0. Branches arising from axillary buds on the seedling axis are first-order branches, branches arising from them are second-order and so on, the shoots at the periphery of the crown having the highest order.

Callus - cells that forms over an injury or scar, that develops from actively dividing plant tissue.

Canker - A discrete area of dead or malformed bark caused by a pathogen.

Canopy - Of a single tree, its crown, emphasizing its spreading and enclosing character. Of a forest, the crowns of the larger trees considered collectively.

Chlorophyll - The pigment in green plants and a kind of bacteria (cyanobacteria) that permits photosynthesis. Chlorophyll is green because it absorbs light most strongly in the blue and red regions of the visible spectrum, reflecting the green.

Compartmentalization - A form of defense in woody plants, in which barriers resistant to invasion by pathogens or wood decay fungi are laid down while the wood is living (sapwood), and which continue to act passively once the wood is incorporated into heartwood.

Deadwood - Dead and decomposing wood including dead trees (whether standing, snapped or fallen), branches of any size, stumps and roots.

Defect - Any feature of a tree that is likely to make it less safe (in the case of a structural defect) or otherwise to reduce its health, longevity, landscape prominence or conservation value for any other reason.

Diameter - Broadly, the width of a cylindrical object like the main stem of a tree.

dbh – the diameter of a stem measured at breast height i.e. 1000mm.

Dip. Arb. – Diploma in Arboriculture.

Drip zone – the area from one edge of the canopy to the other.

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Expert witness - Someone capable of giving an expert opinion, to be relied upon in some official or legal process.

Fastigiate - A growth habit with branches strongly ascending, like Lombardy poplar. A common ornamental form.

Fibre buckling A local transverse failure in compression of the outer wood of a stem as it sways in a strong wind. The resulting adaptive growth gives rise to a characteristic ring-like bulge around the stem.

First-order branch – a branch which emanates directly from the trunk, in contrast to a scaffold branch, sometimes referred to as a primary branch.

Flush cut - A pruning cut that removes the branch collar and/or part of the branch ridge, slowing the occlusion of the wound.

Footing - A relatively broad base to a foundation to help spread load and improve the stability of a structure.

Fungi (singular 'fungus') - One of the four main groups (kingdoms) of organisms. There are two groups of higher fungi, the Basidiomycetes and Ascomycetes, while other groups are moulds. Many fungi are decomposers, including the relatively specialized wood decay fungi. Some are plant pathogens, some are symbiotic (see mycorrhiza, lichen) and some are cultivated by insects for food (see ambrosia beetle).

Fungus - Several fungal diseases, sometimes called heart rots, sap rots, or canker rots, decay wood in tree trunks and limbs. Under conditions favoring growth of specific rot fungi, extensive portions of the wood of living trees can decay in a relatively short time (i.e., months to years). Decay fungi reduce wood strength and may kill storage and conductive tissues in the sapwood.

Included bark - Areas of bark on adjacent parts of a tree, typically on the inner faces of a narrow fork, which become grown over to occupy part of the internal joint.

Ganoderma spp. - A common wood decay fungus of the selective delignification type, causing root rot and butt rot mainly in broadleaf trees. The fruiting bodies of the fungus are woody brackets, commonly occurring in the flutes between the buttresses of big trees near ground level.

Heartwood - In a branch, main stem or root of sufficient diameter, the non-living inner wood, in contrast to the sapwood in which the xylem parenchyma cells are alive.

Lignin - A constituent of some plant cell walls making them stiff and woody. About 1/3 of the dry weight of wood is lignin.

Lion-tailing - A long branch with a tuft of secondary branches near the tip, a marked form of end loading, either arising naturally or from poor pruning practice.

Mistletoe - A semi-parasite, having green leaves for photosynthesis but growing into the host to obtain water and nutrients.

Mycelium - A network of hyphae making up the vegetative part of a fungus.

Osmosis - The flow of water across a semi-permeable membrane from a dilute solution to a more concentrated one, as from the soil water into a root cell or from the xylem into a leaf cell.

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Quantified tree risk assessment (QTRA) - A refinement of visual tree assessment with emphasis on seeking to quantify the component probabilities of tree risk, particularly the occupancy of the target area, to arrive at an overall numerical or categorical risk.

Root Zone - Area encompassing the tree roots.

Scaffold branch – a branch which emanates from a first-order branch, also known as a second-order branch.

Structural defect - A defect in a structure that makes it less able to withstand the forces applied to it.

t/R ratio - In hollow tree stems, the ratio of the thickness of sound wood to the radius. A criterion helpful in evaluating tree risk developed by Mattheck & Breloer (1994)

Tension wood - The kind of reaction wood found in broadleaf trees which is strong in tension and is characterized by a low lignin content.

Tree risk - The risk that a tree causes damage or injury if it (or part of it) suffers structural failure. Tree risk is a composite of several variables: hazard, probability, target value and occupancy.

TPZ (m) - Radius measured from the centre of the tree.

SRZ (m) - Radius measured from the centre of the tree.

Urban forest - Trees and other woody vegetation in the built environment considered collectively over an extensive area (eg. the jurisdiction of a local authority).

Vigour – the genetic capacity (potential) of a tree to resist strain. Vigour can be measured by applying a known stimulus [such as a wound] and then measuring the trees response. Vigour cannot be increased. Vigour is classified as either 'normal' or 'low' (Shigo, 1986, p.120).

Vitality – the ability (dynamic) of a tree to adapt to the conditions in which it finds itself. Vitality can be improved by; watering, mulching, fertilizing, aerating etc. (Shigo, 1986, p. 120). For the purpose of this report vitality shall be classified as either low or good.

VTA - Visual Tree Assessment

Windthrow- The fall of a tree in a high wind, with the breakage of the outer roots, so that the tree is uprooted. There are three main modes of windthrow.

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