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# Arboricultural Impact Assessment

An assessment is addressing the potential viability of trees in relation to the proposed development.

SSD Submission

*Prepared for*
Johnstaff P/L
C/- Health Infrastructure

*For the proposed development titled*
Stages 1 and 2
Concord Hospital Upgrade,
Hospital Road, Concord NSW

*Prepared by*
Warwick Varley
Consulting Arborist

Prepared: June 2018
Reference No: D3307B

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**THE USE OF THIS REPORT IS RESTRICTED FOR THOSE TREES MENTIONED WITHIN FOR WHICH THE REPORT WAS ISSUED.**

## COPYRIGHT

## 1.0 Introduction

**1.1** The following Arborist report has been requested by *Johnstaff P/L*, and care of *Health Infrastructure* (referred to as the 'client') and prepared to accompany a State Significant Development Application (SSDA) for Concord Hospital. These works assess the trees located within and adjacent to the area of the proposed upgrade works related to Stage 1 and 2. This report includes ninety-one trees located on a portion of the hospital site.

**1.2** In brief, the SSDA report seeks consent for the proposed redevelopment of Concord Repatriation General Hospital and is to be undertaken in two (2) stages including:

- Clinical Services Building (CSB) and multi-story carpark (Stage 1); and
- Acute Services Building (ASB) and multi-story carpark (Stage 2).

**1.3** This report will address for these and the viability based on the proposed works. The data included include:

- species' identification, location, dimensions, and condition;
- SULE and STARS rating;
- discussion and impact of the proposed works on each tree;
- recommendations for the removal, retention and/or pruning;
- tree protection zones and protection specifications for trees nominated for retention.

## 2.0 Standards

**2.1** *Allied Tree Consultancy* provides an ethical and unbiased approach to all assignments, possessing no association with private utility arboriculture or organisations that may reflect a conflict of interest.

**2.2** This report must be made available to all contractors during the tendering process so that any cost associated with the required works for the protection of trees can be accommodated.

**2.3 It is the responsibility of the project manager to provide the requirements outlined in this report relative to the Protection Zones, Measures (Section 7.0) and Specifications (Section 8.0) to all contractors associated with the project before the initiation of work**.

**2.4** All tree-related work outlined in this report is to be conducted in accordance with the:

- Australian Standard – AS4373; Pruning of Amenity Trees.
- Guide to Managing Risks of Tree Trimming and Removal Work[1].

[1] Safe Work Australia; July 2016; Guide to Managing Risks of Tree Trimming and Removal Work, Australia

- All tree works must be carried out at a tertiary level (minimum Certificate-level 3) qualified and experienced (minimum five years) arboriculturist.
- For any works in the vicinity of electrical lines, the arboriculturist must possess the ISSC26 endorsement (Interim guide for operating cranes and plant in proximity to overhead powerlines).

**2.5** As a minimum requirement, all trees recommended for retention in this report must have removed all dead, diseased, and crossing limbs and branch stubs to be pruned to the branch collar. This work must comply with the local government tree policy (Canada Bay Council) and Section 2.4.

## 3.0 Disclosure Statement

Trees are living organisms and, for this reason, possess natural variability. This cannot be controlled. However, risks associated with trees can be managed. An arborist cannot guarantee that a tree will be safe under all circumstances, nor predict the time when a tree will fail. To live or work near a tree involves some degree of risk, and this evaluation does not preclude all the possibilities of failure.

## 4.0 Methodology

**4.1** The following tree assessment was undertaken using criteria based on the guidelines laid down by the International Society of Arboriculture.

**4.2** The format of the report is summarised below;

**4.2.1** **Plan 1;** Tree Location Relative to Site: This is an unscaled plan reproduced from the Survey Plan as referenced in Section 4.4.1, depicting the area of assessment.

**4.2.2** **Table 1;** This table compiles the tree species, dimensions**,** brief assessment (history, structure, pest, disease or any other variables subject to the tree), significance, allocation of the zones of protection (i.e., Tree Protection Zone[2] ;TPZ and Structural Root Zone; SRZ) for each tree illustrated in Plans 1-5, Sections 5.0-5.4. All measurements are in meters. An 'Action' is included and provides the nomination for retention/removal based on the tree location relative to the proposed design (drawing set, Section 4.4.2).

This table has not included trees no. 31-38, 53, 54, 58, 59, 60, 61, 62, 79, 84 and 85. These trees have been approved for removal within the REF and are included in the initial Arboricultural Impact Assessment, referenced D3307A and dated March 2018.

[2] *Australian Standard, 4970; 2009* – Protection of Trees on Development Sites, Australia

**4.2.3 Discussion relating to the site assessment and proposed works regarding the trees.**

**4.2.4 Protection Specification**; This Section (Section 8.0) details the requirements for that area designated as the Tree Protection Zone (TPZ), for those trees recommended for retention.

**4.3** The opinions expressed in this report, and the material, upon which they are based, were obtained from the following process and data supplied:

**4.3.1** Site assessment on the 9th February 2018 using the method of the Visual Tree Assessment[3]. This has included a Level 2 risk assessment, being a *Basic Assessment*[4]. The assessment has been conducted by Warwick Varley[5] on behalf of *Allied Tree Consultancy*. The site assessment initiated with a site meeting with Marc Carneiro (Project manager; *Johnstaff P/L*) and included a circuit of the site requiring assessment.

**4.3.2** The area of assessment has been limited to the area illustrated in blue outline in the plan set contained in Section 5.0. This has been established within the scope of works issued to *Allied Tree Consultancy* and confirmed via email correspondence with *Johnstaff*.

**4.3.3** Trees included in this report are those that are 5m or greater in height.

**4.3.4** All measurements, unless specified otherwise are taken from the tree centre.

**4.3.5** Raw data from the preliminary assessment including the specimen's dimensions was compiled by the use of a diameter tape, height clinometer, angle finder, compass, steel probes, Teflon hammer, binoculars and recording instruments.

**4.4 Documentation provided**

The following documentation has been provided to Allied Tree Consultancy and utilised within the report.

**4.4.1** Surveyor
Drawn by *LTS Lockley*
Date: May 2016
Reference: 33907DT-1 – 33907DT-12
Project No: 33907
Note 1: See Section 4.5.1

[3] Mattheck, C. Breloer, H.,1994, The Body Language of Trees – A handbook for failure analysis The Stationary Office, London
[4] Dunster J.A., 2013, Tree Risk Assessment Manual, International Society of Arboriculture, 2013, USA
[5] Consulting Arborist, Graduate Certificate and Diploma of Arboriculture (level 8 and 5)

**4.4.2** Design
Drawn by *Jacobs P/L*
Date: 22 June 2018
Project No.: 1A064700
Drawing No: 56 Sheets, based on the Drawing schedule listed on the drawing titled; Cover Sheet-SSDA; NEWB-AR-DRG-00, Rev. 3
Note 2: See Section 4.5.2

**4.4.3** Civil
Drawn by *Taylor Thomson Whitting P/L*
Date: 22 June 2018
Reference: 171496
Drawing No: 33 Sheets, based on the Drawing schedule listed on the drawing titled; Notes and Legends Sheet; NEWB-CV-DRG-SKC101, Rev. P9

**4.4.4** Electrical
Drawn by *Wood & Grieve Engineers P/L*
Date: 9 January 2018
Reference: 35503
Drawing No: EL-EN-0000 - EL-EN-1012, EL-EN-1802- EL-EN-0804, Rev. T2

**4.4.5** Hydraulic
Drawn by *Wood & Grieve Engineers P/L*
Date: 20 February 2018
Reference: 5944000
Drawing No: HS-0000- HS-0006, Rev. 03

**4.4.6** Mechanical; Gas Site Plan
Drawn by *Wood & Grieve Engineers P/L*
Date: 20 February 2018
Reference: 35503
Drawing No: ENA-MG-DRG-4002, Rev. D

**4.4.7** Fire
Drawn by *Warren Smith and Partners P/L*
Date: January 2018
Reference: 5944000
Drawing No: 5944000-ENA-FR-DRG-0010, Rev. 06

**4.4.8** Document
Flora and Fauna Assessment
Author: *Ecological Australia*
Title: Supporting Document Biodiversity Sheet 001-007
Project No.: 17STD_9170
Date: June 2018

**4.4.9** Document
Vegetation Mapping
Author: *Catchment Management Authority care of the City of Canada Bay Council*
Title: Supporting Document Biodiversity Sheet 001-007
Date: 2007, 2009

## 4.5 Limitations of the assessment/discussion process

**4.5.1** Trees no. 39, 41, 42, 51, 58, 62, 63, 64, 68 and 78-91 (23 trees) have been omitted from the plans provided, however, required for inclusion because it conforms to the definition of a prescribed tree within the local government tree policy. The tree location has been plotted on the Plan set (Section 5.0) by *Allied Tree Consultancy*. The tree location was established by measuring from known points and scaling onto the drawing. *Allied Tree Consultancy* is not a registered surveyor and, however, the accuracy of the survey is attempted; the true position of the trees may marginally deviate. Any such deviation provides the potential for changing the actual impact (encroachment) provided to a tree.

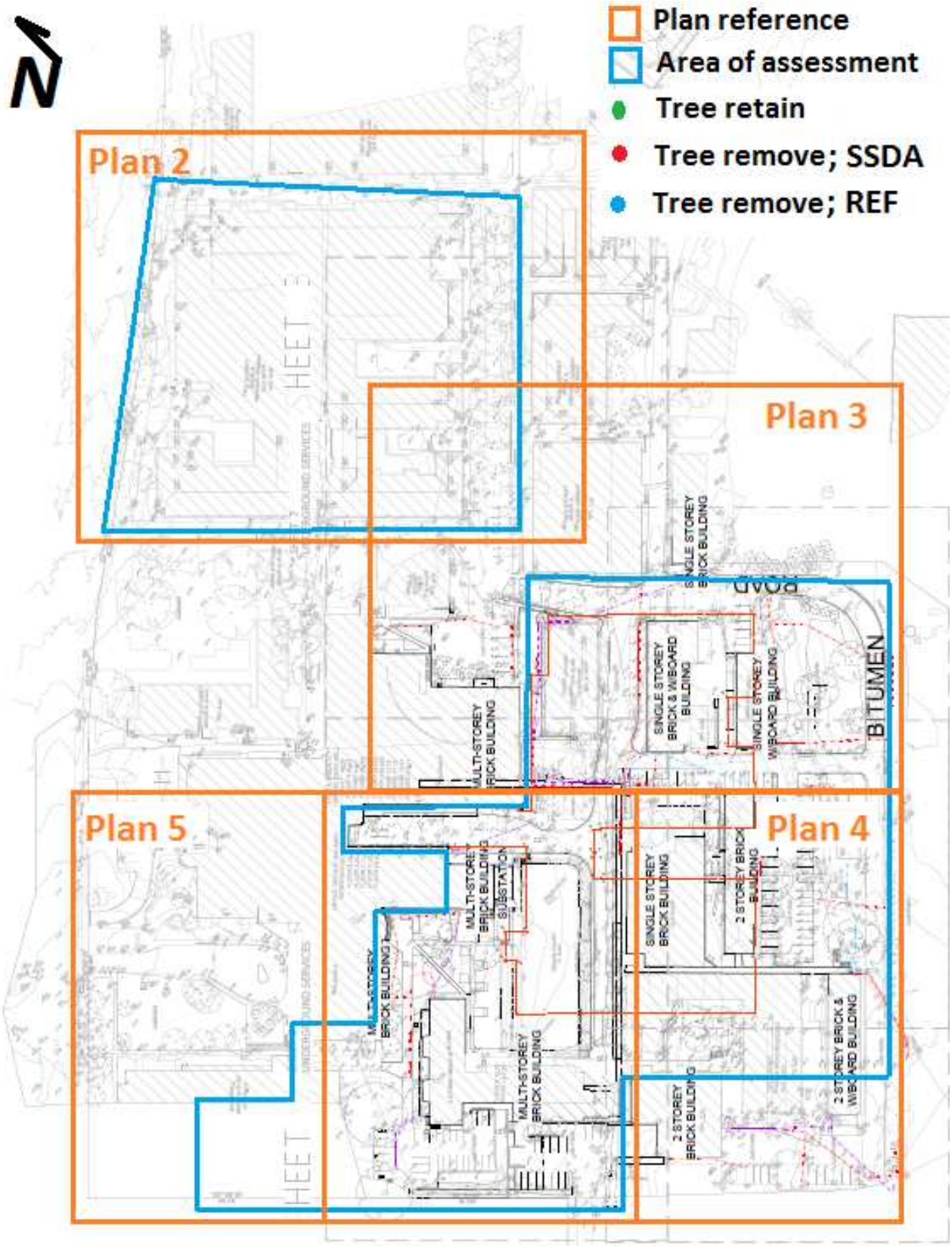
**4.5.2** All trees have not been included within the entire drawing set, therefore have been transposed onto the required drawings by *Allied Tree Consultancy*. The tree location was established by scaling from the survey drawing. Therefore discrepancies that can affect the actual impact on the trees can occur.

**4.5.3** The assessment has considered only those target zones that are apparent to the author and the visually apparent tree conditions, during the time of assessment.

**4.5.4** Any tree regardless of apparent defects would fail if the forces applied to exceed the strength of the tree or its parts, for example, extreme storm conditions.

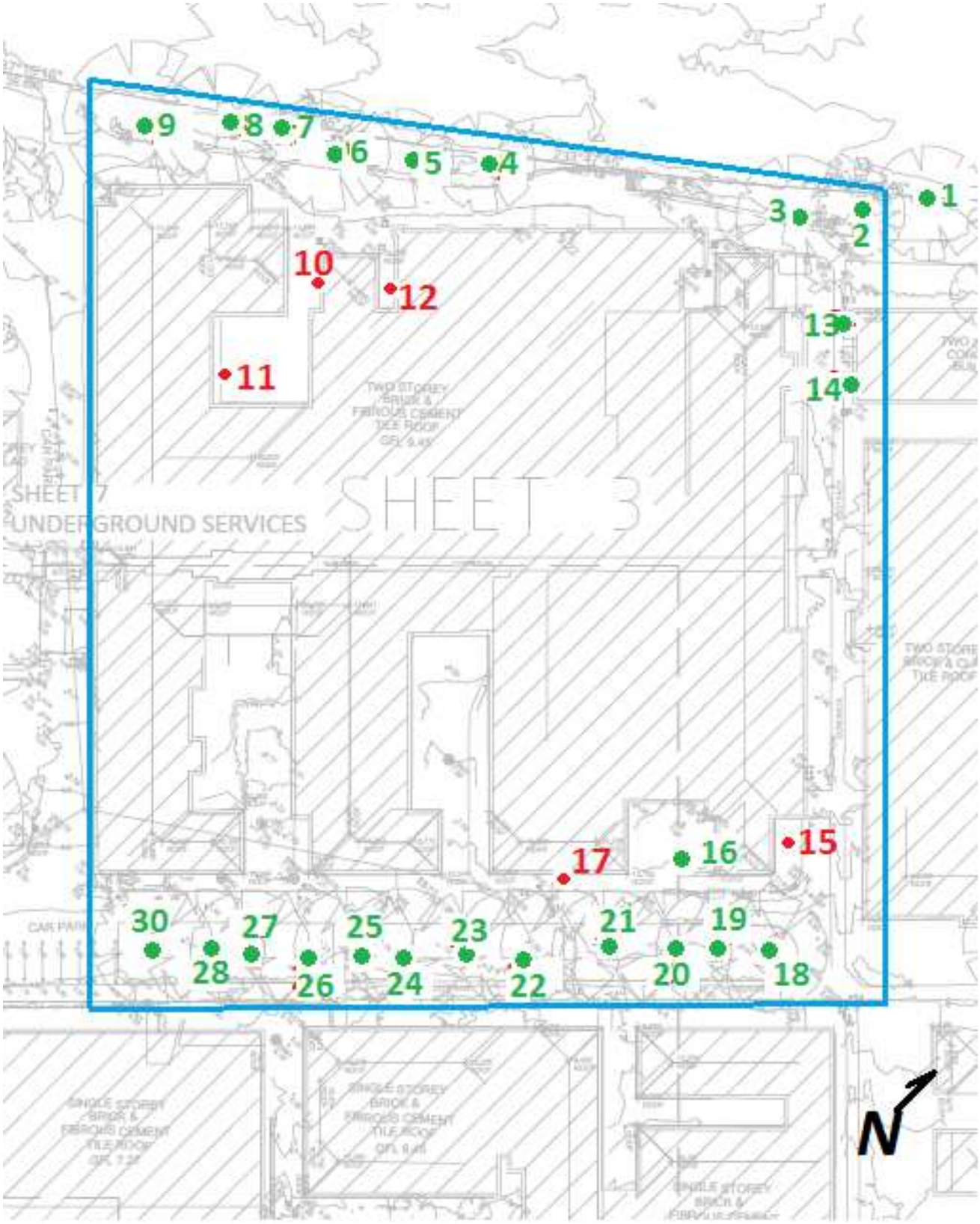
**4.5.5** The assessment has been limited to that part of the tree which is visible, existing from the ground level to the crown. Root decay can exist and in some circumstances provide no symptoms of the presence. This assessment responds to all the symptoms provided by a tree, however, cannot provide a conclusive recommendation regarding any tree that may have extensive root decay that leads to windthrow without the appropriate symptoms.

## 5.0 Plan 1; Areas of assessment



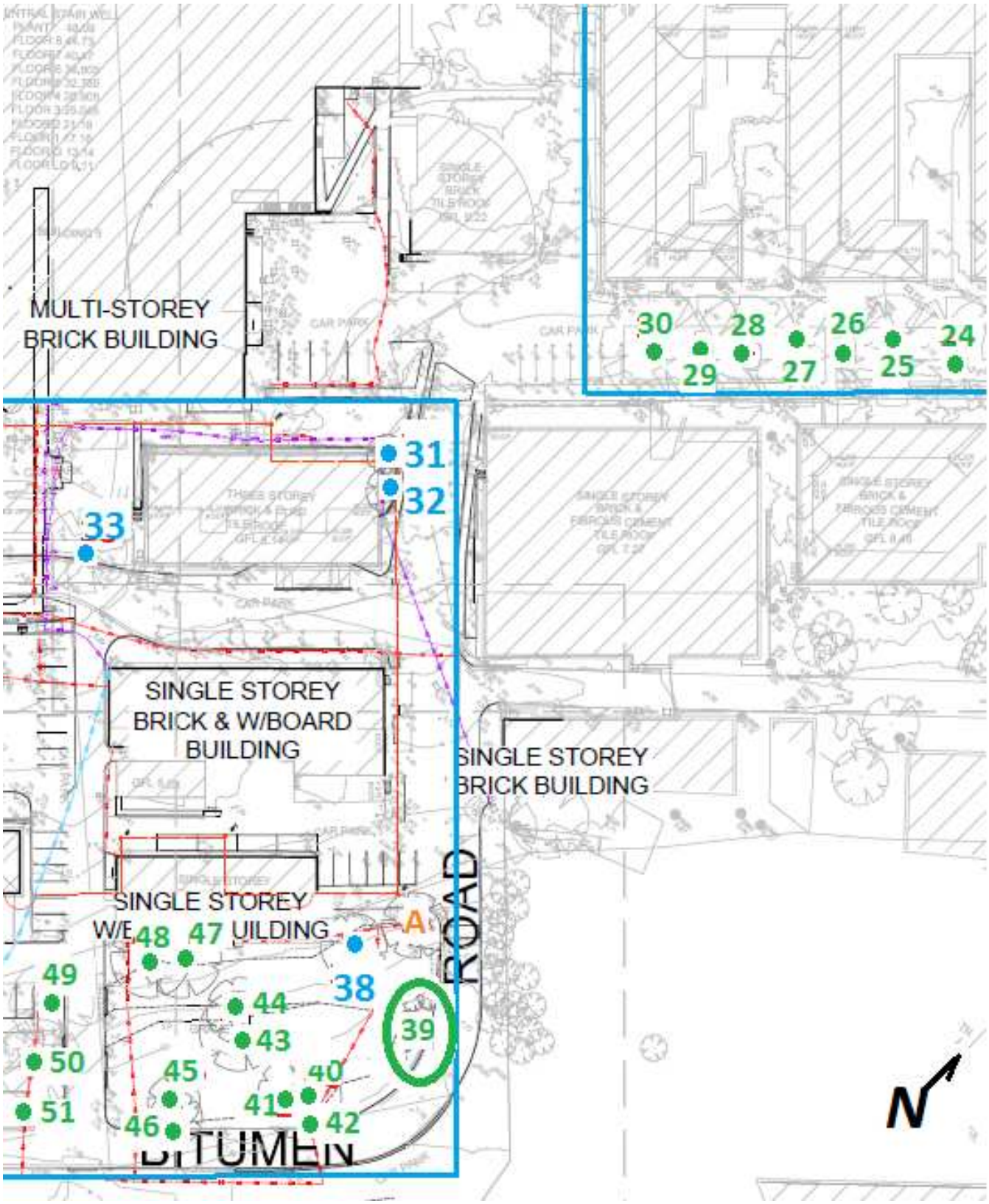

Not to scale
Source: Adapted from *LTS Lockley P/L,* see Section 4.4.1

## 5.1 Plan 2; Area of assessment illustrating tree location



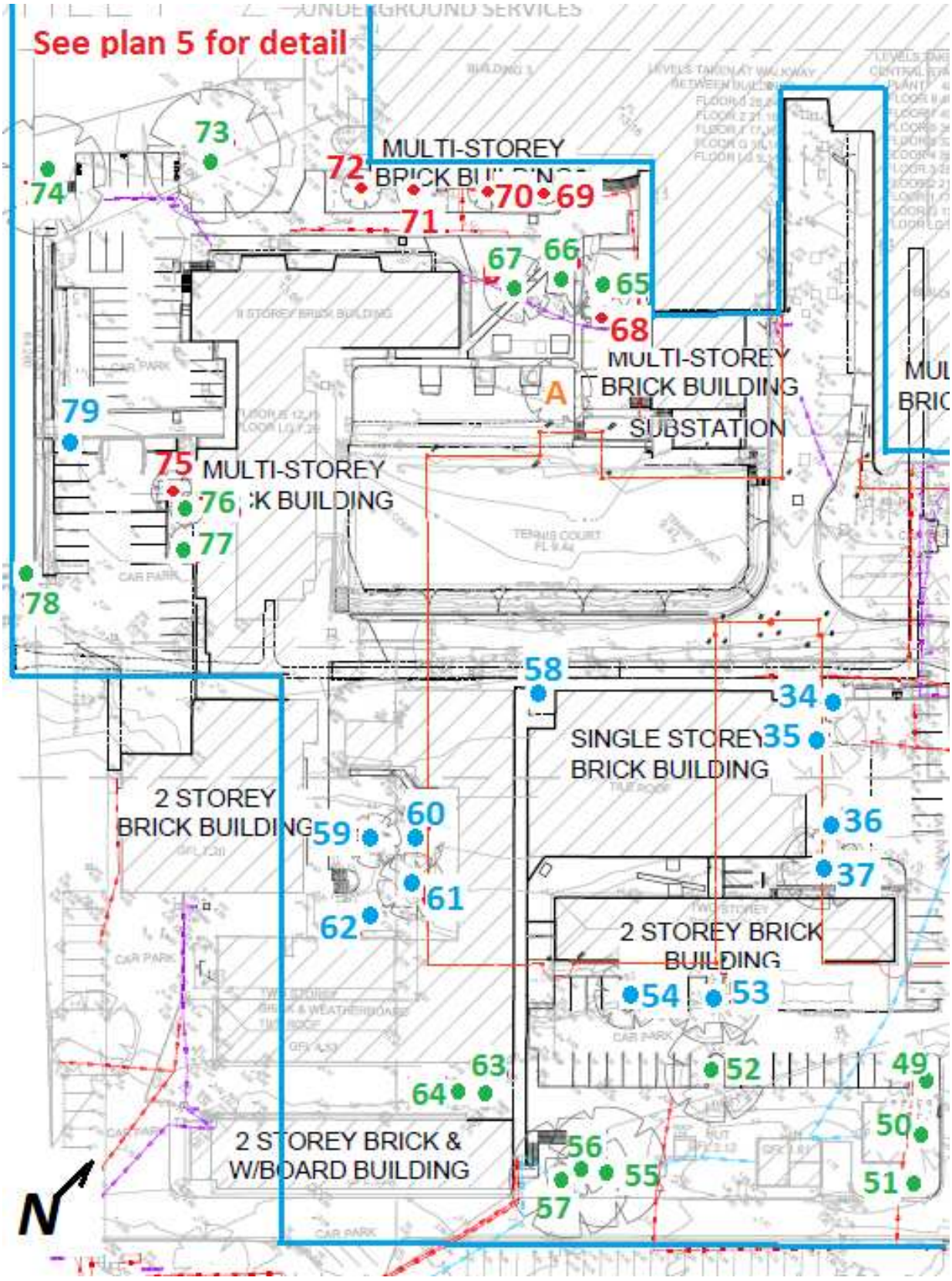

Not to scale
Source: Adapted from *LTS Lockley P/L,* see Section 4.4.1

## 5.2 Plan 3; Area of assessment illustrating tree location



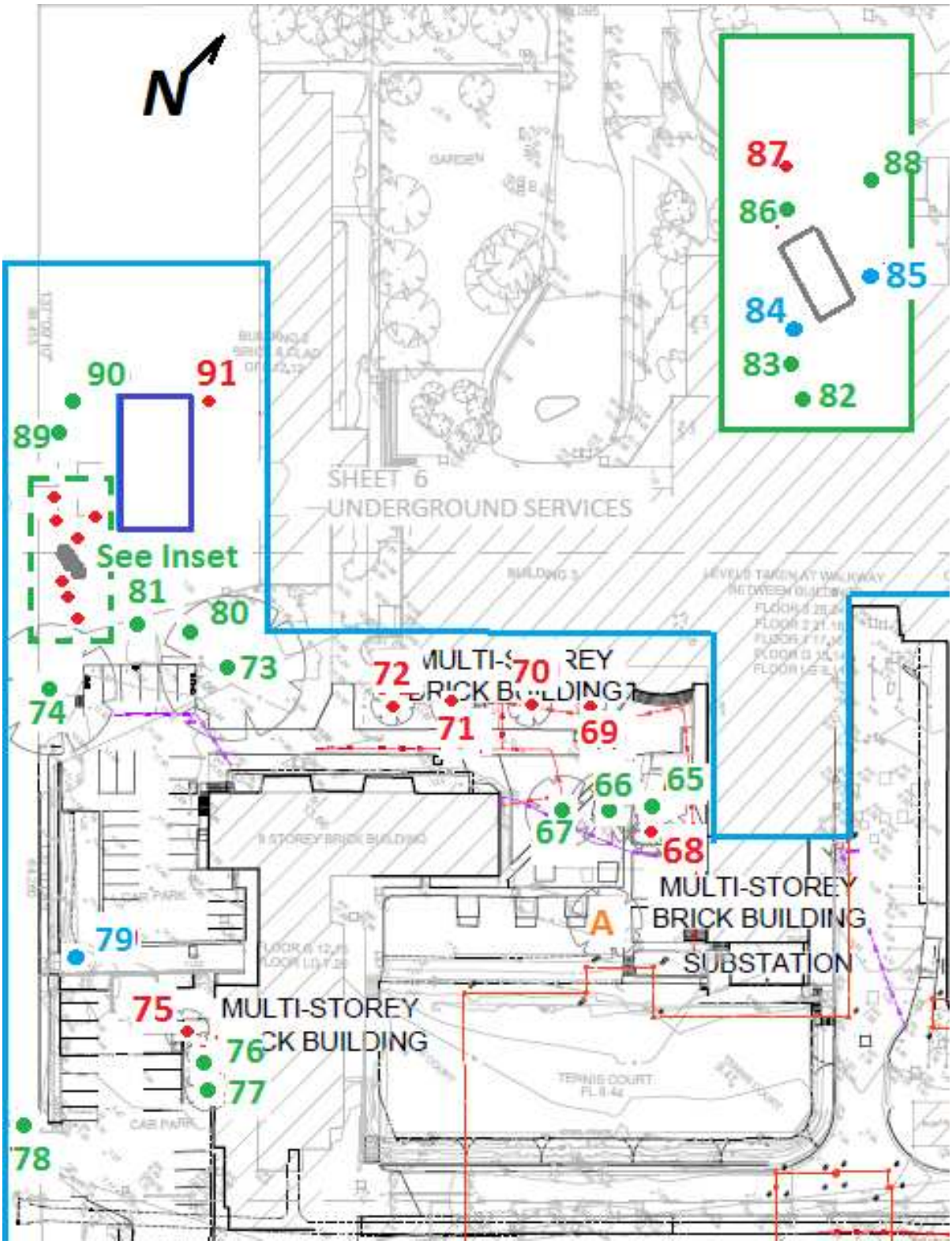

Not to scale
Source: Adapted from *LTS Lockley P/L,* see Section 4.4.1

### 5.3 Plan 4; Area of assessment illustrating tree location




Not to scale
Source: Adapted from *LTS Lockley P/L,* see Section 4.4.1

### 5.4 Plan 5; Area of assessment illustrating tree location




Not to scale
Source: Adapted from *LTS Lockley P/L,* see Section 4.4.1

## 6.0 Table 1 – Tree Species Data

Terminology/references provided in Appendix A.

| Tree No. | Botanical Name Common Name | Height (m) | DBH (m) | Crown Spread (m) | Age | Crown Class | Crown Aspect | Crown Ratio | SULE Rating | STARS Rating | TPZ | SRZ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | *Ficus microcarpa* var.Hillii Hill's Weeping Fig | 16 | 1.13[B] | 18 x 16 | M | C | Sym. | P | **A1** | **HIGH** | **15.0** | **3.7** |
| **Assessment** | | This tree forms part of a screen planting, as part of the trees no. 1-9, where trees no. 1-3 form a single group separated by a drive, from where trees no. 4-9 form the remaining linear planting. This tree provides the habit, typical for the urban grown species and has been subject to power line pruning on the northern side, and crown lifting (as a vertical cut) on the southern side for clearance of the access drive. The group planting form significant contribution to the streetscape. | | | | | | | | | RETAIN See Section 7.1.1 | |
| 2 | *Ficus microcarpa* var.Hillii Hill's Weeping Fig | 16 | 0.86[B] | 10 x 16 | M | I | S | F | **A1** | **HIGH** | **10.3** | **3.1** |
| **Assessment** | | See assessment for tree no. 1 | | | | | | | | | RETAIN See Section 7.1.1 | |
| 3 | *Ficus microcarpa* var.Hillii Hill's Weeping Fig | 16 | 0.88[B] | 12 x 16 | M | C | S | F | **A1** | **HIGH** | **10.6** | **3.2** |
| **Assessment** | | See assessment for tree no. 1 | | | | | | | | | RETAIN See Section 7.1.1 and 7.1.6 | |
| 4 | *Ficus microcarpa* var.Hillii Hill's Weeping Fig | 16 | 0.70[B] | 12 x 8 | M | C | W | F | **A1** | **HIGH** | **8.4** | **2.8** |
| **Assessment** | | See assessment for tree no. 1 | | | | | | | | | RETAIN See Section 7.1.1 and 7.1.6 | |

| Tree No. | Botanical Name Common Name | Height (m) | DBH (m) | Crown Spread (m) | Age | Crown Class | Crown Aspect | Crown Ratio | SULE Rating | STARS Rating | TPZ | SRZ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5 | *Ficus microcarpa* var.Hillii Hill's Weeping Fig | 16 | 0.71[B] | 10 x 8 | M | I | W | F | **A1** | **HIGH** | **8.5** | **2.8** |
| **Assessment** | | See assessment for tree no. 1 | | | | | | | | | RETAIN See Section 7.1.1 and 7.1.6 | |
| 6 | *Ficus microcarpa* var.Hillii Hill's Weeping Fig | 16 | 0.79[B] | 10 x 8 | M | I | W | F | **A1** | **HIGH** | **9.5** | **3.0** |
| **Assessment** | | See assessment for tree no. 1 | | | | | | | | | RETAIN See Section 7.1.1 and 7.1.6 | |
| 7 | *Ficus microcarpa* var.Hillii Hill's Weeping Fig | 16 | 0.73[B] | 8 x 10 | M | I | W | F | **A1** | **HIGH** | **8.7** | **2.9** |
| **Assessment** | | See assessment for tree no. 1 | | | | | | | | | RETAIN See Section 7.1.1 and 7.1.6 | |
| 8 | *Ficus microcarpa* var.Hillii Hill's Weeping Fig | 16 | 0.78[B] | 7 x 10 | M | I | W | F | **A1** | **HIGH** | **9.4** | **2.9** |
| **Assessment** | | See assessment for tree no. 1 | | | | | | | | | RETAIN See Section 7.1.1 and 7.1.6 | |
| 9 | *Ficus microcarpa* var.Hillii Hill's Weeping Fig | 16 | 0.97[B] | 18 x 10 | M | I | SW | F | **A1** | **HIGH** | **11.6** | **3.3** |
| **Assessment** | | See assessment for tree no. 1 | | | | | | | | | RETAIN See Section 7.1.1 and 7.1.6 | |

| Tree No. | Botanical Name<br>Common Name | Height (m) | DBH (m) | Crown Spread (m) | Age | Crown Class | Crown Aspect | Crown Ratio | SULE Rating | STARS Rating | TPZ | SRZ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 | *Melaleuca bracteata*<br>'Revolution Gold'<br>Golden Tea Tree | 6 | < 0.10 | 3 x 6 | M | D | Sym. | F | **A2** | **LOW** | **2.0** | **1.5** |
| **Assessment** | | Located in a small courtyard, the tree was likely planted to form a large shrub, however, has grown over the building and conflicting with the eave. The tree provides the habit typical for the species. | | | | | | | | | REMOVE<br>See Section 7.1.5 | |
| 11 | *Melaleuca bracteata*<br>'Revolution Gold'<br>Golden Tea Tree | 7 | < 0.20 | 4 x 4 | M | D | Sym. | F | **A2** | **LOW** | **2.4** | **1.7** |
| **Assessment** | | Located in a small courtyard, the tree was likely planted to form a large shrub, however, has grown over the building and conflicting with the eave. The tree provides the habit typical for the species. | | | | | | | | | REMOVE<br>See Section 7.1.5 | |
| 12 | *Cupressus sempervirens*<br>'Stricta'<br>Mediterranean Cypress | 7 | 0.17[B] | 1 x 1 | Y | D | Sym. | F | **A1** | **LOW** | **2.1** | **1.6** |
| **Assessment** | | This tree provides the habit typical for the species. | | | | | | | | | REMOVE<br>See Section 7.1.5 | |
| 13 | *Camellia sasanqua*<br>Camellia | 6 | 0.40[B] | 3 x 4 | M | C | S | F | **A2** | **MEDIUM** | **4.8** | **2.3** |
| **Assessment** | | This tree provides the habit typical for the species, that is a large shrub. The co-dominant class with due to the close planting of the building. The tree has been lopped to 2m in the past, where the predominant crown mass is composed of mature epicormic growth. | | | | | | | | | RETAIN<br>See Section 7.1.1 | |
| 14 | *Camellia sasanqua*<br>Camellia | 6-5 | 0.40[B] | 3 x 5 | M | C | S | F | **A2** | **MEDIUM** | **4.8** | **2.3** |

| Tree No. | Botanical Name Common Name | Height (m) | DBH (m) | Crown Spread (m) | Age | Crown Class | Crown Aspect | Crown Ratio | SULE Rating | STARS Rating | TPZ | SRZ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Assessment** | | This tree provides the habit typical for the species, that is a large shrub. The co-dominant class with due to the close planting of the building. The tree has been lopped to 2m in the past, where the predominant crown mass is composed of mature epicormic growth. | | | | | | | | | RETAIN See Section 7.1.1 | |
| 15 | *Jacaranda mimosifolia* Jacaranda | 9 | 0.25 0.25 0.26 0.27 | 10 x 10 | M | D | Sym. | F | **A2[E]** | **HIGH** | **6.3** | **2.5** |
| **Assessment** | | This tree is composed of four equally sized leaders that initiate from a common root crown. The attachment points of these leaders are unknown and would warrant further assessment for risk if the tree is retrained. The tree provides normal vitality and high amenity value. | | | | | | | | | REMOVE See Section 7.1.5 | |
| 16 | *Eucalyptus botryoides* Bangalay | 11 | 0.52 | 15 x 15 | M | D | Sym. | F | **A1** | **HIGH** | **6.3** | **2.5** |
| **Assessment** | | This tree provides the habit typical for the species and normal vitality. | | | | | | | | | RETAIN See Section 7.1.1 and 7.1.6 | |
| 17 | *Cupaniopsis anacardioides* Tuckeroo | < 5 | < 0.15[B] | 10 x 3 | Y | C | E | F | **A2** | **LOW** | **2.0** | **1.5** |
| **Assessment** | | This is a linear planting of four young trees, planted on a strip garden bounded by the building and an access road. They present typical form, however mature growth will likely conflict with the building. | | | | | | | | | REMOVE See Section 7.1.5 | |

| Tree No. | Botanical Name Common Name | Height (m) | DBH (m) | Crown Spread (m) | Age | Crown Class | Crown Aspect | Crown Ratio | SULE Rating | STARS Rating | TPZ | SRZ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 18 | *Jacaranda mimosifolia* Jacaranda | 8 | 0.45 | 7 x 5 | M | C | NW | F | **A1** | **HIGH** | **5.4** | **2.4** |
| **Assessment** | | Trees no. 18 to 30 form an avenue planting on one side of an access road. The driplines of the linear planting are meshing together. They have been planted a consistent gap between one another, and form high amenity value. These trees provide the habit typical for the species and normal vitality. | | | | | | | | | RETAIN See Section 7.1.1 and 7.1.6 | |
| 19 | *Jacaranda mimosifolia* Jacaranda | 7 | 0.37 | 4 x 8 | M | I | W | F | **A1** | **HIGH** | **4.4** | **2.2** |
| **Assessment** | | See assessment for tree no. 17. | | | | | | | | | RETAIN See Section 7.1.1 and 7.1.6 | |
| 20 | *Jacaranda mimosifolia* Jacaranda | 8 | 0.39 | 7 x8 | M | I | W | F | **A1** | **HIGH** | **4.7** | **2.3** |
| **Assessment** | | See assessment for tree no. 17. | | | | | | | | | RETAIN See Section 7.1.1 and 7.1.6 | |
| 21 | *Jacaranda mimosifolia* Jacaranda | 7 | 0.47[B] | 8 x 10 | M | I | W | F | **A1** | **HIGH** | **5.6** | **2.4** |
| **Assessment** | | See assessment for tree no. 17. | | | | | | | | | RETAIN See Section 7.1.1 and 7.1.6 | |
| 22 | *Jacaranda mimosifolia* Jacaranda | 6 | 0.38 | 4 x 8 | M | I | N | F | **A1** | **HIGH** | **4.6** | **2.2** |
| **Assessment** | | See assessment for tree no. 17. | | | | | | | | | RETAIN See Section 7.1.1 | |

| Tree No. | Botanical Name Common Name | Height (m) | DBH (m) | Crown Spread (m) | Age | Crown Class | Crown Aspect | Crown Ratio | SULE Rating | STARS Rating | TPZ | SRZ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | and 7.1.6 | |
| 23 | *Jacaranda mimosifolia* Jacaranda | 6 | 0.34 | 4 x 8 | M | I | N | F | **A1** | **HIGH** | **4.1** | **2.1** |
| **Assessment** | | See assessment for tree no. 17. | | | | | | | | | RETAIN See Section 7.1.1 and 7.1.6 | |
| 24 | *Jacaranda mimosifolia* Jacaranda | 7 | 0.48 | 8 x 9 | M | I | N | F | **A1** | **HIGH** | **5.7** | **2.4** |
| **Assessment** | | See assessment for tree no. 17. | | | | | | | | | RETAIN See Section 7.1.1 and 7.1.6 | |
| 25 | *Jacaranda mimosifolia* Jacaranda | 6 | 0.31 | 3 x 5 | M | I | N | F | **A1** | **HIGH** | **3.7** | **2.1** |
| **Assessment** | | See assessment for tree no. 17. | | | | | | | | | RETAIN See Section 7.1.1 and 7.1.6 | |
| 26 | *Jacaranda mimosifolia* Jacaranda | 7 | 0.43 | 7 x 8 | M | I | N | F | **A2** | **HIGH** | **5.2** | **2.3** |
| **Assessment** | | See assessment for tree no. 17. | | | | | | | | | RETAIN See Section 7.1.1 and 7.1.6 | |
| 27 | *Jacaranda mimosifolia* Jacaranda | 6 | 0.38 | 5 x 6 | M | I | N | P | **A2** | **HIGH** | **4.6** | **2.2** |
| **Assessment** | | See assessment for tree no. 17. | | | | | | | | | RETAIN | |

| Tree No. | Botanical Name Common Name | Height (m) | DBH (m) | Crown Spread (m) | Age | Crown Class | Crown Aspect | Crown Ratio | SULE Rating | STARS Rating | TPZ | SRZ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | See Section 7.1.1 and 7.1.6 | |
| 28 | *Jacaranda mimosifolia* Jacaranda | 8 | 0.45 | 7 x 8 | M | I | N | F | **A1** | **HIGH** | **5.4** | **2.4** |
| **Assessment** | | See assessment for tree no. 17. | | | | | | | | | RETAIN See Section 7.1.1 and 7.1.6 | |
| 29 | *Jacaranda mimosifolia* Jacaranda | 8 | 0.56 | 9 x 9 | M | I | Sym. | F | **A1** | **HIGH** | **6.7** | **2.6** |
| **Assessment** | | See assessment for tree no. 17. | | | | | | | | | RETAIN See Section 7.1.1 and 7.1.6 | |
| 30 | *Jacaranda mimosifolia* Jacaranda | 8 | 0.40 | 3 x 8 | M | C | S | F | **A1** | **HIGH** | **4.8** | **2.3** |
| **Assessment** | | See assessment for tree no. 17. | | | | | | | | | RETAIN See Section 7.1.1 and 7.1.6 | |
| 39 | *Melaleuca linariifolia* Snow in Summer | < 5 | < 0.20 | 4 x 15 | M | D | Sym. | F | **A2** | **MEDIUM** | **2.4** | **1.7** |
| **Assessment** | | This is a group planting of six trees. Each tree is composed of 3-4 leaders from ground level. They combine to form a single dripline which has been crown lifted for vehicle/pedestrian access. Each tree forms a shrub-like habit. | | | | | | | | | RETAIN See Section 7.1.1 and 7.1.6 | |
| 40 | *Corymbia citriodora* Lemon-scented Gum | 9 | 0.34 | 6 x 9 | M | D | Sym. | F | **A1** | **MEDIUM** | **4.1** | **2.1** |

| Tree No. | Botanical Name Common Name | Height (m) | DBH (m) | Crown Spread (m) | Age | Crown Class | Crown Aspect | Crown Ratio | SULE Rating | STARS Rating | TPZ | SRZ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Assessment** | | This tree provides the habit typical for the species and normal vitality. | | | | | | | | | RETAIN See Section 7.1.1 | |
| 41 | *Corymbia citriodora* Lemon-scented Gum | 9 | 0.29 | 4 x 4 | M | C | E | F | **A2** | **MEDIUM** | **3.5** | **1.9** |
| **Assessment** | | This tree provides the habit typical for the species and normal vitality. | | | | | | | | | RETAIN See Section 7.1.1 | |
| 42 | *Corymbia citriodora* Lemon-scented Gum | 7 | 0.17 | 3 x 2 | Y | C | N | F | **A2** | **MEDIUM** | **2.1** | **1.6** |
| **Assessment** | | This tree provides the habit typical for the species and normal vitality. | | | | | | | | | RETAIN See Section 7.1.1 | |
| 43 | *Corymbia citriodora* Lemon-scented Gum | 16 | 0.56 | 17 x 12 | M | C | E | F | **A1** | **HIGH** | **6.7** | **2.6** |
| **Assessment** | | This tree provides the habit typical for the species and normal vitality. | | | | | | | | | RETAIN See Section 7.1.1 | |
| 44 | *Corymbia citriodora* Lemon-scented Gum | 16 | 0.38 | 10 x 6 | I/M | D | Sym. | F | **A1** | **HIGH** | **4.6** | **2.2** |
| **Assessment** | | This tree provides the habit typical for the species and normal vitality. | | | | | | | | | RETAIN See Section 7.1.1 | |
| 45 | *Corymbia citriodora* Lemon-scented Gum | 8 | 0.32 | 10 x 6 | M | C | W | F | **A1** | **HIGH** | **3.8** | **2.1** |
| **Assessment** | | This tree provides the habit typical for the species and normal vitality. | | | | | | | | | RETAIN See Section 7.1.1 | |

| Tree No. | Botanical Name Common Name | Height (m) | DBH (m) | Crown Spread (m) | Age | Crown Class | Crown Aspect | Crown Ratio | SULE Rating | STARS Rating | TPZ | SRZ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 46 | *Corymbia citriodora* Lemon-scented Gum | 10 | 0.34 | 9 x 5 | M | C | E | F | **A1** | **HIGH** | **4.1** | **2.1** |
| **Assessment** | | This tree provides the habit typical for the species and normal vitality. | | | | | | | | | RETAIN See Section 7.1.1 | |
| 47 | *Eucalyptus microcorys* Tallowwood | 18 | 0.76 | 17 x 17 | M | D | Sym. | F | **A1** | **HIGH** | **9.2** | **2.9** |
| **Assessment** | | This tree provides the habit typical for the species and normal vitality. | | | | | | | | | RETAIN See Section 7.1.1 | |
| 48 | *Eucalyptus microcorys* Tallowwood | 16 | 0.53 | 10 x 15 | M | C | S | F | **A2** | **MEDIUM** | **6.4** | **2.5** |
| **Assessment** | | This tree provides the habit typical for the species and normal vitality. | | | | | | | | | RETAIN See Section 7.1.1 | |
| 49 | *Corymbia citriodora* Lemon-scented Gum | 17 | 0.52 | 16 x 16 | M | D | Sym. | F | **A1** | **HIGH** | **6.3** | **2.5** |
| **Assessment** | | This tree provides the habit typical for the species and normal vitality. | | | | | | | | | RETAIN See Section 7.1.1 and 7.1.6 | |
| 50 | *Corymbia citriodora* Lemon-scented Gum | 18 | 0.51 | 10 x 7 | M | D | Sym. | F | **A1** | **HIGH** | **6.2** | **2.5** |
| **Assessment** | | This tree provides the habit typical for the species and normal vitality. | | | | | | | | | RETAIN See Section 7.1.1 and 7.1.6 | |
| 51 | *Corymbia citriodora* Lemon-scented Gum | 10 | 0.33 | 10 x 12 | M | D | Sym. | F | **A1** | **HIGH** | **3.9** | **2.1** |

| Tree No. | Botanical Name Common Name | Height (m) | DBH (m) | Crown Spread (m) | Age | Crown Class | Crown Aspect | Crown Ratio | SULE Rating | STARS Rating | TPZ | SRZ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Assessment** | | This tree provides the habit typical for the species and normal vitality. | | | | | | | | | RETAIN See Section 7.1.1 | |
| 52 | *Corymbia maculata* Spotted Gum | 19 | 0.71 | 18 x 16 | M | D | Sym. | F | **A1** | **HIGH** | **8.5** | **2.8** |
| **Assessment** | | This tree provides the habit typical for the species and normal vitality. | | | | | | | | | RETAIN See Section 7.1.1 | |
| 55 | *Harpephyllum caffrum* Kaffir Plum | 16 | 1.14[B] | 8 x 20 | M | C | N | F | **A2** | **HIGH** | **13.7** | **3.5** |
| **Assessment** | | This tree provides the habit typical for the species and is composed of at least five large leaders that initiate from a common root crown or small stem. A collection of stubs, crossing branches, and deadwood occurs in the crown, and based on retention some remedial pruning and a level 3- aerial assessment should proceed to reduce any related risk. | | | | | | | | | RETAIN See Section 7.1.1 | |
| 56 | *Harpephyllum caffrum* Kaffir Plum | 16 | 0.67[B] | 4 x 15 | M | I | Sym. | F | **A2** | **HIGH** | **8.1** | **2.8** |
| **Assessment** | | See Assessment for tree no. 55. | | | | | | | | | RETAIN See Section 7.1.1 and 7.1.6 | |
| 57 | *Harpephyllum caffrum* Kaffir Plum | 16 | 1.13[B] | 10 x 20 | M | C | S | F | **A2** | **HIGH** | **13.6** | **3.5** |
| **Assessment** | | See Assessment for tree no. 55. | | | | | | | | | RETAIN See Section 7.1.1 and 7.1.6 | |

| Tree No. | Botanical Name Common Name | Height (m) | DBH (m) | Crown Spread (m) | Age | Crown Class | Crown Aspect | Crown Ratio | SULE Rating | STARS Rating | TPZ | SRZ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 63 | *Elaeocarpus reticulatus* Blueberry Ash | 6 | 0.12 | 2 x 2 | Y | D | Sym. | F | **A2** | **LOW** | **2.0** | **1.5** |
| **Assessment** | | This tree provides the habit typical for the species. | | | | | | | | | RETAIN See Section 7.1.1 and 7.1.6 | |
| 64 | *Radermachera sinica* China Doll | 6 | 0.13 | 2 x 2 | Y | D | Sym. | F | **A2** | **LOW** | **2.0** | **1.5** |
| **Assessment** | | This tree provides the habit typical for the species. | | | | | | | | | RETAIN See Section 7.1.1 and 7.1.6 | |
| 65 | *Lophostemon confertus* Brush Box | 18 | 0.71 | 11 x 9 | M | C | N | F | **A1** | **HIGH** | **8.5** | **2.8** |
| **Assessment** | | The tree provides the habit, typical for a forest class, a result of the building height surrounding the tree group, no. 65-67. The vitality appears normal. | | | | | | | | | RETAIN See Section 7.1.1 | |
| 66 | *Lophostemon confertus* Brush Box | 18 | 0.60 | 6 x 10 | M | I | Sym. | F | **A1** | **HIGH** | **7.2** | **2.7** |
| **Assessment** | | The tree provides the habit, typical for a forest class, a result of the building height surrounding the tree group, no. 65-67. The vitality appears normal. | | | | | | | | | RETAIN See Section 7.1.1 | |
| 67 | *Lophostemon confertus* Brush Box | 18 | 0.78 | 7 x 9 | M | C | SW | P | **A2** | **MEDIUM** | **9.4** | **2.9** |
| **Assessment** | | The tree provides the habit, typical for a forest class, a result of the building height surrounding the tree group, no. 65-67. The vitality appears below average; this is based on the partial crown density. No apparent reason exists for this reduced vitality. | | | | | | | | | RETAIN See Section 7.1.1 and 7.1.6 | |
| 68 | *Homalanthus populifolius* Bleeding Heart | 6 | 0.19 | 6 x 5 | M | C | E | F | **A3** | **LOW** | **2.3** | **1.6** |

| Tree No. | Botanical Name<br>Common Name | Height (m) | DBH (m) | Crown Spread (m) | Age | Crown Class | Crown Aspect | Crown Ratio | SULE Rating | STARS Rating | TPZ | SRZ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Assessment** | | This self-sown tree presents the habit typical for the species. The rating is based on the limited life span of the tree and location from where it is growing. | | | | | | | | | REMOVE<br>See Section 7.1.4 | |
| 69 | *Prunus sp.*<br>Ornamental Cherry | 5 | 0.18[B] | 6 x 3 | M | D | Sym. | S | **A4** | **LOW** | **2.2** | **1.6** |
| **Assessment** | | Trees no. 69-72 are a planted row, likely intended as a privacy screen for the ground floor windows from the area of primary access. Each tree presents the domed shaped habit typical for the species and is composed of several leaders that initiate from a small stem. | | | | | | | | | REMOVE<br>See Section 7.1.4 | |
| 70 | *Prunus sp.*<br>Ornamental Cherry | 5 | 0.16[B]<br>0.16 | 7 x 6 | M | D | Sym. | F | **A2** | **MEDIUM** | **2.7** | **1.8** |
| **Assessment** | | See assessment for tree no. 69. | | | | | | | | | REMOVE<br>See Section 7.1.4 | |
| 71 | *Prunus sp.*<br>Ornamental Cherry | 5 | 0.19[B] | 6 x 6 | M | D | Sym. | F | **A2** | **MEDIUM** | **2.3** | **1.6** |
| **Assessment** | | See assessment for tree no. 69. | | | | | | | | | REMOVE<br>See Section 7.1.4 | |
| 72 | *Prunus sp.*<br>Ornamental Cherry | 4 | 0.15[B] | 5 x 4 | M | D | Sym. | F | **A2** | **MEDIUM** | **2.0** | **1.5** |
| **Assessment** | | See assessment for tree no. 69. | | | | | | | | | REMOVE<br>See Section 7.1.4 | |
| 73 | *Ficus microcarpa, var. hillii*<br>Hill's Weeping Fig | 24 | 1.90[B] | 20 x 20 | M | D | Sym. | F | **A1** | **HIGH** | **15.0** | **4.3** |

| Tree No. | Botanical Name Common Name | Height (m) | DBH (m) | Crown Spread (m) | Age | Crown Class | Crown Aspect | Crown Ratio | SULE Rating | STARS Rating | TPZ | SRZ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Assessment** | | This tree provides the habit typical for the species and normal vitality. | | | | | | | | | RETAIN See Section 7.1.1 and 7.1.6 | |
| 74 | *Ficus microcarpa, var. hillii* Hill's Weeping Fig | 20 | 1.20[B] | 16 x 16 | M | D | Sym. | F | **A1** | **HIGH** | **14.4** | **3.6** |
| **Assessment** | | This tree provides the habit typical for the species and normal vitality. | | | | | | | | | RETAIN See Section 7.1.1 and 7.1.6 | |
| 75 | *Callistemon viminalis* Bottlebrush | 8 | 0.32 0.25 | 5 x 5 | M | C | Sym. | F | **A2** | **MEDIUM** | **4.9** | **2.3** |
| **Assessment** | | This tree provides the habit typical for the species and normal vitality. | | | | | | | | | REMOVE See Section 7.1.4 | |
| 76 | *Callistemon viminalis* Bottlebrush | 8 | 0.21 | 4 x 4 | M | D | Sym. | F | **A2** | **MEDIUM** | **2.5** | **1.7** |
| **Assessment** | | This tree provides the habit typical for the species and normal vitality. | | | | | | | | | RETAIN See Section 7.1.1 | |
| 77 | *Callistemon viminalis* Bottlebrush | 8 | 4 x 0.19 | 4 x 6 | M | D | Sym. | F | **A2** | **MEDIUM** | **4.6** | **2.2** |
| **Assessment** | | This tree provides the habit typical for the species and normal vitality. | | | | | | | | | RETAIN See Section 7.1.1 | |
| 78 | *Cupressus sempervirens* Mediterranean Cypress | 13 | 0.45[B] | 4 x 4 | M | D | Sym. | F | **A2** | **MEDIUM** | **5.4** | **2.4** |
| **Assessment** | | This tree provides the habit typical for the species and normal vitality. This tree is the | | | | | | | | | RETAIN | |

| Tree No. | Botanical Name Common Name | Height (m) | DBH (m) | Crown Spread (m) | Age | Crown Class | Crown Aspect | Crown Ratio | SULE Rating | STARS Rating | TPZ | SRZ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | end planting of a linear (avenue) planting of the species that extend along a drive and within a narrow garden bed. Eighteen trees appear to form part of this screen. Several gaps occur in this screen from past removals. However the predominant screen still exists and offers significant amenity value and screening for this part of the hospital. | | | | | | | | | See Section 7.1.1 and 7.1.6 | |
| 86 | *Syncarpia glomulifera* Turpentine | 16 | 0.59<br>0.55 | 7 x 15 | M | D | Sym. | F | **A1** | **HIGH** | **9.7** | **3.1** |
| **Assessment** | | This tree is likely a remnant planting and based on the habit, is estimated to be mature coppiced regrowth. The tree provides the habit typical for the growth type and normal vitality, See Section 7.0. | | | | | | | | | RETAIN<br>See Section 7.1.1 | |
| 87 | *Olea europaea subsp. cuspidata* African Olive | 8 | 0.25<br>0.20 | 9 x 6 | M | S | W | F | **B2** | **LOW** | **3.8** | **2.1** |
| **Assessment** | | This tree is self-sown, this is based on the location from where the tree is growing, i.e., suppressed beneath mature trees and the related weed status. This is reflected in the applied rating. | | | | | | | | | REMOVE<br>See Section 7.1.4 | |
| 88 | *Syncarpia glomulifera* Turpentine | 18 | 0.89 | 8 x 10 | M | F | Sym. | F | **A1** | **HIGH** | **10.7** | **3.2** |
| **Assessment** | | This tree is likely a remnant planting. The tree provides the habit typical for the species as a forest class, See Section 7.0. | | | | | | | | | RETAIN<br>See Section 7.1.1 | |
| 89 | *Syncarpia glomulifera* Turpentine | 16 | 0.65<br>0.60<br>0.48<br>0.50 | 9 x 15 | M | F | Sym. | F | **A1** | **HIGH** | **13.4** | **3.5** |
| **Assessment** | | This tree is likely a remnant planting and based on the habit, is estimated to be mature coppiced regrowth. The tree provides the habit typical for the growth type and normal | | | | | | | | | RETAIN<br>See Section 7.1.1 | |

| Tree No. | Botanical Name Common Name | Height (m) | DBH (m) | Crown Spread (m) | Age | Crown Class | Crown Aspect | Crown Ratio | SULE Rating | STARS Rating | TPZ | SRZ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | vitality, See Section 7.0. | | | | | | | | | | |
| 90 | *Syncarpia glomulifera* Turpentine | 15 | 0.45<br>0.60<br>0.65 | 9 x 10 | M | C | N | F | **A1** | **HIGH** | **11.8** | **3.3** |
| **Assessment** | | This tree is likely a remnant planting and based on the habit, is estimated to be mature coppiced regrowth. The tree provides the habit typical for the growth type and normal vitality, See Section 7.0. | | | | | | | | | RETAIN See Section 7.1.1 | |
| 91 | *Celtis sinensis* Hackberry | 7 | 0.15<br>0.20 | 6 x 6 | M | D | Sym. | P | **B2** | **LOW** | **3.0** | **1.8** |
| **Assessment** | | This tree is self-sown, this is based on the location from where the tree is growing, i.e., edge of the pool coping and the related weed status. This is reflected in the applied rating. | | | | | | | | | REMOVE See Section 7.1.4 | |

A. Incomplete identification of species due to insufficiently available plant material
B. Diameter taken below 1.4m due to low stem bifurcation
C. estimate due to overgrown area and/or limited access
D. deciduous species, void of leaf at the time of assessment
E. Level 3 assessment required to determine accurate rating

## 7.0 Site Assessment

The area of assessment comprised a portion of the Concord Hospital and based on an outline of assessment provided by *Johnstaff P/L.* This has included three areas, for which two are illustrated in Plans 2 and 3. The third area consists of a portion of the existing car park fronting Hospital Road and where the multistory (MS) car park, Stage 1 and 2 is proposed. This area of the site does not contain any trees nor has it been assessed. A street tree planting exists and has not been included in this report. This area has an overall medium gradient with a south-eastern aspect. The area is predominately composed of grade changes to accommodate infrastructure. Therefore underlying soil profiles are estimated to be a composite of fill material and horizon B. The south-eastern area of assessment, containing unsealed car parking areas could reflect natural grade as does the area adjacent to the swimming pool, and in the western corner of assessment.

Tree significance

The predominant site trees are planted and of varying ages. Some are considered to have formed part of the initial landscape associated with the hospital; construction during the 1940's, for example, the trees no. 65-67. While many others have been added, possibly related to extensions and modifications, for example, trees no. 34-37. Other sole specimens may be memorial plantings, and likely unregistered, therefore difficult to confirm. Other significance can be applied to group plantings and amenity value these contribute as a group, for example, the Fig trees, being trees no. 1-9 and Jacarandas, being trees no. 18 to 30. A single group of trees is estimated to be remnant and cater for specimens of high significance. These are trees no. 86, 88, 89 and 90. These Turpentines but for one are coppiced regrowth, and accounting for the maturity of the regrowth, have likely been trees that were cut to stumps as part of the original hospital development. The species is not a common urban planting and based on vegetation mapping[6], have formed part of a vegetation community indigenous to the area. The area of the hospital grounds has not been completely mapped. However, bio-diversity mapping illustrates the vegetation community; *Sydney Turpentine Ironbark Forest* to occur within a kilometer of these trees. Therefore it is likely to have occurred in the area of Concord Hospital.

This vegetation community is classed as an Endangered Environmental Community (EEC) and protected under Part 2 of Schedule 1A the Threatened Species Conservation Act (TSC Act) and the Commonwealth Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act). None of the trees contained in this report are endangered species and do not warrant legislative

[6] See Section 4.4.9

protection other than the vegetation community to which they belong. The significance of this planting, relative to the vegetation community is beyond the scope of an arborist. Based on this point, the protection offered as an EEC would require further consultation by an ecologist.

A remaining tree group is not based on age or significance but risk related to the inherent physiology. These are trees that can cater a threat to humans based on allergy or toxicity. Due to the hospital environment and issues related to patient's susceptibility to any health-related conditions, these trees should be removed regardless of condition or proposed works. These are referred to Section 7.1.2. The risks include persons sensitive to respiratory complications and allergies (and especially persons susceptible to asthma) related to Privet. These are located adjacent to tree no. 79. Fibre irritants, related to tree no. 84 (Norfolk Island Hibiscus) and susceptibility for persons prone to dermatological disorders, and caustic action related to the Indian Tree Spurge, tree no. 85. This will cause a range of issues based on dermal contact often resulting in medical assistance.

Other Areas

Trees labeled as 'A' on the plan set, Section 5.1-5.5, have been included in the survey, however, had been removed prior to the assessment.

The area is containing trees no. 80 to 91 has been requested for assessment as an addition, however, has not been included in the survey drawing. These trees have been included and plotted by *Allied Tree Consultancy*, as illustrated on Plan 5, inset. This area is a level lawn area containing an inground swimming pool and brick pool building. The area of assessment has extended to the western end of the pool. The area that extends past this is predominately lawn. However, a dense band of unmaintained vegetation up to 10m wide extends along and parallel with the south-western boundary and up till the end of the seven-story brick building located on the northern side of this yard. This area of unmaintained vegetation contains trees, and though the majority of this area appears to contain woody weeds, that is, Privet and Camphor Laurel, some other tree species also occur in this area. This area has not been assessed.

The area is adjacent to tree no. 80 contains two, Canary Islands Dragon Trees (*Dracaena draco*). These have not been included in the assessment because they do not provide sufficient height for inclusion. These trees are mature and provide significant landscape value based on species, habit, and size. The species is 'out of character' for the landscape trees that occur throughout the grounds, therefore may be related to memorial plantings or similar. These trees provide high success rate for transplanting, and if they conflict with any proposed works, consideration for transplant and use elsewhere in the hospital landscape is recommended.

### 7.1 Proposed development

This SSDA report seeks consent for the proposed redevelopment of Concord Repatriation General Hospital to improve and replace outmoded facilities to meet the substantial growth in clinical service demand across the hospital's catchment:

Concept approval is sought for the redevelopment of indicatively comprising 82,000sqm GFA, to be undertaken in two (2) stages including:

- Clinical Services Building (CSB) and multi-story carpark (Stage 1); and
- Acute Services Building (ASB) and multi-story carpark (Stage 2).
  Detailed approval is sought for the Stage 1 construction of the proposed CSB (44,000sqm GFA) and the construction of a multi-story car park located to the north of Hospital Road.

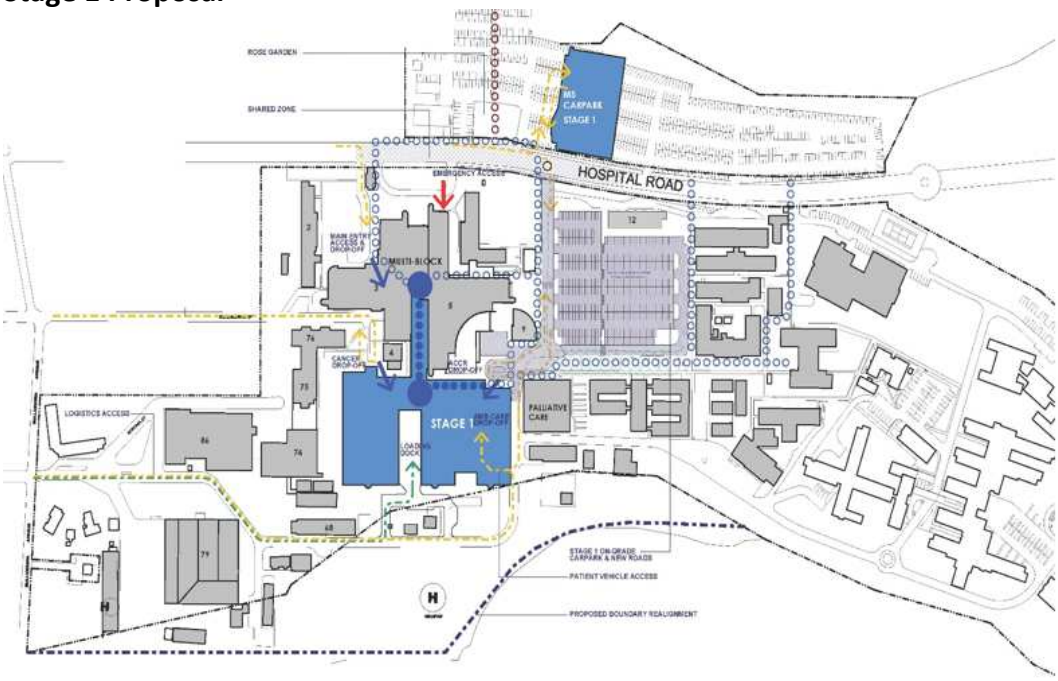
Detailed development approval for the proposed Stage 2 works will be completed at a later date and does not form part of this SSDA. The Stage 1 Detailed works are estimated to be completed by the end of 2021.

The proposed Stage 1 detailed development (CSB and multi-story carpark) is in accordance with the architectural drawings prepared by Jacobs.

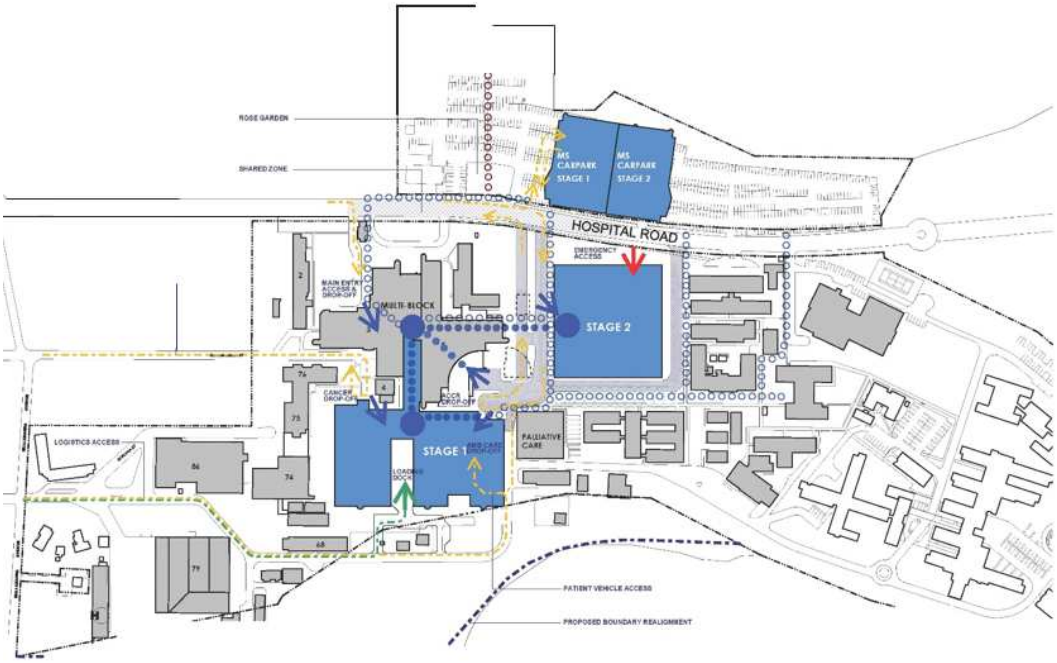
The areas in the below-staging plans have been assessed and are included in this report.

Source: Marc Carneiro, Senior Project Manager; *Johnstaff*

**Stage 1 Proposal**



**Stage 2 (future expansion)**




Sections 7.1.3-7.1.5 refer to the impact of the footprint of the architectural design relative to the work stage, that is, REF and SSDA, further divided between, Stage 1 and Stage 2. Section 7.1.2 refers to tree removal based on the tree condition/species. Section 7.1.6 discusses the impact of subsurface utilities. The method of installation and proposed route of these utilities can be flexible. Therefore no nomination for tree removal has been indicated in this section. This is based on the opportunity that can exist for design measures that are sympathetic towards tree retention and installation of the utility.

The proposal for tree retention and removal has been based on the REF, and specifically Condition 3.1 being those trees nominated for removal and Condition 3.2 being those trees nominated for retention.

This report provides a summary of the impact of the proposed design on the trees. Ninety-one (91) trees have been listed within this report based upon the requested area of assessment. The following summary provides the impact on these trees and the nomination for retention and removal based on the REF;

**7.1.1 Trees nominated for retention in the REF and SSDA**

Trees no. 1-9, 13, 14, 16, 18-30, 39-52, 55, 56, 57, 63-67, 73, 74, 76-78, 80-83, 86 and 88-90.

The predominant architectural design does not conflict with the location of these trees. However, some trees have the respective zones of protection (TPZ/SRZ) encroached upon by both the design works and subsurface

utilities, see Sections 7.1.6 and 7.1.7. The extent of encroachment varies from minor to major[7] as does the type of encroachment. Within some circumstances, this encroachment can be reduced and mitigated for tree retention. The project arborist must be contacted before any works that are proposed in the area of the nominated Tree Protection Zone proceed. The project arborist must assess the tree relative to the proposed works to determine appropriate mitigation. The Tree Protection Zone are contained in Table 1 and defined in Appendix A.

### 7.1.2 Trees providing a limited useful life expectancy

Trees no. 38, 68, 69, 84, 85, 87 and 91.

These trees provide low significance based on the species, habit and rating and could be removed due to the low amenity value and limited useful life expectancy.

Trees no. 84 and 85 provide a risk to a personal health based on the inherent nature of tree species and should be removed based on the related issues regardless of impact by design. These two trees have been included in the REF, Condition 3.1 for removal.

### 7.1.3 Trees approved for removal in the REF based on the conflicting location with the design

Trees no. 31-38, 53, 54, 58, 59, 60, 61, 62, 79, 84 and 85.

These trees are located in the footprint of the proposed design and would require removal based on this premise alone. The conflict is summarised as follows;

- Trees no. 31-38 and 58: occur within the footprint of the proposed 'new building footprint,' see NEWB-AR-DRG-0005, Rev. 12
- Trees no. 53, 54, 59, 60, 61 and 62: occur adjacent to the footprint of the proposed 'new building footprint,' and have been proposed for removal based on this drawing for the enabling works, see drawing NEWB-AR-DRG-0005, Rev. 12
- Tree no. 79: within the footprint of the proposed 'Relocated New Med Gas,' see drawing 1A064700-ENA-AR-DRG-030 (rev. 4)
- Trees 84 and 85; See Section 7.1.2

[7] Australian Standard, 2009, AS4970, Protection of trees on development sites, page 11.

**7.1.4 Trees nominated for removal in the SSDA (Stage 1 works) based on the conflicting location with the design**

Trees no. 68-72, 75, 87 and 91.

These trees are located in the footprint of the proposed design and would require removal based on this premise alone. The conflict is summarised as follows;

- Tree no. 70, 71, 72 and 75: occur within the footprint of the proposed car parking bays see drawing NEWB-AR-DRG-0005, Rev. 12.
- Tree no. 68, 69, 87 and 91: see Section 7.1.2

**7.1.5 Trees nominated for removal in the SSDA (Stage 2 works) based on the conflicting location with the design**

Trees no. 10, 11, 12, 15 and 17.

These trees are located in the footprint of the proposed design and would require removal based on this premise alone. The conflict is summarised as follows;

- Trees no. 10-12, 15 and 17: occur within the footprint of the proposed 'new on grade carpark,' see drawing NEWB-AR-DRG-0005, Rev. 12.

**7.1.6 Trees impacted upon by the subsurface utilities.**

Trees no. 3-9, 16, 18-30, 39, 49, 50, 51, 56, 57, 63, 64, 67, 73, 74, 78 and 80.

The impacts include trenching for gas, communications, water and electricity and based on the drawing sets referenced in Sections 4.4.3 (Civil), 4.4.4 (Electrical) and 4.4.5 (Hydraulic). The extent of the impact will be variable and based on the methodology required for installation of these services. That is, based on installation via trenching, the depth of the trench will relate to the extent of root severance. Opportunities exist for reducing the impact and therefore maintaining tree retention. These include rerouting the trenching further from the tree, installation of trenches by alternative methods that reduce the impact on any tree, including under boring, and excavation via hand tools and under instruction by the project arborist. However, limitations for these methods can occur and would require the viability to be discussed prior to initiation of works to determine whether such methods can be employed to retain site trees. Table 2 describes the trees that are impacted upon. This table provides the following parameters;

- Tree number, and respective significance (from Table 1, Section 6.0),
- Type of impact; based on the AS 4970 that is major (greater than 10% of the TPZ/SRZ), and the zone that is impacted upon, SRZ; Structural Root Zone, TPZ; Tree Protection Zone[8]. Trenching in the SRZ can lead to

[8] TPZ/SRZ definitions described in Appendix A.

destabilising the tree. Trenching in the area of TPZ is unlikely to destabilise the tree, however, will impact on the vitality of the tree (health).

- The proposed service(s) that will impact on the SRZ/TPZ. The terminology has been extracted from the 'legend' contained in the drawing set referenced in Section 4.4.3.
- Notes referring to specific trees.

**Table 2; Impact on the site trees by subsurface utilities**

| Tree no./ Significance | Type/zone of encroachment | Service providing encroachment | Notes |
|---|---|---|---|
| 3<br>HIGH | Major/SRZ | - HV service trench<br>- Comms service trench<br>- Sewer service trench<br>- Pit | 1 |
| 4-9<br>HIGH | Major/SRZ | - HV service trench<br>- Comms service trench | 1 |
| 15<br>HIGH | Major/SRZ | - HV service trench<br>- Comms service trench<br>- Sewer service trench<br>- Mains works S/W pipe | 2, 4 |
| 16<br>HIGH | Major/TPZ | - Sewer service trench | 3, 4 |
| 17<br>LOW | Major/TPZ | - Sewer service trench | 4, 5 |
| 18-30<br>HIGH | Major/SRZ | - Mains works S/W pipe<br>- Medical gas service trench | 6 |
| 39<br>MEDIUM | Major/TPZ | - Mains works S/W pipe | 4 |
| 49<br>HIGH | Major/SRZ | - Mains works S/W pipe | 7 |
| 50<br>HIGH | Major/SRZ | - Comms service trench | 3 |
| 51<br>HIGH | Major/SRZ | - Mains works S/W pipe<br>- Comms service trench | 3, 4 |
| 56<br>HIGH | Major/TPZ | - Water service trench | 3, 8 |
| 57<br>HIGH | Major/SRZ | - Water service trench | 3, 8 |
| 63-64<br>LOW | Major/SRZ | - Water service trench<br>- Sewer service trench | 4, 5 |
| 67<br>MEDIUM | Major/SRZ | - Comms service trench<br>- Water service trench | - |
| 73<br>HIGH | Major/SRZ,TPZ | - HV service trench<br>- Comms service trench<br>- Sub-station | 9 |

| | | | |
|---|---|---|---|
| | | - Pits | |
| 74<br>HIGH | Major/SRZ | - HV service trench<br>- Comms service trench<br>- Pits | 9 |
| 78<br>MEDIUM | Major/TPZ | - HV service trench<br>- Comms service trench | 4, 10 |
| 80<br>MEDIUM | Major/SRZ | - HV service trench<br>- Comms service trench | 4, 9 |

**Notes**

1. These trees (along with trees no. 1-9) provide significant amenity value to the streetscape and screening of the hospital.
2. Accounting for a large number of proposed services that extend throughout the tree location and zones of protection, it is unlikely that this tree can be retained.
3. The proposed utilities around this tree appear minor and could likely be maneuvered to allow for tree retention.
4. The location of these trees has been plotted by *Allied Tree Consultancy*. See Section 4.5.1
5. This tree provides low significance and is not considered to provide sufficient retention value to change the design or installation methodology to allow for tree retention. That is, measures are not required to accommodate this tree. If the location of the subsurface utility conflict, then the tree can be removed.
6. This avenue planting of Jacaranda offer high amenity value and require measures and design constraints to retain without impacting the zones of protection (TPZ, SRZ).
7. This is a group planting, and any encroachment could require removal of part of the tree group, and still allow for retaining the remaining trees.
8. This tree is large, and risk relating to the branch structure may exist. A level 3- aerial assessment should proceed to reduce any risk before redesigning any subsurface utilities around this tree or any work in the vicinity of the tree.
9. These trees offer high amenity value and require measures and design constraints to retain without impacting the zones of protection (TPZ, SRZ).
10. This tree is located at the end of a screen planting. The proposed route of subsurface utilities extends parallel with this screen planting, and all trees will be subject to similar encroachment. Based on the scope of works, none of this screen planting has been included in the report other than tree no. 78. This planting is considered to exhibit sufficient significance to retain and protect.

Therefore the measures placed for retaining and protecting this tree should extend to all trees in this screen planting.

#### 7.1.7 Works within the zones of protection; TPZ/SRZ.

Any work proposed to be located in the zones of protection, being the Tree Protection Zone (TPZ) or Structural Root Zone (SRZ)[9] shall conform to the conditions outlined in Section 8.0; Protection Specification. Within circumstances where the proposed works do not fulfill the requirements of this section, then the project arborist must be contacted prior to any works progressing to determine the means for reducing the encroachment, via design modification or work methodology. This may include tree removal pending the significance of the tree.

### 7.2 Protection measures

Tree protection measures will be required during the demolition and construction stage. However, the design/location of these measures will be pending the work and design methodology. The project arborist should be contracted after the confirmation of tender award for the instruction of the protection measures implementation.

A project arborist must be appointed to the project before work proceeds.

The primary types of protection measures, however not limited to are illustrated in Appendix B.

Site induction; All workers related to the construction process and before entering the site must be briefed about the requirements/conditions outlined in this report relative to the zone of protection, measures, and specifications before the initiation of work. This is required as part of the site induction process.

### 7.3 Compliance Documentation

The following stages will require assessment and documentation (report, letter, certification) by the project arborist or person responsible for the specific work type, and the related documentation is to be issued to the principal certifying agent.

#### 7.3.1 Table 3; Assessment/Certification stages

| Stage | Work type | Document required |
|---|---|---|
| Pre- works | Installation of the protection measures, Section 7.2. | Certificate* |

[9] See Table 1, for the zones of each tree and definitions contained in Appendix A.

| | | |
|---|---|---|
| During construction | Any <u>further works</u> required within the area of the TPZ, or decline related to the trees that have not been covered by this report. | Report Brief |
| During construction | Any crown modification including pruning or root disturbance. | Report Brief |

**Construction** refers to the time between the initiation of demolition and until an occupation certificate is issued.
***Mandatory**

## 8.0 Protection Specification

The retention and protection of trees provide for the requirement of the Tree Protection Zone (TPZ) to conform to the conditions outlined below. These conditions provide the limitations of work permitted within the area of the Tree Protection Zone (TPZ) and must be adhered to unless otherwise stated.

1. <u>Foundation/footing types should not be strip type</u>, but utilise footing types that are sympathetic towards retaining root system that is, screw, pier, etc. Slab on the ground can be accommodated in some circumstances and will be nominated by the project arborist. The extent of encroachment will be dependent upon the tree species, soil type (texture and profile) and gradients.

2. <u>Trenching must not occur within the area of the TPZ/SRZ</u> unless permitted by the project arborist.

3. <u>Subsurface utilities</u> can extend through the TPZ and Structural Root Zone (SRZ), however, are limited to the method of installation. That is under boring is permitted, however trenching is limited and depends on the proposed route within the TPZ. No trenching is permitted within the area of the TPZ unless stipulated by the project arborist.

4. Crown pruning can be accommodated, however, must conform to the AS 4373; *Pruning of Amenity Trees*, and not misshape the crown nor remove in excess of 10-15% of the existing crown, pending on the species, and vigour. The opportunity for, type and proportion of pruning will be required to be nominated by the project arborist.

5. <u>Soil levels within the TPZ must remain the same</u>. Any excavation within the TPZ must have been previously specified and allowed for by the project arborist:

   a) So it does not alter the drainage to the tree.

   b) Under specified circumstances,

- Added fill soil does not exceed 100mm in depth over the natural grade. Construction methodologies exist that can allow grade increases in excess of 100mm, via the use of an impervious cover, an approved permeable material or permanent aeration system or other approved methods.

- Excavation cannot exceed a depth of more than 50mm within the area of the TPZ, not including the SRZ. The grade within the SRZ cannot be reduced without the consent from a project arborist.

6. No form of material or structure, solid or liquid, is to be stored or disposed of within the TPZ.

7. No lighting of fires is permitted within the TPZ.

8. All drainage runoff, sediment, concrete, mortar slurry, paints, washings, toilet effluent, petroleum products, and any other toxic wastes must be prevented from entering the TPZ.

9. No activity that will cause excessive soil compaction is permitted within the TPZ. That is, machinery, excavators, etc. must refrain from entering the area of the TPZ unless measures have been taken, and with consultation with the project arborist to protect the TPZ.

10. No site sheds, amenities or similar site structures are permitted to be located or extend into the area of the TPZ unless the project arborist provides prior consent.

11. No form of construction work or related activity such as the mixing of concrete, cutting, grinding, generator storage or cleaning of tools is permitted within the TPZ.

12. No part of any tree may be used as an anchorage point, nor should any noticeboard, telephone cable, rope, guy, framework, etc. be attached to any part of a tree.

12. (a) All excavation work within the TPZ will utilise methods to preserve root systems intact and undamaged. Examples of methods permitted are by hand tools, hydraulic, or pneumatic air excavation technology.

(b) Any root unearthed which is less than 50mm in diameter must be cleanly cut and dusted with a fungicide, and not allowed to dry out, with minimum exposure to the air as possible.

(c) Any root unearthed which is greater than 50mm in diameter must be located regarding their directional spread and potential impact. A

project arborist will be required to assess the situation and determine future action regarding retaining the tree in a healthy state.

Project Arborist: person nominated as responsible for the provision of the tree assessment, arborist report, consultation with stakeholders, and certification for the development project. This person will be adequately experienced and qualified with a minimum of a level 5 (AQF); Diploma in Horticulture (Arboriculture)[10].

[10] Based upon the definition of a 'consulting arborist' from the AS 4970; Protection of trees on development sites; 2009, section 1.4.4, p 6.

## 9.0 Recommendations

Based on the design supplied, the following summary provides the impacts imposed on the trees included in this report.

### 9.1 Trees nominated for retention in the REF and SSDA

Trees no. 1-9, 13, 14, 16, 18-30, 39-52, 55, 56, 57, 63-67, 73, 74, 76-78, 80-83, 86 and 88-90

The following conditions are required for specific trees;

**9.1.1** Trees no. 3-9, 16, 18-30, 39, 49, 50, 51, 56, 57, 63, 64, 67, 73, 74, 78 and 80

These trees are located within the vicinity of the subsurface utilities proposed for the project. The extent of impact on each tree will be variable and in some circumstances offer an impact where tree retention is not viable. However several of this tree group offers high significance and should be retained. Therefore the route and methodology required for installation of these services will require modification and discussion with the project arborist to determine the best practice for allowing tree retention and completion of the works.

**9.1.2** Trees no. 1-9, 13, 14, 16, 18-30, 39-52, 55, 56, 57, 63-67, 73, 74, 76-78, 80-83, 86 and 88-90

The predominant architectural design does not conflict with the location of these trees. However, some trees have the respective zones of protection (TPZ/SRZ) encroached upon by both the design works and subsurface utilities. Within some circumstances, this encroachment can be reduced and mitigated for tree retention. The project arborist must be contacted before any works that are proposed in the area of the nominated Tree Protection Zone proceed. The project arborist must assess the tree relative to the proposed works to determine appropriate mitigation.

### 9.2 Trees approved for removal in the REF based on the conflicting location with the design

Trees no. 31-38, 53, 54, 58, 59, 60, 61, 62, 79, 84 and 85

### 9.3 Trees nominated for removal in the SSDA (Stage 1 works) based on the conflicting location with the design

Trees no. 68-72, 75, 87 and 91

### 9.4 Trees nominated for removal in the SSDA (Stage 2 works) based on the conflicting location with the design

Trees no. 10, 11, 12, 15 and 17

### 9.6 Protection measures

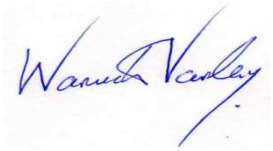
Protection measures (outlined in Section 7.2 and 7.3) are required to be implemented for the trees nominated for retention (referenced in Section 9.1)

and installed before initiation of site works (including demolition/excavation) and retained until the landscaping works are required unless otherwise specified.

All workers related to the construction process and before entering the site must be briefed about the requirements/conditions outlined in this report relative to the zone of protection, measures, and specifications before the initiation of work.

A project arborist is required to be nominated, and the stages and related certification or similar documentation is to be issued to the principal certifying agent.

**The opinions expressed in this report by the author have been provided within the capacity of a Consulting Arborist. Any further explanation or details can be provided by contacting the author.**



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## 10.0 Appendix A- Terminology Defined

**Height**

Is a measure of the vertical distance from the average ground level around the root crown to the top surface of the crown, and on palms - to the apical growth point.

**DBH**

Diameter at Breast Height – being the stem diameter in meters, measured at 1.4m from ground level, including the thickness of the bark.; Mult. refers to multiple stems, that is in excess of 4 stems.

**Crown Spread**

A two dimension linear measurement (in metres) of the crown plan. The first figure being the north-south span, the second being the east-west measurement.

**Age**

Is the estimate of the specimen's age based upon the expected life span of the species. This is divided into three stages.

| | |
|---|---|
| Young (Y) | Trees less than 20% of life expectancy. |
| Mature (M) | Trees aged between 20% to 80% life expectancy. |
| Over-mature (O) | Trees aged over 80% of life expectancy with probably symptoms of senescence. |

**Crown Aspect**

In relation to the root crown, this refers to the aspect the majority of the crown resides in. This will be either termed Symmetrical (Sym.) where the centre of the crown resides over the root crown, or the cardinal direction the centre of the crown is biased towards, being either North (N), South (S), East (E) or West (W).

**Crown Ratio;**

Refers to the density of the crown in comparison to an example of the same species and age. The crown ratio can be expected to contain the following proportions of foliage in regard to a specimen of average vigour (being 100%).

F - Full 85% - 100%
P - Partial 40% - 85%
S - Sparse less than 40%

Live Crown Ratio

This is a ratio specific to conifers (and few genus of Angiosperms), and offers the proportion of existing crown relative to the overall height. This figure, expressed as a percentage acts as an indicator for stability, vigour and the potential for retention. Trees with a Live Crown Ratio less than 30% typically are "weak, lack vigour and have low diameter growth" [11]

**Limb Diameter**

Is measured adjacent to the branch collar, which is the cross-section offering the largest diameter of the limb.

[11] Dunster J. and Dunster K. , 1996, Dictionary of Natural Resource Management UBC Press, University of British Columbia. Vancouver, B.C, Canada

**Crown Class**

Is the differing crown habits as influenced by the external variables within the surrounding environment. They are:

**D** – *Dominant* Crown is receiving uninterrupted light from above and sides, also known as emergent.

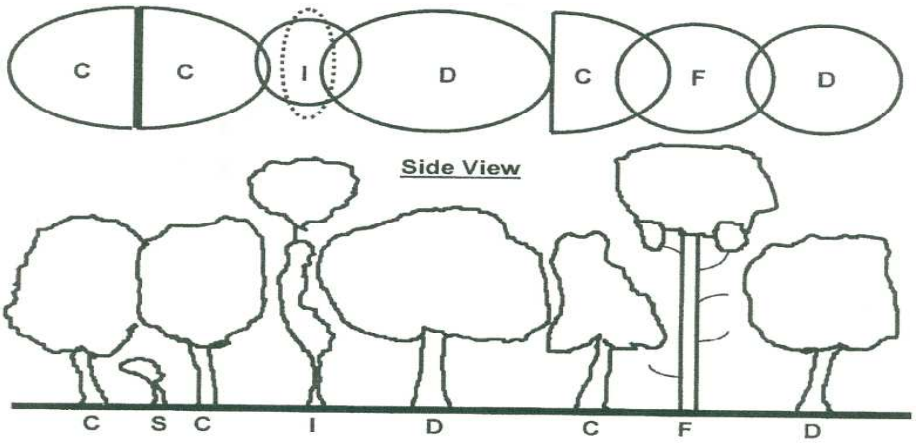
**C** – *Codominant* Crown is receiving light from above and one side of the crown.

**I** – *Intermediate* Crown is receiving light from above but not the sides of the crown.

**S** – *Suppressed* Crown has been shadowed by the surrounding elements and receives no light from above or sides.

**F** – *Forest* Characterised by an erect, straight stem (usually excurrent) with little stem taper and virtually no branching over the majority of the stem except for the top of the tree which has a small concentrated branch structure making up the crown.

**Top View**




D C, I & S and side view, after (Matheny, N. & Clark, J. R. 1998, Trees Development, Published by International Society of Arboriculture, P.O. Box 3129, Champaign IL 61826-3129 USA, p.20, adapted from the Hazard Tree Assessment Program, Recreation and Park Department, City of San Francisco, California).

**Levels of assessment**

Level 1: Limited visual: a visual tree assessment for the purpose of managing large populations of trees within a limited time span and in order to identify obvious faults which would be considered imminent.

Level 2: Basic assessment: a standard performed assessment providing for a detailed visual assessment including all parts of the tree and surrounding environment and via the use of simple tools.

Level 3: Advanced assessment: specific type assessments conducted by either arborists whom specialise with specific areas of assessment or via the use of specialised equipment. For example, aerial assessment by use of an EWP or rope/harness, or decay detection equipment.

**All other definitions are referenced from**;

Draper D.B., Richards P.A., 2009, Dictionary for Managing Trees in Urban Environments CSIRO Pub., Australia

**Significance Rating,** Significance of a Tree Assessment Rating System (S.T.A.R.S), IACA, 2010[12]

Tree Significance – Assessment Criteria

**1.** High Significance in landscape

- The tree is in good condition and good vitality;
- 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 vitality;
- 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 vitality;
- 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,

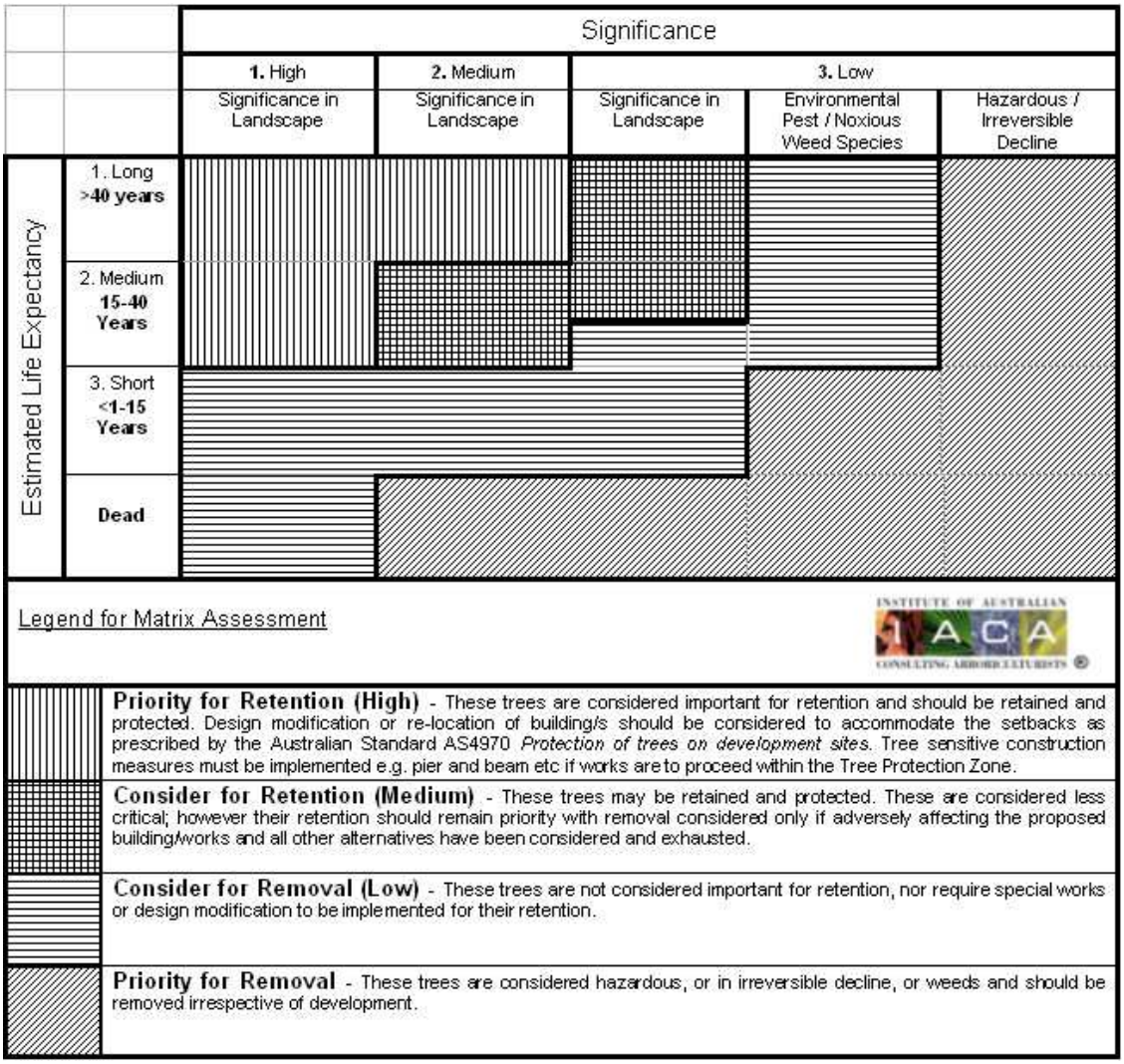
[12] IACA, 2010, IACA Significance of a Tree, Assessment Rating System (STARS), Institute of Australian Consulting Arboriculturists, Australia, www.iaca.org.au

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.

**Table 3; Tree Retention Value – Priority Matrix.**



## 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). | |

**TPZ; Tree Protection Zone**
Is an area of protection required for maintaining the trees vigour and long term viability. Measured in meters as a radius from the trees centre. The requirements of this zone are outlined within the Protection Specification, Section 8.0, and are to be adhered to, unless otherwise stated.

The size of the Tree Protection Zone (TPZ) has been calculated from the *Australian Standard, 4970; 2009* – Protection of Trees on Development Sites

The TPZ does not provide the limit of root extension, however offers an area of the root zone that requires predominate protection from development works. The allocated TPZ can be modified by some circumstances; however will require compensation equivalent to the area loss, elsewhere and adjacent to the TPZ.

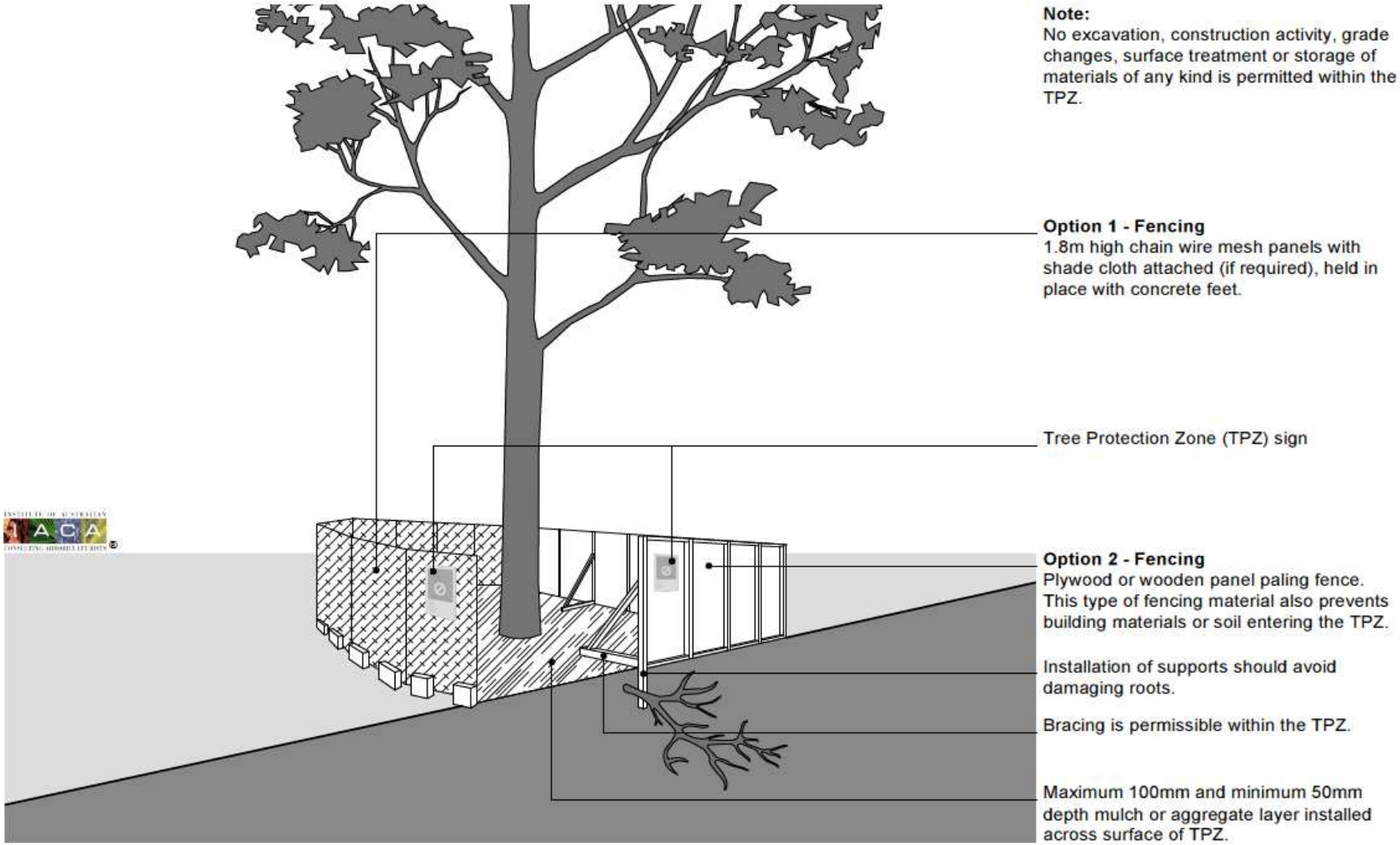
**SRZ; Structural Root Zone**
Is the area around the tree containing the woody roots necessary for stability. Measured in meters as a radius from the trees centre. The requirements of this zone are outlined within the Protection Specification, Section 8.0, and are to be adhered to, unless otherwise stated.

**Protection Measures**
These are required for the protection of trees during demolition/construction activities. Protective barriers are required to be installed before the initiation of demolition and/or construction, and are to be maintained up to the time of landscaping. Samples of the recommended protection measures are illustrated in Appendix B.

**Project Arborist**
Person nominated as responsible for the provision of the tree assessment, arborist report, consultation with stakeholders, and certification for the development project. This person will be adequately experienced and qualified with a minimum of a level 5 (AQF); Diploma in Horticulture (Arboriculture)[13].

[13] Based upon the definition of a 'consulting arborist' from the AS 4970; Protection of trees on development sites; 2009, section 1.4.4, p 6.

**Appendix B- Protection measures;**
**Protective fence**



**Tree protection zone sign; requirements**

**Stem and Ground protection**