ALLIED TREE
CONSULTANCY
Level 5 and 8 Arboriculturist

Arboricultural Impact Assessment Report

For the site address

Multi-level and on-grade carpark,
Concord Hospital;
Hospital Road, CONCORD

Prepared for

Health Infrastructure
C/- APG

AUTHOR

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ABSTRACT

This report addresses the tree impact for the development proposal for the construction of a multi-level car park and temporary car park at the Concord Hospital. This report includes thirty-two trees, for which eight (trees No. 150, 157-161, 164, and 165), are street tree plantings. These trees *Liquidambar,* is the property of Canada Bay Council and referred in the heritage study as 'of HIGH heritage significance'. An additional group of trees, being No. 18-30 (*Jacaranda*), cater for the same significance rating.

The design impact on the site trees requires the removal of ten trees (being No. 10, 15, 16, 17, 150, 155, 156, 162, 163, and 164) and is illustrated in Plan 2, Appendix D. Trees No. 150 and 164 are the property of Canada Bay Council and will require consent by the owner. The following points summarise additional areas that require attention.

- Tree No. 163 provides an existing risk for failure, where the car park forms the target zone and should be removed immediately.
- Tree No. 18 is adversely impacted by the proposed substation. The substation must be removed from this location to allow for long-term retention.
- Tree No. 160 is subject to encroachment by the proposed design and must have the conditions outlined in Section 7.1.5 adhered to.
- The stormwater service proposed to extend west into the adjacent Public reserve can likely impact the trees and mangroves in this area. These trees are not included in the drawings; therefore, the impact is unknown. Mitigation to avoid impact via excavation of these areas adjacent to the trees is necessary to avoid risk from failure or tree decline.

Tree protection measures will be required during the demolition and construction stage. However, the design of these will be pending the work methodology and final design. The project arborist shall be contracted after the completion/confirmation of design work for the instruction of the protection measures implementation, that is, the Arboricultural Method Statement.

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1.0 Introduction

1.1 *Allied Tree Consultancy* (ATC) has been commissioned by *APG* on behalf of *Health Infrastructure* to prepare an Arboricultural Impact Assessment for the development proposal of the multi-level car park and temporary car park at the Concord Hospital. This proposal includes the construction of these car parking facilities. This report includes thirty-two trees located on, and adjacent to the lot, and discusses the viability of these trees based on the proposed works.

1.2 This report will address for these trees, the:

- species' identification, location, dimensions, and condition;
- SULE (Safe Useful Life Expectancy) and STARS (Significance of a Tree Assessment Rating System) rating;
- discussion and impact of the proposed works on each tree;
- tree protection zones and protection specifications for trees recommended for retention.

1.3 The subject site resides within Concord; for this reason, the Canada Bay Council is the consenting authority for those trees that reside on the street, while all remaining trees within the hospital grounds form part of state planning.

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.

2.6 Any tree stock subject to conditions for works carried out in this report must be supplied by a registered Nursery that adheres to the AS 2303; 2015[2].

- All tree stock must be of at least 'Advanced' size (minimum 75lt) unless otherwise requested.
- All tree stock requested must be planted with adequate protection. This may include tree guards (protect stem and crown) and if planted in a lawn area, a suitable barrier (planter ring) of an area, at least, $1m^2$ to prevent grass from growing within the area adjacent to the stem.

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.

[2] Australian Standard; 2015, AS2303, Tree stock for landscape use, Australia

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[3] ;TPZ and Structural Root Zone; SRZ) for each tree illustrated in Plan 1, Section 5.0. All measurements are in metres.

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

4.2.4 **Protection Specification**; 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 4th August 2021 using the method of the Visual Tree Assessment[4]. This has included a Level 2 risk assessment, being a *Basic Assessment*[5]. The assessment has been conducted by Warwick Varley[6] on behalf of *Allied Tree Consultancy*.

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

4.3.3 Tree numbering is sequential and is carried on and included from the tree numbering included in the reports issued for the Concord Hospital redevelopment and enabling works, referenced in Section 4.4.6.

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.

[3] Australian Standard, 4970; 2009 – Protection of Trees on Development Sites, Australia
[4] Mattheck, C. Breloer, H.,1994, The Body Language of Trees – A handbook for failure analysis The Stationary Office, London
[5] Dunster J.A., 2013, Tree Risk Assessment Manual, International Society of Arboriculture, 2013, USA
[6] Consulting Arborist, Graduate Certificate and Diploma of Arboriculture (level 8 and 5)

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: 10 February 2018
Reference: 33907 012, Rev. J
Project No: 33907
Note 1: see Section 4.5.1

4.4.2 Design

Drawn by *Jacobs P/L*
Date: 22 June 2021
Reference: IA064700
Drawing No: 16 Sheets, Rev. 8
Note 1: See Section 4.5.1

4.4.3 Engineering (Civil)

Drawn by *Taylor Thomson Whitting P/L*
Date: 21 July 2021
Reference: 171496
Drawing No: 19 Sheets
Note 2: See Section 4.5.2

Amended Drawings
Date: 14 September 2021
Reference: 171496
Drawing No: 171496-MSCP-CV-DRG-C335, Revision P9
Drawing No: 171496-MSCP-CV-DRG-C327, Revision P4

4.4.4 Signage

Drawn by *Minale Tattersfield P/L*
Date: 16 September 2021
Reference: S3375
Drawing No: 3, Issue D

4.4.5 Document

Conservation Management Plan
Author: *Conybeare Morrison International P/L, Futurepast P/L, Context Landscape Design*
Date: June 2015

Project No.: 15006
Pages 161

4.4.6 Document

Arboricultural Impact Assessment
Author: *Allied Tree Consultancy*
Date: June 2021
Reference: D4530

4.4.7 Document

SSD; Approved drawings,
Referenced SSD 9036, granted 28 February 2018
Being Sheets 35 of 54
Drawn by *Jacobs P/L*
Drawing No: SS15-3002-NEWB-LS-DRG-101
SS15-3002-NEWB-LS-DRG-101, Rev. 2

4.5 Limitations of the assessment/discussion process

4.5.1 **Trees No. 10, 11, 12, 154, 155 and 156**. These trees have been omitted from the plans provided, however, are required for inclusion because they conform to the definition of a prescribed tree within the local government tree policy. The tree location has been plotted onto the Plan 1 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 These drawings illustrate significantly more trees on site than occur. This is assumed to be related to an old survey and trees since removed.

4.5.3 **Trees 10 and 11:** No access has been available to these trees during the assessment time due to the area containing these trees to be locked. The data contained in Table 1 is based on the data at the time of assessment on the 9th February 2018.

4.5.4 **Trees 164 and 165:** These trees have not formed the initial scope of works, however the plan set indicates potential impact by design. Therefore, require mandatory inclusion within this report. These trees have not been assessed, therefore based on the

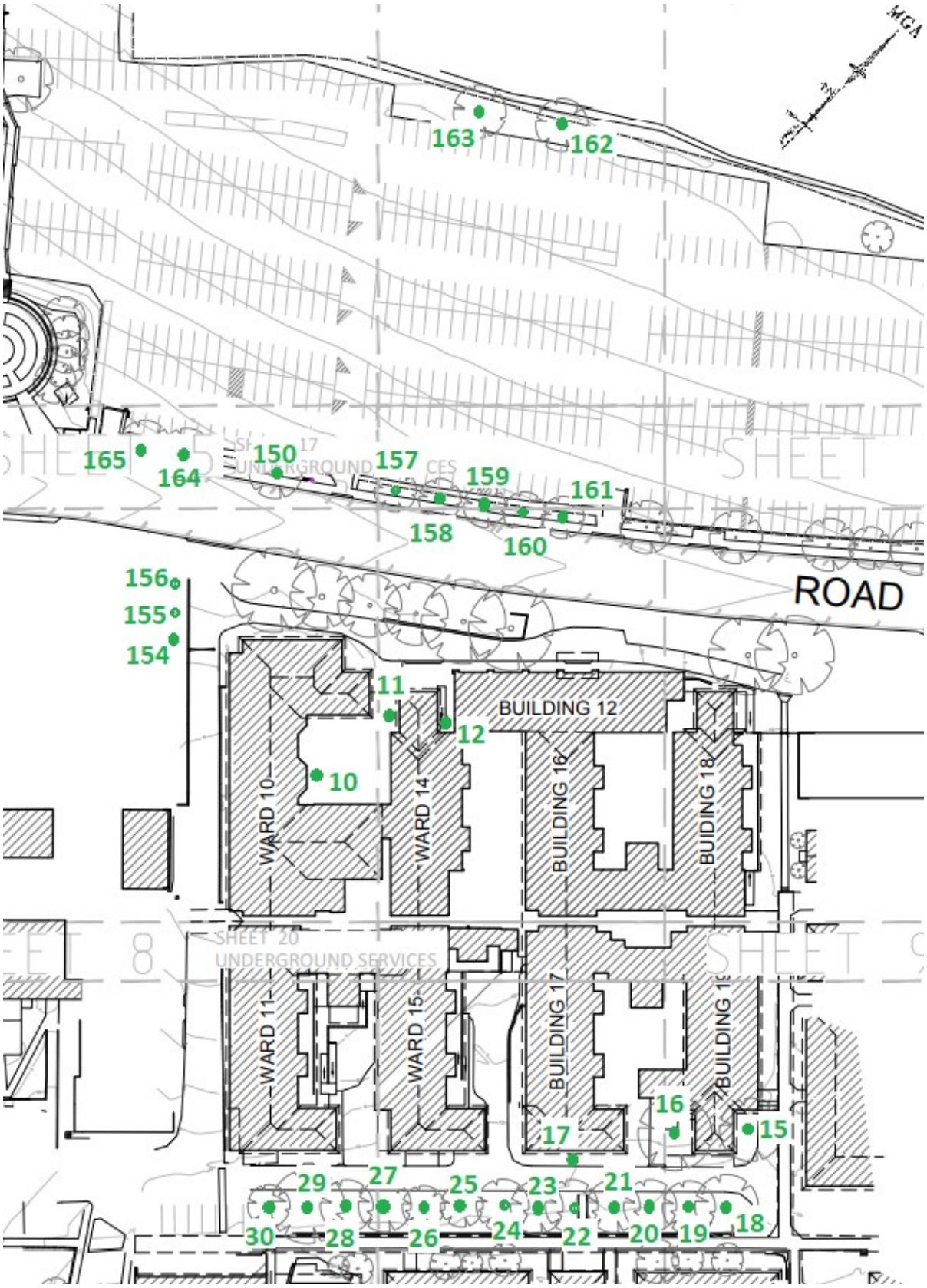
similar species and planting as tree No. 150, the data from this tree has been utilised for each of these trees.

4.5.5 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.

4.5.6 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.

4.5.7 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; 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	Vitality Rating	SULE Rating	STARS Rating	TPZ	SRZ
10[7]	*Melaleuca bracteata* 'Revolution Gold' Golden Tea Tree	6	<0.10	3 x 6	M	D	Sym.	A	**2A**	**Low**	**2.00**	**1.50**
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.											**Development Impact** See Section 7.1.3	
11[7]	*Melaleuca bracteata* 'Revolution Gold' Golden Tea Tree	7	<0.20	4 x 4	M	D	Sym.	A	**2A**	**Low**	**2.40**	**1.70**
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. This tree is been issued consent for removal based on a prior application, see Section 4.4.7.											**Development Impact** See Section 7.1.3	
12[7]	*Cupressus sempervirens* 'Stricta' Mediterranean Cypress	7	0.19[B]	1 x 1	Y	D	Sym.	A	**1A**	**Low**	**2.10**	**1.60**
Assessment This tree provides the habit typical for the species. This tree is been issued consent for removal based on a prior application, see Section 4.4.7.											**Development Impact** See Section 7.1.3	
15[7]	*Jacaranda mimosifolia* Jacaranda	9	0.28 0.28 0.28 0.29	10 x 10	M	D	Sym.	A	**2A**[E]	**High**	**6.30**	**2.50**

[7] Extracted (and reassessed) from the Arboricultural Impact Assessment, Allied Tree Consultancy: Reference D3307, date: February 2018

Tree No.	Botanical Name Common Name	Height (m)	DBH (m)	Crown Spread (m)	Age	Crown Class	Crown Aspect	Vitality Rating	SULE Rating	STARS Rating	TPZ	SRZ
Assessment This tree is composed of four equally sized leaders that initiate from a common root crown. The attachment points of these leaders is unknown and would warrant further assessment for risk, if the tree is retrained. The tree provides normal vitality and high amenity value. At the time of assessment, a 20mm incremental increase for each leader has occurred since 9th February 2018. This is considered consistent with normal vitality.											**Development Impact** See Section 7.1.3	
16[7]	*Eucalyptus botryoides* Bangalay	11	0.55	15 x 15	M	D	Sym.	A	**1A**	**High**	**6.30**	**2.50**
Assessment This tree provides the habit typical for the species and normal vitality. At the time of assessment, a 20mm incremental increase in stem growth has occurred since 9th February 2018. This is considered consistent with normal vitality.											**Development Impact** See Section 7.1.3	
17[7]	*Cupaniopsis anacardioides* Tuckeroo	<5	<0.15[B]	10 x 3	Y	C	E	A	**2A**	**Low**	**2.00**	**1.50**
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.											**Development Impact** See Section 7.1.3	
18[7]	*Jacaranda mimosifolia* Jacaranda	8	0.45	7 x 5	M	C	NW	A[D]	**1A**	**High**	**5.40**	**2.40**
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 provides the habit typical for the species and normal vitality. The trees were deciduous at the time of assessment and therefore the vitality could not be confirmed. This is discussed further in Section 7.0, Site Assessment.											**Development Impact** See Section 7.1.5	

Tree No.	Botanical Name Common Name	Height (m)	DBH (m)	Crown Spread (m)	Age	Crown Class	Crown Aspect	Vitality Rating	SULE Rating	STARS Rating	TPZ	SRZ
At the time of assessment, no change to stem incremental growth has occurred since 9th February 2018.												
19[7]	*Jacaranda mimosifolia* Jacaranda	7	0.37	4 x 8	M	I	W	A^D	**1A**	**High**	**4.40**	**2.20**
Assessment See assessment discussion for tree No. 18. At the time of assessment, no change to stem incremental growth has occurred since 9th February 2018.											**Development Impact** See Section 7.1.5	
20[7]	*Jacaranda mimosifolia* Jacaranda	8	0.39	7 x 8	M	I	W	A^D	**1A**	**High**	**4.70**	**2.30**
Assessment See assessment discussion for tree No. 18. At the time of assessment, no change to stem incremental growth has occurred since 9th February 2018.											**Development Impact** See Section 7.1.5	
21[7]	*Jacaranda mimosifolia* Jacaranda	7	0.47	8 x 10	M	I	W	A^D	**1A**	**High**	**5.60**	**2.40**
Assessment See assessment discussion for tree No. 18. At the time of assessment, no change to stem incremental growth has occurred since 9th February 2018.											**Development Impact** See Section 7.1.5	
22[7]	*Jacaranda mimosifolia* Jacaranda	6	0.38	4 x 8	M	I	N	A^D	**1A**	**High**	**4.60**	**2.20**
Assessment See assessment discussion for tree No. 18. At the time of assessment, no change to stem incremental growth has occurred since 9th February 2018.											**Development Impact** See Section 7.1.5	
23[7]	*Jacaranda mimosifolia* Jacaranda	6	0.34	4 x 8	M	I	N	A^D	**1A**	**High**	**4.10**	**2.10**
Assessment See assessment discussion for tree No. 18. At the time of assessment, no change to stem incremental growth has occurred since 9th February 2018.											**Development Impact** See Section 7.1.5	

Tree No.	Botanical Name Common Name	Height (m)	DBH (m)	Crown Spread (m)	Age	Crown Class	Crown Aspect	Vitality Rating	SULE Rating	STARS Rating	TPZ	SRZ
24[7]	*Jacaranda mimosifolia* Jacaranda	7	0.48	8 x 9	M	I	N	A^D	**1A**	**High**	**5.70**	**2.40**
Assessment See assessment discussion for tree No. 18. At the time of assessment, no change to stem incremental growth has occurred since 9th February 2018.											**Development Impact** See Section 7.1.5	
25[7]	*Jacaranda mimosifolia* Jacaranda	6	0.31	3 x 5	M	I	N	A^D	**1A**	**High**	**3.70**	**2.10**
Assessment See assessment discussion for tree No. 18. At the time of assessment, no change to stem incremental growth has occurred since 9th February 2018.											**Development Impact** See Section 7.1.5	
26[7]	*Jacaranda mimosifolia* Jacaranda	7	0.43	7 x 8	M	I	N	A^D	**2A**	**High**	**5.20**	**2.30**
Assessment See assessment discussion for tree No. 18. At the time of assessment, no change to stem incremental growth has occurred since 9th February 2018.											**Development Impact** See Section 7.1.5	
27[7]	*Jacaranda mimosifolia* Jacaranda	6	0.38	5 x 6	M	I	N	A^D	**2A**	**High**	**4.60**	**2.20**
Assessment See assessment discussion for tree No. 18. At the time of assessment, no change to stem incremental growth has occurred since 9th February 2018.											**Development Impact** See Section 7.1.5	
28[7]	*Jacaranda mimosifolia* Jacaranda	8	0.45	7 x 8	M	I	N	A^D	**1A**	**High**	**5.40**	**2.40**
Assessment See assessment discussion for tree No. 18. At the time of assessment, no change to stem incremental growth has occurred since 9th February 2018.											**Development Impact** See Section 7.1.5	
29[7]	*Jacaranda mimosifolia* Jacaranda	8	0.56	9 x 9	M	I	Sym.	A^D	**1A**	**High**	**6.70**	**2.60**
Assessment See assessment discussion for tree No. 18.											**Development Impact** See Section 7.1.5	

Tree No.	Botanical Name Common Name	Height (m)	DBH (m)	Crown Spread (m)	Age	Crown Class	Crown Aspect	Vitality Rating	SULE Rating	STARS Rating	TPZ	SRZ
At the time of assessment, no change to stem incremental growth has occurred since 9th February 2018.												
30[7]	*Jacaranda mimosifolia* Jacaranda	8	0.40	3 x 8	M	C	S	A[D]	**1A**	**High**	**4.80**	**2.30**
Assessment See assessment discussion for tree No. 18. This tree has been subject to pruning since the initial assessment consisting of a large 1st order branch, 200mm in diameter having been removed. The pruning has retained a stub and is contrary to arboricultural pruning standards, i.e. AS 4373. This pruning should be subject to remedial work. At the time of assessment, no change to stem incremental growth has occurred since 9th February 2018.											**Development Impact** See Section 7.1.5	
150[8]	*Liquidambar styraciflua* Sweet Gum	12	0.42	12 x 12	M	D	Sym.	A[D]	**1A**	**High**	**5.04**	**2.30**
Assessment A public street tree planting, this tree provides the habit typical for the species.											**Development Impact** See Section 7.1.3	
154	*Callistemon viminalis* Weeping Red Bottlebrush	6	0.14 0.17 0.19	6 x 5	M	C	NE	A	**2A**	**Medium**	**3.49**	**1.97**
Assessment This tree presents the habit typical for the species and composed of three leaders that share a common root crown. The suppressed rating is based on the included crotches supporting the leaders. The tree is set back from the wall approximately 300mm. The north-eastern crown bias, is the result of a codominant growth response from two recently removed trees directly south.											**Development Impact** See Section 7.1.1	
155	*Callistemon viminalis* Weeping Red Bottlebrush	6	0.13 0.07	4 x 3	M	C	NE	A	**2A**	**Low**	**2.00**	**1.48**

[8] Extracted (and reassessed) from the Arboricultural Impact Assessment, Allied Tree Consultancy: Reference D4451, date: March 2021

Tree No.	Botanical Name Common Name	Height (m)	DBH (m)	Crown Spread (m)	Age	Crown Class	Crown Aspect	Vitality Rating	SULE Rating	STARS Rating	TPZ	SRZ
Assessment This tree presents the habit typical for the species and composed of two leaders that share a common root crown. The suppressed rating is based on the included crotches supporting the leaders. The north-eastern crown bias, is the result of a codominant growth response from two recently removed trees directly south.											**Development Impact** See Section 7.1.3	
156	*Hymenosporum flavum* Native Frangipani	5	0.10	2 x 2	Y	I	Sym.	A	**1A**	**Medium**	**2.00**	**1.26**
Assessment This tree presents the habit typical for the species.											**Development Impact** See Section 7.1.3	
157	*Liquidambar styraciflua* Sweet Gum	5	0.33	8 x 8	Y	D	Sym.	A^D	**2A**	**Medium**	**3.96**	**2.08**
Assessment A public street tree planting, this tree provides the habit typical for the species.											**Development Impact** See Section 7.1.4	
158	*Liquidambar styraciflua* Sweet Gum	6	0.34	8 x 8	Y	D	Sym.	A^D	**2A**	**Medium**	**4.08**	**2.10**
Assessment A public street tree planting, this tree provides the habit typical for the species.											**Development Impact** See Section 7.1.4	
159	*Liquidambar styraciflua* Sweet Gum	5	0.25	6 x 6	Y	D	Sym.	A^D	**2A**	**Medium**	**3.00**	**1.85**
Assessment A public street tree planting, this tree provides the habit typical for the species.											**Development Impact** See Section 7.1.4	
160	*Liquidambar styraciflua* Sweet Gum	6	0.33	8 x 8	Y	D	Sym.	A^D	**2A**	**Medium**	**3.96**	**2.08**
Assessment A public street tree planting, this tree provides the habit typical for the species.											**Development Impact** See Section 7.1.5	
161	*Liquidambar styraciflua* Sweet Gum	6	0.30	8 x 8	Y	D	Sym.	A^D	**2A**	**Medium**	**3.60**	**2.00**
Assessment A public street tree planting, this tree provides the habit typical for the species.											**Development Impact** See Section 7.1.4	

Tree No.	Botanical Name Common Name	Height (m)	DBH (m)	Crown Spread (m)	Age	Crown Class	Crown Aspect	Vitality Rating	SULE Rating	STARS Rating	TPZ	SRZ
162	*Eucalyptus scoparia* Wallangarra White Gum	5	0.15	5 x 4	Y	C	E	A	**2A**	**Medium**	**1.80**	**1.49**
Assessment This tree provides the habit typical for the species other than the bias crown, a result of the co-dominant class.											**Development Impact** See Section 7.1.3	
163	*Eucalyptus scoparia* Wallangarra White Gum	9	0.60[B]	7 x 7	M	D	E	B	**4C**	**Low**	**7.20**	**2.67**
Assessment This tree provides the habit typical for the species. The tree exhibits symptoms of stress, and based on the existing signs (i.e. bracket fungus, *Phellinus* sp.) is likely related to the decay pathogen which is evident throughout the predominate tree. This tree is beyond remedial work and would warrant removal irrespective of any design conflict. This tree likely presents a risk for failure where the car parking bays present the target zone. This tree should be removed within three months.											**Development Impact** See Section 7.1.2 and 7.1.3	
164[C]	*Liquidambar styraciflua* Sweet Gum	10	0.42	12 x 12	M	D	Sym.	A	**2A**	**Medium**	**5.04**	**2.30**
Assessment This tree has not been assessed, see Section 4.5.4.											**Development Impact** See Section 7.1.3	
165[C]	*Liquidambar styraciflua* Sweet Gum	10	0.42	12 x 12	M	D	Sym.	A	**2A**	**Medium**	**5.04**	**2.30**
Assessment This tree has not been assessed, see Section 4.5.4.											**Development Impact** 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 the overgrown area and/or limited access
D. Deciduous species, void of foliage at the time of assessment
E. Level 3 assessment required to determine the accurate rating

7.0 Site Assessment and tree significance

The area of assessment comprises a portion of the Concord Hospital and presents as a large rectangular area divided by Hospital Road. The eastern side of this area has been subject to prior assessments and reports, however, the western has been assessed for the first time as part of this proposal.

The western area is an existing on-grade car park, asphalt sealed with some kerb and guttering. This area has a consistent moderate gradient with a western aspect. This area caters for trees No. 150, 157-161, 164, 165 being the *Liquidambar styraciflua a*nd trees No. 162-163; *Eucalyptus scoparia.*

Trees No. 150 and 157-161 is a portion of the street tree planting which extends the predominate length of the Hospital site and along the verge on the western side of Hospital Road. Approximately twenty-four trees comprise this planting, all the same species, similar age and habit. These are the property of the Canada Bay Council, and constitutes ownership by a second party. Any proposed works within the zones of protection for these trees must not adversely impact these zones, and the tree shall be retained and protected from any site works unless permission for removal/pruning is granted by the tree owner. The heritage study (Section 4.4.4) has referred to this planting in Section 6.5.2 Landscape Area 2 (LA2). Although, this document has referenced the *Sweet Gum*, it is not applied to individual trees but as the entire avenue. The applied landscape significance is referred to as 'of HIGH heritage significance'[9].

Trees No. 162 and 163 occur at the western extremity of the car park. Three trees of the same species have occurred in this location, although one has recently succumbed to windthrow, therefore has not been included in the survey or assessment. The area west of these trees, is the boundary (chain wire fence), from where a public reserve containing trees and a walking track occurs. This area caters for a moderate gradient and a western aspect. The trees are planted Casuarina species, and none cater for a root zone that encroaches into the building footprint, therefore have not been included. Directly to the northwest of these trees are the high tide mark and a Mangrove (*Avicennia marina*) community.

The eastern area consists of a composite of buildings, roads, and footpaths. This area has a consistent moderate gradient with an eastern aspect. This area caters for trees No. 10-12 and 15-30, being the predominant species *Jacaranda mimosifolia.*

[9] See *Conybeare Morrison International P/L et.al,* Section 4.4.5

Trees No. 18-30 are referenced in the heritage study (Section 4.4.4) as the 'Jacaranda', although the protection factor is afforded to the avenue planting and referred to as the Landscape Area 4 (LA4): South-East of Hospital Road. The applied landscape significance is referred to as 'of HIGH heritage significance'[10].

Enabling works included trenching works have occurred in the asphalt roadway parallel with these trees. ATC had not been included as part of these works, and therefore the extent of root impact (severance) is unknown. Although excavation of one part of the roadway was able to be photographed and exhibited substantial woody roots from these trees. Therefore, a substantial root system does extend into the area of the roadway. Accounting for the lack of incremental stem growth (that is, Dbh), as included as part of the assessment in Table 1, Section 5.0. Some impact to the vitality of these trees is considered to have occurred. The growth increments of trees No. 16 and 18, which are outside of any trenching works, that is encroachment, represesnt the growth expectation for these trees.

7.1 Proposed development

The proposed development consists of the demolition of existing site structures and construction of a multi-level car parking facility on the western side of Hospital Road and a new on-grade car park on the eastern side of the Road. This is illustrated in Figure 1.

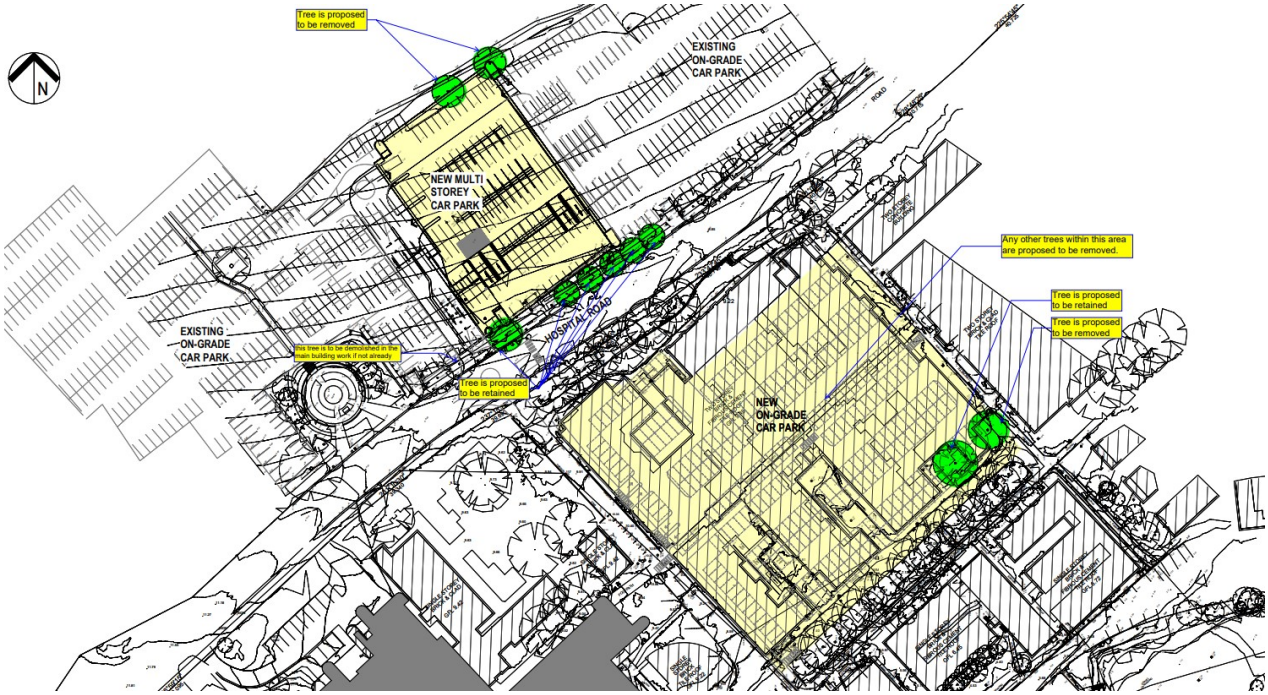


Figure 1; Area ilustrated in yellow shading presesnts the area of assessment.
Source: Supplied by *APG* as the scope of works.

[10] See *Conybeare Morrison International P/L et.al,* Section 7.5.5

Neighbours trees: Trees No. 150-161, 164, 165 are street tree plantings, therefore constitute ownership by a second party. Any proposed works within the zones of protection for these trees must not adversely impact these zones, and the trees shall be retained and protected from any site works unless permission for removal is granted by the tree owner and Canada Bay Council.

The calculations included in the following discussion have not been considered;

- subsurface utilities that have not been included in the design,
- Work methods related to subsurface utilities, for example, concrete encasing or replacement of existing lines
- or work methods related to construction (stockpiling, site sheds, scaffolding) unless otherwise specified.

These may also increase the encroachment and tree impact and, therefore, the opportunity for tree retention.

This report discusses the impact of the proposed design on the trees. Thirty-two (32) trees have been listed within this report based upon the vicinity of the proposed works. This has included any tree where any part of the zones of protection; Tree Protection Zone (TPZ) and Structural Root Zone (SRZ), encroach into the area proposed for work. Recommendations based on the tree significance and condition, together with the impact on these trees regarding the proposed development (based on the documents contained in Section 4.4) and mitigation where available follow.

7.1.1 Trees and zones of protection (TPZ/SRZ) outside of the proposed design

Trees No. 154 and 161

None of the proposed works conflict with the location of these trees or respective zones of protection. These trees can be retained without impact by the proposed design.

Tree No. 154

The location of this tree has not been included in the survey and transposed onto the drawing set by ATC, see Section 4.5.1. Although a single tree within this area has been included in the Civil drawings (Section 4.4.3), and assumed to be tree No. 156, see Section 7.1.3. The impact on these trees is uncertain and should be determined by inclusion in the drawings for further assessment.

7.1.2 Trees providing a limited useful life expectancy

Tree No. 163

This tree provides low significance based on the risk rating and should be removed irrespective of the proposed works. This tree should be removed immediately.

7.1.3 Trees directly conflicting with the design

Trees No. 10, 11, 12, 15, 16, 17, 150, 155, 156 and 162-164

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. The Plan 2 (Appendix C) illustrates the tree removal/retention required for the proposed works contained in this report.

- Trees No. 10, 11, 12, 15, 16, and 17; within the footprint of the on-grade car park.

  Trees No. 11 and 12 have been issued consent for removal based on a prior application, see Section 4.4.7.

  Trees No. 15 and 16 provide for high significance. Allowing for the design amendment to retain and protect trees No. 18-30, the amendment should consider the retention of these trees.
- Tree No. 150 and 164; within the footprint (Drawing C352, P1, see Section 4.4.3) of the cut required for the multi-level car park crossover.
- Tree No. 155; within or closely adjacent to the proposed signage (Drawing No: 3, Issue D, see Section 4.4.4)

  Note: The location of this tree has not been included in the survey and transposed onto the drawing set by ATC, see Section 4.5.1. Although a single tree within this area has been included in the Civil drawings (Section 4.4.3), and assumed to be tree No. 156, see Section 7.1.3. The impact on this tree is uncertain and should be determined by inclusion in the drawings for further assessment.
- Tree No. 156; within the footprint (Drawing C305, P11, see Section 4.4.3) of the widened road entrance to the on-grade car park. The drawing does not illustrate any other trees, and this tree is not included in the survey. That is, the impact on this tree is assumed. This would require clarification before tree removal is determined.
- Trees No. 162 and 163; within the footprint of the multi-story car park

7.1.4 Trees subject to a minor encroachment

Trees No. 157, 158, 159, 161 and 165

These trees are not directly located in the footprint of the proposed design, however, are subject to a *minor encroachment*. That is, the proportion (<10%) of encroachment provided by design will not adversely impact on the tree. These trees could be retained relative to the design.

Trees No. 157, 158, 159 and 161

Although the zones of protection (TPZ/SRZ) are subject to a minor encroachment by the footprint of the multi-level car park, other components will be subject to an impact that can form an accumulative impact. The crown mass that is dripline will require pruning back and

routine maintenance to allow for a buffer between the new multi-level car park and branch structure. Further impacts will likely be assigned to the construction methodology, including hoarding/scaffolding.

7.1.5 Trees subject to a major encroachment

Trees No. 18-30 and 160

These trees are not directly located in the footprint of the proposed design, however, are located close and adjacent to the design footprint and subject to a *major encroachment*, that is, in excess of 10% of the TPZ. The extent and type of encroachment for each tree are discussed and the relative implications.

The tree group, No. 18-30 only partially subscribes to this section since the amended drawings have been issued, and has been retain based on the discussion relating to the entire tree group.

Trees No. 18-30

The trees No. 18-30 are a screen planting and heritage-listed specimens. The proposed on-grade car park extends parallel with these trees, and based on the Drawing No: 171496-MSCP-CV-DRG-C335, Revision P9, see Section 4.4.3 will require a retaining wall where the specifications are referred to the Civil engineering drawings. Based on the sections, the retaining wall will remove all root system that extends past the wall. Based on this drawing, the calculated impacts have been summarised in Table 2; Encroachments on the tree group, No. 18-30.

Table 2, Encroachments on the tree group, No. 18-30.

Orange shading refers to a *major encroachment*
Green shading refers to a *minor encroachment*

Tree No.	Encroachment (%)	Encroachment Into SRZ	Type of encroachment
18	70%	Yes	Retaining wall Substation
19	2%	No	Retaining wall
20	8%	No	Retaining wall
21	10%	No	Retaining wall
22	4%	No	Retaining wall
23	<1%	No	Retaining wall
24	9%	No	Retaining wall
25	<1%	No	Retaining wall
26	6%	No	Retaining wall

Tree No.	Encroachment (%)	Encroachment Into SRZ	Type of encroachment
27	8%	No	Retaining wall
28	8%	No	Retaining wall
29	14%	No	Retaining wall
30	10%	No	Retaining wall

Allowing for past impacts by the enabling works (see Section 7.0), which has resulted with a reduced vitality. The impacts assigned to the proposed car park have the ability to adversely impact these trees. For this reason, the initial design was requested to be amended to reduce these impacts and resulting in the design referenced in the Amended drawings, Section 4.4.3).

These trees are listed as 'High significance" and must be retained and protected. The summary in Table 2, supports a design that offers minimal impact, and all trees but for trees, No. 18 and 29 are subject to a minor encroachment and can allow for long-term retention.

Tree No. 18: this tree has a proposed substation on one side and a retaining wall proposed for the western side. The combined encroachment would remove the tree. The encroachment by the retaining wall is 7%, and this on its own will allow for tree retention. The substation will offer an adverse impact and must be removed from the TPZ to allow for the retention of this tree.

Tree No. 14: this tree is subject to an encroachment of four percentage points in excess of a minor encroachment and this is considered of insufficient encroachment where the tree is able to accommodate the design and retain the useful life expectancy.

Tree No. 160

This street tree planting has a concrete pathway proposed to be installed within the SRZ. The proposed grades are unknown, although accounting for the kerb level for which the pathway services, is likely to be on or close to on existing grade. The pathway is not considered to offer an adverse impact, although due to the location within the SRZ, measures during construction are required to retain and protect significant root system. Pending significant roots (>40mm in diameter) that may occur in the area of the pathway foundation, further mitigation relating to the surfaces employed may require amendment. The following conditions are required during the construction.

1. The project arborist will need to be onsite during the excavation works for the pipe.
2. The foundation will require to be excavated by hand tools only.
3. No roots greater than 40mm in diamter should be cut without prior assessment by the project arborist.
4. All root cutting must be limited to woody roots less than 40mm in diameter. These must be cleanly cut (not torn), with a pruning saw, loppers or secateurs and the cut ends dusted with a fungicide (eg. sulphur).
5. Any woody roots greater than 40mm in diameter that are unearthed and considered to require cutting shall have the presence of the project arborist to be present to assess any further mitigation. The option for the pipe to be placed under or if available around these roots should be considered. No cutting of these roots can proceed without the presence of the project arborist.
6. After completion of the excavation works and backfilling of the trench, irrigation and a soil conditioner (e.g., Seasol™) shall be used over the area of the TPZ's for each tree, and ensure the backfilled area of the trench is well irrigated. This must be installed for routine application based on the project arborists assessment.

7.2 Sub-surface utilities

No drawings have been provided for the proposed route of sub-surface utilities other than stormwater. Any trenching, other than what has been allowed for should be avoided within the area of the TPZ's for any tree nominated for retention. Any proposed route shall be re-routed outside of the TPZ. Under boring may be required if a limitation for the route of a service is restricted to an area that falls within the TPZ from any tree. Any excavation in the area of a TPZ must be authorised and conditioned by the project arborist.

7.2.1 Stormwater

The drawing No. C306 (P12) illustrates the stormwater outlet servicing the multi-level car park, see Figure 2. This extends adjacent to trees No. 162 and 163 and into the public reserve via a 450mm diameter pipe and pits from where it terminates at dispersion trench. No vegetation, including the densely planted *Casuarinas* throughout the route of the pipe and the Mangroves that exist adjacent to the dispersion trench, have been included in this drawing. Therefore the respective impacts on these public assets cannot be determined, although could likely exist. Allowing for the pipe size, extensive excavation estimated up to 600mm deep and wide will be required. The machine required for these works will spread the impact zone further outside the pipe route, as will the laydown area. This,

therefore, significantly increases the risk related to tree damage if not removal. Any excavation within the Structural Root Zones of these trees can increase the risk for failure. The trees within this area adjacent to these works shall be surveyed and transposed onto the Civil drawings to allow a determination of the impact on these assets, and therefore allow for mitigation and tree management.

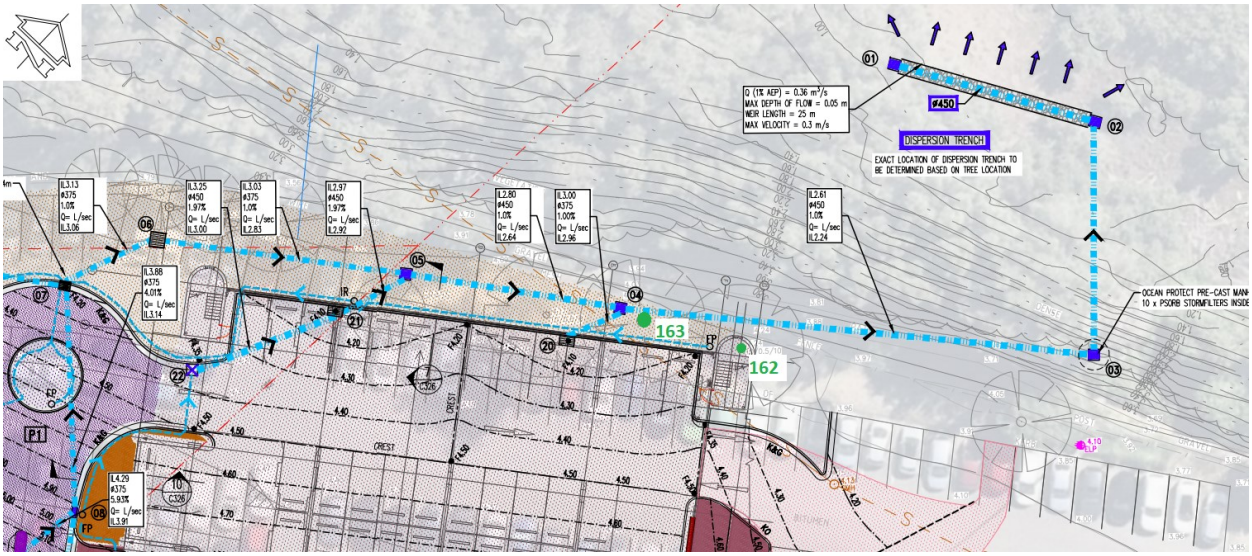


Figure 2; Proposed route of stormwater within the public reserve.
Source: Adapted from *Taylor Thomson Whitting P/L*, Drawing C306 (P12), see Section 4.4.3

7.3 Protection measures

Tree protection measures will be required during the demolition and construction stage. However, the design of these will be pending the work methodology and final design. The project arborist shall be contracted after the completion/confirmation of design work for the instruction of the protection measures implementation, that is the Arboricultural Method Statement. Examples of the protection measures are contained in Appendix B.

7.3.1 Conditions for compliance

The following conditions are required before any works proceed on site.

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.

Project Arborist; A project arborist who conforms to the requirements of the AS 4970 is required to be nominated immediately after a *Notice of Determination* is issued, and they are to be provided with all related site documents.

7.4 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.

7.4.1 Table 2; Assessment/Certification stages

Hold Points	Work type	Document required
Pre-demolition	Installation of the protection measures, Section 7.3	Certificate
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.

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)[11].

8.0 Protection Specification

The retention and protection of these trees requires the remaining Tree Protection Zone (TPZ) not subject to encroachment 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>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

[11] 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.

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.

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

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

4. 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.

5. 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, in consultation with the project arborist.

6. 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.

7. 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.

8. 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.

9. (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.

9.0 Summary of tree impact by design

The proposed development consists of the demolition of existing site structures and construction of a multi-level car parking facility on the western side of Hospital Road and a new on-grade car park on the eastern side of the Road.

Trees No. 150 and 157-161 are a portion of the street tree planting. These are the property of the Canada Bay Council and constitute ownership by a second party. Any proposed works within the zones of protection for these trees must not adversely impact these zones, and they shall be retained and protected from any site works unless permission for removal/pruning is granted by the tree owner. The heritage study has applied landscape significance as 'of HIGH heritage significance'[12].

Trees No. 18-30 are referenced in the heritage study as the 'Jacaranda', and referred to as the Landscape Area 4 (LA4). The applied landscape significance is referred to as 'of HIGH heritage significance'[13].

Both these tree groups are impacted upon where tree removal would be required to accommodate the design.

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

9.1 Trees outside of the design impact

Trees No. 154, 157, 158, 159, 161 and 165

These trees are not adversely impacted by the design, that is, they conform to an acceptable encroachment based on the nominated zones of protection (TPZ, SRZ) and the requirements of the Protection Specification, Section 8.0. These trees can be retained.

9.2 Design Impact

Trees No. 10, 11, 12, 15, 16, 17, 150, 155, 156 and 162-164

The proposed design will directly conflict with the location of these trees and they are unable to be retained based on the design. These trees will require removal to accommodate the design only.

Trees No. 11 and 12

These trees have been issued consent for removal based on a prior application, see Section 4.4.7.

[12] See *Conybeare Morrison International P/L et.al,* Section 7.5.3
[13] See *Conybeare Morrison International P/L et.al,* Section 7.5.5

Trees No. 15 and 16

These trees provide for high significance. Allowing for the design amendment to retain and protect trees No. 18-30, the amendment should also consider the retention of these trees.

Tree No. 156

Assumed to reside within the footprint (Drawing C305, P11, see Section 4.4.3) of the widened road entrance to the on-grade car park. The drawing does not illustrate any other trees, and this tree is not included in the survey. That is, the impact on this tree is assumed. This would require clarification before tree removal is determined.

Tree No. 163

This tree provides a risk should be removed immediately.

9.3 Trees subject to a major encroachment

Trees No. 18-30 and 160

These trees are subject to an encroachment, although could be retained pending the following conditions/design modification.

9.3.1 Trees No. 18-30

These trees are a screen planting and heritage-listed specimens. The retention and protection of these trees are mandatory. The proposed design will accommodate all trees except No. 18. The substation must be moved outside of the TPZ for this tree to allow retention.

9.3.2 Tree No. 160

This street tree planting will be subject to potential adverse impact and the conditions assigned in Section 7.1.5 must be adhered to, so as to allow for long term retention.

9.4 Sub-surface utilities

The stormwater outlet servicing the multi-level car park extends into the public reserve, where it terminates at a dispersion trench. No vegetation, including the densely planted *Casuarinas* throughout the route of the pipe and the Mangroves that exist adjacent to the dispersion trench, have been included in this drawing. Therefore the respective impacts on these public assets cannot be determined, although could likely exist. The trees within this area adjacent to these works shall be surveyed and transposed onto the Civil drawings to allow a determination of the impact on these assets, and therefore allow for mitigation and tree management.

No drawings have been provided for the proposed route of any other sub-surface utilities other than stormwater. Any trenching other than what has been allowed for should be avoided within the area of the TPZ's for any

tree nominated for retention. Any proposed route shall be re-routed outside of the TPZ. Under boring may be required if a limitation for the route of a service is restricted to an area that falls within the TPZ from any tree. Any excavation in the area of a TPZ must be authorised and conditioned by the project arborist.

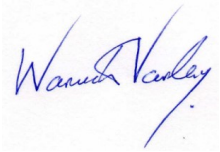
9.5 Protection measures

Protection measures (outlined in Section 7.3 and 7.4) 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 is the north-south span, the second being the east-west measurement.

Age

Is the estimate of the specimen's age based upon the expected lifespan 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 probable 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).

Vitality Rating

Is a rating of the health of the tree, irrespective and independent of the structural integrity, and defined by the 'ability for a tree to sustain its life processes' ((Draper, Richards, 2009). This is divided between three variables, and based on the assessment of symptoms including, but not limited to; leaf size, colour, crown density, woundwood development, adaptive growth formation, and epicormic growth.

A: Normal vitality, typical for the species

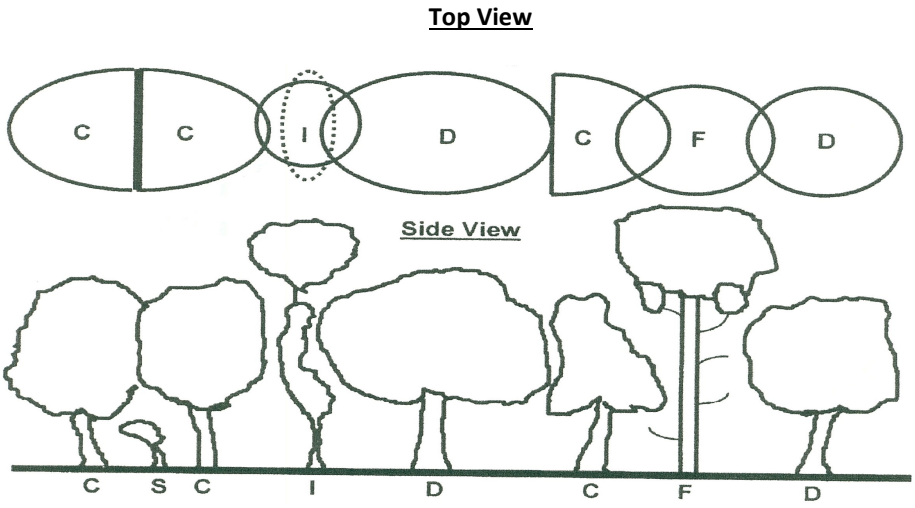
B: Below average vitality, possibly temporary loss of health, partial symptoms.

C: Poor vitality; obvious decline, potentially irreversible

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.



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 to manage large populations of trees within a limited period 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 arborist who 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.

TPZ; Tree Protection Zone

Is an area of protection required for maintaining the trees vitality 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.

Significance Rating, Significance of a Tree Assessment Rating System (S.T.A.R.S), IACA, 2010[14]

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,

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

- 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.

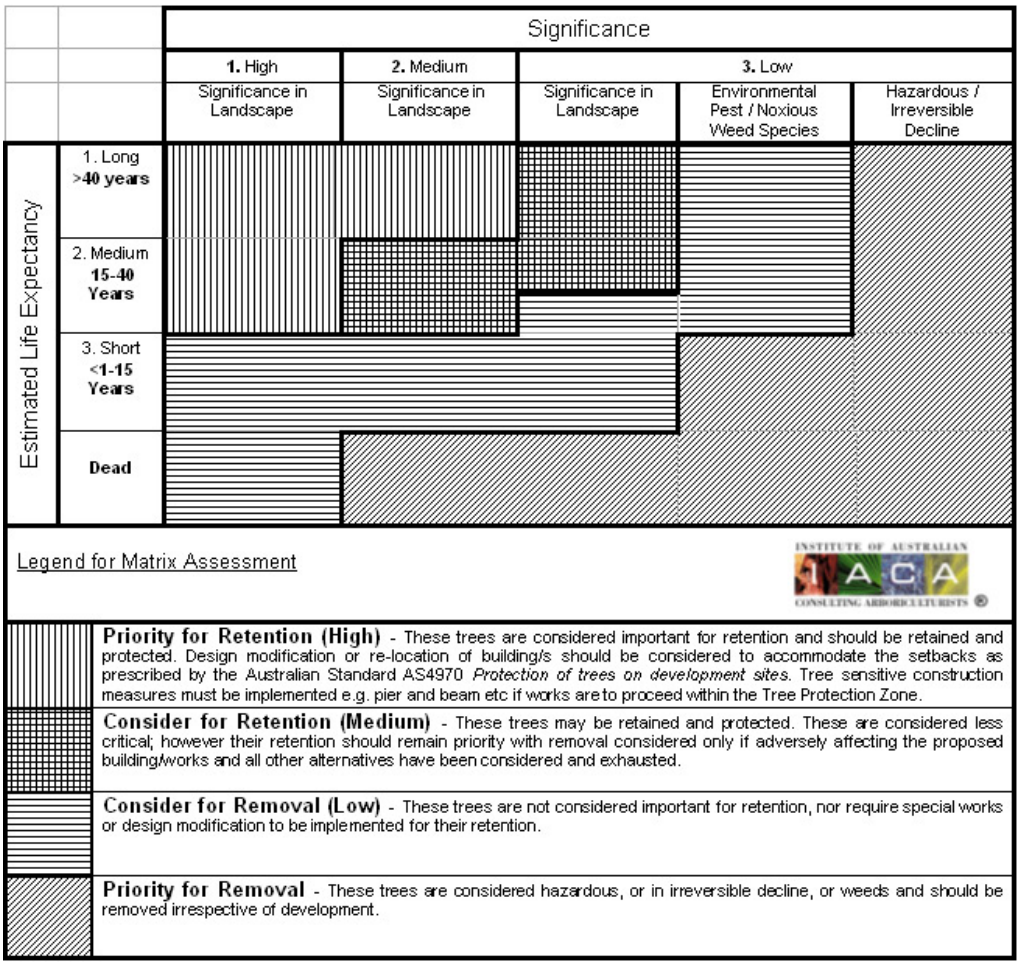
Hazardous/Irreversible Decline

- 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.

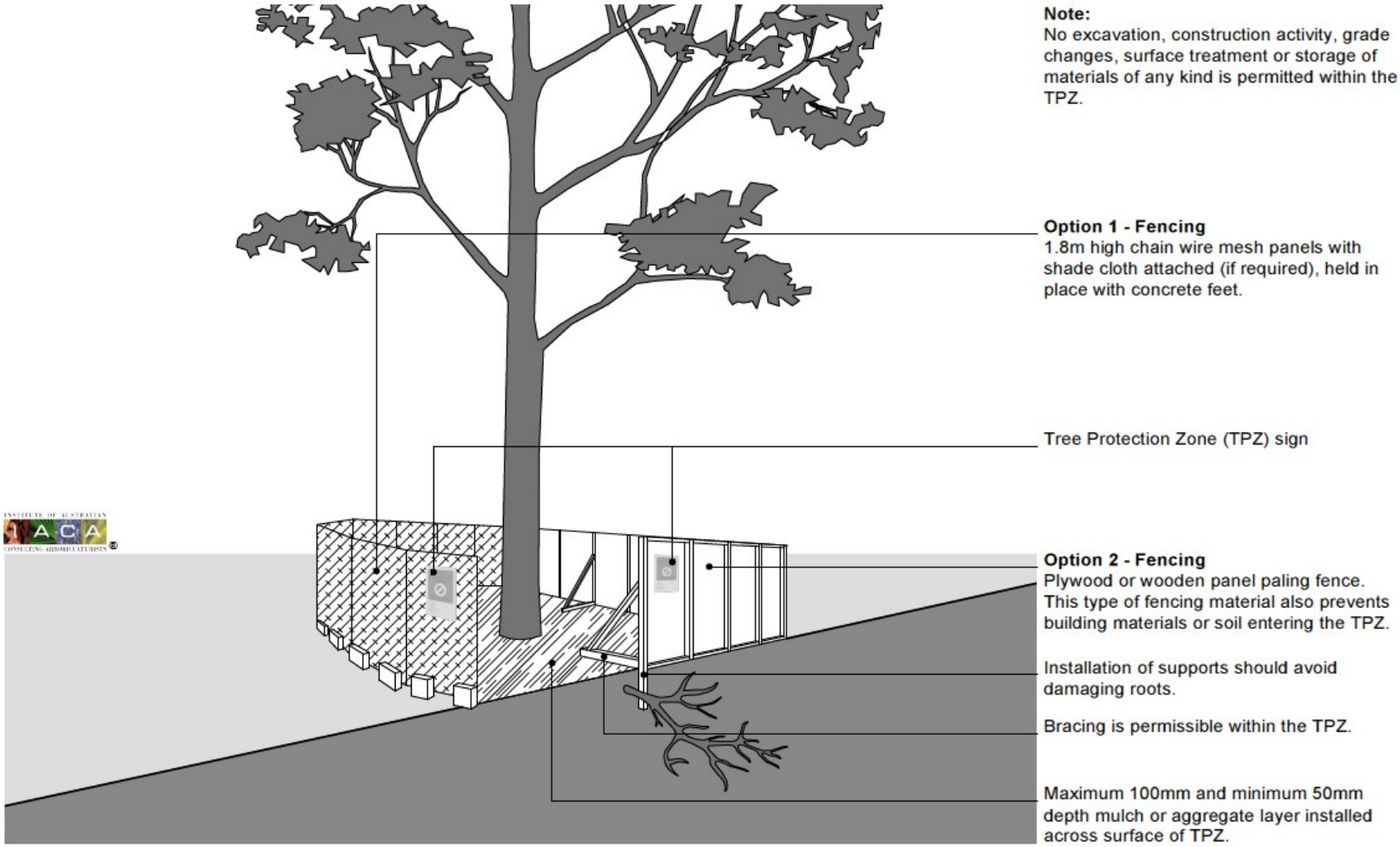
Table 3; Tree Retention Value – Priority Matrix.



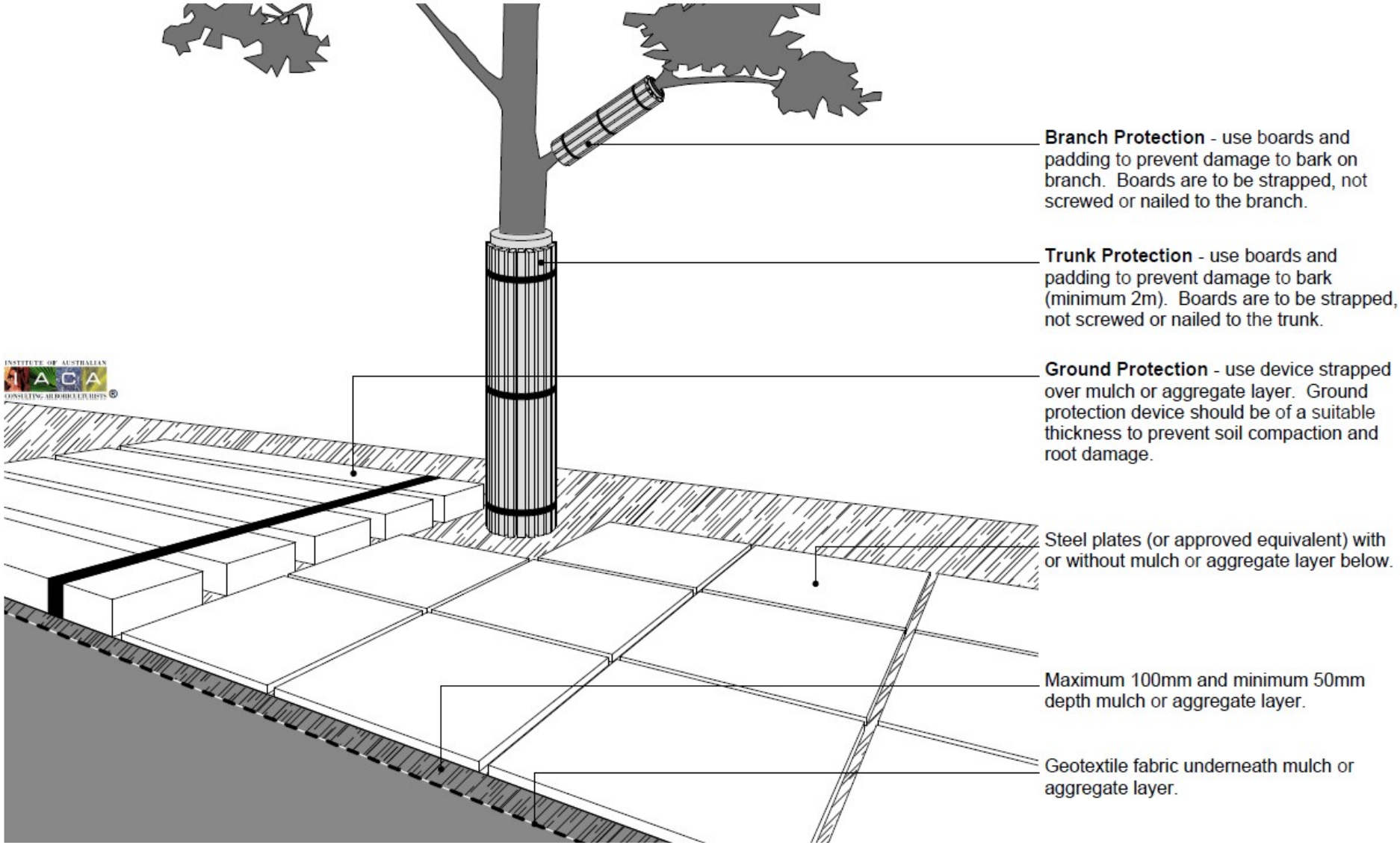
Safe Useful Life Expectancy – S.U.L.E (Barell 1995)

	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).	

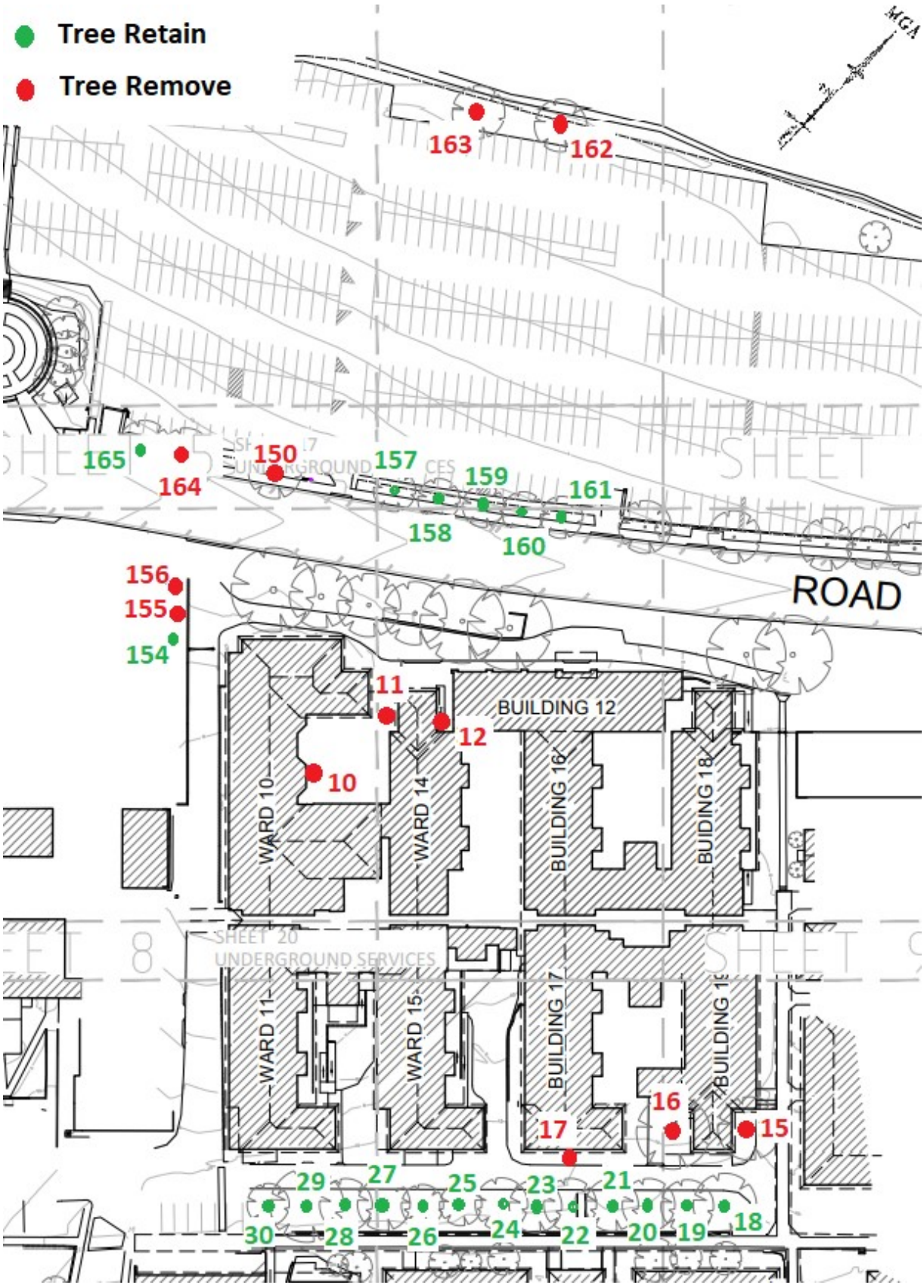
Appendix B- Protection measures;
Protective fence



Stem and Ground protection



Appendix C- Tree removal/retention plan



Not to scale

Source: Adapted from *LTS Lockley P/L,* see Section 4.4.1