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Arborology WA
Arboricultural Consultants

Planning
Safety Inspections
Structural Integrity
Risk Assessments
Tree Protection
Selection

Amended Arboricultural Impact Assessment

Company: **SARICH Building**

Name: **Mr Patrick Chaney** (General Manager)
Phone: 9250 6177 M: 0490 239 842
Address: Unit 1/ 162 Colin Street, West Perth. W.A. 6005
Email: patrick@sarichbuilding.com

Project No.: **SB327D - SB327**

Site Address: **Lot 8 (No.23) Corner of Hatch Court and Stirling Crescent, Hazelmere, W.A.**

Original Report Date: **3rd October 2024.**

Amended Report Date: **2nd April 2025.**

Instructions for Report

Phillip Matthews from Arborology WA Arboricultural Consultants has been commissioned by Mr Patrick Chaney (General Manager) from Sarich Building to undertake an Arboricultural Impact Assessment Report, in accordance with the Australian Standards (4970-2009) *Protection of Trees on Development Sites*, the *Planning and Development Act 2005* and the *Planning and Development Regulations 2009*. Mr Chaney's instructions were to visit the site, inspect the fifty two (52) trees at the property known as at Lot 8 (No.23) Corner of Hatch Court and Stirling Crescent, Hazelmere, W.A. (referred to within this report as the subject property), and prepare the findings in this report.

Report Objectives

The objectives of this Arboricultural Impact Assessment (For DA) are to ensure the successful retention and protection of trees located around the perimeter of the subject property throughout the proposed construction project. Also, to set out the minimum requirements and format to ensure continuity in Arboricultural Reporting for Council Planning Staff, Developers, Builders, and Construction industry staff; and to ensure any works near the retained trees are consistent with best Arboricultural practices and construction methods within the Australian Standards 4970-2009 *Protection of Trees on Development Sites*.

Site Inspection

Phillip Matthews as the Arboricultural Consultant verifies that a site inspection was carried out on Tuesday the 1st of October 2024, between 8.30am and 12.30pm on the fifty two (52) trees located within the subject property, as seen on the site map and plan on **pages 4** and **5**.

Report Purpose

The purpose of this Arboricultural Impact Assessment is to undertake an "above ground 360° Walkaround" tree inspection to carry out a detailed examination of these trees. Each tree has been numbered and their location is placed on the aerial site map and plan on **pages 4** and **5**. Each tree's botanical name, height, canopy spread, trunk's diameter at the base (DAB), trunk's diameter at breast height (DBH), age/maturity, health and structural condition, useful life expectancy (ULE), viability in the landscape significance (VLS), tree problems, recommendations for any tree surgery works prior to construction, tree protection zone (TPZ), structural root zone (SRZ) calculations, tree protection plan – arboricultural/ construction statement, arboricultural impact assessment, tree management plan, construction methodology and the recommendation are all recorded. This information is to be used to provide a record of each tree prior to construction and to guide the construction works.

The author's qualifications and experience are included within **Appendix 1**.

Report Methodology

Tree inspections are usually conducted at ground level using the Visual Tree Assessment (VTA) method. The VTA is used by Arboricultural Consultants to evaluate the structural integrity of a tree, relying on observation of the tree's biomechanical and physiological features. The VTA method of tree assessment is adapted from Mattheck & Breloer (2007), Scott (2005), Ellison (2010) and is recognised by Arboriculture Australia and The Institute of Australian Consulting Arboriculturists.

The tree canopy spread was measured with an Empire measuring wheel on the ground, from the canopy edges. The trunk Diameter at Breast Height (DBH) was measured by a Richter-Qualitor diameter tape measure at 1.4m from ground level.

The tree height was estimated using a laser Forest Pro 2 clinometer.

The full Spreadsheet Explanations are listed within **Appendix 2**.

The Safe Useful Life Expectancy (SULE) was estimated using SULE categories and subgroups, from Barrell, J, (1993), *Pre-planning tree surveys*. Explanatory notes, SULE categories and terminology may be found within this **Appendix 2**.

The Viability in the Landscape was estimated using the IACA Significance of Tree Assessment Rating System, from Footprint Green Ltd, (June 2001). Explanatory notes, categories and terminology can be found within **Appendix 2**.

Photographs taken on the day of inspection have been included to assist in the location and identification of these trees, as seen on **pages 32** to **37**.

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Limitations of this Report

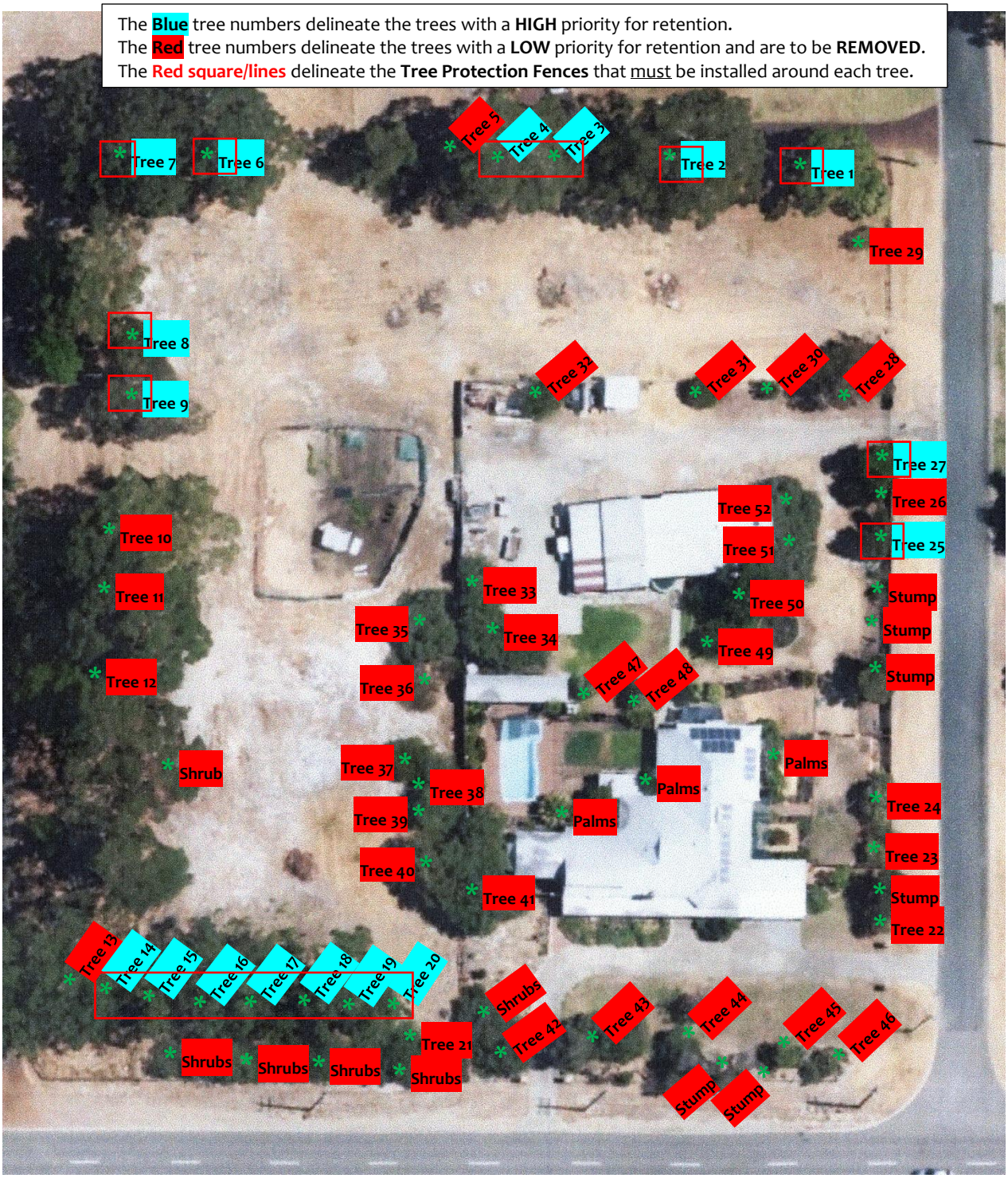
This Arboricultural Impact Assessment only refers to the fifty two (52) trees located within the subject property. The report has been prepared on the basis of information supplied by the parties involved in this project. No responsibility is accepted for any errors of fact or omissions in this report which result from incorrect or incomplete information supplied to Phillip Matthews (Arborology W.A. Arboricultural Consultants), by the parties involved. Any alteration to the site or any council policies could change the current circumstances and may invalidate this report, and any recommendations made. Due to the changing nature of trees and other site circumstances, the validity of this report and any recommendations made are limited to a 12-month period.

NOTE: No diagnostic devices were used on these trees.

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The Site Map

The **Blue** tree numbers delineate the trees with a **HIGH** priority for retention.
The **Red** tree numbers delineate the trees with a **LOW** priority for retention and are to be **REMOVED**.
The **Red square/lines** delineate the **Tree Protection Fences** that must be installed around each tree.



Map from "Google Maps"
Modified by P. Matthews.

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The Site Plan

The **Blue** tree numbers delineate the trees with a **HIGH** priority for retention.
The **Red** tree numbers delineate the trees with a **LOW** priority for retention and are to be **REMOVED**.
The **Green** circles delineate the **SRZ.**
The **Yellow** circles delineate the **TPZ.**
The **Red square/lines** delineate the **Tree Protection Fences** that must be installed around each tree.



Plan from "Meyer Shircore Architects"
Modified by P. Matthews.

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Tree Protection Plan – Arboricultural/Construction Methodology Statement

From the beginning of the development, the following Tree Protection Plan (TPP) and tree construction methodology (ACMS) must[1] be implemented in the method and progression described below.

The **Structural Root Zones (SRZ)** and the **Tree Protection Zones (TPZ)** must be considered during the construction works.
- Temporary "Tree Protection Fencing" around the trees and surrounding vulnerable areas within the TPZ.
- The SRZ and the TPZ calculation for all the trees can be found on the Tree Data Spreadsheet on **pages 10** to **12**.
- The **SRZs** are highlighted in **GREEN** and the **TPZs** are highlighted in **YELLOW**.

The Temporary Tree Protection Fences around the TPZ must -

1. Be installed prior to the start of the construction works and must remain undamaged for the duration of the works.
2. Prevent the storage of all materials and substances within the TPZs.
3. Extra soil must not be placed around the tree trunks.

Temporary Tree Protective Fencing must be installed

- The Temporary Tree Protective Fencing must be 1.8m high orange safety fence or steel panel fencing with plastic-coated concrete footings, which comply with the AS 4687-2007 "Temporary Fencing and Hoardings".
- The Temporary Protective Fencing can be installed around a single tree or installed around groups of trees.
- The Temporary Protective Fencing must not be removed without the consent of the Project Arboricultural Consultant.
- **Signage**: shall be affixed to all 4 external sides of the fence, and state:
a. "Tree Protection Zone: Keep out"'
b. "Contact Arborology WA Arboricultural Consultant 040 342 3377".
The Tree Protection Signs can be printed and laminated (See **Tree Protection Signs** on **page 31**).

Trunk and Ground Protection Area

- Trunk Protection is required for trees **No. 1, 2, 3, 4, 6, 7, 8, 9, 22, 24, 25** and **27** only.
- No added Ground Protection Area required for these trees.

Sequence of Works

1. Pre-construction site meeting.
2. Tree Removal works.
3. Installation of tree protection fences, signs and the trunk protection.
4. The site inspection and a Pre-Construction Arboricultural Compliance Report No. 1.
5. Demolition of the old house.
6. Construction works within the TPZs.
7. Tree inspection and a brief email report, if any damage to the protected trees occurs.
8. Removal of tree protection fences, signs and trunk protection.
9. The site inspection and a Construction Completion Compliance Report No. 2 upon construction completion.

1 All throughout this report, the use of the word, "must" underlined, makes it clear that tree protection is very important.

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1. Pre-Construction Site Meeting.

To outline working methods in relation to trees, a site meeting of the following staff must take place prior to the commencement of any construction activity on site, with the:

- **Site Supervisor**
- **Myself the Project Arboricultural Consultant**

- Copies of the Tree Protection Plan (TPP) & the Arboricultural Construction Method Statement (ACMS) on **pages 6-7** and **24-25** are on site.
- The Site Supervisor and all construction workers must be aware of the **TPZ** measurements for each tree.
- There **must** be no mechanical excavation within the **SRZ** and the **TPZ**.

2. Tree Removal Works.

Prior to the construction works, the Tree Surgery Works must be undertaken to ensure the safety of the construction workers, as seen on **pages 15-16.**

3. Installation of Tree Protection Measures.

- The site supervisor must install the tree protection fences, and the tree protection signs around **trees No. 1, 2, 3, 4, 6, 7, 8, 9, 14, 15, 16, 17, 18, 19, 20, 22, 24, 25** and **27**.
- The site supervisor must install the trunk protection around **trees No. 1, 2, 3, 4, 6, 7, 8, 9, 22, 24, 25** and **27** only.
- There must be no storage of construction equipment, plant, or material within the **TPZ** or the Protective Fencing.
- No storage of harmful substances (e.g. concrete, and other such) within the **TPZ**.
- Site drainage and washings from concrete and mortar mixings must be directed away from the **TPZ** areas.
- The integrity of the **TPZ** fencing must be maintained for the duration of the demolition and the construction phases.

4. Pre-Construction Arboricultural Compliance Report No. 1.

This compliance report is required by the Local Government Authority form the Project Arboricultural Consultant, to verify that the installation of fences, signs and trunk protection has been completed.

5. Demolition of the old house.

The demolition of the old house must[2] protect the **TPZs** of the retained trees around the perimeter of the property**.** All trucks must use the existing driveways at the front and at the rear side. The materials removed from the old house on the truck must not damage any tree branches.

6. Construction works near the TPZs.

- The construction excavation for the footings near trees **No. 9, 25 & 27** that are within the **SRZ** and the **TPZ** must be done by ***vacuum excavation*** leaving the roots undamaged within these areas.
- The excavation of the carpark near trees **No. 1, 2, 3, 4, 6, 7, 8, 9, 19** and **20** that are within the **SRZ** and the **TPZ** must be done by ***vacuum excavation*** leaving the roots undamaged. See the Construction Methodology on **pages 24-25**.
- After the construction works are completed, any excess soil must be removed from the site and the soil level around these trees must be kept at the original soil level.

7. Tree inspection and a brief email report.

- During construction works, a tree inspection and a brief email report will be required by the Project Arboricultural Consultant, if any damage to the protected trees occurs.

8. Removal of Tree Protection Measures.

- The Tree protection fences; signs and the trunk protection must be removed only upon completion of the Main Construction works.

9. Completion Compliance Report No. 2.

- This compliance report is required by the Local Government Authority form the Project Arboricultural Consultant, at the end of the construction works, confirming that the tree protection fences, signs and the trunk protection have been removed. This report will also verify the health and condition of the trees after the construction has been completed.

[2] **All throughout this report, the use of the word, "must" underlined, makes it clear that tree protection is very important.**

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Tree Data Spreadsheets

Refer to **Appendix 2:** for the full spreadsheet explanation.

The tree's botanical name, height, canopy spread, age, health and structural condition.

Tree Number	Botanical Name	Height (m)	Canopy Spread N-S (m)	Canopy Spread E-W (m)	Age/ Maturity	Health	Structural Condition
1	*Corymbia citriodora*	15.4	10	10	EM	G	G
2	*Corymbia citriodora*	17.9	15	15	M	G	G
3	*Corymbia citriodora*	16.4	13	13	M	G	G
4	*Eucalyptus camaldulensis var camaldulensis*	14.3	12	12	M	G	F
5	*Eucalyptus camaldulensis var camaldulensis*	9.3	6	6	SM	P	P
6	*Eucalyptus camaldulensis var camaldulensis*	19.7	11	11	M	G	G
7	*Eucalyptus camaldulensis var camaldulensis*	21.4	16	16	M	G	F
8	*Corymbia citriodora*	16.7	9	9	EM	G	G
9	*Eucalyptus rudis*	16.3	14	12	M	G	F
10	*Eucalyptus camaldulensis var camaldulensis*	17.9	15	15	M	G	F
11	*Corymbia citriodora*	18.3	10	15	M	G	G
12	*Corymbia citriodora*	15.6	15	12	M	G	G
13	*Eucalyptus botryoides*	7	3	3	DS	P	VP
14	*Eucalyptus botryoides*	13.7	7	16	EM	G	F
15	*Eucalyptus botryoides*	14.5	11	15	M	G	F
16	*Eucalyptus botryoides*	14.8	11	16	M	G	F
17	*Eucalyptus botryoides*	12.4	9	13	M	G	F
18	*Eucalyptus botryoides*	14.2	9	17	M	G	F
19	*Eucalyptus botryoides*	14.8	9	15	M	G	F
20	*Eucalyptus botryoides*	16.1	10	15	M	G	G
21	*Banksia species*	5	6	6	M	F	F

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Tree Number	Botanical Name	Height (m)	Canopy Spread N-S (m)	Canopy Spread E-W (m)	Age/ Maturity	Health	Structural Condition
22	*Callistemon salignus 'rubra'*	6	4.5	4.5	SM	G	G
23	*Acacia longifolia*	3	3	3	SM	F	F
24	*Hibiscus rosa-sinensis*	6	4	5	M	G	G
25	*Callistemon 'Kings Park Special'*	6	6	6	M	G	G
26	*Callistemon 'Kings Park Special'*	6	5	5	SM	P	VP
27	*Jacaranda mimosifolia*	7	5	5	SM	G	G
28	*Eucalyptus species*	9.1	10	8	M	F	P
29	*Banksia species*	5	6	6	M	F	F
30	*Ailanthus altissima*	4	3	3	SM	P	P
31	*Callistemon viminalis*	4	4	4	SM	F	F
32	*Malus domistica*	6	7	7	SM	G	G
33	*Leptospermum species*	6	7	7	SM	F	P
34	*Leptospermum species*	6	9	9	M	F	P
35	*Leptospermum species*	5	7	8	M	F	P
36	*Chamelaucium uncinatum*	3	6	6	M	F	P
37	*Leptospermum species*	4	5	5	M	F	P
38	*Chamelaucium uncinatum*	4	4	4	M	F	P
39	*Leptospermum species*	6	6	6	SM	F	P
40	*Agonis flexuosa*	9.1	10	10	SM	G	F
41	*Leptospermum species*	4	4	4	SM	F	P
42	*Leptospermum species*	5	4	4	SM	F	P
43	*Leptospermum species*	5	4	4	SM	F	P
44	*Agonis flexuosa 'Burgundy'*	5	5	5	SM	G	G
45	*Melaleuca quinquenervia*	5	5	5	SM	G	G
46	*Melaleuca quinquenervia*	3	3	3	Y	G	G
47	*Olea europaea*	4	3	3	SM	F	F
48	*Olea europaea*	5	4	4	SM	F	F

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Tree Number	Botanical Name	Height (m)	Canopy Spread N-S (m)	Canopy Spread E-W (m)	Age/ Maturity	Health	Structural Condition
49	*Prunus dulcis*	6	7	6	M	F	F
50	*Unknown deciduos*	8.9	8	8	M	G	F
51	*Leptospermum species*	4.5	5	5	M	F	P
52	*Leptospermum species*	4.5	5	5	M	F	P
	6 Stumps				6 Stumps		
	10 Shrubs	4	4	4	M	F	P
	3 palms	4	2	2	SM	F	P

The tree's VLS, ULE, DAB, DBH, SRZ, TPZ, priority for retention and construction impact.

Tree Number	Viability in the Landscape Significance (VLS)	Useful Life Expectancy (ULE) Years	Trunk DAB (m)	SRZ (m)	Trunk DBH (m)	TPZ (m)	Tree's Priority for Retention	Construction Impact	Trunk Protection Required	Tree Protection Fence Required
1	HS	40-100 years	0.52	2.51	0.4	4.8	Yes High	IMV	Yes	Yes
2	HS	20-50 years	0.84	3.0	0.71	8.5	Yes High	IMV	Yes	Yes
3	HS	20-50 years	0.66	2.78	0.53	6.3	Yes High	IMV	Yes	Yes
4	HS	20-50 years	0.73	2.9	0.64	7.6	Yes High	IMV	Yes	Yes
5	LS	1-10 years	0.23	1.79	0.21	2.5	Removal	IR	N/A	N/A
6	HS	10-20 years	1.01	3.32	1.31	12	Yes High	IMV	Yes	Yes
7	HS	10-20 years	1.2	3.57	0.99	11.9	Yes High	IMV	Yes	Yes
8	HS	40-100 years	0.4	2.25	0.35	4.2	Yes High	IMV	Yes	Yes
9	HS	20-50 years	0.88	3.14	0.82	9.8	Yes High	IMV	Yes	Yes
10	LS	20-50 years	0.85	3.0	0.84	10.1	Removal	IR	N/A	N/A
11	LS	20-50 years	0.68	2.81	0.54	6.4	Removal	IR	N/A	N/A
12	LS	20-50 years	0.51	2.4	0.46	5.5	Removal	IR	N/A	N/A
13	LS	1-10 years	0.39	2.23	0.38	4.5	Removal	IR	N/A	N/A

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Tree Number	Viability in the Landscape Significance (VLS)	Useful Life Expectancy (ULE) Years	Trunk DAB (m)	SRZ (m)	Trunk DBH (m)	TPZ (m)	Tree's Priority for Retention	Construction Impact	Trunk Protection Required	Tree Protection Fence Required
14	HS	20-50 years	0.53	2.53	0.45	5.4	Yes High	IMV	No	Yes
15	HS	20-50 years	0.68	2.81	0.59	7.0	Yes High	IMV	No	Yes
16	HS	20-50 years	0.58	2.63	0.53	6.3	Yes High	IMV	No	Yes
17	HS	20-50 years	0.51	2.4	0.39	4.6	Yes High	IMV	No	Yes
18	HS	20-50 years	0.57	2.61	0.54	6.4	Yes High	IMV	No	Yes
19	HS	20-50 years	0.52	2.51	0.43	5.16	Yes High	IMV	No	Yes
20	HS	20-50 years	0.61	2.6	0.58	6.9	Yes High	IMV	No	Yes
21	LS	1-10 years	0.22	1.75	0.21	2.52	Removal	IR	N/A	N/A
22	LS	20-50 years	0.24	1.82	0.26	3.12	Removal	IR	N/A	N/A
23	LS	1-10 years	0.22	1.75	0.21	2.52	Removal	IR	N/A	N/A
24	LS	10-20 years	0.31	2.02	0.29	3.4	Removal	IR	N/A	N/A
25	HS	20-50 years	0.32	2.05	0.31	3.72	Yes High	IMV	Yes	Yes
26	LS	1-10 years	0.31	2.02	0.29	3.4	Removal	IR	N/A	N/A
27	HS	40-100 years	0.28	1.94	0.44	5.2	Yes High	IMV	Yes	Yes
28	LS	10-20 years	0.72	2.8	0.58	6.9	Removal	IR	N/A	N/A
29	LS	1-10 years	0.22	1.75	0.21	2.52	Removal	IR	N/A	N/A
30	NS	1-10 years	0.11	1.50	0.1	2	Removal	IR	N/A	N/A
31	LS	10-20 years	0.23	1.79	0.22	2.6	Removal	IR	N/A	N/A
32	MS	20-50 years	0.31	2.02	0.32	3.8	Removal	IR	N/A	N/A
33	NS	1-10 years	0.3	2.0	0.3	3.6	Removal	IR	N/A	N/A
34	NS	1-10 years	0.3	2.0	0.3	3.6	Removal	IR	N/A	N/A
35	NS	1-10 years	0.3	2.0	0.3	3.6	Removal	IR	N/A	N/A

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Tree Number	Viability in the Landscape Significance (VLS)	Useful Life Expectancy (ULE) Years	Trunk DAB (m)	SRZ (m)	Trunk DBH (m)	TPZ (m)	Tree's Priority for Retention	Construction Impact	Trunk Protection Required	Tree Protection Fence Required
36	NS	1-10 years	0.3	2.0	0.3	3.6	Removal	IR	N/A	N/A
37	NS	1-10 years	0.3	2.0	0.3	3.6	Removal	IR	N/A	N/A
38	NS	1-10 years	0.3	2.0	0.3	3.6	Removal	IR	N/A	N/A
39	NS	1-10 years	0.3	2.0	0.3	3.6	Removal	IR	N/A	N/A
40	LS	20-50 years	0.43	2.32	0.65	7.8	Removal	IR	N/A	N/A
41	NS	1-10 years	0.3	2.0	0.3	3.6	Removal	IR	N/A	N/A
42	NS	1-10 years	0.3	2.0	0.3	3.6	Removal	IR	N/A	N/A
43	NS	1-10 years	0.3	2.0	0.3	3.6	Removal	IR	N/A	N/A
44	LS	40-100 years	0.18	1.61	0.17	2.0	Removal	IR	N/A	N/A
45	LS	20-50 years	0.15	1.50	0.14	2	Removal	IR	N/A	N/A
46	MS	40-100 years	0.1	1.50	0.09	2	Removal	IR	N/A	N/A
47	LS	10-20 years	0.12	1.50	0.11	2	Removal	IR	N/A	N/A
48	LS	10-20 years	0.14	1.50	0.12	2	Removal	IR	N/A	N/A
49	LS	10-20 years	0.29	1.97	0.27	3.2	Removal	IR	N/A	N/A
50	LS	10-20 years	0.35	2.13	0.32	3.8	Removal	IR	N/A	N/A
51	LS	1-10 years	0.3	2.0	0.3	3.6	Removal	IR	N/A	N/A
52	LS	1-10 years	0.3	2.0	0.3	3.6	Removal	IR	N/A	N/A
6 Stumps	NS	0					Removal	IR	N/A	N/A
10 Shrubs	NS	1-10 years					Removal	IR	N/A	N/A
3 Palms	NS	1-10 years					Removal	IR	N/A	N/A

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Tree Problems

A list of characteristics is provided to assist in gathering information on the trees' current condition, and to give an indication of tree works that may be required. This list of problems identifies issues with the overall structure of the trees, any damage or injury, and abnormal symptoms such as pests or diseases.

Tree Number	Tree Problems
1	Minor deadwood
2	Minor deadwood, low branches
3	Minor deadwood, hanging branch
4	Minor deadwood, hanging branch
5	Major deadwood throughout the canopy
6	Minor deadwood
7	Minor deadwood, low branches
8	Minor deadwood, low branches
9	Minor deadwood, low branches
10	Minor deadwood, low branches
11	Minor deadwood
12	Minor deadwood
13	Poorly pruned in the past, epicormic branch growth
14	Minor deadwood
15	Minor deadwood, hanging branch
16	No tree problems
17	No tree problems
18	Minor deadwood, hanging branch
19	Minor deadwood, hanging branch
20	Minor deadwood, low branches
21	Minor deadwood
22	Minor deadwood
23	Minor deadwood
24	Minor deadwood
25	Minor deadwood
26	Major deadwood throughout the canopy

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Tree Number	Tree Problems
27	Minor deadwood
28	Minor deadwood
29	Minor deadwood
30	Minor deadwood
31	Minor deadwood
32	Minor deadwood
33	Minor deadwood
34	Minor deadwood
35	Minor deadwood
36	Minor deadwood
37	Minor deadwood
38	Minor deadwood
39	Minor deadwood
40	Minor deadwood
41	Minor deadwood
42	Minor deadwood
43	Minor deadwood
44	No tree problems
45	Minor deadwood
46	No tree problems
47	No tree problems
48	No tree problems
49	Minor deadwood
50	Minor deadwood
51	No tree problems
52	No tree problems

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Recommendations for Tree Surgery Works

Tree Surgery Works are only recommended where there is a significant advantage gained from the works or a significant disadvantage if the works are not performed. Works are generally only recommended where the tree represents a risk to people or property. All tree surgery works should be undertaken by a (minimum AQF level 3) qualified and experienced tree surgeon and must comply with Australian Standards 4373 (2007) "*Pruning of Amenity Trees*".

IMPORTANT: It is essential to undertake the following tree surgery works without using climbing spikes, to avoid damaging the trunk.

Tree Numbers	Works Required
1	No Tree Works Required
2	**Remove the minor deadwood, canopy lift on the east side**
3	**Remove the minor deadwood, remove the hanging branch**
4	**Remove the minor deadwood, remove the hanging branch**
5	**Remove Tree**
6	**Remove the minor deadwood, canopy lift on the east side**
7	**Remove the minor deadwood, canopy lift on the east side**
8	**Remove the minor deadwood, canopy lift on the north side**
9	**Remove the minor deadwood, canopy lift on the north side**
10	**Remove Tree**
11	**Remove Tree**
12	**Remove Tree**
13	**Remove Tree**
14	No Tree Works Required
15	**Remove the minor deadwood, remove the hanging branch**
16	No Tree Works Required
17	No Tree Works Required
18	**Remove the minor deadwood, remove the hanging branch**
19	**Remove the minor deadwood, remove the hanging branch**
20	**Remove the minor deadwood, canopy lift on the west side**
21	**Remove Tree**
22	**Remove Tree**
23	**Remove Tree**
24	**Remove Tree**
25	No Tree Works Required

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Tree Numbers	Works Required
26	Remove Tree
27	No Tree Works Required
28	Remove Tree
29	Remove Tree
30	Remove Tree
31	Remove Tree
32	Remove Tree
33	Remove Tree
34	Remove Tree
35	Remove Tree
36	Remove Tree
37	Remove Tree
38	Remove Tree
39	Remove Tree
40	Remove Tree
41	Remove Tree
42	Remove Tree
43	Remove Tree
44	Remove Tree
45	Remove Tree
46	Remove Tree
47	Remove Tree
48	Remove Tree
49	Remove Tree
50	Remove Tree
51	Remove Tree
52	Remove Tree
6 Stumps	Remove Stumps
10 Shrubs	Remove Shrubs
3 Palms	Remove Palms

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Arboricultural Impact Assessment

This Arboricultural Consultant's inspection of the fifty-two (52) trees located within the subject property, for the proposed construction works, found sixteen (16) trees to be in good health and good structural condition. Twelve (12) trees were found to be in good health and fair structural condition. Seven (7) trees were found to be in fair health and fair structural condition. Fourteen (14) trees were found to be in fair health and poor structural condition. One (1) tree was found to be in poor health and poor structural condition, and two (2) trees were found to be in poor health and very poor structural condition.

The construction impact for trees **No. 1, 2, 3, 4, 6, 7, 8, 9, 14, 15, 16, 17, 18, 19, 20, 24, 25** and **27** around the perimeter of the property will be **Impact – Major, viable.**

Impact – Major, viable means the proposed design has a TPZ area encroachment greater than 10%, or it impacts the SRZ. These trees are expected to remain viable because of the following:

- Alternative construction methods are proposed which reduce the impact on these trees.
- A non-destructive root exploration was undertaken and demonstrated that root distribution was limited in the proposed area of works.

The construction impact for trees **No. 10, 11, 12, 22, 24, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51** and **52** will be **Impact – Remove.**

Impact – Remove means these trees are within the footprint of the proposed design and will require removal to facilitate the design.

NOTE: Trees No. 5, 13, 21, 23 and 26 have a short ULE of 1-10 years and should be removal to facilitate the design.

ESSENTIAL: The **Tree Protection fences** must[3] be installed around **trees No. 1, 2, 3, 4, 6, 7, 8, 9, 14, 15, 16, 17, 18, 19, 20, 24, 25** and **27** to prevent accidental damage to these trees.

VERT IMPORTANT: Trunk Protection must also be installed around **trees No. 1, 2, 3, 4, 6, 7, 8, 9, 25** and **27** to prevent accidental damage to these trees.

This Report Must be Available Onsite

This report, including the Tree Protection Plan – Arboricultural/ Construction Statement, the Arboricultural Impact Assessment, the Tree Management Plan, the Construction Methodology and the Recommendations must be made available onsite, prior to the commencement of the demolition and during the construction works.

[3] **All throughout this report, the use of the word, "must" underlined, makes it clear that tree protection is very important.**

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Structural Root Zone (SRZ)

The **SRZ** is the area required for tree stability in the ground. The woody root growth and soil cohesion in this area are necessary to hold the tree upright. Tree roots could be injured by machinery such as excavators, bobcats, trench diggers etc. causing root damage, therefore a SRZ area of a tree is required for tree stability and root anchorage. Cutting, severing, or damaging of any roots within this zone may cause the tree to become unstable, due to the wind movement of the canopy placing an increased loading on the root plate, causing a dramatic decline in the tree's health and vitality. **NOTE:** The SRZ considers a tree's structural stability, but the larger TPZ area is required for a tree's vigour and long-term viability.

This arboricultural report adopts Australian Standards (4970-2009) *"Protection of trees on development sites"* as the preferred SRZ tree protection method. This method provides a SRZ distance (radius from trunk centre) by using the trunk's diameter measurement at the base, just above the root buttress. The formula for the SRZ is, $\mathbf{R_{SRZ} = (D \times 50)^{0.42} \times 0.64}$. In the SRZ calculation the "R_{SRZ}" represents the SRZ radius, and the "D" represents the trunk diameter.

Using the Australian Standards (4970-2009) "*Protection of trees on development sites*", we can calculate the SRZ area of each tree which is required for tree stability. The structural root zone (**SRZ**) calculation for all the trees on this property can be found on the Tree Data Spreadsheet, highlighted in **GREEN** on **pages 10** to **12**.

IMPORTANT: The respective SRZ measurement radius (in meters) around each tree is required to be maintained in order to ensure that the tree remains in a structurally stable condition. Cutting of any roots within this zone may cause the tree to become unstable. If major encroachment into the SRZ is required, the potential for whole tree failure is significantly increased.

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 the canopy area requiring protection. The TPZ is an area isolated from demolition or construction disturbance, so that the tree remains viable. The TPZ is a restricted area prohibiting parking of vehicles, machinery and/or equipment, excavation works, storage and preparation of chemical and/or cement products, spillage of toxic materials on the roots, and trunk, soil level changes and physical damage to the trees.

This arboricultural report adopts the Australian Standards (4970-2009) "*Protection of trees on development sites*" as the preferred tree protection method. This method provides a TPZ distance (radius from trunk centre) by multiplying the trunk's DBH measurement, at a height of 1.4m, by twelve. The calculation represents **TPZ = DBH X 12**.

Using the Australian Standards (4970-2009) "*Protection of trees on development sites*", we can calculate the tree protection zone area of each tree which is the principal means of protection for the tree's canopy, branches, trunk and root system. The Tree Protection Zone (**TPZ**) calculation for all the trees on this property can be found on the Tree Data Spreadsheet, highlighted in **YELLOW** on **pages 10** to **12**.

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Tree Protection Fences and Signs

ESSENTIAL: Before the demolition works start, the temporary Tree Protection Fences and Tree Protection Signs must[4] be installed around single trees or installed around groups of trees.

The portable Tree Protection Fences must be installed **2-3m** from the tree trunk/s. In addition, the fences must be at least **1.8m** high and stay in place during the construction works. Tree Protection Signs must be placed around the edge of the fences and be visible within the construction site (See Diagrams 1 and 2). The Tree Protection Signs can be printed and laminated (See Tree Protection Signs on **page 31**). The Tree Protection Fence acts as a physical and visual reminder to protect the trees during the construction works. It reduces root compaction because no vehicles/machinery and material can be parked or stored within the TPZs; It also reduces spillage of toxic materials on the roots and trunk; and physical damage to the trees.

The designated TPZ of each tree is recommended to be clearly marked out and fenced off from the site in accordance with the Australian Standards (4970-2009) "*Protection of Trees on Development Sites*" guidelines prior to any machinery or materials being brought onto the site, and certainly before the demolition works commence.

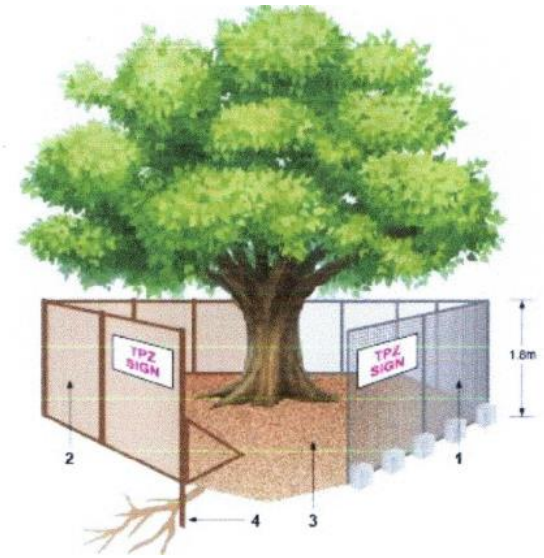


Diagram 1 Diagram source AS 4970-2009 Guidelines

4 **All throughout this report, the use of the word, "must" underlined, makes it clear that tree protection is very important.**

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This Arboricultural Consultant recommends the steel panel fencing with the plastic-coated concrete footings, which comply with the Australian Standards (4687-2007) "*Temporary Fencing and Hoardings*".



Diagram 2 Diagram source AS 4687-2007

Trunk Protection

VERY IMPORTANT: Before the construction works start, the Trunk Protection must be installed around **trees No. 1, 2, 3, 4, 6, 7, 8, 9, 25** and **27**, because of their close proximity to the proposed construction works. The Trunk Protection must stay in place during the construction works.

PLEASE NOTE: **Trees No. 14, 15, 16, 17, 18, 19** and **20** do not need trunk protection at this present time.

This Arboricultural Consultant realizes that proposed works are often within the TPZ, and standard protective fencing may not always be a viable method of protection. In these areas trunk protection must be installed prior to the commencement of the construction works and must remain in place until after the construction works have been completed.

When construction into the TPZ and/or the SRZ cannot be avoided, the tree trunk must be protected by installing padding protection (two layers of hessian or carpet underfelt) around the trunk and/or around the branches, as seen in Diagram 3. This is then covered by 75 x 50mm orange safety fence wrapped around the trunk and/or branches. The orange safety fence must not be nailed to the tree, nor screwed into the tree trunk.

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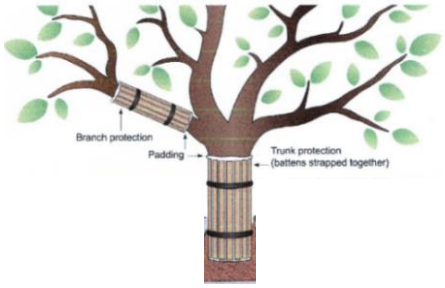


Diagram 3 Diagram source AS 4970-2009 Guidelines

The Trunk Protection for **trees No. 1, 2, 3, 4, 6, 7, 8, 9, 25** and **27**, must be undertaken, in accordance with the Australian Standards (4970-2009) "*Protection of trees on development sites*", 4.5.2, 4.5.3 on page 17.

After the Tree Protection Fences, the Tree Protection Signs and the Trunk Protection have been installed, this arboricultural consultant must provide the Local Government Authorities with a **Pre-demolition Arboricultural Compliance Report (No. 1)**, in accordance with the Australian Standards (4970-2009) "*Protection of trees on development sites*", "Pre-construction (sections 4 & 5)" on page 8. This states that the tree protection fences, signs and trunk protection have all been installed and that the tree protection measures comply for these trees, which includes taking photos as evidence. Failure to do this will hold up the start of the demolition and/or the construction works, and government fines may occur, as seen below.

Failure to Comply Notice

Any failure to comply with the tree protection recommendations is a *breach* of the Australian Standards (4970-2009) "*Protection of Trees on Development Sites*" (p. 4), and an *offence* under the Planning and Development Act 2005 (s. 216) and may result in the stopping of the construction project and/or an infringement notice of $500.00 (s. 42 of the Planning and Development Regulations 2009), or "a *fine* of **$200,000** and, in the case of a continuing offence, a *further fine* of **$25,000.00** for each day during which the offence continues" (s. 223).

Tree Bonds

This Arboricultural Consultant recommends that a $500.00 tree bond be placed onto the contractual conditions for each construction contractor that is involved in this project. These bonds should act as a deterrent and a reminder to protect these trees, prior to and during the demolition and/or the construction works.

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Tree Management Plan

By now, there is an understanding that established trees of good health and structure are an asset to any development site. These trees are living organisms that require certain environmental conditions in order to maintain their value as an asset.

All trees consist of three main sections: a canopy or crown, a trunk and a root system. Each one of these sections carries out specific functions necessary for the survival of the tree as all of the parts interact. A tree is in a state of physiological equilibrium between the above ground and below ground sections, so that if one of these sections is damaged, the entire tree will suffer, and symptoms may appear in any part of the tree.

Thus, damage to these trees and any soil disturbance must be avoided or minimized during the construction works. Design and engineering procedures to ensure the protection of these trees must be in place at all stages. Therefore, any demolition and/or construction that occurs around these trees must be carried out in such a way as to minimise the impact on the health of each tree.

This Report Must be Available Onsite

This entire Arboricultural Report must be available onsite, prior to the commencement of the construction works. The Tree Protection Plan – Arboricultural/ Construction Statement, the Tree Management Plan and the Construction Methodology will identify key stages where monitoring and certification will be required, in accordance with the Australian Standards (4970-2009) "*Protection of trees on development sites*", in section 5 "Monitoring and Certification" 5.2.

Tree Protection Measures

Prior to the commencement of the demolition and/or construction works and/or any machinery or materials being brought onto this site, the Tree Protection Fences, the Tree Protection Signs and the Trunk Protection must be installed. These Tree Protection measures act as a physical and visual reminder to protect the trees during the works, as seen on **pages 18** to **21**.

Encroachments

Minor Encroachments - Any excavation and/ or construction encroachments into the TPZ that are less than 10% of the area of the TPZ and are outside the SRZ will not require detailed root investigation. The area lost to this encroachment should be compensated elsewhere. For example, an excavation and/ or construction encroaching 10% of the TPZ should be compensated on the other side of the tree.

Major Encroachments - Any excavation and/ or construction encroachments into the TPZ that are greater than 10% of the area of the TPZ or are inside the SRZ to any extent are considered major encroachments and will require detailed root investigation by the consulting arborist to ensure the ongoing viability of these trees. This follows Section 3.3 of the Australian Standards (4970-2009) "*Protection of Trees on Development Sites*".

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Root Management Plan - This Arboricultural Consultant must demonstrate that these trees would remain viable. Therefore, ***vacuum excavation*** is the recommended methods for construction workers in these encroachments.

However, this Arboricultural Consultant must be present before and during the excavation and must demonstrate that these trees would remain viable, by providing guidance to the construction workers through a verbal Root Management Plan. Documenting any encroachment, taking photos and providing a Progress Report, in accordance with the Australian Standards (4970-2009) "*Protection of Trees on Development Sites*", "Sections 3.3.3 and 5.4.3".

Nevertheless, outside the TPZ area, **Mechanical** excavation can be used.

Watering

Additional watering for these trees will be required during the construction works, throughout the summer months. Watering is required to minimise stress on these trees while works are occurring. It is recommended to water in the summer months, once a day, applying up to 100 litres each time. Adding a wetting agent in the soil around each tree will assist in soil wettability.

NOTE: Additional watering of these trees is not required during autumn and winter months.

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Construction Methodology

The following construction methodology near these five trees must be followed.

Demolition of the old house

The demolition of the old house must[5] protect the TPZs of the retained trees around the perimeter of the property. All trucks must use the existing driveways at the front and at the rear side. The materials removed from the old house on the truck must not damage any tree branches.

Removal of Grass Around the Retained Trees

Weed chemical and excavator machinery must not be used on the grass within the SRZ and the TPZ areas. Hand removal of the grass is the preferred method.

Carpark Construction Around Trees **No. 1, 2, 3, 4, 6, 7, 8, 9, 19** and **20.**

The excavation of the proposed carpark near and around these retained trees within the TPZs must not damage any of the tree roots to minimise the detrimental impact to these trees. Therefore, this Arboricultural Consultant recommends first the use of manual excavation controls (e.g., ***vacuum excavation***), when undertaking the preparation of these carpark works.

NOTE: The road base material must be clay and must be laid on top of the existing soil. No limestone road base is to be used, because it will change the pH in the soil and would be toxic to these trees.

Then use a Mini tracked machine with a flat bladed bucket to undertake the earthworks in close proximity of these retained trees to minimise any root damage, using a spotter at all times, to avoid damaging any exposed tree roots. When using a bobcat, it must be driven in a forward and backwards motion and no turning is to be carried out within the **TPZ** radius from these trees, always using a spotter at all times. This will ensure that the soil and/or the clay road base are not dug into when turning which will rip and tear surface roots. Any excavated soil must not be stored or built up around the trunks of these trees.

The car park bitumen must be constructed with permeable material for better water/rain penetration into the soil.

The car park islands near the trunk of these trees must not change the soil levels around the trunk's bases, either raised or lowered.

Any excavation and/or construction outside the **TPZs** mechanical excavation can be used. Always use a spotter to prevent ripping tree roots out of the soil. Any tree roots that might need to be removed must not to be cut without permission from myself as a qualified Arboricultural Consultant. I can visit the site and provide the Site Supervisor/Manager with **Brief email report/s** on any unforeseen issues that may arise.

[5] **All throughout this report, the use of the word, "must" underlined, makes it clear that tree protection is very important.**

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The excavation and/ or construction between the trunk and the 10% encroachment area of the **TPZ** including the **SRZ** must be done by ***vacuum excavation***. Leave the roots undamaged within the construction area.

No chemicals, solvents, fuel, oil, herbicides, cement waste, no machinery or vehicles to be parked or stored within the TPZ.

VERY IMPORTANT: No Mechanical excavation and/ or construction is allowed whatsoever between the trunk and the 10% TPZ encroachment area. Also, no chemicals, solvents, fuel, oil, herbicides, machinery or vehicles to be parked or stored or parked within the entire **TPZ** areas.

Outside the **TPZ** area **Mechanical** excavation and/ or construction can be used.

Construction of the Footings near trees **No. 9, 25,** and **27**

The excavation of the proposed footing works near these trees is slightly inside the **TPZ** area and Mechanical excavation must not damage any tree roots, whatsoever. Using a spotter is highly recommended.

All Other Construction Near the Retained Trees

Any damage to the protected trees, including their canopies, trunks or roots, during the construction works must be reported immediately to the site supervisor, who must then immediately report them to myself the qualified Project Arboricultural Consultant. This Arboricultural Consultant must document the damage, take photos, to be recorded in the **Brief email report**, in accordance with the Australian Standards (4970-2009) *"Protection of Trees on Development Sites"*, "Actions and Certification" in TABLE 1, Section 4 and 5 and Section 5.4.2 and 5.4.3), is required. This brief email report must be submitted to the Local Government Authorities.

Watering

Additional watering for these trees will be required during the construction works, throughout the summer months. Watering is required to minimise stress on these trees while works are occurring. It is recommended to water in the summer months, once a day, applying up to 100 litres each time. Adding a wetting agent in the soil around each tree will assist in soil wettability.

NOTE: Additional watering of these trees is not required during autumn and winter months.

Removal of Tree Protection Fences

The Tree Protection fences, Signs and the Trunk Protection must be removed only upon completion of the construction works.

Compliance Monitoring

IMPORTANT: On completion of the construction works, this Arboricultural Consultant must provide the Local Government Authorities with a **Completion Certification Report (No. 2)**. This states that the that the tree protection measures have been removed and verify the trees' health,

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structural condition and safety. This includes taking photos, in accordance with the Australian Standards (4970-2009) "*Protection of trees on development sites*", "Actions" in section 2 and 5.4.3 in section 5). This report must be submitted to the Local Government Authorities.

Failure to Comply Notice

IMPORTANT: Any failure to comply with the tree protection recommendations is a *breach* of the Australian Standards (4970-2009) "*Protection of Trees on Development Sites*" (p. 4) and may result in penalties or infringement notice of $500.00 (s. 42 of the Planning and Development Regulations 2009), or "a *fine* of **$200,000** and, in the case of a continuing offence, a *further fine* of **$25,000.00** for each day during which the offence continues" (s. 223).

Conclusion

Established trees in good health and structure, are considered an asset, and must be protected, prior and during the construction works. Consequently, damage to these trees and any soil disturbance must be avoided or minimized during the construction and works carried out in such a way as to minimise the impact on the health of each tree.

Trees to be Retained: Trees **No. 1, 2, 3, 4, 6, 7, 8, 9, 14, 15, 16, 17, 18, 19, 20, 25** and **27** are around the perimeter of the property and must be retained. This Arboricultural Consultant's inspection of these (17) trees found them to be in good health and fair to good structural condition.

The construction impact on these (17) trees will be **Impact – Major, viable.** Meaning the proposed design has a TPZ area encroachment greater than 10%, or it impacts the SRZ. These trees are expected to remain viable because of the following:

- Alternative construction methods found on **pages 24** and **25** will reduce the impact on these trees.
- A non-destructive root exploration will be undertaken to reduce the root distribution in the proposed area of works.

Trees to be Removed: Trees **No. 5, 10, 11, 12, 13, 21, 22, 23, 24, 26, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51** and **52** are within the footprint of the proposed design and will require removal to facilitate the design. This Arboricultural Consultant's inspection of these trees found them to be in poor health and poor structural condition. The construction impact on these trees will be **Impact – Remove.**

Note: Trees **No. 5, 13, 21, 23** and **26** have a short ULE of 1-10 years and should be removed to facilitate the design.

Tree Surgery Works: Prior to the demolition works, some tree surgery works are essential for the safety of the construction workers. All tree surgery works should be undertaken by a (minimum AQF level 3) qualified and experienced tree surgeon and must comply with Australian Standards 4373 (2007) "*Pruning of Amenity Trees*". **IMPORTANT:** It is essential to undertake these tree surgery works without using climbing spikes.

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This Report Must be Available Onsite: This entire Arboricultural Report must be available onsite, prior to the commencement of the construction works. The Tree Management Plan and the Construction Methodology will identify key stages where monitoring and certification will be required, in accordance with the Australian Standards (4970-2009) "*Protection of Trees on Development Sites*", in section 5 "Monitoring and Certification" 5.2.

Tree Protection Measures: Prior to the demolition works and during the construction works, the Tree Protection Fences and Tree Protection Signs must be installed around **trees No. 1, 2, 3, 4, 6, 7, 8, 9, 14, 15, 16, 17, 18, 19, 20, 25** and **27** to prevent accidental damage to these trees.

Also, the Trunk Protection must also be installed around **trees No. 1, 2, 3, 4, 6, 7, 8, 9, 25** and **27** to prevent accidental damage to these trees.

Monitoring and Certification: After the Tree Protection Fences, the Tree Protection Signs and the Trunk Protection have been installed, this arboricultural consultant must provide the Local Government Authorities with a **Pre- demolition Arboricultural Compliance Report (No. 1)**. This states that the tree protection fences, signs and trunk protection have all been installed and that the tree protection measures comply for the trees in question, which includes taking photos as evidence, in accordance with the Australian Standards (4970-2009) "*Protection of trees on development sites*", "Pre-construction (sections 4 & 5)".

IMPORTANT: Follow the Construction Methodology as seen on **pages 24** and **25** is essential.

Construction Completion: On completion of the construction the Tree Protection Fences, Signs and the Trunk Protection must be removed, and this Arboricultural Consultant must provide the Local Government Authorities with a **Construction Completion Certification Report (No. 2)**, in accordance with the Australian Standards (4970-2009) "*Protection of Trees on Development Sites*", "Actions Section 2 and 5.4.3". This states that the tree protection measures have been removed and verifies the trees' health, structural condition and safety.

The TPZ and SRZ: The Tree Protection Zone (**TPZ**) and the Structural Root Zone (**SRZ**) calculation for each retained tree must be maintained during the construction works, as seen on **pages 10** to **12**.

Tree Photographs: Each tree has been photographed and numbered, and these are presented on **pages 32** to **37**.

This information has been provided as a record of the trees before the construction works; to help understand the risks to the trees, and the potential future impacts. It also gives recommendations for construction methodology based on the potential future impacts on the trees and the necessary Tree Protection measures.

It is this Arboricultural Consultant's opinion that if the recommended **Tree Protection Plan – Arboricultural/ Construction Statement** on **pages 6** and **7**, the **Construction Methodology** on **pages 24** and **25**, and the **Recommendations** on **pages 28** and **29** are followed, these trees will not be adversely affected.

NOTE: This arboricultural consultant confirms the change to the footprint is to trees No. 22 and 24, which require there removal to facilitate the new design. The rest of the footprint does not affect the impact of the other trees.

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Recommendations

Prior to the Demolition Works

Tree Bonds: This Arboricultural Consultant recommends that a $500.00 tree bond be placed onto the contractual conditions for each construction contractor that is involved in this carpark extension project. These bonds should act as a deterrent and a reminder to protect these trees, prior to and during the construction works.

Print Out the Entire Report: Including the Tree Data spreadsheet, the Tree Protection Plan – Arboricultural/ Construction Statement, the Arboricultural Impact Assessment, the Tree Management Plan, the Construction Methodology, these Recommendations, and the aerial site plan. These must be available onsite prior to demolition and from the commencement of, and during the construction works.

Tree Surgery Works: Prior to the demolition works, the tree surgery works must be undertaken to ensure the safety of the construction workers, as seen on the tree works list on **pages 15** to **16** along with the site map on **page 4**. All tree surgery works should be undertaken by a (minimum AQF level 3) qualified and experienced tree surgeon and must comply with Australian Standards 4373 (2007) "*Pruning of Amenity Trees*".

Tree Protection Measures: Prior to the demolition works and during the construction works, the temporary tree protection fences must be installed around trees **No. 1, 2, 3, 4, 6, 7, 8, 9, 14, 15, 16, 17, 18, 19, 24, 25** and **27**. These fences must be at a minimum height of **1.8m**. The Tree Protection signs must also be affixed to all four sides of the fence. These Signs can be printed and laminated (See **Tree Protection Signs** on **page 31**). Also, Trunk Protection must be installed onto trees **No. 1, 2, 3, 4, 6, 7, 8, 9, 25** and **27**.

Monitoring and Certification: After the Tree Protection Fences, the Tree Protection Signs and the Trunk Protection have been installed, this arboricultural consultant must provide the Local Government Authorities with a **Pre-demolition Arboricultural Compliance Report (No. 1)** , in accordance with the Australian Standards (4970-2009) "*Protection of trees on development sites*", "Pre-construction (Sections 4 & 5)". This states the tree protection fences, signs and trunk protection have all been installed and that the tree protection measures comply for these trees, which includes taking photos as evidence. This report must be submitted to the Local Government Authorities.

> The quote for the site tree inspections and the **Pre-construction Arboricultural Compliance Report (No. 1)** is **$495.00.**

Construction Phase

The Tree Protection Plan – Arboricultural/ Construction Statement on **pages 6** and **7**, the Construction Methodology on **pages 24** and **25**, must be used at the critical stages of construction around the SRZ and the TPZ for these retained trees. (See the Spreadsheet Tree Data on **pages 10** to **12** for the specific SRZ and the TPZ calculations, which are placed onto the site plan on **page 5**).

There must be no mechanical excavation within the TPZ's. In these TPZ areas, the construction works must use ***vacuum excavation*** method.

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Watering: Additional watering for these trees will be required during the construction works, throughout the summer months.

Monitoring and Certification: During the Construction works if any damage to these trees occurs – This arboricultural consultant must re-inspect the tree/s and document the damage, to be recorded into a **brief email report**, in accordance with the Australian Standards (4970-2009) "*Protection of Trees on Development Sites*", "Actions and Certification, in TABLE 1, Section 4 and 5 and Section 5.4.2 and 5.4.3". This report must be submitted to the Local Government Authorities.

On-site tree advice: During construction if any on-site tree advice is required due to any concerns raised by the Site Manager, and/or monitoring of the tree protection measures, a **brief email report** will be provided.

The quote for each site tree inspection and **brief email report** is **$395.00.**

Construction Completion

Tree Protection Measures: The site supervisor/manager must remove the Tree Protection Fences and the Trunk Protection after the completion of the construction works.

Monitoring and Certification: On completion of the construction works, this Arboricultural Consultant must provide the Local Government Authorities with a **Construction Completion Certification Report No. 2**: This states that the tree protection measures have been removed and verify the trees' health, structural condition and safety, after the construction has finished. This includes taking photos, in accordance with the Australian Standards, (4970-2009) "*Protection of trees on development sites,*" "Actions Section 2 and 5.4.3". This report must be submitted to the. Local Government Authorities

The quote for the site tree inspections and the **Construction Completion Certification Report No. 2** is **$495.00.**

The quotes for the Re-inspections and/ or Certification reports before, during and after the construction works, have been included within the recommendations, in accordance with the Tree Management Process, Australian Standards (4970-2009) "*Protection of trees on development sites*", under "Monitoring and Certification" 5.2 and 5.3.1, 5.4.2, 5.4.3 and section 2, Table 1, Post construction "section 5". This funding must be put aside and made available at the required times.

Further Alterations to this Report:

Any amendments to this report and/or email correspondence and/or Re-inspections are at an Hourly Tree Inspection Rate of $175.00/hr, including travel.

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Phillip Matthews (Principal Arboricultural Consultant)
Dip. Hort (Arbor) (AQF Level 5), **B. Min, M.A.** (AQF Level 9)

Arborology WA Arboricultural Consultants

Qualified Tree Protection & New Tree Planting Specialist
Certified Tree Health & Structural Integrity Expert

Email: **phillip.arborologywa@gmail.com**
Phone: **040 342 3377**
Website: **www.arborologyWA.com.au**

QTRA Quantified Tree Risk Assessment **QTRA No. 2726**

Liability limitations

This tree report remains the property of Phillip Matthews (Arboricultural Consultant) as the author of this report and would prefer that this report not be shown copied or distributed onto social media without his prior written permission. The contents of reports such as tree heights, life expectancies and ages of trees are approximate. Trees are inspected from the ground only. The findings of this report are preliminary in nature. Activities such as taking root samples for laboratory analysis are not taken unless by prior arrangement. Sketches or not-to-scale drawings, photos and maps are usually provided with the report for illustration purposes only. All duty of care has been taken to gather this information, nevertheless. No responsibility is accepted for any errors of fact or omissions which appear in this report which result from incorrect or incomplete information supplied to Phillip Matthews by the parties involved in the project. Due to the changing nature of trees and other site circumstances, this report and any recommendations made are limited to a 12-month period. Any alteration to the site and any new development proposals could change the current circumstances and may invalidate this report and any recommendations made. No employee of or Phillip Mathews shall be required to give testimony or to attend court by reason of this report unless subsequent contractual arrangements are made, including payment of an additional fee for such services. If due to limitations in your instructions any amendments to the report or reinspection are required to be carried out, travel to and from site and the revisit hours will be invoiced at the hourly rate of $175.00. Phillip Matthews (Arboricultural Consultant) accepts no liability due to the loss of, or damage to, or the failure of, the subject of this advice.

Insurances:

Professional Indemnity	AON	$5,000,000.00
Public Liability	SGIO	$20,000,000.00
Personal Accident Insurance	SGIO	
Motor Vehicle	QBE	

Police Checks:

National Police Certificate	Valid as at 2/06/2023
Working With Children Check	Expiry Date 7/02/2024

Industry Certifications and Licenses:

Construction Induction	Issued 16/08/2018
Urban Tree Management in WA	
QTRA Guide to Visual Tree Assessment	
Power Line Safety	
Traffic Management	
St John First Aid	21/09/18

COVID – 19 Vaccination:
Phil has received all require **COVID 19** vaccines. July 2021, December 2021 and August 2022.
Phil has received all require **Influenza** vaccines. April 2020, April 2021, April 2022, April 2023, July 2024.

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Tree Protection Zone

KEEP OUT

Contact:

Arborology WA
Arboricultural Consultants

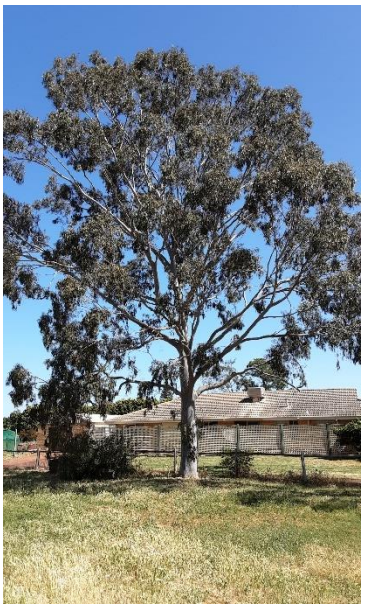
0403 423 377

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Photographs



Tree No. 1



Tree No. 2



Trees No. 4 & 3



Tree No. 5

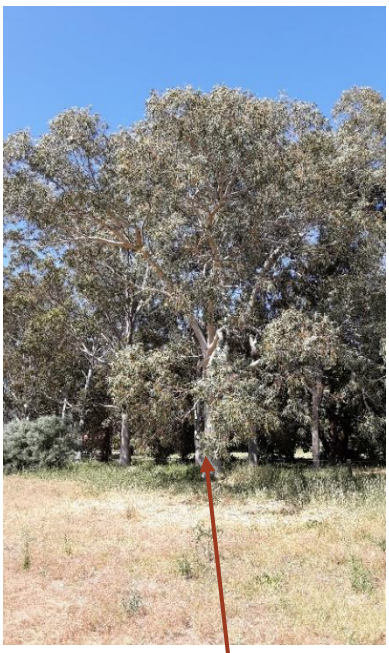


Trees No. 7 & 6



Trees No. 9 & 8

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Tree No. 10



Tree No. 11



Tree No. 12







Trees No. 13, 14, 15, 16, 17, 18, 19 & 20

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Tree No. 21



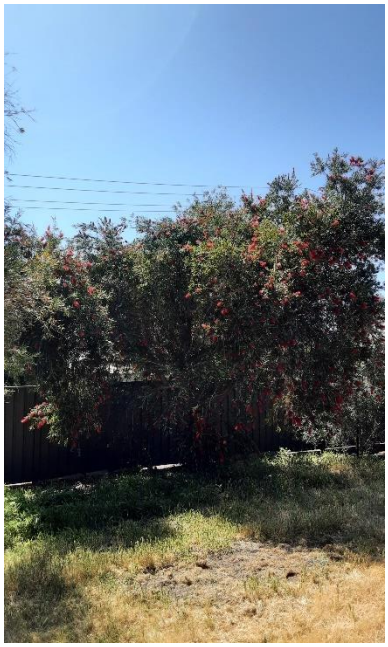
Tree No. 22



Tree No. 23



Tree No. 24



Tree No. 25



Trees No. 27 & 26

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Tree No. 28



Tree No. 29



Tree No. 30



Tree No. 31



Tree No. 32



Trees No. 33 & 34

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Trees No. 35 & 36



Tree No. 37



Trees No. 38 & 39



Trees No. 40 & 41



Trees No. 42 & 43



Tree No. 44

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Trees No. 45 & 46



Trees No. 47 & 48



Tree No. 49



Tree No. 50



Trees No. 51 & 52

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Appendix 1: Author's Qualifications & Experience

Phillip Matthews is an AQF level 5, Consulting Arborist, Dip Hort (Arbor), QTRA VTA and Urban Tree Management in WA trained, with a B.Min, Grad Dip.Min and an AQF Level 9, Master of Arts (See the following pages).

Phil has worked within the arboricultural and horticultural profession for over 30 years in Perth. He has worked closely with Local and State Government Departments, Demolition Companies, Builders, Developers, Project Managers, Architects, Landscape Architects, Designers, Engineers, Environmental Consultants, Strata Managers, Real Estate Consultants, Golf Courses, Private Schools/Colleges, Universities and Retirement Villages. He is a well-qualified tree protection, new tree planting, tree health and structural integrity expert. He has a passion for sustainable urban canopy forest both now and in the future.

His work ranges from individual expert tree inspections to managing trees on major multimillion-dollar housing developments and infrastructure projects. His work often involves trees with preservation orders, tree surveys for tree protection on development sites and tree selection for new tree plantings DA's. This involves tree inspections, tree risk assessments, structural integrity and safety assessments, Arboricultural Forensic Investigation, Helliwell tree valuations, new tree planting selection, root mapping, preliminary tree surveys (Pre DA), building arboricultural impact assessment reports (For DA), construction methodology and tree protection plans, in accordance with the Australian Standards: (AS 4970-2009) "*Protection of Trees on Development Sites*".

Project and Client List

Rockingham Senior High School Carpark Extension – **Arboricultural Impact Assessment Report** (**AS 4970-2009**) for **Ecoscape Australia.**
Street Tree Data Collection – **13,368 Street Tree Survey 2024** for the **City of Melville.**
Department of Education Asbestos Removal – **5 sites Arboricultural Report** (**AS 4970-2009**) for **West Coast Construction and Demolition.**
Kemp Street, Pearsall Subdivision – **79 Tree Survey, Arboricultural Report** (**AS 4970-2009**) for the **Porter Consulting Engineers.**
Esperance Town - **42 Tree Audit, Arboricultural Report** for **Shire of Esperance.**
Water Corporation's William Traylen Park – **113 Tree Audit, Arboricultural Report** for **The Garden Gurus Landscape Design and Maintenance**
South Hedland Integrated Sports Hub (SHISH) Redevelopment Site – **770 Tree Survey, Arboricultural Report** (**AS 4970-2009**) for the **Town of Port Hedland.**
Point Walter Mountain Bike Trail Project – **72 Tree Survey, Arboricultural Report** (**AS 4970-2009**) for **Common Ground Trails** and the **City of Melville.**
Street Tree Data Collection – **13,381 Street Tree Survey 2023** for the **City of Melville.**

Arboricultural Reports (For DA) Housing Construction (**AS 4970-2009**)

ACERO Construction Pty Ltd	**Domination Homes**	**New Imperial Co**
ADCO Construction	**GDD Design Group**	**Oceancorp**
Allstyle Homes	**Germano Designs**	**Perkins Builders**
APD&C Pty Ltd	**Integrity Development**	**Pyramid Construction (WA)**
Asset Build	**IQ Construction**	**Sarich Building**
BGC Housing Group	**Individual Developments**	**Snell Building Services**
Broadhurst & Bott Architects	**Integro Homes**	**Shelford Homes**
CARDNO Engineering Services	**Jubilee Homes Builders**	**Summit Homes Group**
Customised Projects	**Klopper & Davis Architects**	**Urbanista Planning**
Danmar Homes/ Developments	**KPA Architects**	**Waterford PBSA Pty Ltd**
Dale Alcock Homes/Projects	**Mustang Group**	**Yuro Building Design**

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New Tree Planting Arboricultural Reports (For DA)

Allstyle Homes	**Danmar Homes**	**Element Drafting & Design**
Germano Designs	**Shelford Homes**	**Yuro Building Design**

Department of Defence - RAAF Pearce Demolition Works & CSI Communication Trench Works – **190 Tree Survey and Arboricultural Reports** (**AS 4970-2009**) for **Duratec Limited.**
Kenby Chase, Wandi – Urban Development Project – **Arboricultural Report (For DA)** (**AS 4970-2009**) for **Westcoast Engineering (WA) Pty Ltd .**
Thomas Road, Byford - Solar Cable Project – **605 Tree Survey and Arboricultural Report (Pre DA)** for **Western Power.**
Madora Bay East Project – **49 Tree Survey and Arboricultural Report (For DA)** (**AS 4970-2009**) for **Environmental Industries.**
Arbuckle Reserve, Carine – Underground Power Construction Project – **42 Tree Survey** (**AS 4970-2009**) for **Civil Technology.**
Dragonfly Boulevard, Mandurah – Urban Development Project (**AS 4970-2009**)
Stock Road, Lakelands – Urban Development Project (**AS 4970-2009**)
Jubata Court, Maida Vale – Urban Development Project (**AS 4970-2009**) for **Buckby Contracting Pty Ltd.**
Elizabeth Quay Project, Perth – **387 Tree Survey, Arboricultural and Horticultural Reports** (**AS 4970-2009**) for **CPB Contractors Pty Ltd.**
Queensland Fruit Fly Baiting for **Department of Primary Industries and Regional Developments** (between Oct & Dec 2021 and between May & August 2023)

Tree Audit/Survey and Arboricultural Report for Tree Works Schedules

Al-Ameen College	**Kingsway Christian College**	**Rehoboth Christian College**
Beechboro Christian School	**Metropolitan Cemeteries Board**	**Rockingham Golf Club**
Foundation Christian College	**Natural Area Consulting**	**Sun City Country Club**
Irene McCormack Catholic College	**Perth Bible College**	**Swan Christian College**
Kennedy Baptist College	**Providence Christian College**	**Water Corporation**

Tree Inspections and Arboricultural Report for Local and State Government Departments

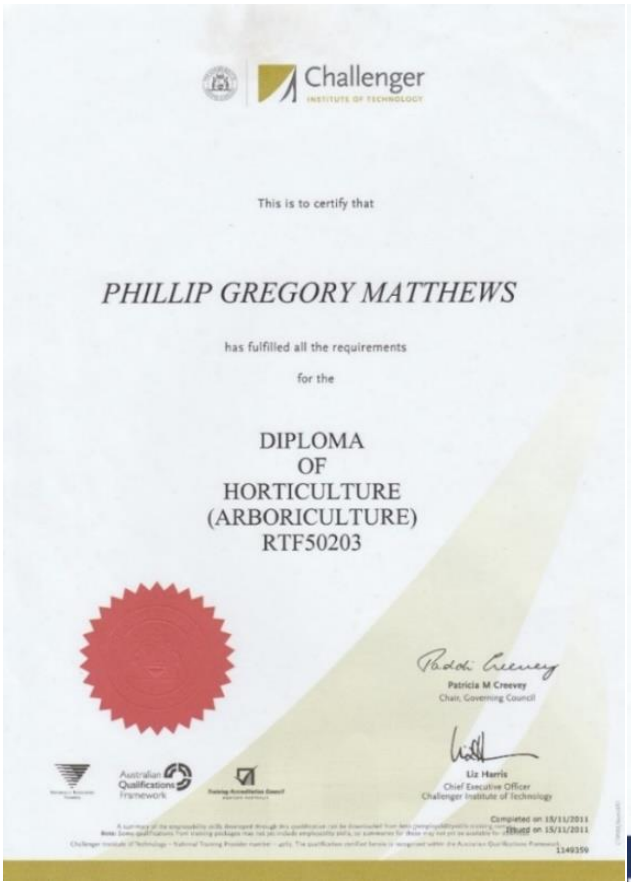
Australian Federal Police	**City of Melville**	**Department of Education**
Department of Communities	**Department of Defence**	**Town of Cambridge**
Town of Port Hedland	**Western Power**	**Shire of Esperance**

Tree Inspections and Arboricultural Report for Environmental Engineering and Real Estate company's

Environmental Industries	**Exal Group Pty Ltd**	**Engenuity Engineering**
Smithwick Strata	**Buckby Contracting Pty Ltd**	**CPB Contractors Pty Ltd**
Duratec Limited		

Asset Tree Valuation Surveys and Reports
for **Bethanie on the Park - Retirement village** (271 trees with a tree valuation of $760,000.00)
And 1000's of individual clients

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Challenger
INSTITUTE OF TECHNOLOGY

This is to certify that

PHILLIP GREGORY MATTHEWS

has fulfilled all the requirements

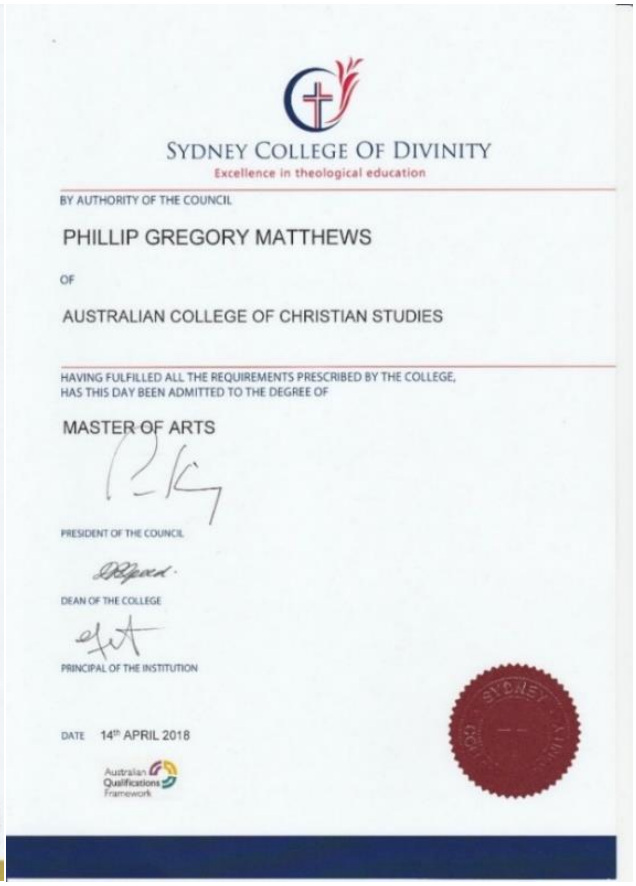
for the

DIPLOMA
OF
HORTICULTURE
(ARBORICULTURE)
RTF50203

Patricia M Creevey
Chair, Governing Council

Liz Harris
Chief Executive Officer
Challenger Institute of Technology

Completed on 15/11/2011
Issued on 15/11/2011



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BY AUTHORITY OF THE COUNCIL

PHILLIP GREGORY MATTHEWS

OF

AUSTRALIAN COLLEGE OF CHRISTIAN STUDIES

HAVING FULFILLED ALL THE REQUIREMENTS PRESCRIBED BY THE COLLEGE,
HAS THIS DAY BEEN ADMITTED TO THE DEGREE OF

MASTER OF ARTS

PRESIDENT OF THE COUNCIL

DEAN OF THE COLLEGE

PRINCIPAL OF THE INSTITUTION

DATE 14th APRIL 2018



Certificate of Attendance

Quantified Tree Risk Assessment Limited certifies that on the 09 March 2010

Phillip Matthews

attended a course of training entitled

A PRACTITIONERS GUIDE TO VISUAL TREE ASSESSMENT

Signature M. J. Ellison (Director)

09 March 2010
Date

Quantified Tree Risk Assessment Ltd.
9 Lowe Street, Macclesfield
Cheshire, SK11 7NJ, ENGLAND

QTRA

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Quantified Tree Risk Assessment Ltd.

Certifies that on 22 March 2011

Phillip Matthews

completed a course of training in the principles and application of the

QUANTIFIED TREE RISK ASSESSMENT SYSTEM

and is a **Representative** of **Registered Licensee Paperbark Technologies** from **22 March 2011**

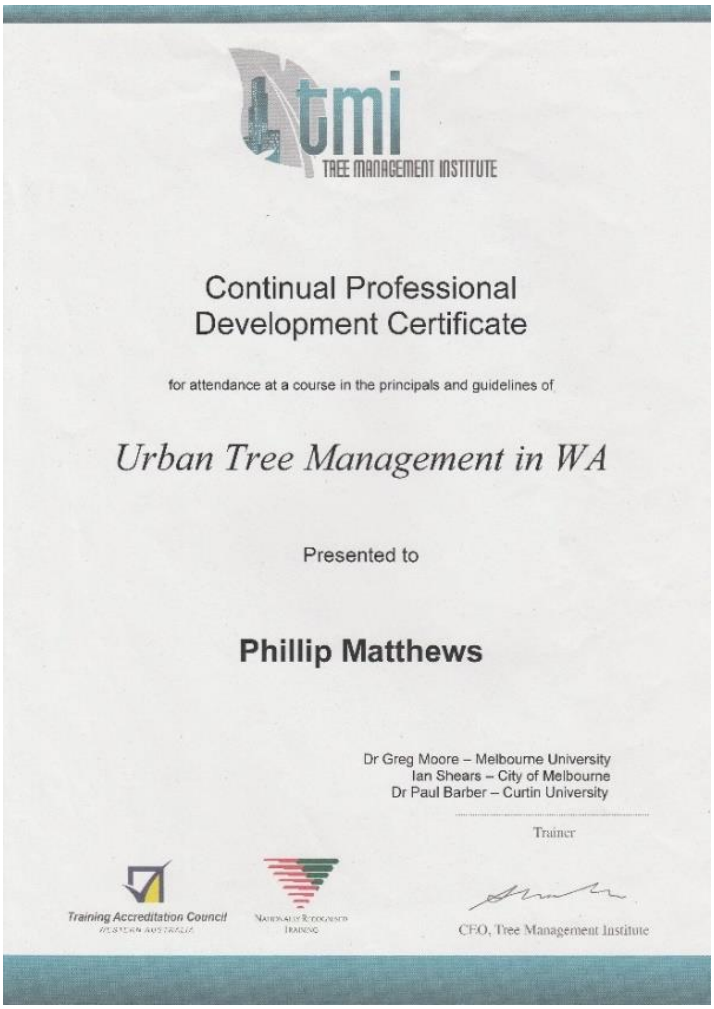
To verify the current status of the Licence please enter the Licence number at 'Check a Licence' in the Licensed User Directory at www.qtra.co.uk

Signature M. J. Ellison (Director)

22 March 2011
Date

QTRA (No 2726)

Quantified Tree Risk Assessment Limited
9 Lowe Street, Macclesfield
Cheshire, SK11 7NJ, ENGLAND



tmi TREE MANAGEMENT INSTITUTE

Continual Professional Development Certificate

for attendance at a course in the principals and guidelines of

Urban Tree Management in WA

Presented to

Phillip Matthews

Dr Greg Moore – Melbourne University
Ian Shears – City of Melbourne
Dr Paul Barber – Curtin University

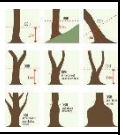
Trainer

Training Accreditation Council WESTERN AUSTRALIA

CEO, Tree Management Institute

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Appendix 2: Tree Data Spreadsheet Explanation

Tree ID Number	Provides the schedule numerical character so the tree's location can be clearly identified on the site map/plan.
Botanical Name	Provides the most used botanical name of the tree specimen.
Height	Provides the vertical distance range between the base of the tree and the tip of the highest branch on the tree. The height of the tree is measured by a clinometer from ground level. Tree heights are in metres.
Canopy Spread	Provides the canopy spread (width) measurement from north to south or east to west. Tree canopy spreads are in metres.
Trunk DAB	Provides the trunk diameter measurement (in metres) immediately above the root buttress of the tree specimen. This measurement is required for the SRZ. **DAB** = Trunk Diameter Above the Root Buttress.
Trunk DBH	Provides the trunk diameter (in metres, and generally measured at 1.4 metres above ground level) of the tree specimen. This measurement is required for the TPZ. **DBH** = Trunk diameter at breast height. 
Useful Life Expectancy (ULE)	The criteria used to calculate the remaining safe useful life expectancy of a tree is based on numerous factors. The key information required for long term planning is how long each tree can be expected to remain on site with an acceptable degree of safety. The assessment for each tree is based on the potential of the species in the locality, and the final assessment made gives particular consideration to the following: • Obvious past influences. • Health and Vitality – present and future potential for the species on the site. • Estimated age in relation to the expected life expectancy for the species. • Structural defects, which may influence the potential life expectancy of the tree or represent a risk factor to the proposed development. On the basis of the above ULE guidelines, trees are allocated an expected useful life expectancy from 1 to 100 years and then placed into one of five (5) categories. **EL Extra-long - 100+ years.** **SM Short to Medium - 10-20 years.** **L Long - 40-100 years.** **S Short - 1-10 years.** **M Medium - 20-50 years.**
Extra-long SULE	**Trees that appear to be retainable with an acceptable level of risk for 100+ years.** Trees of Good health and structurally sound located in the landscape that can accommodate future growth.
Long SULE	**Trees that appear to be retainable with an acceptable level of risk for 40-100 years.** Structurally sound trees located in positions that can accommodate future growth. Trees that could be made suitable for retention in the long term by remedial tree care.
Medium SULE	**Trees that appear to be retainable with an acceptable level of risk for 20-50 years.** Trees that may only have between 20-50 years remaining life span. Trees that may live for more than 20-50 years but would be removed in that time during the course of management for safety and nuisance reasons. Damaged or defective trees that can be made suitable for retention in the medium term by remedial work.

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Short to Medium SULE	**Trees that appear to be retainable with an acceptable level of risk for 10-20 years.** Trees that may only have 10-20 years of remaining life span. Trees that may live for more than 10-20 years but would be removed in that period during the course of management for safety or nuisance reasons. Defective trees that require substantial remedial work to be made safe and are only suitable for retention in the short-term.
Short to SULE	**Trees with a high level of risk that would need removing within the next 1-10 years.** Dying trees or suppressed and declining trees through disease. Dangerous trees through instability. Dangerous trees through structural defects including cavities, decay wounds or poor form. Damaged trees, which are considered unsafe to retain. Dead trees.
The Structural Root Zone (SRZ)	The SRZ is the area required for tree stability. Tree roots could be injured by machinery such as excavators, bobcats, trench diggers etc. causing root damage, therefore the SRZ area of a tree is required for tree stability and root anchorage. Cutting, severing or damaging of any roots within this zone may cause the tree to become unstable, due to the wind movement of the canopy placing an increased loading on the root plate, and/or due to a dramatic decline in the tree's health and vitality. The SRZ is the area around the base of a tree essential 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 technically 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. This arboricultural report adopts the Australian Standards 4970-2009 "*Protection of Trees on Development Sites*" as the preferred tree protection method. This method provides a SRZ distance (radius from trunk centre) by using the diameter of the trunk just above the root buttress, which represents, "D" in the SRZ calculation – $R_{SRZ} = (D \times 50)^{0.42} \times 0.64$.
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 the canopy area requiring protection. It is an area isolated from construction disturbance, so that the tree remains viable. This arboricultural report adopts the Australian Standards 4970-2009 "*Protection of Trees on Development Sites*" as the preferred tree protection method. This method provides a TPZ distance (radius from trunk centre) by using the diameter of the trunk at 1.4m, which represents, "DBH" in the TPZ calculation – TPZ = DBH X 12. Using the Australian Standards 4970-2009 "*Protection of Trees on Development Sites*", we can calculate the TPZ area for each tree which is the principal means of protection for the tree's canopy, branches, trunk and root system.
Age/Maturity	Provides the tree's age. **Note:** The tree's age does not depend on the tree's health. The tree's age is then placed into one of eight (8) classifications. **Y** Young or juvenile **PM** Post mature **SM** Semi mature **DS** Declined severely **EM** Early mature **A** Ancient **M** Mature **T** Transplanted
Young / Juvenile	A young or juvenile tree is under 2m in height and is easily replaced.
Semi Mature	A semi mature tree would have a single trunk that is greater than 2m in height. Semi mature trees have branched out and may or may not have developed flowers.
Early Mature	An early mature tree is about 2/3 of its expected mature height. The tree has become well developed in the landscape, is normally vigorous and increasing in height. It has increasing landscape significance and may be approaching mature size.

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Mature	A mature tree is fully established; the tree is around the middle half of its usual life-expectancy; generally retaining good vigour, vitality, and has branched out and developed flowers. A mature tree has achieved full height and size for the species.
Post Mature	The tree has passed the mature stage of its life and would be considered; (1) very slow in its growth rate and (2) it cannot be disturbed. The tree has insufficient energy reserves to fight decay and pests particularly through pruning cuts or wounds and has poor vigour and vitality.
Declined Severely	The tree is in its last stage of life and has started to lose its capacity to protect itself. It is vulnerable to pests and diseases. The tree should be inspected for branch hazards and may need reduction pruning or to be entirely removed.
Ancient	The tree is very old, has low vigour, and is liable to decline. It may be an important tree, historically or culturally. The tree should be assessed for hazards and may require reduction pruning or total removal.
Transplanted	The tree has been removed from its original site, transported to another site, for the purpose of creating an established tree. Tree transplanting should always be dated.
Tree Health	Each tree was assessed to determine its health and vitality and then placed into one of six (6) categories. **G** Good **VP** Very poor **F** Fair **MDT** Moribund Dead tree **P** Poor **DT** Dead Tree
Good	The tree shows good or outstanding health and vitality for that tree species. The tree displays an overall full canopy of foliage. The foliage colour, size and density, should be characteristic of a healthy tree. The tree is free of pest and disease problems. The tree has a Normal (N) range of vitality for its species and age. The tree is able to produce sufficient carbohydrate and is able to make structurally adaptive growth.
Fair	The tree shows fair health and vitality and is in a reasonable condition for that tree species. The tree displays a satisfactory or adequate canopy of foliage. The tree may display some chlorotic leaves in the canopy and it may have some minor pest damage or disease problems. The foliage colour, size or density may be different from a healthy specimen of that species and age.
Poor	The tree is not growing to its full capacity. The tree may show minor extension growth in the lateral branch structure. The crown may be light, thin or sparse. There may be large amounts of chlorotic or dead leaves throughout the canopy. The tree may display lots of pest and disease problems or the tree may be in decline, indicating signs of stress. The tree cannot produce enough carbohydrate to make structurally adaptive growth. There may be some root damage; Reduced (R) or Poor (P) vitality may indicate the presence of issues such as root death that affect the health and vitality of the tree.
Very Poor	The tree is in decline and the canopy may be sparse or very thin. A significant volume of dead wood may be present in the canopy and pest and disease problems may be causing a severe decline in tree health. Poor vitality may indicate the presence of issues such as root death that could affect the stability of the tree.
Moribund Tree	The tree is at the point of death. A significant volume of dead wood will be present which will be of a size and weight to represent a risk to the surrounding targets. The tree should be totally removed.
Dead Tree	The tree has no life and is dead. A significant volume of dead wood will be present which will be of a size and weight to represent a risk to the surrounding targets. The tree should be totally removed.

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Tree Structural Condition	The structural condition of the tree refers to the physiological condition that is observed at the time of inspection. Each tree was assessed to determine its structural condition and then placed into one of five (5) categories. **G** Good **VP** Very poor **F** Fair **FD** Failed **P** Poor
Good	The tree has a healthy and balanced canopy with little or no physiological damage. The branch unions seem to be strongly attached, with no defects or mechanical degradation in the trunk or in the branch limbs. Main branch limbs are well delineated and are not exposed to any new mechanical loads. The tree would be viewed as a good specimen for its kind. The tree has a Normal (N) range of vitality for that species and its age. The tree has good stability.
Fair	The tree has some minor complications in the structure of the canopy. The canopy may be somewhat out of balance, and some branches or branch unions may be showing minor structural physiological damage. The tree has a Reduced (R) vitality from the Normal (N) range for its species and age. The tree may be on a slight lean or be showing insignificant structural faults.
Poor	The tree has a poor structure and perhaps an unbalanced canopy or is displaying large openings. Some branches are not well formed. Branch unions may be structurally poor or physiologically damaged at the attachments. The tree has a Reduced (R) or Poor (P) vitality that may indicate the presence of issues such as root death that could affect the health of the tree.
Very Poor	The tree has a very poor structure and unbalanced canopy with very large holes. Major branches are not well formed. Minor or major branches may be structurally very poor or physiologically damaged at the attachments. The tree has a Very Poor (VP) vitality that may indicate the presence of issues such as root death that could affect the stability of the tree. A portion of the tree has broken off and/or has failed and danger of failure is looming. The tree would be considered physiologically unstable.
Failed & dead	A substantial portion of the tree or the whole tree has failed, and the tree is dead.
Construction Impact classifications	Each tree was assessed to determine the construction impact and then placed into one of five categories. **IR** **Impact – Remove** **IMNV** **Impact – Major, not viable** **IMV** **Impact – Major, viable** **IMR** **Impact – Minor** **NI** **None or No Impact**
Impact – Remove	The tree is within the footprint of the proposed design and will require removal to facilitate the design. In order to successfully retain the tree, a design modification would be required.
Impact – Major, not viable	The proposed design has a TPZ area encroachment greater than 10%, or it impacts the SRZ. The proposed works are expected to have a significant impact on the tree such that it is expected to die or fail in the future as a result of the works. In order to successfully retain the tree, a design modification would be required which reduces the impact to an acceptable level.

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Impact – Major, viable	The proposed design has a TPZ area encroachment greater than 10%, or it impacts the SRZ. The tree is expected to remain viable because of one, or a combination of the following: • Alternative construction methods are proposed which reduce the impact on the • tree. • Site conditions have limited root development within the proposed area of works. • The species is known to be particularly tolerant to root disturbance. • A non-destructive root exploration was undertaken and demonstrated that root distribution was limited in the proposed area of works.
Impact – Minor	The proposed design has a TPZ area encroachment of less than 10% and does not impact the SRZ. The tree is expected to remain a viable component with the establishment of a TPZ prior to the commencement of works, which may require compensation for the area lost to encroachment.
None or No Impact	The proposed design does not enter the TPZ area. The tree is expected to remain a viable component with the establishment of a TPZ prior to the commencement of works.
Viability in the Landscape	A tree's viability in the landscape refers to the importance it may have on a particular site. Each tree was assessed to determine its viability in the landscape and then placed into one of three (3) categories. **HS** High Significance **MS** Medium Significance **LS** Low Significance **NOTE:** A tree must have a minimum of three (3) criteria in a category to be classified in that group. From the IACA Significance of Tree Assessment Rating System, from Footprint Green Ltd, (June 2001).
High Significance	• The tree is in good health and good structure. • The tree is in good form. • The tree is a locally indigenous species and/or rare. • The tree is a Heritage tree or is listed on Council's Significant Tree Register. • The tree is visually prominent when viewed from a distance within the landscape. • The tree has a social, cultural or spiritual association within the broader community.
Medium Significance	• The tree is in fair-good health and fair-good structure. • The tree is in fair-good form. • The tree is a locally indigenous species, or a common species planted in the local area. • The tree is visible within its surroundings but is not visually prominent from the street. • The tree provides a fair contribution to the visual amenity of the local area.
Low Significance	• The tree is in poor-fair health and poor-fair structure or lower. • The tree has a form that is not representative of its species. • The tree is not visible or is partly visible within its surroundings. • The tree provides minor contribution or negative impact on the visual amenity of the local area. • The tree is a young specimen that will not reach its full potential. • The tree has a wound or defect that has potential to become structurally unsound. • The tree is a noxious weed. • The tree is hazardous or in irreversible decline, structurally unsound and/or unstable • The tree is dead and/or has the potential to fail or collapse.

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Tree's Retention Values	Each tree was assessed to determine its priority for retention and then placed into one of five (5) classifications, with the following colours. **High – Priority for Retention** **Medium – Consider for Retention** **Low – Consider for Removal** **Removal – Priority for Removal** **Transplant – Priority for Transplant**
High – Priority for Retention	• A tree that is in good health and structure condition, with a **long** or **medium to long ULE**. • A tree that has a horticultural or botanical significance. • A tree that should be **incorporated within the development layout/design**. • A tree that is not located within the subject site i.e., nature strip, adjoining properties.
Medium – Consider for Retention	• A tree that is in fair health and structure condition, with a **medium ULE**. • A tree that has some horticultural or botanical significance. • A tree that is not located within the design layout.
Low – Consider for Removal	• A tree that is in poor health and structure condition, with a **short to medium ULE.** • A tree that has no or little horticultural or botanical significance. • A tree or shrub.
Removal – Priority for Removal	• A tree that is in the wrong spot. • A tree that is a noxious weed. • A tree that is within the development layout/design. • A tree that is dead or dying.
Transplant – Priority for Transplant to another location	• The tree in question could be transplanted to another site. • The tree in question could be sold and transplanted to another location. • The tree in question could be transplanted and sold to a tree nursery.

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Appendix 3: Arboricultural Terms and Definitions

Branch - A secondary shoot or stem arising from the main stem of trunk.

Branch Attachment - The structural linkage of branch to stem.

Branch Bark Ridge - A ridge of bark in a branch crotch that marks where branch and trunk tissue meet and often extends down the trunk.

Branch Collar - Wood that forms around a branch attachment, frequently more pronounced below the branch. The branch collar is used to identify the correct location of all thinning cuts.

Brown Rot - Form of decay where cellulose is digested. The result of brown rot is brittle wood with no tensile strength.

Buttress – Support branch, stem, or root; usually associated with exaggerated growth.

Canopy – The part of the crown composed of leaves and small twigs.

Cavity – An open wound, characterized by the presence of decay and resulting in a hollow structure.

Codominant – A situation where a tree has two or more stems which are of equal diameter and relative amounts of leaf area. Trees with codominant primary scaffolding stems are inherently weaker than stems, which are of unequal diameter and size.

Compartmentalization – The boundary-setting process that resists loss of normal wood function and resists the spread of discoloration and decay; a process that separates injured or decayed tissue from healthy tissue.

Compression Wood – Type of reaction wood that develops on the underside of branches and leaning trunks in coniferous trees; tends to maintain branch angle of growth or straighten the trunk.

Conker – Fruiting or spore producing body of wood decay fungi, forming on the external surface of branches and trunks.

Decay – The process of degradation of woody tissues by fungi and bacteria through decomposition of cellulose and lignin.

Defect – A fault or weakness in a tree support system.

Dominant Leader/Trunk/Stem – The stem that grows much larger than all other stems and branches.

Dripline –The width of the crown, as measured by the lateral extent of the foliage.

Epicormic growth – Shoot that arises from latent or adventitious buds that occur on stems and branches and on suckers produced from the base of trees.

Fungi – Simple plants that lack a photosynthetic pigment. The individual cells have a nucleus surrounded by a membrane, and they may be linked together in long filaments called hyphae.

Girdling Roots – Roots that grow around the trunk in a circular manner, constricting other roots or restricting trunk growth.

Heart Rot – Decay present in the heartwood (center) of a tree.

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Heartwood – Darker-coloured wood toward the center of a stem or root that has become physiologically inactive. It no longer functions for the transport of water and nutrients but may be a site for storage.

Included Bark or Embedded Bark (EB) – Included bark occurs when bark is included into the attachment between two stems, preventing the joining of wood tissue in the area between the stems. Included bark attachments always have an extremely narrow angle between the stems, resembling the letter "V" (rather than the letter "U" or "L" typical in strong attachments). As stems having included bark increase in size, pressure is exerted from the stem expansion and a crack often develops in the crotch between the stems. Included bark attachments have a higher potential for failure in later years.

Lateral branch – A branch or twig growing from a parent branch or stem in a horizontal direction from the parent stem.

Lean – A tree trunk grows or moves away from an upright position. The degree of leaning can be categorized as *Slight Lean*, *Moderate Lean, Severe Lea*n and *Critical Lean.*

Slight Lean A leaning tree where the trunk is growing at an angle within 0° – 15° from upright.

Moderate Lean A leaning tree where the trunk is growing at an angle within 15° – 30° from upright.

Severe Lean A leaning tree where the trunk is growing at an angle within 30° – 45° from upright.

Critical Lean A leaning tree where the trunk is growing at an angle greater > 45° from upright.

Progressive Lean A tree where the degree of *leaning* appears to be increasing over time.

Static Lean A tree where the degree of *leaning* appears to have stabilized over time.

Self-correcting *Atypical* stem growth subsequently influenced and modified by *tropism*, e.g., *gravitropism* and *phototropism*, where *reaction wood* attempts to return it to a more *typical* habit or *form*, e.g., a *trunk* with a *butt sweep* where it is returning to upright.

Limb – Same as branch, but usually larger and more prominent.

Lion Tailing – The improper practice of removing all or most secondary and tertiary branches from the interior portion of the crown, leaving most live foliage at the edge of the canopy.

Photosynthesis – The transformation, in the presence of chlorophyll and light, of carbon dioxide (from air) and water (primarily from soil) into a simple carbohydrate and oxygen.

Reaction Wood – Specialized secondary xylem that develops in response to lean or similar mechanical stress, to restore the stem to the vertical. Occurs as compression wood in conifers and tension wood in angiosperms.

Root – An organ of a tree that serves to maintain mechanical support, to provide water and essential elements from the soil through absorption, and to store energy reserves.

Root Crown – Same as Root Collar.

Sapwood – The outer portion of the wood that has living cells and transports water and nutrients and stores carbohydrates.

Scaffold branch – A large limb that is or will be part of the permanent branch structure of a tree.

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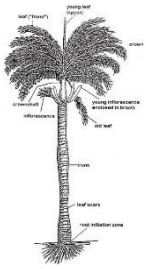
Species – A group of plants that resemble each other closely and that interbreed freely.

Stem – A woody structure bearing foliage and buds that gives rise to other stems.

Stress and Strain – Stress is a potentially injurious, reversible condition, caused by energy drain, disruption, or blockage, or by life processes operating near the limits for which they were genetically programmed. When stress goes to strain, the tree dies; Generally attributed to over-pruning and root loss due to construction activity.

Suckers – Adventitious stems arising from the lower trunk or roots.

Target – People or property potentially affected by a tree failure.



Taper – The change in diameter within the length of the trunk and/or branches, (See diagram on the right). Important to mechanical strength.

Tension Wood – Type of reaction wood in angiosperms that forms on the upper side of branch and stems, acting to pull the member back to a vertical orientation or a genetically programmed angle of growth.

Union (Crotch) – The junction between stem and branch or between stems.

Wound – An opening that is created when the tree's protective bark covering is penetrated, cut, or removed, injuring or destroying tissue. Pruning a live branch creates a wound, even when the cut is properly made.

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Appendix 4: Technical References

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