TREE CONSULTANCY

# Arboricultural Impact Assessment

**Site Location**
88 Helen Street, Sefton NSW

**Prepared**
9th April 2025

**Client**
La Salle Group

**Prepared by: DJD Tree Consultancy**
**Revision: A**

# Contents



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## 1.0 EXECUTIVE SUMMARY

This report was commissioned by La Salle Group to accompany the Development Application for 88 Helen Street, Sefton. The aim of the report is to provide an assessment of nineteen (19) trees on site, Council and neighbouring allotments that may be impacted by the proposed development.

The report collates and presents information collected on Wednesday 13th and Saturday 23rd November 2024, and Friday 10th January 2025. The tree data is outlined in Section 5: Tables 1, 2, 3; also see Appendix E: Tree Locations /Photos.

The site 88 Helen Street, Sefton is located within the Canterbury-Bankstown Council LGA and is zoned as non-residential land use. The current plantings on the site, Council and neighbouring allotments are a mixture of native and exotic species.

The proposed report considers the retention of two (2) trees on site, three (3) on Council allotment and three (3) on neighbouring allotment. Consideration for removal and replacement of eleven (11) trees on site.

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**9th April 2025**

**La Salle Group**
36 Meredith Street
Bankstown NSW

**Reference: DA- 88 Helen Street**

**Arboricultural Impact Assessment (Revision A):**
88 Helen Street
Sefton NSW

## 2.0 INTRODUCTION

This report has been prepared by DJD Tree Consultancy on behalf of La Salle Group. The site and general growing environment of the subject trees was inspected and evaluated by the Author on the 13th and 23rd November 2024, and 10th January 2025.

The site is subject to a Development Application and this report, and any works recommended herein, that require approval from the consenting authority are provided to form part of that development application and its consent conditions. The Tree Location (Appendix E) Tree Protection Plan (Appendix F) and Tree Pruning Specification (Appendix G) are to be included into and used in conjunction with the approval for the site.

The aims and objectives of this report are to detail and comply with the tree protection requirements specified in AS4970 (2009) *Protection of trees on development sites* to identify and assess the condition of the subject tree/s; determine the impact of development on the subject tree/s; provide recommendations for retention or removal of the subject tree/s; provide specifications for protection of tree/s to be retained. The information in this report is intended to provided tree management and protection through all stages of development.

## 3.0 AIMS & OBJECTIVES

### 3.1 ***Aims***

Detail the condition of the tree/s on the site or on adjoining sites where such tree/s may be affected by the proposed works, by assessment of individual specimens or stands, and indicate remedial works or protection measures for their retention in a safe and healthy condition, or a condition not less than that at the time of initial inspection for this report, or in a reduced but sustainable condition due to the impact of the development but ameliorated through tree protection measures able to be applied, and will consider the location and condition of the trees in relation to the proposed building works, or recommend removal and replacement where appropriate.

Provide as an outcome of the assessment, the following: a description of the tree/s, observations made, discussion of the effects the location of the proposed building works may have on the tree and makes recommendations required for remedial or other works to the tree, if and where appropriate.

Determine from the assessment a description of the works or measures required to ameliorate the impact upon the tree to be retained, by the proposed building works or future impacts the tree may have upon the new building works if and where appropriate, or the benefits of removal and replacement if appropriate for the medium to long term safety and amenity of the site.

### 3.2 ***Objectives***

Assess the condition of the subject tree/s.

Determine impact of development on the subject tree/s.

Provide recommendations for retention or removal of the subject tree/s.

### 3.3 ***Documentation***

The following documents were received and have been reviewed as part of this report.

| Documentation | Author | Issue/Date |
|---|---|---|
| Architectural Plans | **GGA** -Glender Group Architects | **Issue**: O<br>**Date** :18/03/2025 |
| Survey | **W. Buxton** Pty Ltd | **Date** :04/03/2024 |
| Stormwater Plan | **SGC** Consultants Pty Ltd | **Issue** : A<br>**Date** : 09/04/2025 |
| Landscape Plan | **Zenith** Landscape Designs | **Issue:** B<br>**Date** :24/03/2025 |
| Chapter 2.3 Tree Management-Development Control Plan | **Canterbury - Bankstown Council** | **Date:** 2023 |

## 4.0 METHODOLOGY

**4.1** The method of assessment of tree/s is applied from the ongoing knowledge and development of the author and considers but is not confined to:

- Tree health and subsequent stability, both long and short term
- Sustainable Retention Index Value (S.R.I.V.) © IACA 2009)
- Amenity values
- Significance

**4.2** This assessment is undertaken using a standard tree assessment criterion for each tree based on the values above and is implemented as a result of at least one comprehensive and detailed site inspection.

**4.3** In this report the dimensions of the tree recorded by the author for the trunk *diameter at breast height* (DBH) measurement is calculated at 1.4m above ground from the base of the tree. Where a tree is trunkless or branches at or near ground such as a mallee formed tree, an average diameter is determined by recording the radial extent of the stem mass at its narrowest and widest dimensions, adding the two dimensions together and dividing them by 2 to record an average.

**4.4** Crown spreads are expressed as length by breadth measurements to accurately record their dimensions. Where appropriate, *crown spread orientation* is described along the length of the crown spread e.g. North/South, or as *radial* if the crown is distributed at an approximately even radius from the trunk e.g. 6x6m.

**4.5**

- *Tolerance of individual species to disturbance,*
- *Geology e.g. physical barriers in soil, floaters, bedrock to surface*
- *Topography e.g. slope, drainage,*
- *Soil e.g. depth, drainage, fertility, structure,*
- *Microclimate e.g. due to landform, exposure to dominant wind,*
- *Engineering e.g. techniques to ameliorate impact on trees such as structural soil, lateral boring,*
- *Construction e.g. techniques to ameliorate impact on trees such as pier and beam, bridge footings, suspended slabs*
- *Arboriculture e.g. exploration trenches to map location of roots,*
- *Physical limitations - existing modifications to the environment and any impact to tree/s by development e.g. property boundaries, road reserves, previous impact by excavation in other directions, soil level changes by cutting or filling, existing landscaping works within close proximity, modified drainage patterns*

## 5.0 TREE ASSESSMENTS

### 5.1 Table 1

| Tree No. | Genus &Species Common Name | Age Y – Yong M-Mature O- Overmature | Condition G- Good F- Fair P- Poor D- Dead | Branch Bark Included | Canopy Orientation Sy- Symmetrical Asy- Asymmetrical | Trunk Diameter (DBH- 1.4 m above ground level in mm) | Height X Spread N- S / W-E (in metres) | Tree Vigour L- Low G- Good D- Dormant | SRIV Sustainable Retention Index Value SULE Safe Useful Life Expediency |
|---|---|---|---|---|---|---|---|---|---|
| 1 | **Callistomen viminalis** Weeping Bottle Brush | M | F | No | Asy | 300 (140/160/215) | 7.5 x 6 (N-S) 5(W-E) | G | MGVF9 2b |
| | Single mature tree located on site; fair condition. | | | | | | | | |
| 2 | **Callistomen citrinus** Red Bottle Brush | M | F | No | Asy | N/A | 4.5x 4(N-S) 3(W-E) | G | MGVF9 5a |
| | Single mature shrub/ small tree located on site; fair condition. | | | | | | | | |
| 3 | **Callistomen viminalis** Weeping Bottle Brush | M | F | No | Asy | 450 (330/310) | 8 x 8(N-S) 7(W-E) | G | MGVF9 2b |
| | Single mature tree located on site; fair condition. | | | | | | | | |
| 4 | **Callistomen citrinus** Red Bottle Brush | M | P | No | Asy | N/A | 5 x 4(N-S) 5(W-E) | G | MGVP6 5a |
| | Single mature shrub/ small tree located on site; poor condition. | | | | | | | | |
| 5 | **Melaleuca quinquenervia** Broad – leaved paperbark | M | F | No | Asy | 370 | 9 x 6(N-S) 5(W-E) | G | MGVF9 2b |
| | Single mature tree located on site; fair condition. | | | | | | | | |
| 6 | **Eucalyptus microcorys** Tallowwood | M | F | No | Asy | 490 | 17 x 9(N-S) 12(W-E) | G | MGVF9 2b |
| | Single mature tree located on site; fair condition | | | | | | | | |
| 7 | **Eucalyptus microcorys** Tallowwood | M | F | No | Asy | 860 | 18x15(N-S) 12(W-E) | G | MGVF9 2b |
| | Single mature tree located on site; fair condition | | | | | | | | |
| 8 | **Melaleuca quinquenervia** Broad – leaved paperbark | M | F | No | Asy | 250 | 8.5x 5(N-S) 6(W-E) | G | MGVF9 2b |
| | Single mature tree located on site; fair condition | | | | | | | | |
| 9 | **Melaleuca quinquenervia** Broad – leaved paperbark | M | F | No | Asy | 230 | 8.5x 4(N-S) 3(W-E) | G | MGVF9 2b |
| | Single mature tree located on site; fair condition | | | | | | | | |
| 10 | **Eucalyptus microcorys** Tallowwood | M | F | No | Asy | 655 | 20 x 8(N-S) 12(W-E) | G | MGVF9 2b |
| | Single mature tree located on site; fair condition | | | | | | | | |

| Tree No. | **Genus &Species** Common Name | **Age** Y – Yong M-Mature O- Overmature | **Condition** G- Good F- Fair P- Poor D- Dead | **Branch Bark Included** | **Canopy Orientation** Sy- Symmetrical Asy- Asymmetrical | **Trunk Diameter** (DBH- 1.4 m above ground level in mm) | **Height X Spread** N- S / W-E (in metres) | **Tree Vigour** L- Low G- Good D- Dormant | **SRIV** Sustainable Retention Index Value **SULE** Safe Useful Life Expediency |
|---|---|---|---|---|---|---|---|---|---|
| **11** | **Eucalyptus microcorys** Tallowwood | M | F | No | Asy | **450** | 18 x 7 (N-S) 9 (W-E) | G | MGVF9 2b |
| | | Single mature tree located on site; fair condition. | | | | | | | |
| **12** | **Callistomen viminalis** Weeping Bottle Brush | M | F | No | Asy | **470** (270/380) | 7.5x 10(N-S) 8(W-E) | G | MGVF9 2b |
| | | Single mature street tree located on Council allotment; fair condition. | | | | | | | |
| **13** | **Callistomen viminalis** Weeping Bottle Brush | M | F | No | Asy | **340** (240/190/150) | 7.5 x 9(N-S) 8(W-E) | G | MGVF9 2b |
| | | Single mature street tree located on Council allotment; fair condition. | | | | | | | |
| **14** | **Callistomen viminalis** Weeping Bottle Brush | M | P | No | Asy | **260** (100/160/140/ 120) | 7.5 x 7(N-S) 6(W-E) | G | MGVF9 2b |
| | | Single mature street tree located on Council allotment; fair condition. | | | | | | | |
| **15** | **Eucalyptus microcorys** Tallowwood | M | F | No | Asy | **810** | 22 x 12(N-S) 10(W-E) | G | MGVF9 2b |
| | | Single mature tree located on neighbouring allotment; fair condition. | | | | | | | |
| **16** | **Eucalyptus microcorys** Tallowwood | M | F | No | Asy | **630** | 22 x 14(N-S) 9(W-E) | G | MGVF9 2b |
| | | Single mature tree located on neighbouring allotment; fair condition. | | | | | | | |
| **17** | **Eucalyptus microcorys** Tallowwood | M | F | No | Asy | **710** | 20 x14(N-S) 9(W-E) | G | MGVF9 2b |
| | | Single mature tree located on neighbouring allotment; fair condition. | | | | | | | |
| **18** | **Ligustrum lucidum** Privet- broad - leaf | M | F | No | Asy | **N/A** | 9 x 6(N-S) 5(W-E) | G | MGVF9 4e |
| | | Single self-seeded tree located on site; fair condition. | | | | | | | |
| **19** | **Cinnamomum camphora** Camphor laurel | M | F | No | Asy | **N/A** | 9 x 6(N-S) 5(W-E) | G | MGVF9 4e |
| | | Single self -seeded tree located on site; fair condition. | | | | | | | |

### 5.2 Tree Protection Zone (TPZ) & Structural Root Zone (SRZ)

- The Australian Standards provides a formula for calculating both TPZ and SRZ.
- Australian Standard 4970- Protection of trees on development sites-2009 stipulates a minor encroachment of the TPZ as being less than 10%, whilst more than 10% is considered a major encroachment. Such encroachment may be deemed acceptable as long the tree remains viable. This is based on many other variables including the tree species health, condition, structure, and age etc.

See Appendix E for TPZ- (Tree Protection Zone) & SRZ (Structural Root Zone)

TPZ- Tree Protection Zone and SRZ Structural Root Zone - calculated in accordance with *AS4970/2009- Protection of trees on development sites.*

**Table 2**

| Tree No | Common Name | TPZ- Tree Protection Zone : metres | SRZ- Structural Root Zone : metres |
|---|---|---|---|
| **1** | Weeping Bottlebrush | 3.6 | 2.2 |
| **3** | Weeping Bottlebrush | 5.4 | 2.7 |
| **5** | Broad- leaved -paperbark | 4.4 | 2.6 |
| **6** | Tallowwood | 5.9 | 2.8 |
| **7** | Tallowwood | 10.3 | 3.6 |
| **8** | Broad- leaved -paperbark | 3.0 | 2.2 |
| **9** | Broad- leaved -paperbark | 2.8 | 2.1 |
| **10** | Tallowwood | 7.0 | 3.3 |
| **11** | Tallowwood | 5.4 | 2.6 |
| **12** | Weeping Bottlebrush | 5.6 | 2.6 |
| **13** | Weeping Bottlebrush | 4.1 | 2.3 |
| **14** | Weeping Bottlebrush | 3.1 | 2.1 |
| **15** | Tallowwood | 9.7 | 3.4 |
| **16** | Tallowwood | 7.6 | 3.0 |
| **17** | Tallowwood | 8.5 | 3.2 |

### 5.3 ***Tree Significance*** See Appendix C for Assessment Criteria (IACA, 2009).

Significant Trees as established by the Rating System for Tree Significance – (IACA, 2009), Appendix C.

**Table 3**:

Significance Scale

**1 – High**
**2 – Medium**
**3 – Low**

| Significance Scale | 1 | 2 | 3 |
|---|---|---|---|
| Tree No. | 15,16,17 | 1,3,5,6,7,8,9,10,11,12<br>13,14 | 2,4,18,19 |

## 5.4 DISCUSSION

Urban tree management is a delicate balance between preserving the natural beauty and ecological benefits of trees while ensuring the safety and functionality of human environments. This document delves into the intricate process of assessing and managing trees within an urban development context. This discussion assesses the subject trees and vegetation on site and then considers their long-term retention or removal.

**Tree 1:**

- existing ***Weeping Bottlebrush*** located on site at 88 Helen Street.
- mature specimen in fair condition; medium significance in current landscape.
- planted in conjunction with previous landscape works.
- will be impacted by the proposed development.
- to be removed and exchanged for a suitable planting in compliance with final landscape works.

**Tree 2:**

- existing ***Red Bottlebrush*** located on site at 88 Helen Street.
- mature shrub in fair condition; low significance in current landscape.
- planted in conjunction with previous landscape works.
- will be impacted by the proposed development.
- to be removed and exchanged for a suitable planting in compliance with final landscape works.

**Tree 3:**

- existing ***Weeping Bottlebrush*** located on site at 88 Helen Street.
- mature specimen in fair condition; medium significance in current landscape.
- planted in conjunction with previous landscape works.
- will be impacted by the proposed development.
- to be removed and exchanged for a suitable planting in compliance with final landscape works.

**Tree 4:**

- existing ***Red Bottlebrush*** located on site at 88 Helen Street.
- mature shrub in fair condition; low significance in current landscape.
- planted in conjunction with previous landscape works.
- will be impacted by the proposed development.
- to be removed and exchanged for a suitable planting in compliance with final landscape works.

**Tree 5:**

- existing ***Broad- leaved paperbark*** located on site at 88 Helen Street.
- mature specimen in fair condition; medium significance in current landscape.
- planted in conjunction with previous landscape works.
- suppression by adjacent Tree 6 with resultant asymmetrical crown formation on southern aspect.
- existing and proposed development has encroachment into **TPZ-** Tree Protection Zone and **SRZ-** Structural Root Zone.
- will be impacted by the proposed development (**See Appendix E:** Fig 3).
- to be substituted for one (1) canopy tree with a mature height expectancy of 6-8 metres to assist in replenishment of the urban tree canopy.

**Tree 6:**

- existing ***Tallowwood*** located on site at 88 Helen Street.
- mature specimen in good condition; medium significance in current landscape.
- continual crown modifications due to line clearance from overhead services on western aspect with formation of asymmetrical crown on eastern aspect.

**Building design impacts: Extension**

- **TPZ-** Tree Protection Zone of 5.9 metres and **SRZ-** Structural Root Zone of 2.8 metres.
- **TPZ**- Tree Protection Zone area of 108.2 m2.
- existing and proposed development has an estimated encroachment of 11.5 m2 (10.6%) into **TPZ-** Tree Protection Zone on eastern aspect therefore only 0.6% greater than a minor encroachment in accordance with *AS 4970-2009: Protection of trees on development sites*; (**See Appendix E:** Fig 2).
- development on pier construction above existing ground level to allow air transfer to root system and avoid soil compaction within the **TPZ** (**See Appendix E:** Fig 23).
- flexible pier design for proposed development within and adjacent to **TPZ** will allow final pier placement 200mm from any encountered structural root > 40mm diameter.
- will not be impacted by the proposed development and with adequate tree protection and management can be retained.

**Above ground impacts**

- selective pruning required on eastern crown (**See Appendix G:** Fig 1).

**Tree Protection requirements**

- any installation of underground services adjacent to or within **TPZ-** Tree Protection Zone requires directional drilling or manual excavation of trenches.
- removal of external concrete structures within **TPZ** by demolition saw to a maximum depth of 10mm below slab and at small intervals to ensure manual removal under supervision by **AQF5 Project Arborist;** commence in zone closest to tree then radiate outwards to utilize existing structure as Ground Protection.
- piers within **TPZ**- Tree Protection Zone will require manual excavation and final location of pier holes 200mm from any root >40mm encountered; all new pier holes encased for prevention of concrete residue that may impact feeder roots.
- to be retained and Tree Protection implemented in accordance with *AS4970 -2009 Protection of trees on development sites* and Tree Protection Plan **(Appendix F).**

**Tree 7:**

- existing ***Tallowwood*** located on site at 88 Helen Street.
- mature specimen in fair condition; medium significance in current landscape.
- planted in conjunction with previous landscape works.
- existing and proposed development has encroachment into **TPZ-** Tree Protection Zone and **SRZ-** Structural Root Zone.
- will be impacted by the proposed development (**See Appendix E:** Fig 3).
- to be substituted for one (1) canopy tree with a mature height expectancy of 6-8 metres to assist in replenishment of the urban tree canopy.

**Tree 8:**

- existing ***Broad- leaved paperbark*** located on site at 88 Helen Street.
- mature specimen in fair condition; medium significance in current landscape.
- planted in conjunction with previous landscape works.
- suppression by adjacent Tree 7 and Tree 10.
- existing and proposed development has encroachment into **TPZ-** Tree Protection Zone and **SRZ-** Structural Root Zone.
- will be impacted by the proposed development (**See Appendix E:** Fig 3).
- to be substituted for one (1) canopy tree with a mature height expectancy of 6-8 metres to assist in replenishment of the urban tree canopy.

**Tree 9:**

- existing ***Broad- leaved paperbark*** located on site at 88 Helen Street.
- mature specimen in fair condition; medium significance in current landscape.
- planted in conjunction with previous landscape works.
- suppressed by adjacent Tree 7 and Tree 10.
- existing and proposed development has encroachment into **TPZ-** Tree Protection Zone and **SRZ-** Structural Root Zone.
- will be impacted by the proposed development (**See Appendix E:** Fig 3).
- to be substituted for one (1) canopy tree with a mature height expectancy of 6-8 metres to assist in replenishment of the urban tree canopy.

**Tree 10:**

- existing ***Tallowwood*** located on site at 88 Helen Street.
- mature specimen in good condition; medium significance in current landscape.
- continual crown modifications due to line clearance from overhead services on western aspect; formation of asymmetrical crown on eastern aspect.
- estimated encroachment into **TPZ** -Tree Protection Zone of existing building footprint ( 38.3 m2) is 23.5%; high probability of root deflection (**See Appendix E:** Fig 2).

**Building design impacts:**

- **TPZ-** Tree Protection Zone of 7.0 metres and **SRZ-** Structural Root Zone of 3.0 metres.
- **TPZ**- Tree Protection Zone area of 154.5 m2.
- proposed development has an estimated encroachment of 23.5 m2 (19.2%) into **TPZ-** Tree Protection Zone on eastern aspect; 4.3% lower than encroachment of existing building (**See Appendix E:** Fig 2).
- both existing and proposed developments result in a major encroachment in accordance with *AS 4970-2009: Protection of trees on development sites* (**See Appendix E:** Fig 2).
- development on pier construction above existing ground level to allow air transfer to root system and avoid soil compaction within the **TPZ**(**See Appendix E:** Fig 23).
- flexible pier design for proposed development within and adjacent to **TPZ** will allow final pier placement 200mm from any encountered structural root > 40mm diameter.
- no alteration to existing growing environment and with adequate tree protection and management can be retained.

**Above ground impacts**

- selective pruning required on eastern crown (**See Appendix G:** Fig 2).

**Tree Protection requirements**

- any installation of underground services adjacent to or within **TPZ-** Tree Protection Zone requires directional drilling or manual excavation of trenches.
- removal of external concrete structures within **TPZ** by demolition saw to a maximum depth of 10mm below slab and at small intervals to ensure manual removal under supervision by **AQF5 Project Arborist;** commence in zone closest to tree then radiate outwards to utilize existing structure as Ground Protection.
- piers within **TPZ**- Tree Protection Zone will require manual excavation and final location of pier holes 200mm from any root >40mm encountered; all new pier holes encased for prevention of concrete residue that may impact feeder roots.
- to be retained and Tree Protection implemented in accordance with *AS4970 -2009 Protection of trees on development sites* and Tree Protection Plan **(Appendix F).**

**Tree 11:**

- existing ***Tallowwood*** located on site at 88 Helen Street.
- mature specimen in fair condition; medium significance in current landscape.
- planted in conjunction with previous landscape works.
- existing and proposed development has encroachment into **TPZ-** Tree Protection Zone and **SRZ-** Structural Root Zone.
- will be impacted by the proposed development(**See Appendix E:** Fig 3).
- to be substituted for one (1) canopy tree with a mature height expectancy of 6-8 metres to assist in replenishment of the urban tree canopy.

**Tree 12:**

- existing ***Weeping Bottlebrush*** located on Council allotment at front of 88 Helen Street.
- a mature specimen in fair condition with good vigour; medium significance in current landscape.
- within a colonnade of street tree plantings in Helen Street below overhead services.
- continual crown modifications due to line clearance from overhead services.
- proposed new driveway crossover on northern aspect has a 7.8% encroachment into **TPZ**- Tree Protection Zone and is outside **SRZ**- Structural Root Zone (**See Appendix E:** Fig 4**)**; resultant minor encroachment in accordance with *AS4970-2009: protection of trees on development sites*
- will not be impacted by the proposed development and with adequate tree protection and management can be retained.

**Tree Protection requirements**

- any installation of underground services adjacent to or within **TPZ-** Tree Protection Zone requires directional drilling or manual excavation of trenches.
- to be retained and Tree Protection implemented in accordance with *AS4970 -2009 Protection of trees on development sites* and Tree Protection Plan **(Appendix F).**

**Tree 13:**

- existing ***Weeping Bottlebrush*** located on Council allotment at front of 88 Helen Street.
- a mature specimen in fair condition with good vigour; medium significance in current landscape.
- within a colonnade of street tree plantings in Helen Street below overhead services.
- will not be impacted by the proposed development and with adequate tree protection and management can be retained (**See Appendix E:** Fig 4**)**.

**Tree Protection requirements**

- any installation of underground services adjacent to or within **TPZ-** Tree Protection Zone requires directional drilling or manual excavation of trenches.
- to be retained and Tree Protection implemented in accordance with *AS4970 -2009 Protection of trees on development sites* and Tree Protection Plan **(Appendix F).**

**Tree 14:**

- existing ***Weeping Bottlebrush*** located on Council allotment at front of 88 Helen Street.
- a mature specimen in fair condition with good vigour; medium significance in current landscape.
- within a colonnade of street tree plantings in Helen Street below overhead services.
- will not be impacted by the proposed development and with adequate tree protection and management can be retained (**See Appendix E:** Fig 4**)**.

**Tree Protection requirements**

- any installation of underground services adjacent to or within **TPZ-** Tree Protection Zone requires directional drilling or manual excavation of trenches.
- to be retained and Tree Protection implemented in accordance with *AS4970 -2009 Protection of trees on development sites* and Tree Protection Plan **(Appendix F).**

**Tree 15:**

- existing ***Tallowwood*** located on neighbouring allotment.
- mature specimen in good condition; high significance in current landscape.
- estimated encroachment into **TPZ** -Tree Protection Zone of existing building footprint ( 53 m2) is 17.9%; high probability of root deflection (**See Appendix E:** Fig 5).

**Building design impacts:**

- **TPZ-** Tree Protection Zone of 9.7 metres and **SRZ-** Structural Root Zone of 3.4 metres.
- **TPZ**- Tree Protection Zone area of 295.4 m2.
- proposed and existing development with equivalent building footprint, therefore encroachment into **TPZ-** Tree Protection Zone of 53 m2 (17.9%) on southern aspect; resultant major encroachment in accordance with *AS 4970-2009: Protection of trees on development sites*; (**See Appendix E:** Fig 5).
- proposed development of pier construction above existing ground level to allow air transfer to root system and avoid soil compaction within the **TPZ** (**See Appendix E:** Fig 23).
- flexible pier design for proposed development within **TPZ** and **SRZ** will allow final pier placement 200mm from any encountered structural root > 40mm diameter.
- will not be impacted by the proposed development and with adequate tree protection and management can be retained.

**Tree Protection requirements**

- removal of external concrete structures within **TPZ** by demolition saw to a maximum depth of 10mm below slab and at small intervals to ensure manual removal under supervision by **AQF5 Project Arborist;** commence in zone closest to tree then radiate outwards to utilize existing structure as Ground Protection.
- the volume loss from proposed removal within **TPZ-** Tree Protection Zone and **SRZ-** Structural Root Zone to have substitution by an approved growing medium to compensate for the loss of weight upon the root plate and assist in ongoing stability; increase in deep soil will also improve air transfer and regrowth of root system; sections of existing concrete platform located within **SRZ-** Structural Root Zone may have to be retained to maintain existing ballast on southern aspect.
- piers within **TPZ**- Tree Protection Zone will require manual excavation and final location of pier holes 200mm from any root >40mm encountered; all new pier holes encased for prevention of concrete residue that may impact feeder roots.
- to be retained and Tree Protection implemented in accordance with *AS4970 -2009 Protection of trees on development sites* and Tree Protection Plan **(Appendix F).**

**Tree 16:**

- existing ***Tallowwood*** located on neighbouring allotment.
- mature specimen in good condition; high significance in current landscape.
- estimated encroachment into **TPZ** -Tree Protection Zone of existing building footprint ( 45.7 m2) is 25%; high probability of root deflection (**See Appendix E:** Fig 6).

**Building design impacts: Extension**

- **TPZ-** Tree Protection Zone of 7.6 metres and **SRZ-** Structural Root Zone of 3.0 metres.
- **TPZ**- Tree Protection Zone area of 180.7 m2.
- proposed and existing development with equivalent building footprint, therefore encroachment into **TPZ-** Tree Protection Zone of 45.7 m2 (25%) on southern aspect; resultant major encroachment in accordance with *AS 4970-2009: Protection of trees on development sites*; (**See Appendix E:** Fig 6).
- proposed development will be of pier construction above existing ground level to allow air transfer to root system and avoid soil compaction within the **TPZ** (**See Appendix E:** Fig 23).
- flexible pier design for proposed development within **TPZ** and **SRZ** will allow final pier placement 200mm from any encountered structural root > 40mm diameter.
- will not be impacted by the proposed development and with adequate tree protection and management can be retained.

**Above ground impacts**

- selective pruning required on southern crown (**See Appendix G:** Fig 3).

**Tree Protection requirements**

- removal of external concrete structures within **TPZ** by demolition saw to a maximum depth of 10mm below slab and at small intervals to ensure manual removal under supervision by **AQF5 Project Arborist;** commence in zone closest to tree then radiate outwards to utilize existing structure as Ground Protection.
- the volume loss from proposed removal within **TPZ-** Tree Protection Zone and **SRZ-** Structural Root Zone to have substitution by an approved growing medium to compensate for the loss of weight upon the root plate and assist in ongoing stability; increase in deep soil will also improve air transfer and regrowth of root system; sections of existing concrete platform located within **SRZ-** Structural Root Zone may have to be retained to maintain existing ballast on southern aspect.
- piers within **TPZ**- Tree Protection Zone will require manual excavation and final location of pier holes 200mm from any root >40mm encountered; all new pier holes encased for prevention of concrete residue that may impact feeder roots.
- to be retained and Tree Protection implemented in accordance with *AS4970 -2009 Protection of trees on development sites* and Tree Protection Plan **(Appendix F).**

**Tree 17:**

- existing ***Tallowwood*** located on neighbouring allotment.
- mature specimen in good condition; high significance in current landscape.
- estimated encroachment into **TPZ** -Tree Protection Zone of existing building footprint ( 50.1 m2) is 22.2%; high probability of root deflection (**See Appendix E:** Fig 7).

**Building design impacts: Extension**

- **TPZ-** Tree Protection Zone of 8.5 metres and **SRZ-** Structural Root Zone of 3.2 metres.
- **TPZ**- Tree Protection Zone area of 225.1 m2.
- proposed and existing development with equivalent building footprint, therefore encroachment into **TPZ-** Tree Protection Zone of 50.1 m2 (22.2%) on southern aspect; resultant major encroachment in accordance with *AS 4970-2009: Protection of trees on development sites*; (**See Appendix E:** Fig 7).
- proposed development will be of pier construction above existing ground level to allow air transfer to root system and avoid soil compaction within the **TPZ** (**See Appendix E:** Fig 23).
- flexible pier design for proposed development within **TPZ** and **SRZ** will allow final pier placement 200mm from any encountered structural root > 50mm diameter.
- will not be impacted by the proposed development and with adequate tree protection and management can be retained.

**Above ground impacts**

- selective pruning required on southern crown (**See Appendix G:** Fig 4).

**Tree Protection requirements**

- removal of external concrete structures within **TPZ** by demolition saw to a maximum depth of 10mm below slab and at small intervals to ensure manual removal under supervision by **AQF5 Project Arborist;** commence in zone closest to tree then radiate outwards to utilize existing structure as Ground Protection.
- the volume loss from proposed removal within **TPZ-** Tree Protection Zone and **SRZ-** Structural Root Zone to have substitution by an approved growing medium to compensate for the loss of weight upon the root plate and assist in ongoing stability; increase in deep soil will also improve air transfer and regrowth of root system; sections of existing concrete platform located within **SRZ-** Structural Root Zone may have to be retained to maintain existing ballast on southern aspect.
- piers within **TPZ**- Tree Protection Zone will require manual excavation and final location of pier holes 200mm from any root >40mm encountered; all new pier holes encased for prevention of concrete residue that may impact feeder roots.
- to be retained and Tree Protection implemented in accordance with *AS4970 -2009 Protection of trees on development sites* and Tree Protection Plan **(Appendix F).**

**Tree 18:**

- existing ***Privet- Broad leaf*** located on site at 88 Helen Street.
- self-seeded specimen; low significance in current landscape.
- Exempt Species – Canterbury- Bankstown Council (DCP-2023): 2.3 Tree Management.
- will not be impacted by proposed development.
- to be removed and exchanged for a suitable planting in compliance with the approved development consent.

**Tree 19:**

- existing ***Camphour laurel*** located on site at 88 Helen Street.
- self-seeded specimen; low significance in current landscape.
- Exempt Species – Canterbury- Bankstown Council (DCP-2023): 2.3 Tree Management.
- will not be impacted by proposed development.
- to be removed and exchanged for a suitable planting in compliance with the approved development consent.

## 5.5 *Tree Protection requirements for Trees 6,10,12,13,14,15,16,17*

## 5.6. Tree Protection Zone Fencing

***Extract from AS4970-2009 Section 4.3 PROTECTIVE FENCING***

*Fencing should be erected before any machinery or materials are brought onto the site and before the commencement of works including demolition. Once erected, protective fencing must not be removed or altered without approval by the project arborist. The TPZ should be secured to restrict access.AS 4687 specifies applicable fencing requirements. Shade cloth or similar should be attached to reduce the transport of dust, other particulate matter and liquids into the protected area. Fence posts and supports should have a diameter greater than 20 mm and be located clear of roots. Existing perimeter fencing and other structures may be suitable as part of the protective fencing.*

**Response: Trees 6,10,12,13,14,15,16,17**
**TPZ**- TPZ Fencing to be installed - See also Appendix F "Tree Protection Plan".

**Response: Trees 6,10,12,13,14,15,16,17**
**TPZ** signage to be attached to boundary fence TPZ fencing- See also Appendix F "Tree Protection Plan".

## 5.7 Ground Protection within TPZs-

***Extract from AS4970-2009- 4.5.3 Ground protection.***

*If temporary access for machinery is required within the TPZ ground protection measures will be required. The purpose of ground protection is to prevent root damage and soil compaction within the TPZ. Measures may include a permeable membrane such as geotextile fabric beneath a layer of mulch or crushed rock below rumble boards.*

**Response: Trees 6,10,12,13,14,15,16,17** – IF TPZ fencing is removed for site movement, than Ground protection as per AS 4970 is to be installed. Appendix F "Tree Protection Plan".

## 5.8 Trunk Protection and Branch Protection-

***Extract from AS4970-2009- 4.5.2 Trunk and branch protection.***

*Where necessary, install protection to the trunk and branches of trees. The materials and positioning of protection are to be specified by the project arborist . A minimum height of 2 metres is recommended.*

*Do not attach temporary powerlines, stays , guys and the like to the tree. Do not drive nails into the trunks or branches.*

**Response: Trees 6,10,15,16,17:** Trunk and Branch protection as per AS4970 is to be installed. See also Appendix F "Tree Protection Plan".

## 5.9 Root Protection -

***Extract from AS4970-2009- 4.5.4 Root protection during works within the TPZ***

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

**Response: Trees 6,10,12,13,14,15,16,17:** All excavation within and near to prescribed TPZs should be undertaken utilising hand tools to depths of 700mm. Below these depths mechanical means could be utilised. Any roots encountered are to be clean cut with final cuts to undamaged woody tissue. All trees to be removed internal to the site should be undertaken utilising ground area outside of the TPZs of trees to be retained.

## 5.10 Inspection Schedule – Trees 6,10,12,13,14,15,16,17:

An inspection schedule should be adopted as follows:

- Establishment and certification of Tree Protection Zone (TPZ) measures implemented prior to commencement of any site works.
- Site inspections during any works within and adjacent to the TPZs.
- Bimonthly inspections of retained trees.
- A final inspection at the completion of work

## 6.0 RECOMMENDATIONS.

**6.1** Remove Trees 1,2,3,4,5,7,8,9 and 11 to facilitate the proposed development.

**6.2** Remove and replace Trees 18 and 19 irrespective of the proposed development.

**6.3** Replacement trees, shrubs and ground covers be provided as part of the final landscape design.

**6.4** Inspection schedule should be introduced for the retention of Trees 6,10,12,13,14,15,16 and 17.

- An AQF5 Qualified Arborist must be engaged and on-site during any construction works within the TPZ (see **Appendix F** – Tree Protection Plan).

- Final inspection of Trees 6,10,12,13,14,15,16 and 17 at completion of all works.

**6.5** Trees 6,10,12,13,14,15,16 and 17 to be retained as outlined in sections 5.5 to 5.10 of this report and within **Appendix F** – Tree Protection Plan.

**6.6** Selective pruning of Trees 6,10,15,16 and 17 in accordance with *AS4373: 2007 Pruning of amenity trees* required to reduce conflict with proposed above ground component of the development at 88 Helen Street **(See Appendix G: Fig 1-3).**

**6.7** All pruning works to be approved by Governing Authority**- Canterbury-Bankstown Council.**

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TRAQ (Tree Risk Assessment Qualification)

**DISCLAIMER**

**The tree has been assessed based on the information and facts of the site and as presented by the client at the time of inspection. No responsibility can be taken for incorrect information provided by the client. The nominated tree is assessed for biological requirements and hazard potential with reasonable care.**

**The tree is assessed from the ground by Visual Tree Assessment (VTA) unless otherwise stated.**

**Trees are inherently dangerous, therefore will always have a hazard potential. Trees fail in ways that are not predictable or fully understood. There is no guarantee expressed or implied that failure or deficiencies may not arise of the subject tree in the future. No responsibility is accepted for damage to property or injury/death caused by the nominated tree.**

# Appendix A

## Matrix - Sustainable Retention Index Value (S.R.I.V.)©

Developed by IACA – Institute of Australian Consulting Arboriculturists

www.iaca.org.au

Version 4, 2010

To be used with the values defined in the Glossary.
An Index value as indicated where ten (10) is the highest value.

| Age Class | Vigour Class and Condition Class | | | | | |
|---|---|---|---|---|---|---|
| | Good Vigour & Good Condition (GVG) | Good Vigour & Fair Condition (GVF) | Good Vigour & Poor Condition (GVP) | Low Vigour & Good Condition (LVG) | Low Vigour & Fair Condition (LVF) | Low Vigour & Poor Condition (LVP) |
| | Able to be retained if sufficient space available above and below ground for future growth. No remedial work or improvement to growing environment required. May be subject to high vigour. Retention potential - Medium – Long Term. | Able to be retained if sufficient space available above and below ground for future growth. Remedial work may be required or improvement to growing environment may assist. Retention potential - Medium Term. Potential for longer with remediation or favourable environmental conditions. | Able to be retained if sufficient space available above and below ground for future growth. Remedial work unlikely to assist condition, improvement to growing environment may assist. Retention potential - Short Term. Potential for longer with remediation or favourable environmental conditions. | May be able to be retained if sufficient space available above and below ground for future growth. No remedial work required, but improvement to growing environment may assist vigour. Retention potential - Short Term. Potential for longer with remediation or favourable environmental conditions. | May be able to be retained if sufficient space available above and below ground for future growth. Remedial work or improvement to growing environment may assist condition and vigour. Retention potential - Short Term. Potential for longer with remediation or favourable environmental conditions. | Unlikely to be able to be retained if sufficient space available above and below ground for future growth. Remedial work or improvement to growing environment unlikely to assist condition or vigour. Retention potential - Likely to be removed immediately or retained for Short Term. Potential for longer with remediation or favourable environmental conditions. |
| (Y) Young | **YGVG - 9** **Index Value 9** Retention potential - Long Term. Likely to provide minimal contribution to local amenity if height <5 m. High potential for future growth and adaptability. Retain, move or replace. | **YGVF - 8** **Index Value 8** Retention potential - Short – Medium Term. Potential for longer with improved growing conditions. Likely to provide minimal contribution to local amenity if height <5 m. Medium-high potential for future growth and adaptability. Retain, move or replace. | **YGVP - 5** **Index Value 5** Retention potential - Short Term. Potential for longer with improved growing conditions. Likely to provide minimal contribution to local amenity if height <5 m. Low-medium potential for future growth and adaptability. Retain, move or replace. | **YLVG - 4** **Index Value 4** Retention potential - Short Term. Potential for longer with improved growing conditions. Likely to provide minimal contribution to local amenity if height <5 m. Medium potential for future growth and adaptability. Retain, move or replace. | **YLVF - 3** **Index Value 3** Retention potential - Short Term. Potential for longer with improved growing conditions. Likely to provide minimal contribution to local amenity if height <5m. Low-medium potential for future growth and adaptability. Retain, move or replace. | **YLVP - 1** **Index Value 1** Retention potential - Likely to be removed immediately or retained for Short Term. Likely to provide minimal contribution to local amenity if height <5 m. Low potential for future growth and adaptability. |
| (M) Mature | **MGVG - 10** **Index Value 10** Retention potential - Medium - Long Term. | **MGVF - 9** **Index Value 9** Retention potential - Medium Term. Potential for longer with improved growing conditions. | **MGVP - 6** **Index Value 6** Retention potential - Short Term. Potential for longer with improved growing conditions. | **MLVG - 5** **Index Value 5** Retention potential - Short Term. Potential for longer with improved growing conditions. | **MLVF - 4** **Index Value 4** Retention potential - Short Term. Potential for longer with improved growing conditions. | **MLVP - 2** **Index Value 2** Retention potential - Likely to be removed immediately or retained for Short Term. |
| (O) Over-mature | **OGVG - 6** **Index Value 6** Retention potential - Medium - Long Term. | **OGVF - 5** **Index Value 5** Retention potential - Medium Term. | **OGVP - 4** **Index Value 4** Retention potential - Short Term. | **OLVG - 3** **Index Value 3** Retention potential - Short Term. Potential for longer with improved growing conditions. | **OLVF - 2** **Index Value 2** Retention potential - Short Term. | **OLVP - 0** **Index Value 0** Retention potential - Likely to be removed immediately or retained for Short Term. |

# Appendix B

## Definitions & Terminology

From

*Dictionary for Managing Trees in Urban Environments*

Institute of Australian Consulting Arboriculturists (IACA) 2009.

## *Condition of trees*

**Condition** A tree's *crown form* and growth habit, as modified by its *environment* (aspect, suppression by other trees, soils), the *stability* and *viability* of the *root plate*, trunk and structural branches (first (1st) and possibly second (2nd) order branches), including structural defects such as wounds, cavities or hollows, *crooked* trunk or weak trunk/branch junctions and the effects of predation by pests and diseases. These may not be directly connected with *vigour* and it is possible for a tree to be of *normal vigour* but in *poor condition*. Condition can be categorized as *Good Condition*, *Fair Condition*, *Poor Condition* and *Dead*.

**Good Condition** Tree is of good habit, with *crown form* not severely restricted for space and light, physically free from the adverse effects of *predation* by pests and diseases, obvious instability or structural weaknesses, fungal, bacterial or insect infestation and is expected to continue to live in much the same condition as at the time of inspection provided conditions around it for its basic survival do not alter greatly. This may be independent from, or contributed to by vigour.

**Fair Condition** Tree is of good habit or *misshapen*, a form not severely restricted for space and light, has some physical indication of *decline* due to the early effects of *predation* by pests and diseases, fungal, bacterial, or insect infestation, or has suffered physical injury to itself that may be contributing to instability or structural weaknesses, or is faltering due to the modification of the *environment* essential for its basic survival. Such a tree may recover with remedial works where appropriate, or without intervention may stabilise or improve over time, or in response to the implementation of beneficial changes to its local environment. This may be independent from, or contributed to by vigour.

**Poor Condition** Tree is of good habit or *misshapen*, a form that may be severely restricted for space and light, exhibits symptoms of advanced and *irreversible decline* such as fungal, or bacterial infestation, major die-back in the branch and *foliage crown*, *structural deterioration* from insect damage e.g. termite infestation, or storm damage or lightning strike, ring barking from borer activity in the trunk, root damage or instability of the tree, or damage from physical wounding impacts or abrasion, or from altered local environmental conditions and has been unable to adapt to such changes and may decline further to death regardless of remedial works or other modifications to the local *environment* that would normally be sufficient to provide for its basic survival if in *good* to *fair* condition. Deterioration physically, often characterised by a gradual and continuous reduction in vigour but may be independent of a change in vigour, but characterised by a proportionate increase in susceptibility to, and *predation* by pests and diseases against which the tree cannot be sustained. Such conditions may also be evident in trees of advanced senescence due to normal phenological processes, without modifications to the growing environment or physical damage having been inflicted upon the tree. This may be independent from, or contributed to by vigour.

**Dead** Tree is no longer capable of performing any of the following processes or is exhibiting any of the following symptoms;

*Processes*

Photosynthesis via its foliage crown (as indicated by the presence of moist, green or other coloured leaves);

Osmosis (the ability of the root system to take up water);

Turgidity (the ability of the plant to sustain moisture pressure in its cells);

Epicormic shoots or *epicormic strands* in Eucalypts (the production of new shoots as a response to stress, generated from latent or adventitious buds or from a *lignotuber*);

*Symptoms*

Permanent leaf loss;

Permanent wilting (the loss of turgidity which is marked by desiccation of stems leaves and roots);

Abscission of the *epidermis* (bark desiccates and peels off to the beginning of the sapwood).

**Removed** No longer present, or tree not able to be located or having been cut down and retained on a site, or having been taken away from a site prior to site inspection.

## *Description of Tree Dimensions*

**Height** The distance measured vertically between the horizontal plane at the lowest point at the base of a tree, which is immediately above ground, and the horizontal plane immediately above the uppermost point of a tree.

**Spread** The furthest expanse of the crown when measured horizontally from one side of the tree to the other, generally through the centre of the trunk. Where the crown is not circular a measurement should be an average of the narrowest and widest diameters and this is dependent upon crown form and to a lesser extent its symmetry.

**Crown Cover** Percent of the homogenous distribution of foliage across the entire crown based upon that expected for a specimen of that species in good condition and of normal vigour, depending on form in situ, e.g. this may be influenced by crown die-back, proximity to other trees or structures, moisture stress, or overshadowing.

## *Vigour*

**Vigour** Ability of a tree to sustain its life processes. This is independent of the *condition* of a tree but may impact upon it. Vigour can appear to alter rapidly with change of seasons (seasonality) e.g. *dormant*, deciduous or semi-deciduous trees. Vigour can be categorized as *Normal Vigour, High Vigour*, *Low Vigour* and *Dormant Tree Vigour*.

**Normal Vigour** Ability of a tree to maintain and sustain its life processes. This may be evident by the typical growth of leaves, crown cover and crown density, branches, roots and trunk and resistance to predation. This is independent of the condition of a tree but may impact upon it, and especially the ability of a tree to sustain itself against predation.

**High Vigour** *Accelerated growth* of a tree due to incidental or deliberate artificial changes to its growing *environment* that are seemingly beneficial, but may result in *premature aging* or failure if the favourable conditions cease, or promote *prolonged senescence* if the favourable conditions remain, e.g. water from a leaking pipe; water and nutrients from a leaking or disrupted sewer pipe; nutrients from animal waste, a tree growing next to a chicken coop, or a stock feed lot, or a regularly used stockyard; a tree subject to a stringent watering and fertilising program; or some trees may achieve an extended lifespan from continuous *pollarding* practices over the life of the tree.
**Low Vigour** Reduced ability of a tree to sustain its life processes. This may be evident by the atypical growth of leaves, reduced crown cover and reduced crown density, branches, roots and trunk, and a deterioration of their functions with reduced resistance to predation. This is independent of the condition of a tree but may impact upon it, and especially the ability of a tree to sustain itself against predation.

**Dormant Tree Vigour** Determined by existing turgidity in lowest order branches in the outer extremity of the crown, with good bud set and formation, and where the last extension growth is distinct from those most recently preceding it, evident by bud scale scars. Normal vigour during dormancy is achieved when such growth is evident on a majority of branches throughout the crown.
**Poor Vigour** See low vigour
**Good Vigour** See Normal Vigour

## Age of Trees

**Age of Trees** Most trees have a stable biomass for the major proportion of their life. The estimation of the age of a tree is based on the knowledge of the expected lifespan of the taxa in situ divided into three distinct stages of measurable biomass, when the exact age of the tree from its date of cultivation or planting is unknown. These increments are Young, Mature and Overmature.
**Young** Tree aged less than 20% of life expectancy.
**Mature** Tree aged 20-80% of life expectancy.
**Over-mature** Tree aged greater than 80% of life expectancy tending to senescent with or without reduced vigour, and declining gradually or rapidly but irreversibly to death.
**Sapling** A young tree, early in its development with small dimensions.
**Senescent** Advanced old age, over-mature.

## General Terms

**Significant** Important, weighty or more than ordinary.
**Significant Tree** A tree considered important, weighty or more than ordinary. Example: due to prominence of location, or in situ, or contribution as a component of the overall landscape for *amenity* or aesthetic qualities, or *curtilage* to structures, or importance due to uniqueness of taxa for species, subspecies, variety, form, or as an historical or cultural planting, or for age, or substantial dimensions, or habit, or as remnant vegetation, or habitat potential, or a rare or threatened species, or uncommon in cultivation, or of aboriginal cultural importance, or is a commemorative planting.
**Substantial** A tree with large dimensions or proportions in relation to its place in the landscape.
**Excurrent** Tree where the crown is comprised of one (1) dominant first order structural branch which is usually an extension of the trunk, erect, straight and continuous, tapering gradually, with the main *axis* clear from base to apex, e.g. *Araucaria heterophylla* - Norfolk Island Pine. Note: some tree species of *typical* excurrent habit may be altered to deliquescent by physical damage of the *apical meristem*, or from top lopping, or from the propagation of inferior quality stock. However, *formative pruning* may be able to correct a *crown* to excurrent if undertaken when a tree is *young*.
**Sustainable Retention Index Value (SRIV)** A visual method of rating the viability of urban trees for development sites and management, based on general tree and landscape assessment criteria. SRIV© is for the professional manager of urban trees to consider the tree in situ with an assumed knowledge of the taxa and its growing environment and is based on the physical attributes of the tree and its response to its environment considering its age class, vigour class, condition class and its sustainable retention with regard to the safety of people or damage to property and the ability to retain the tree with remedial work or beneficial modifications to its growing environment or removal and replacement. (IACA 2005)
**Crown Spread Orientation** Direction of the *axis* of *crown spread* which can be categorized as *Orientation Radial* and *Orientation Non-radial*.
**Diameter at Breast Height (DBH)** Measurement of trunk width calculated at a given distance above ground from the base of the tree often measured at 1.4 m. The trunk of a tree is usually not a circle when viewed in cross section, due to the presence of *reaction wood* or *adaptive wood*, therefore an average diameter is determined with a *diameter tape* or by recording the trunk along its narrowest and widest axes, adding the two dimensions together and dividing them by 2 to record an average and allowing the orientation of the longest axis of the trunk to also be recorded. Where a tree is growing on a lean the distance along the top of the trunk is measured to 1.4m and the diameter then recorded from that point perpendicular to the edge of the trunk. Where a *leaning* trunk is *crooked* a vertical distance of 1.4m is measured from the ground. Where a tree branches from a trunk that is less than 1.4m above ground, the trunk diameter is recorded perpendicular to the length of the *trunk* from the point immediately below the base of the flange of the *branch collar* extending the furthest down the trunk, and the distance of this point above ground recorded as *trunk* length. Where a tree is located on sloping ground the DBH should be measured at half way along the side of the tree to average out the angle of slope. Where a tree is *acaulescent* or *trunkless* branching at or near ground an average diameter is determined by recording the radial extent of the trunk at or near ground and noting where the measurement was recorded e.g. at ground.
**Structural Root Zone (SRZ)** The minimal area around the base of a tree, generally circular, required for its *stability* in the ground. The section of *root plate* within this area and subsequent soil cohesion necessary to hold the tree upright against *wind throw*, therefore the entire depth of the *root zone* must be included.

# Appendix C

## IACA Significance of a Tree, Assessment Rating System (STARS) © (IACA 2010)©

In the development of this document IACA acknowledges the contribution and original concept of the Footprint Green Tree Significance & Retention Value Matrix, developed by Footprint Green Pty Ltd in June 2001.

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

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

## Tree Significance - Assessment Criteria

### 1. High Significance in landscape

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

### 2. Medium Significance in landscape

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

### 3. Low Significance in landscape

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

**Environmental Pest / Noxious Weed Species**

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

**Hazardous/Irreversible Decline**

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

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

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

# Appendix D
## S.U.L.E
## (Safe Useful life Expectancy)

**Safe Useful Life Expectancy – S.U.L.E (Barell 1995)**

| | 1. Long | 2. Medium | 3. Short | 4. Removal | 5. Moved or Replaced |
|---|---|---|---|---|---|
| | Trees that appeared to be retainable at the time of assessment for more than 40 years with an acceptable level of risk. | Trees that appeared to be retainable at the time of assessment for 15 – 40 years with an acceptable level of risk. | Trees that appeared to be retainable at the time of assessment for 5 – 15 years with an acceptable level of risk. | Trees that should be removed within the next 5 years. | Trees which can be reliably moved or replaced. |
| A | Structurally sound trees located in positions that can accommodate future growth. | Trees that may only live between 15 and 40 years. | Trees that may only live between 5 and 15 more years. | Dead, dying, suppressed or declining trees through disease or inhospitable conditions. | Small trees less than 5m in height. |
| B | Trees that could be made suitable for retention in the long term by remedial tree care. | Trees that may live for more than 40 years but would be removed for safety or nuisance reasons. | Trees that may live for more than 15 years but would be removed for safety or nuisance reasons. | Dangerous trees through instability on recent loss of adjacent trees. | Young trees less than 15 years old but over 5m in heights |
| C | Trees of special significance for historical, commemorative or rarity reasons that would warrant extraordinary efforts to secure their long term retention. | Trees that may live for more than 40 years but would be removed to prevent interference with more suitable individuals or to provide space for new planting. | Trees that may live for more than 15 years but should be removed to prevent interference with more suitable individuals or to provide space for new planting. | Damaged trees through structural defects including cavities, decay, included bark, wounds or poor form. | Trees that have been pruned to artificially control growth. |
| D | | Trees that could be made suitable for retention in the medium term by remedial tree care. | Trees that require substantial remedial tree care and are only suitable for retention in the short term. | Damaged trees that are clearly not safe to retain. | |
| E | | | | Trees that may live for more than 5 years but should be removed to prevent interference with more suitable individuals or to provide space for new plantings. | |
| F | | | | Trees that are damaging or may cause damage to existing structures within 5 years. | |
| G | | | | Trees that will become dangerous after removal of other trees for reasons given in (A) to (F). | |

# Appendix E

Tree Locations / TPZ- SRZ/Photos

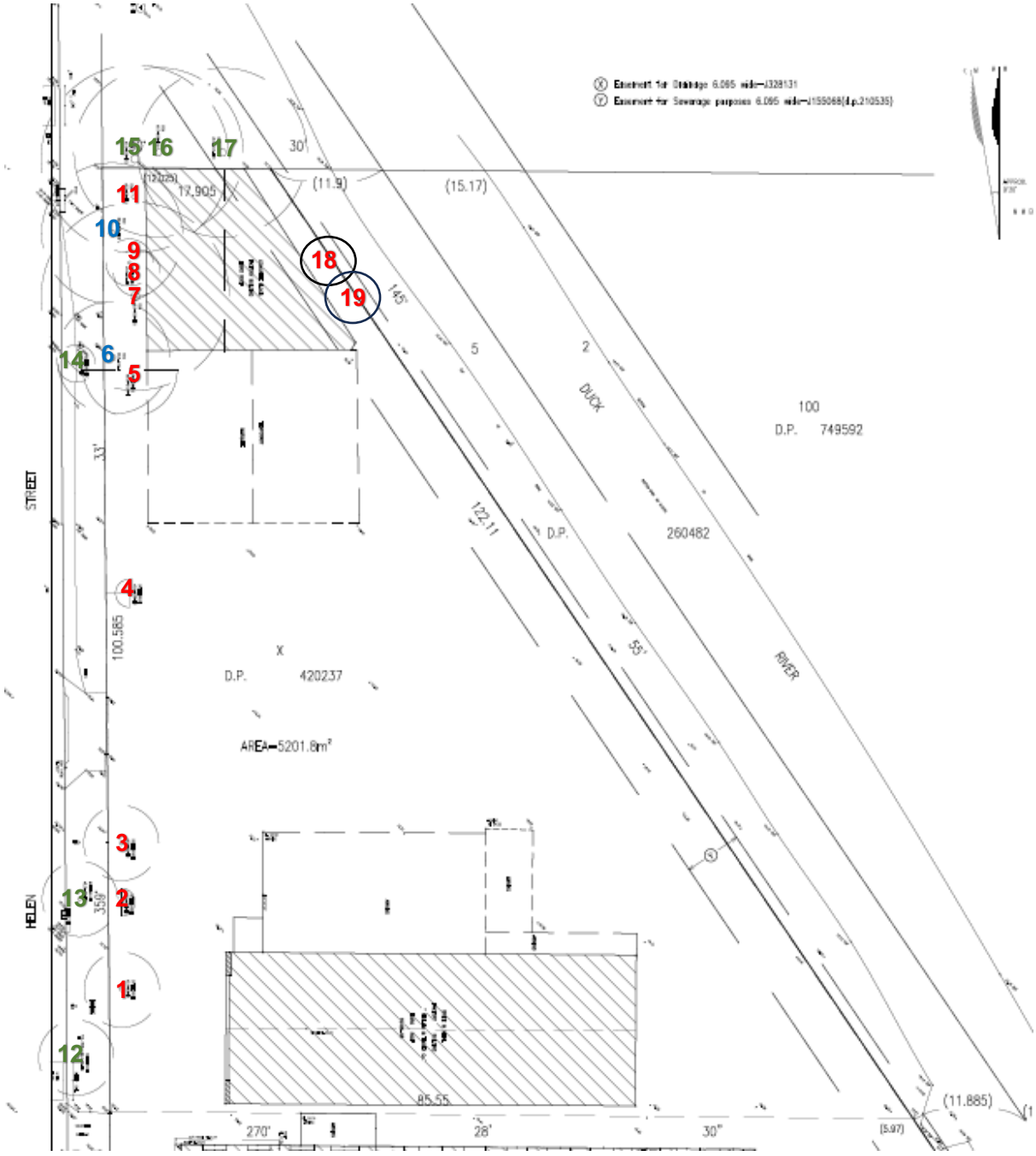
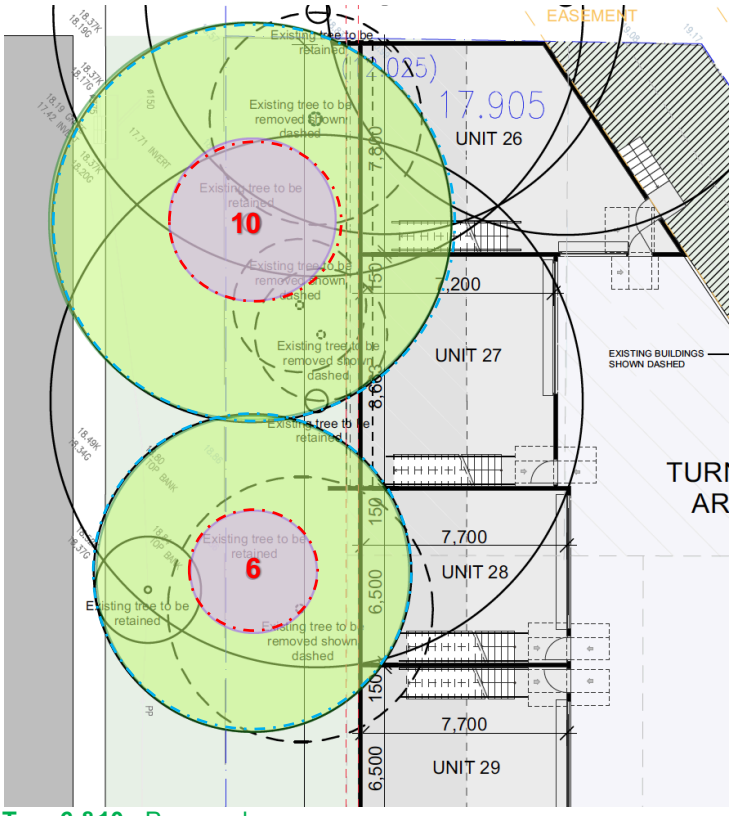
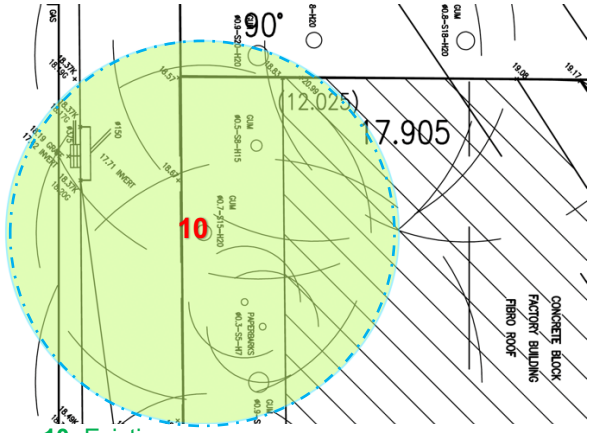



**Fig 1:** Tree locations (1-19)




**Tree 6 &10 :** Proposed




**Tree 10:** Existing

**Fig 2: Existing &Proposed Development**

**Tree 2 Calculated TPZ** (Tree Protection Zone) & SRZ ( Structural Root Zone).

**Tree 6:** **TPZ** (Tree Protection Zone) = 5.9 metres

**SRZ** (Structural Root Zone)= 2.8 metres

**Tree 10:** **TPZ** (Tree Protection Zone) = 7.0 metres

**SRZ** (Structural Root Zone)= 3.3 metres

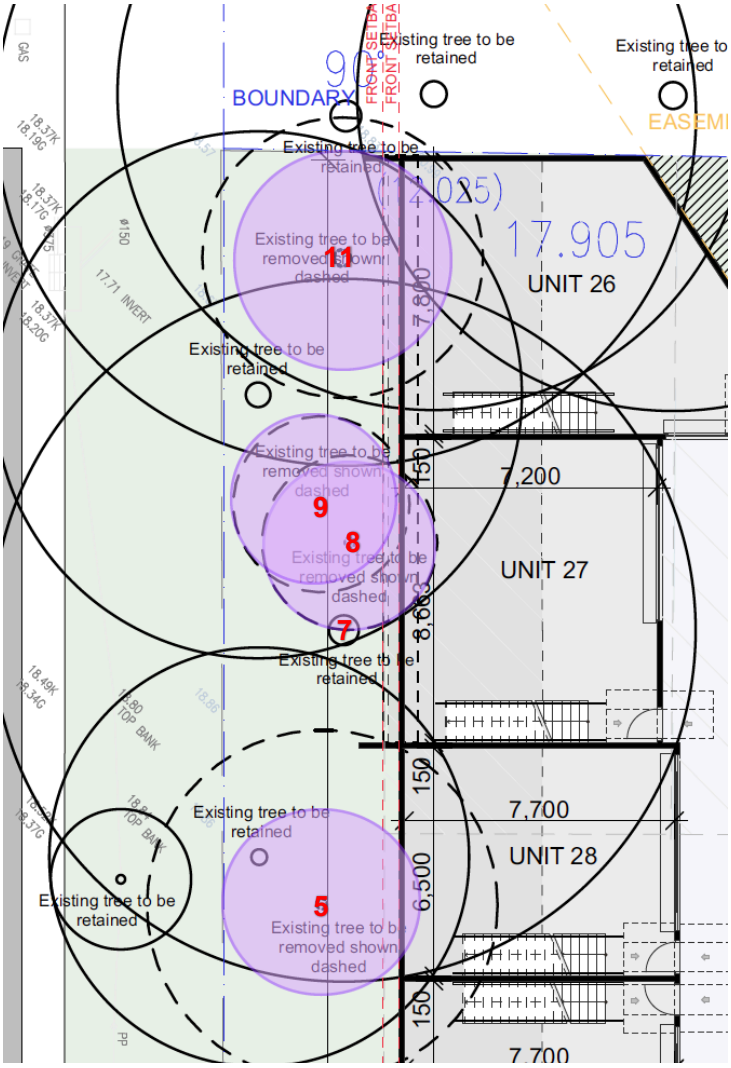



**Fig 3: Proposed development**

**Trees 5,7,8,9,11 Calculated** SRZ ( Structural Root Zone).

**SRZ** (Structural Root Zone)

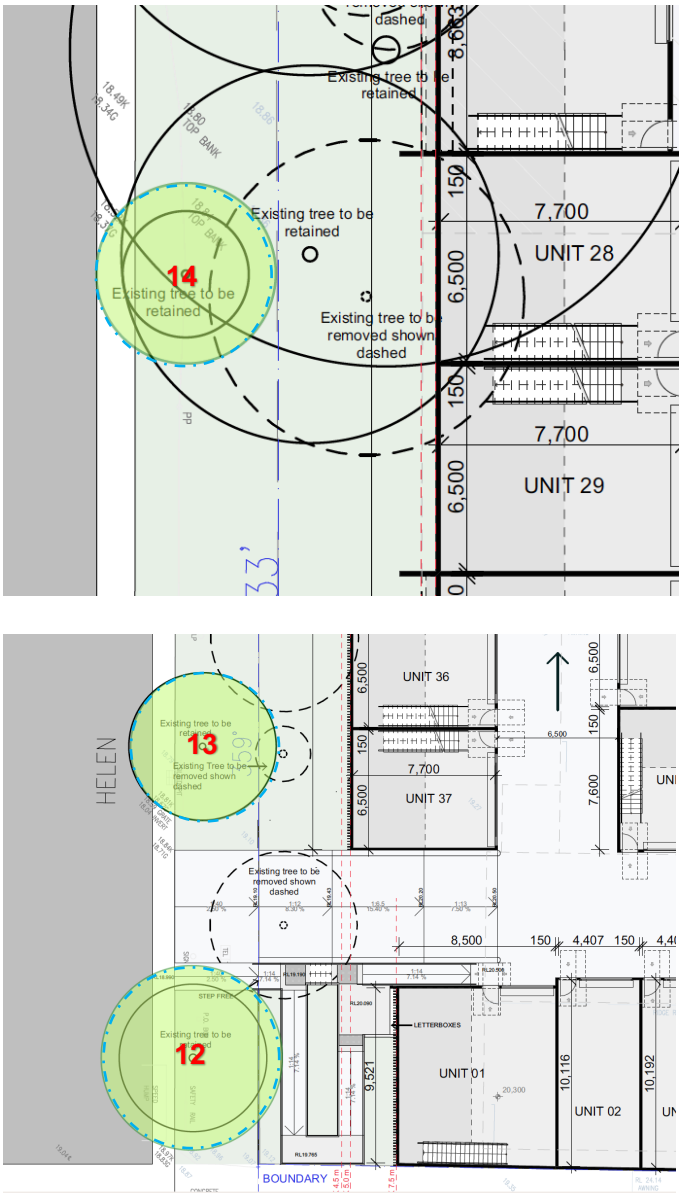
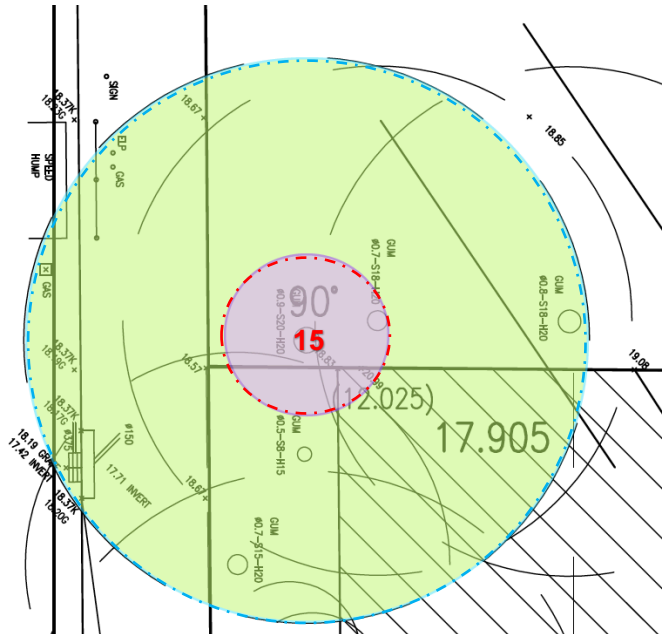


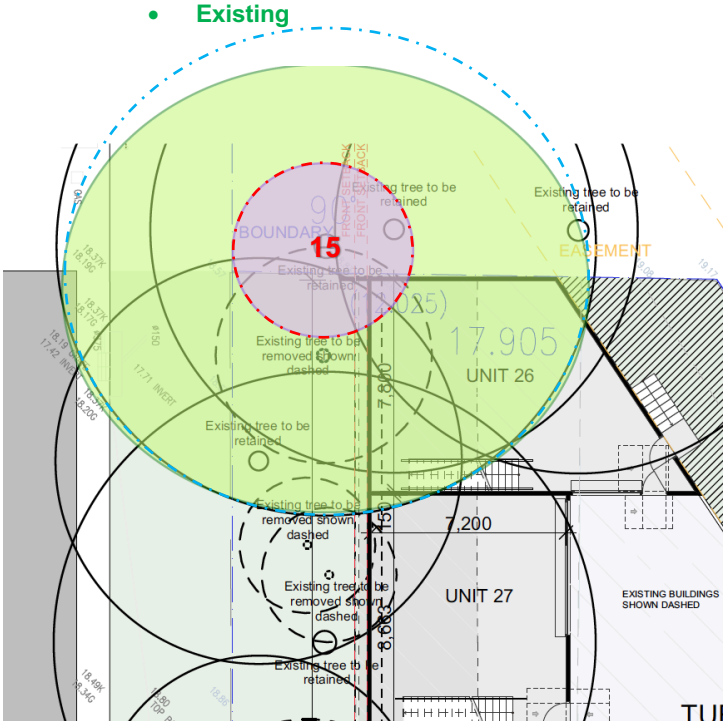

**Fig 4: Proposed development**

**Trees 12,13,14 Calculated TPZ** (Tree Protection Zone)

**TPZ** (Tree Protection Zone)




- **Existing**



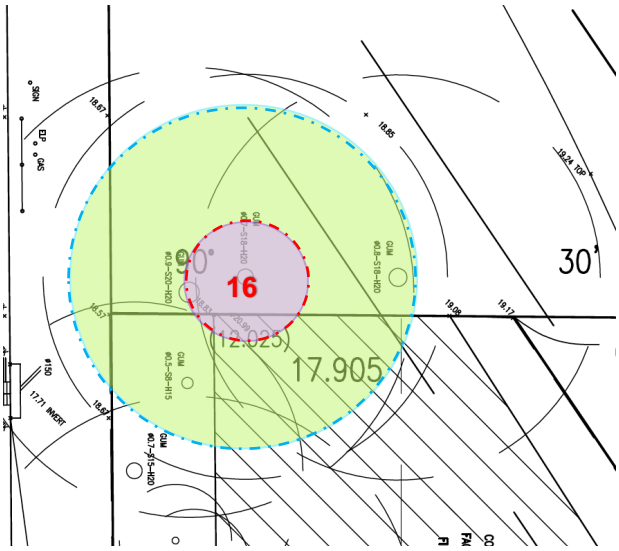

- **Proposed**

**Fig 5: Calculated TPZ** (Tree Protection Zone) & SRZ ( Structural Root Zone).

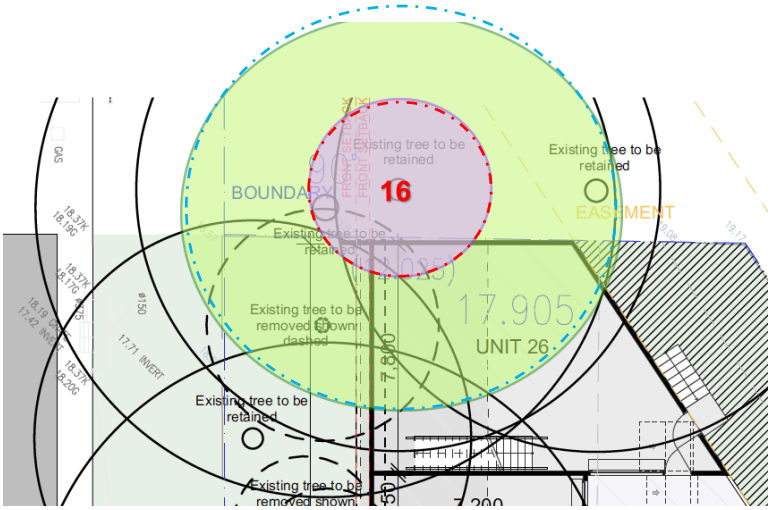
**Tree 15:** **TPZ** (Tree Protection Zone) = 9.7 metres

**SRZ** (Structural Root Zone)= 3.4 metres

**TPZ area**= 295.4m2




- **Existing**



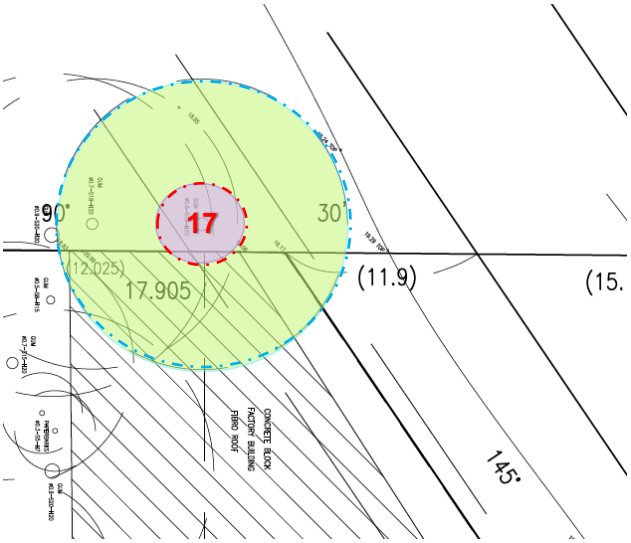

- **Proposed**

**Fig 6: Calculated TPZ** (Tree Protection Zone) & SRZ ( Structural Root Zone).

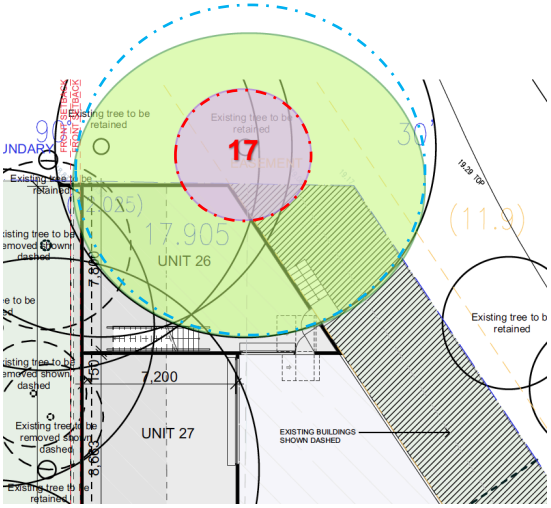
**Tree 16:** **TPZ** (Tree Protection Zone) = 7.6 metres

**SRZ** (Structural Root Zone)= 3.0 metres

**TPZ area** = 180.7 m2




- **Existing**




- **Proposed**

**Fig 7: Calculated TPZ** (Tree Protection Zone) & SRZ ( Structural Root Zone).

**Tree 17:** **TPZ** (Tree Protection Zone) = 8.5 metres

**SRZ** (Structural Root Zone)= 3.2 metres

**TPZ area** = 225.1 m2

**Fig 8:** Tree 1

**Fig 9:** Tree 2

**Fig 10:** Tree 3

**Fig 11:** Tree 3

**Fig 12:** Tree 4

**Fig 13:** Tree 5 and Tree 6

**Fig 14:** Tree 10 and Tree 7

**Fig 15:** Tree 10, Tree 9, Tree 8

**Fig 16:** Tree 10, Tree 6

**Fig 17:** Tree 17, Tree 16,Tree 15 ,Tree 11

**Fig 18:** Tree 12

**Fig 19** :Tree 13

**Fig 20:** Tree 14

**Fig 21** :Trees 18 and 19

**Fig 22** :Tree 15 and Tree 10 and Tree 6 and Tree 14

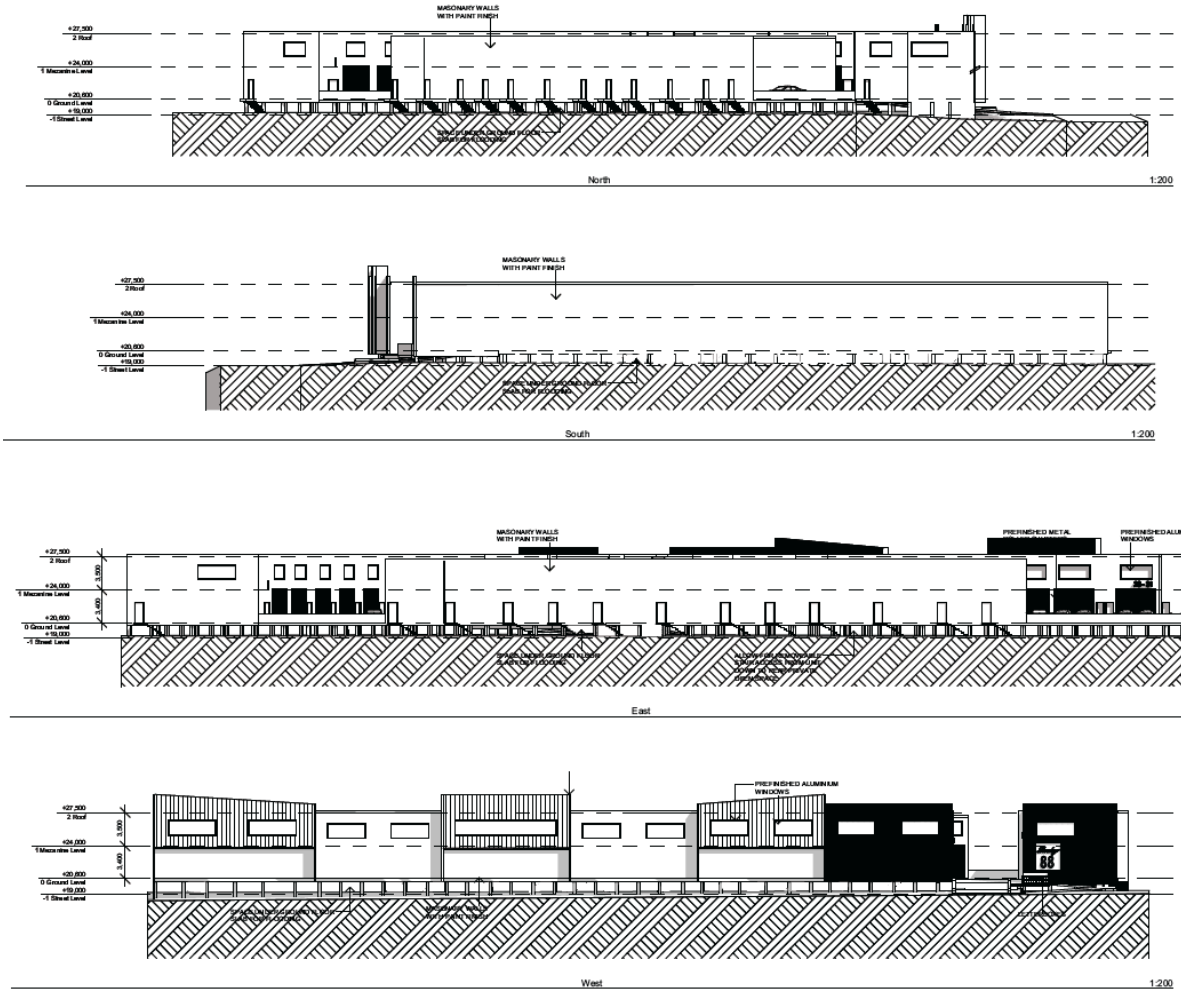
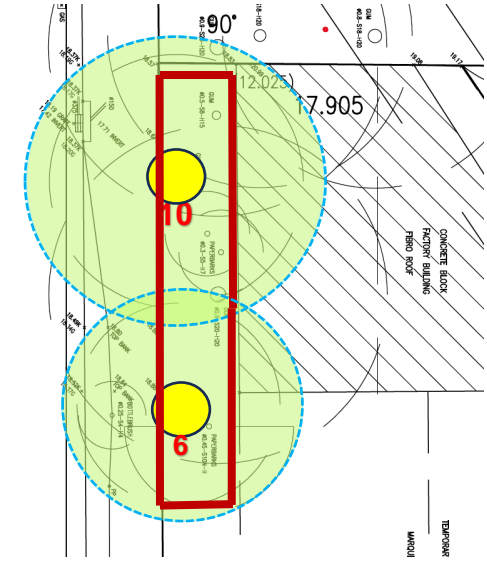



**Fig 23** : Elevations

# Appendix F
## Tree Protection Plan

**Page 1 of 5**- Tree Protection Plan




**TPZ** (Tree Protection Zone) **Trunk Protection** **Tree Protection Fencing**

**Tree Protection for Trees 6 and 10**

| Tree No | Tree Protection |
|---|---|
| 6,10 | Trunk Protection to be installed as per AS 4970 **See drawing 2** page 4 of 5. |
| 6,10 | Tree protection fencing and signage to be installed as per AS 4970 **See drawing 3/4** page 5 of 5. |
| 6,10 | If **TPZ** fencing is to be removed for site movement, then Ground Protection to be installed as per AS 4970 See drawing 2 page 4 of 5. |
| 6,10 | All excavation works within the **TPZ** are to be supervised by the project arborist. All works should be undertaken utilizing hand tools. Any roots encountered are to be clean cut with all final cuts to undamaged woody tissue. |
| 6,10 | Any roots exposed within the **TPZ** during excavations, temporary root protection should be installed to prevent them from drying out. The installation of jute mesh or hessian is to be installed over the soil profile and is to be kept moist during the period the root zone is exposed. |
| 6,10 | Removal of external and internal concrete structures within **TPZ** shall be completed by cutting with a demolition saw to no greater than 10mm below depth of the slab. The cuts are to be made at small intervals to produce sections that can be removed and lifted by hand. This is to prevent machinery digging and damaging roots in this area. All works to be supervised by **AQF5 Project Arborist.** If site movement required than Ground protection as per AS 4970 **See drawing 2** page 4 of 5. |
| 6,10 | Installation of any underground services within **TPZ:** If underground services must be routed within **TPZ**, they should be installed by directional drilling or in manually excavated trenches. All works to be supervised by **AQF5 Project Arborist** |
| 6,10 | All landscape preparation works within the **TPZ** are to be supervised by the project arborist. All works should be undertaken utilizing hand tools. Any roots encountered are to be clean cut with all final cuts to undamaged woody tissue. |
| 6,10 | Activities excluded within the **TPZ** (Tree Protection Zone): storage (Plant & Machinery); stockpiling of waste and fill; cleaning of equipment; site shed and/or toilet; machine cultivation of ground for landscaping purposes. |

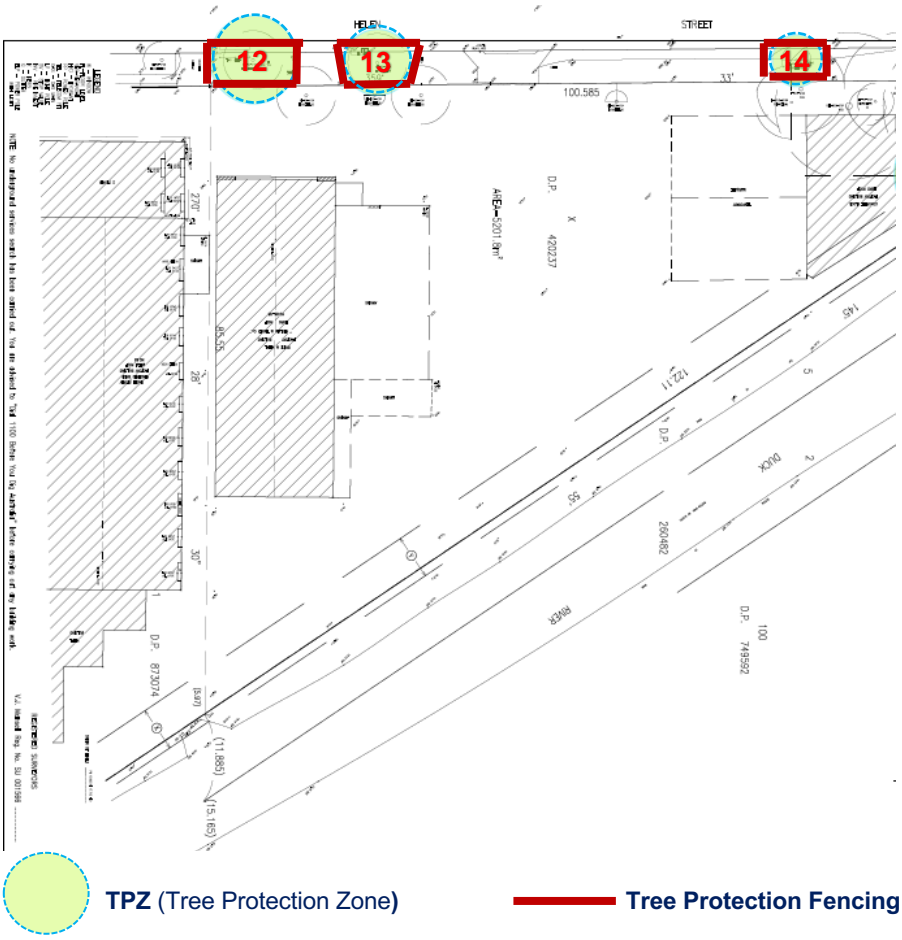
**Inspection Schedule for Trees 6 and 10– to be retained.**

An inspection schedule is to be adopted as follows.

1. Engagement of an AQF5 Project Arborist for the site.
2. Establishment and certification of Tree Protection Zone (TPZ) measures implemented prior to commencement for any site works.
3. Site inspections during excavations within and adjacent to the TPZ
4. Bimonthly inspection of trees retained.
5. A final inspection at the completion of works

# Appendix F

**Page 2 of 5**- Tree Protection Plan




**Tree Protection for Trees 12,13,14**

| Tree No | Tree Protection |
|---|---|
| 12,13,14 | Tree protection fencing and signage to be installed as per AS 4970 **See drawing 3/4** page 5 of 5. |
| 12,13,14 | If **TPZ** fencing is to be removed for site movement, then Ground Protection to be installed as per AS 4970 See drawing 2 page 4 of 5. |
| 12,13,14 | All excavation works within the **TPZ** are to be supervised by the project arborist. All works should be undertaken utilizing hand tools. Any roots encountered are to be clean cut with all final cuts to undamaged woody tissue. |
| 12,13,14 | Any roots exposed within the **TPZ** during excavations, temporary root protection should be installed to prevent them from drying out. The installation of jute mesh or hessian is to be installed over the soil profile and is to be kept moist during the period the root zone is exposed. |
| 12,13,14 | Installation of underground services within **TPZ:** If underground services must be routed within **TPZ**, they should be installed by directional drilling or in manually excavated trenches. All works to be supervised by **AQF5 Project Arborist** |
| 12,13,14 | All landscape preparation works within the **TPZ** are to be supervised by the project arborist. All works should be undertaken utilizing hand tools. Any roots encountered are to be clean cut with all final cuts to undamaged woody tissue. |
| 12,13,14 | Activities excluded within the **TPZ** (Tree Protection Zone): storage (Plant & Machinery); stockpiling of waste and fill; cleaning of equipment; site shed and/or toilet; machine cultivation of ground for landscaping purposes. |

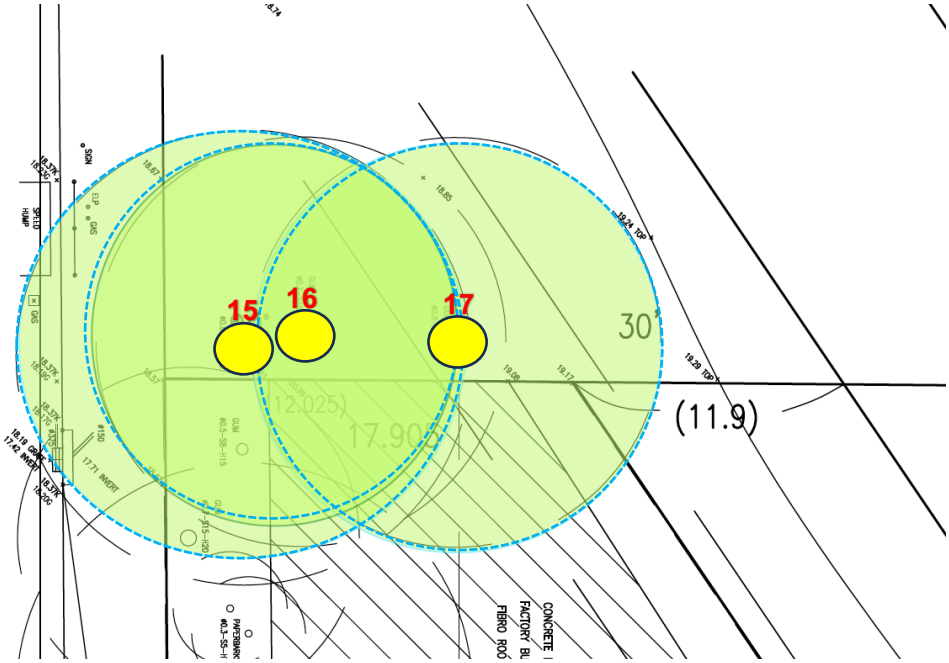
**Inspection Schedule for Trees 12,13,14– to be retained.**

An inspection schedule is to be adopted as follows.

1. Engagement of an AQF5 Project Arborist for the site.
2. Establishment and certification of Tree Protection Zone (TPZ) measures implemented prior to commencement for any site works.
3. Site inspections during excavations within and adjacent to the TPZ
4. Bimonthly inspection of trees retained.
5. A final inspection at the completion of works

# Appendix F

**Page 3 of 5**- Tree Protection Plan




**TPZ** (Tree Protection Zone)  **Trunk Protection**

**Tree Protection for Trees 15,16,17**

| Tree No | Tree Protection |
|---|---|
| **15,16,17** | Trunk Protection to be installed as per AS 4970 **See drawing 2** page 4 of 5. |
| **15,16,17** | Tree protection signage to be installed to trunk protection as per AS 4970 **See drawing 3/4** page 5 of 5. |
| **15,16,17** | If site movement is required within **TPZ**, then Ground Protection to be installed as per AS 4970 **See drawing 2** page 4 of 5. |
| **15,16,17** | All excavation works within the **TPZ** are to be supervised by the project arborist. All works should be undertaken utilizing hand tools. Any roots encountered are to be clean cut with all final cuts to undamaged woody tissue. |
| **15,16,17** | Any roots exposed within the **TPZ** during excavations, temporary root protection should be installed to prevent them from drying out. The installation of jute mesh or hessian is to be installed over the soil profile and is to be kept moist during the period the root zone is exposed. |
| **15,16,17** | Removal of external and internal concrete structures within **TPZ** shall be completed by cutting with a demolition saw to no greater than 10mm below depth of the slab. The cuts are to be made at small intervals to produce sections that can be removed and lifted by hand. This is to prevent machinery digging and damaging roots in this area. All works to be supervised by **AQF5 Project Arborist.** If site movement required than Ground protection as per AS 4970 See drawing 2 page 4 of 5. |
| **15,16,17** | Installation of any underground services within **TPZ:** If underground services must be routed within **TPZ**, they should be installed by directional drilling or in manually excavated trenches. All works to be supervised by **AQF5 Project Arborist** |
| **15,16,17** | All landscape preparation works within the **TPZ** are to be supervised by the project arborist. All works should be undertaken utilizing hand tools. Any roots encountered are to be clean cut with all final cuts to undamaged woody tissue. |
| **15,16,17** | Activities excluded within the **TPZ** (Tree Protection Zone): storage (Plant & Machinery); stockpiling of waste and fill; cleaning of equipment; site shed and/or toilet; machine cultivation of ground for landscaping purposes. |

**Inspection Schedule for Trees 5,6,7,8,9,10– to be retained.**

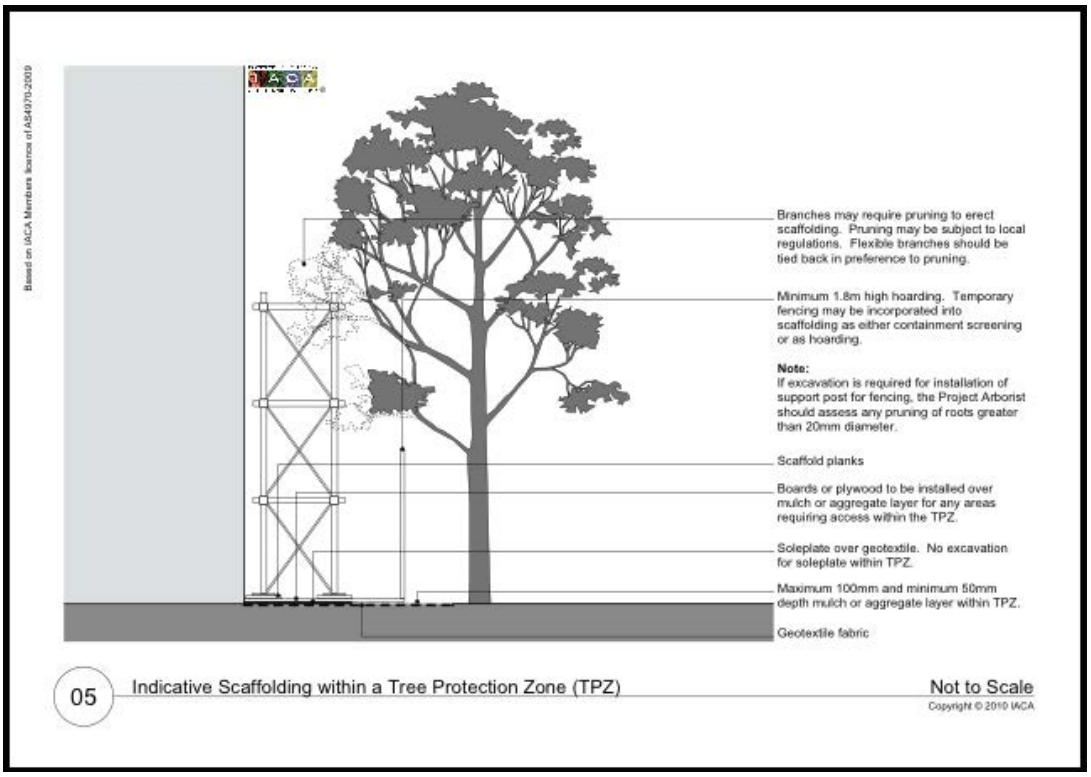
An inspection schedule is to be adopted as follows.

1. Engagement of an AQF5 Project Arborist for the site.
2. Establishment and certification of Tree Protection Zone (TPZ) measures implemented prior to commencement for any site works.
3. Site inspections during excavations within and adjacent to the TPZ
4. Bimonthly inspection of trees retained.
5. A final inspection at the completion of works

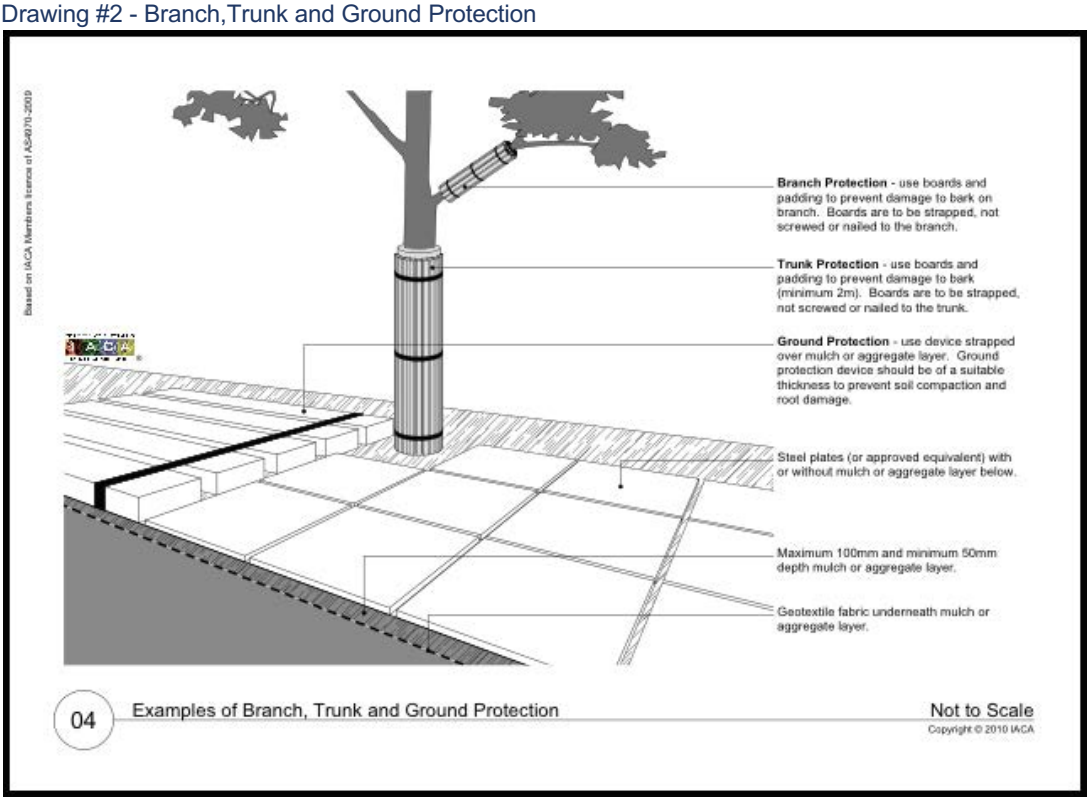
# Appendix F

**Page 4 of 5**- Tree Protection Plan

Drawing #1 - Scaffolding a TPZ



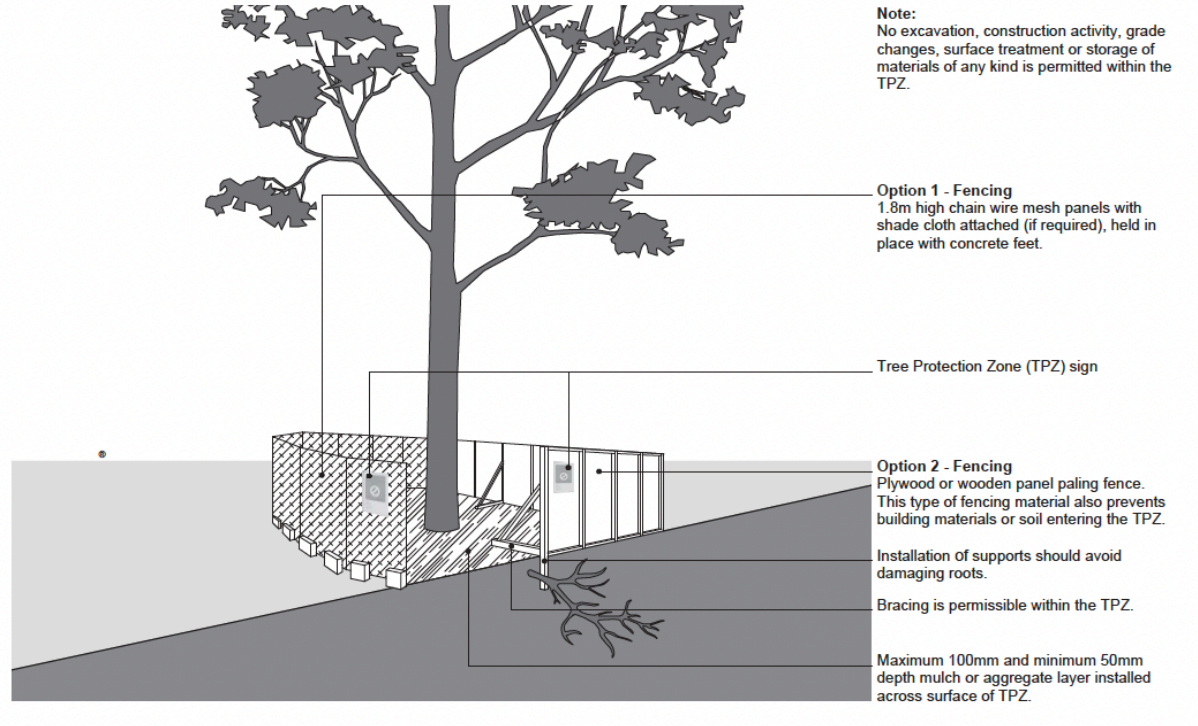

Drawing #2 - Branch,Trunk and Ground Protection



# Appendix F

**Page 5 of 5-** Tree Protection Plan

Drawing #3 - Example of TPZ Fencing




Drawing #4 - Example of TPZ Signage

# Appendix G
## Tree Pruning Specification

- All pruning works to be approved by Governing Authority**: Canterbury- Bankstown Council.**
- All pruning to comply with *AS4373: 2007 Pruning of amenity trees*.


**Fig 1:Tree 6**

1. Selective prune two (2) eastern laterals back to nearest branch and trunk collar to provide clearance of the existing and proposed new building.
2. All pruning to be in accordance with *AS 4373: 2007: pruning of amenity* trees under guidance of **Project Arborist.**

# Appendix G
## Tree Pruning Specification

- All pruning works to be approved by Governing Authority**: Canterbury- Bankstown Council.**
- All pruning to comply with *AS4373: 2007 Pruning of amenity trees*.


**Fig 2:Tree 10**

1. Selective prune two (2) eastern laterals back to trunk collar to provide clearance of the existing and proposed new building.
2. All pruning to be in accordance with *AS 4373: 2007: pruning of amenity* trees under guidance of **Project Arborist.**

# Appendix G
## Tree Pruning Specification

- All pruning works to be approved by Governing Authority**: Canterbury- Bankstown Council.**
- All pruning to comply with *AS4373: 2007 Pruning of amenity trees*.


**Fig 3:Tree 16**

1. Selective prune two (2) southern laterals back to nearest branch and trunk collar to provide clearance of the existing and proposed new building.
2. All pruning to be in accordance with *AS 4373: 2007: pruning of amenity* trees under guidance of **Project Arborist.**

# Appendix G
## Tree Pruning Specification

- All pruning works to be approved by Governing Authority**: Canterbury- Bankstown Council.**
- All pruning to comply with *AS4373: 2007 Pruning of amenity trees*.


.
**Fig 4:Tree 17**

1. Selective prune two (2) southern laterals back to trunk collar to provide clearance of the existing and proposed new building.
2. All pruning to be in accordance with *AS 4373: 2007: pruning of amenity* trees under guidance of **Project Arborist.**

# Appendix H

## Extract from Australian Standard
## AS4970 2009 Protection of trees on development sites

### Section 3, Determining the tree protection zones of the selected trees

#### 3.1 Tree protection zone (TPZ)

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

*The TPZ incorporates the structural root zone (SRZ) (refer to Clause 3.3.5)."*

#### 3.2 Determining the TPZ

The radius of the TPZ is calculated for each tree by multiplying its DBH x 12.

**TPZ = DBH x 12**

where

DBH = trunk diameter measured at 1.4 m above ground

Radius is measured from the centre of the stem at ground level.

# Appendix H

## Extract from Australian Standard AS4970 2009 Protection of trees on development sites

## Section 3, Determining the protection zones of the selected trees

### 3.3.5 Structural root zone (SRZ)

*"The SRZ is the area required for tree stability. A larger area is required to maintain a viable tree. The SRZ only needs to be calculated when a major encroachment into a TPZ is proposed. Root investigation may provide more information on the extent of these roots."*

**Determining the SRZ**

The radius of the TPZ is calculated for each tree by multiplying its DBH x 12.

**SRZ radius** expressed by the curve is calculated by the following formula,

$$R_{SRZ} = (D \times 50)^{0.42} \times 0.64$$

where

*D* = trunk diameter, in metres measured immediately above the root buttress.

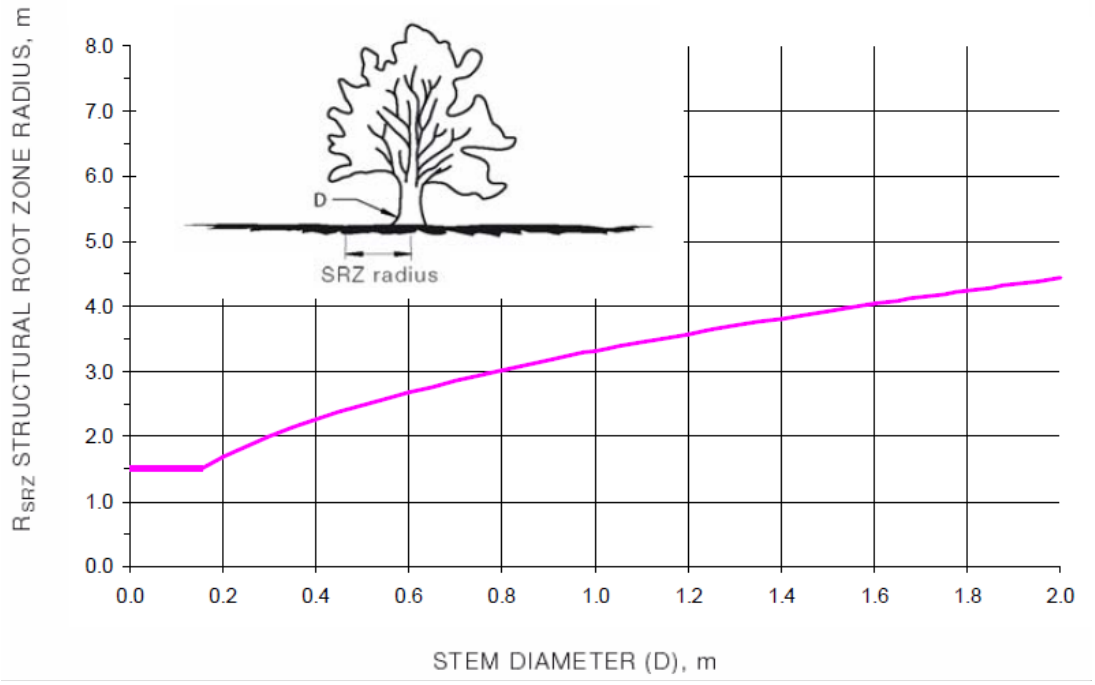



FIGURE 1 STRUCTURAL ROOT ZONE CALCULATION

(AS 4970 – 2009, Amendment No. 1 March 2010)

NOTES:

1 $R_{SRZ}$ is the calculated structural root zone radius (SRZ radius).

2 D is the stem diameter measured immediately above root buttress.

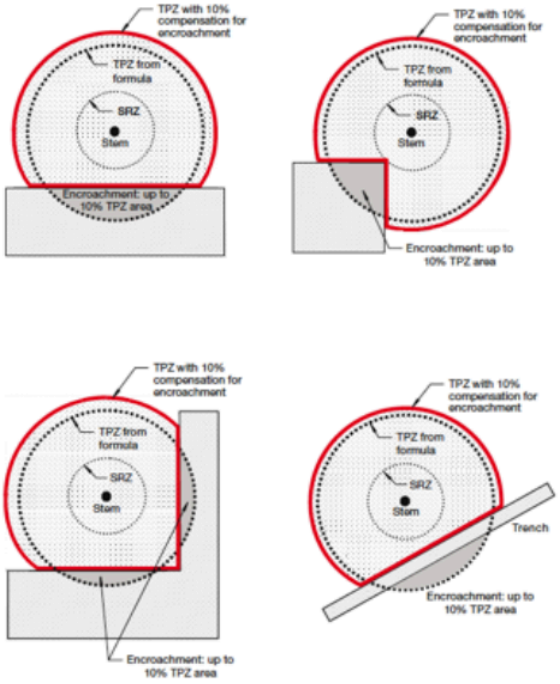
3 The $R_{SRZ}$ for trees less than 0.15 m diameter is 1.5 m.

4 The $R_{SRZ}$ formula and graph do not apply to palms, other monocots, cycads and tree ferns.

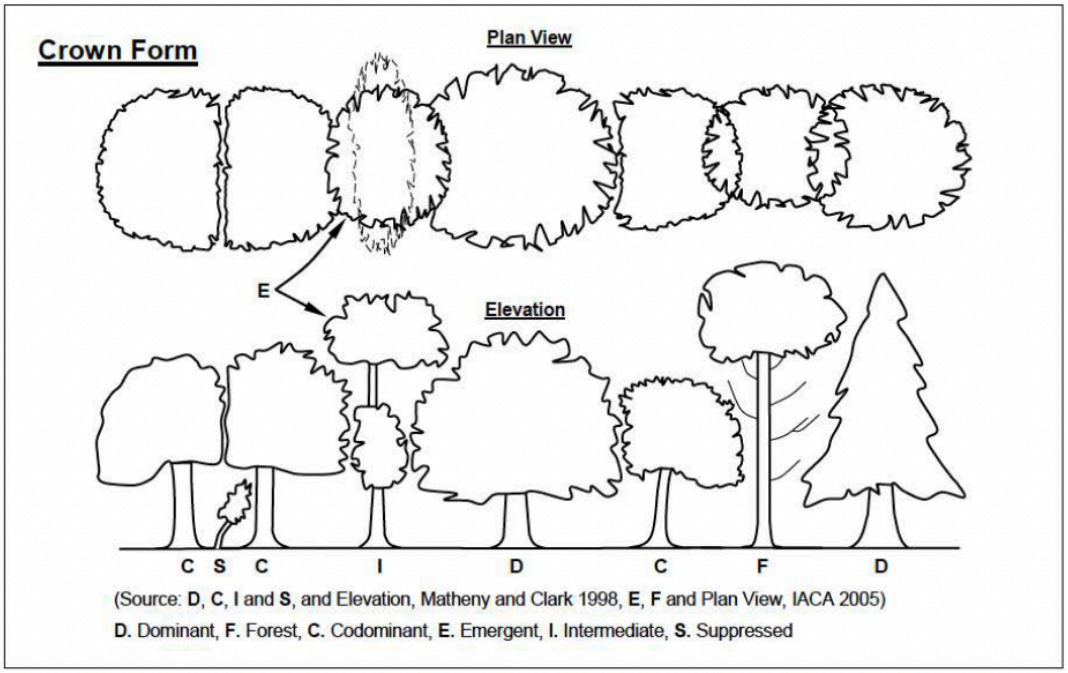
5 This does not apply to trees with an asymmetrical root plate

# Appendix H

## Extract from Australian Standard
## AS4970 2009 Protection of trees on development sites
## Encroachment into TPZ (Tree Protection Zone)



# Appendix I
## Crown Form




(Source: **D**, **C**, I and **S**, and Elevation, Matheny and Clark 1998, **E**, **F** and Plan View, IACA 2005)

**D.** Dominant, **F.** Forest, **C.** Codominant, **E.** Emergent, **I.** Intermediate, **S.** Suppressed

**Symmetry** Balance within a crown, or root plate, above or below the axis of the trunk of branch and foliage, and root distribution respectively and can be
categorized as Asymmetrical and Symmetrical.

**Asymmetrical** Imbalance within a crown, where there is an uneven distribution of branches and the foliage crown or root plate around the vertical axis of the trunk. This may be due to Crown Form Codominant or Crown From Suppressed as a result of natural restrictions e.g. from buildings, or from competition for space and light with other trees, or from exposure to wind, or artificially caused by pruning for clearance of roads, buildings or power lines. An example of an expression of this may be, crown asymmetrical, bias to west.

**Symmetrical** Balance within a crown, where there is an even distribution of branches and the foliage crown around the vertical axis of the trunk. This usually applies to trees of Crown Form Dominant or Crown Form Forest. An example of an expression of this may be crown symmetrical.

# Appendix J
References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