



Level 5 and 8 Arboriculturist

## **Arboricultural Impact Assessment Report**

For the project titled  
Glenbrook Station Upgrade;  
Transport Access Program 3  
Glenbrook Station Upgrade, GLENBROOK, NSW

Prepared for  
RPS

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## 1.0 Introduction

**1.1** The following Arborist report has been requested by *RPS* for the development proposal at the Glenbrook Station, Glenbrook, titled Glenbrook Station Upgrade; Transport Access Program 3. The upgrade works includes:

The Proposal would include the following key elements:

- installation of a new lift on the platform to provide access to the existing footbridge (footbridge and stairs to be retained)
- provision of a new station entrance which would include demolition of the existing (non-compliant) ramp from the footbridge to Burfitt Parade to be replaced with new stairs and a new accessible path from the existing footbridge extending east to the raised pedestrian crossing
- landscaping around the station entrance
- internal reconfiguration of the station building to allow for a new Family Accessible Toilet, a new ambulant toilet, communications room and staff facilities
- installation of an external glass canopy at the entrance to the Family Accessible Toilet to provide weather protection
- new formalised kiss and ride on Burfitt Parade
- installation of a pad mount electrical transformer adjacent to the new stairs
- ancillary works including lighting, fencing, new bin storage, minor drainage works, seating adjustments, improvement to station communication systems (including CCTV cameras), hearing loops, installation of wayfinding signage and other signage to identify existing and new accessible features including installation of new tactile ground surface indicators (TGSIs).

The area of assessment is the verge of the rail corridor fronting Burfitt Parade. This report includes forty-two trees located on, and adjacent to the area of proposed works, 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;
- recommendations for the removal, retention and/or pruning;
- tree protection zones and protection specifications for trees recommended for retention.

**1.3** The subject site is in Glenbrook; however, will be assessed under Part 5 of the Environmental Planning and Assessment Act (1979), and the determining authority for this proposal is Transport for NSW.

## 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<sup>1</sup>.
  - 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 (Blue Mountains City 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<sup>2</sup>.
- 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<sup>2</sup> 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

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<sup>1</sup> Safe Work Australia; July 2016; Guide to Managing Risks of Tree Trimming and Removal Work, Australia

<sup>2</sup> Australian Standard, 2015, AS2303- Tree stock for landscape use, Australia

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

**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 29<sup>th</sup> August 2018 using the method of the Visual Tree Assessment<sup>4</sup>. This has included a Level 2 risk assessment, being a *Basic Assessment*<sup>5</sup>. The assessment has been conducted by Geoff Beisler<sup>6</sup> on behalf of *Allied Tree Consultancy*.

**4.3.2** Trees included in this report are those that are 3m or greater in height.

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

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<sup>3</sup> Australian Standard, 2009, AS4970; – Protection of Trees on Development Sites, Australia

<sup>4</sup> Mattheck, C. Breloer, H., 1994, The Body Language of Trees – A handbook for failure analysis  
The Stationary Office, London

<sup>5</sup> Dunster J.A., 2013, Tree Risk Assessment Manual, International Society of Arboriculture, 2013, USA

<sup>6</sup> Consulting Arborist, Diploma of Arboriculture (level 5)

**4.3.4** 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 Design**

Drawn by *DesignInc P/L*

Date: 13 August 2018

Reference: P18-040

Drawing No: Sheet 1-4

SK-1700(Draft), date: 22<sup>nd</sup> August 2018

Note 1: See Section 4.5.1

**4.4.2 Document**

Draft Flora and Fauna Assessment

Author: *RPS Australia East P/L*

Date: 8 August 2008

52 pages

**4.5 Limitations of the assessment/discussion process**

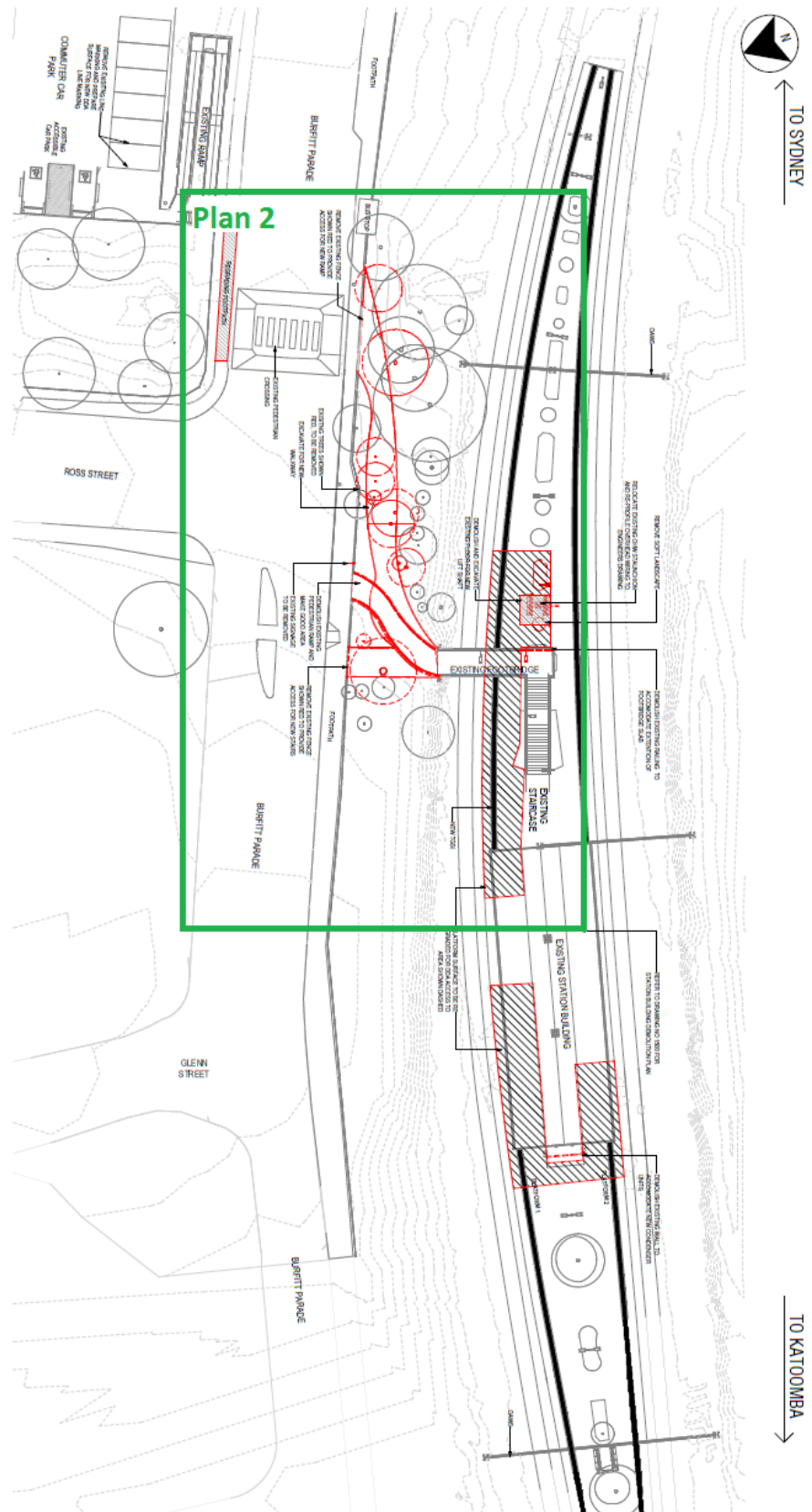
**4.5.1** Trees no. 1, 2, 39, 10, 17, 18, 19, 22, 23, 27, 28, 29, 30, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41 and 42 have been omitted from the plans provided, however, are required for inclusion because they conform to the definition of a prescribed tree within the local government tree policy. The tree 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** Several trees (1, 2, 7, 9, 16-21, 27) are located on the rail corridor embankment and/or clad in Lantana and were unable to be entirely assessed due to limited access.

**4.5.3** A large proportion of the trees contained in the assessment were saplings of the genus *Eucalyptus*. These trees were of insufficient age to provide fruit or flower required for a confident assessment. Therefore, the specific epithet has been estimated based on the species assembly referenced in the Flora and fauna Report, see Section 4.4.2.

- 4.5.4** 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.
- 4.5.5** 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.
- 4.5.6** 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

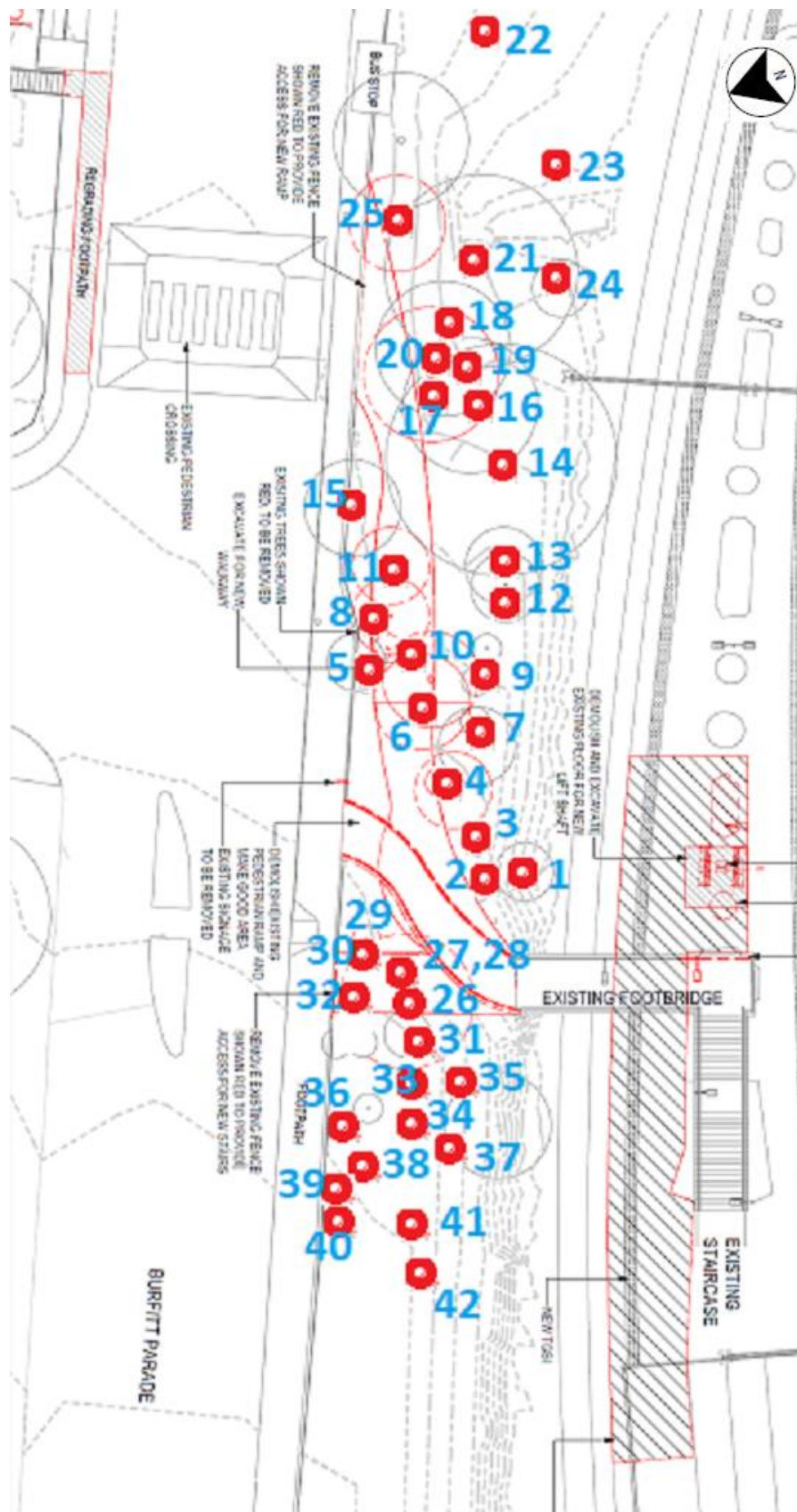


Not to scale

Source: Adapted from *DesignInc P/L*, Sheet 3 of 3, see Section 4.4.1



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



Not to scale

Source: Adapted from *DesignInc P/L*, Sheet 3 of 3, 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	SULE Rating	STARS Rating	TPZ	SRZ
1	<i>Eucalyptus deanei</i> <sup>A</sup> Eucalypt	5	0.15 0.10	3 x 3	Y	C	Sym.	A	B2 <sup>C</sup>	Low <sup>C</sup>	2.1	1.6
<b>Assessment</b>		Limited assessment due to its location on the edge of the embankment. Stump sprouts from a previously removed tree.									RETAIN See Section 7.1.1	
2	<i>Eucalyptus deanei</i> <sup>A</sup> Eucalypt	4	0.09	1 x 2	Y	C	Sym.	A	B2 <sup>C</sup>	Low <sup>C</sup>	2.0	1.5
<b>Assessment</b>		Limited assessment due to its location on the edge of the embankment.									REMOVE See Section 7.1.5	
3	<i>Eucalyptus deanei</i> <sup>A</sup> Eucalypt	5	0.09	1 x 1	Y	C	Sym.	A	A1	Low	2.0	1.5
<b>Assessment</b>		This juvenile tree presents as typical for the species.									REMOVE See Section 7.1.5	
4	<i>Acacia sp.</i> <sup>A</sup> Wattle	6	0.18	4 x 5	M	D	Sym.	A	A3	Medium	2.1	1.6
<b>Assessment</b>		This tree presents as typical for the species.									REMOVE See Section 7.1.5	
5	<i>Eucalyptus deanei</i> <sup>A</sup> Eucalypt	4	0.14 0.14	1 x 2	Y	D	Sym.	B-C	B3	Low	2.4	1.7
<b>Assessment</b>		This tree is co-dominant at the base and presents as typical for the species. However, a low voltage power line passes through the crown, and the tree has been subject to routine clearance pruning.									REMOVE See Section 7.1.5	

Tree No.	Botanical Name Common Name	Height (m)	DBH (m)	Crown Spread (m)	Age	Crown Class	Crown Aspect	Vitality	SULE Rating	STARS Rating	TPZ	SRZ
6	<i>Eucalyptus deanei</i> <sup>A</sup> Eucalypt	6	0.19 0.14	2 x 4	Y	D	E	A	B3	Low	2.9	1.8
<b>Assessment</b>		This tree is co-dominant at the base and presents as typical for the species. However, a low voltage power line passes through the crown, and the northern leader has been 'lopped' as a result.									REMOVE See Section 7.1.3	
7	<i>Eucalyptus deanei</i> <sup>A</sup> Eucalypt	5	0.10 0.09 0.09	1 x 2	Y	C	Sym.	A <sup>c</sup>	B3/A4 <sup>c</sup>	Low <sup>c</sup>	2.0	1.5
<b>Assessment</b>		Limited assessment due to location. This is a group of three saplings, all similar and adjacent to one another. The southern specimen exhibits stem borer.									RETAIN See Section 7.1.4	
8	<i>Acacia sp.</i> <sup>A</sup> Wattle	4	0.19 0.08	2 x 2	M	C	N	C	B3/A4	Low	2.5	1.7
<b>Assessment</b>		This tree exhibits extensive decline. It is rubbing on the fence beside the footpath and has been lopped due to the low voltage power line above it.									REMOVE See Section 7.1.3	
9	<i>Acacia sp.</i> <sup>A</sup> Wattle	5	0.08 0.05	2 x 3	M	D	N	A-B <sup>c</sup>	B3 <sup>c</sup>	Medium <sup>c</sup>	2.0	1.5
<b>Assessment</b>		Limited assessment due to location. Located on the edge of the embankment.									RETAIN See Section 7.1.1	
10	<i>Acacia sp.</i> <sup>A</sup> Wattle	4	0.07	1 x 2	M	S	S	B	A3	Medium	2.0	1.5
<b>Assessment</b>		This tree presents as typical for the species.									REMOVE See Section 7.1.3	
11	<i>Acacia sp.</i> <sup>A</sup> Wattle	4	0.10	2 x 2	M	C	N	B-C	B3/A4	Low	2.0	1.5

Tree No.	Botanical Name Common Name	Height (m)	DBH (m)	Crown Spread (m)	Age	Crown Class	Crown Aspect	Vitality	SULE Rating	STARS Rating	TPZ	SRZ
<b>Assessment</b>		This tree exhibits decline. It has been subject to extensive pruning (contrary to the AS4373) due to both the fence to the north, and the overhead low voltage power line.									REMOVE See Section 7.1.3	
12	<i>Eucalyptus deanei</i> <sup>A</sup> Eucalypt	4	0.05	1 x 1	Y	C	Sym.	A	A1/A2	Low	2.0	1.5
<b>Assessment</b>		Tree presents as typical of the species.									RETAIN See Section 7.1.1	
13	<i>Acacia sp.</i> <sup>A</sup> Wattle	4	0.06	1 x 2	M	S	Sym.	C	A4	Low	2.0	1.5
<b>Assessment</b>		This tree exhibits severe decline.									RETAIN See Section 7.1.1	
14	<i>Eucalyptus paniculata</i> Grey Ironbark	16	0.39	7 x 8	M	D	Sym.	A	A1	High	4.7	2.2
<b>Assessment</b>		Tree presents as typical of the species.									RETAIN See Section 7.1.4	
15	<i>Acacia sp.</i> <sup>A</sup> Wattle	4	0.13	1 x 2	M	C	N	B-C	A3/A4	Low	2.0	1.5
<b>Assessment</b>		This tree exhibits severe decline.									REMOVE See Section 7.1.5	
16	<i>Eucalyptus paniculata</i> Grey Ironbark	16	0.29 0.24	7 x 9	M	C	N	A	D2	HIGH	4.6	2.2
<b>Assessment</b>		Limited assessment due to Lantana infestation. Tree presents as typical of the species. Epicormic growths are present on pruning wounds, south side. Co-dominant at base, bark is included- union appears sound. There is a tear out wound at 4m, south side.									REMOVE See Section 7.1.5	

Tree No.	Botanical Name Common Name	Height (m)	DBH (m)	Crown Spread (m)	Age	Crown Class	Crown Aspect	Vitality	SULE Rating	STARS Rating	TPZ	SRZ
17	<i>Eucalyptus paniculata</i> Grey Ironbark	16	0.28	6 x 7	M	C	N	A <sup>c</sup>	D2 <sup>c</sup>	HIGH <sup>c</sup>	3.4	1.9
<b>Assessment</b>		Limited assessment due to Lantana infestation. Tree presents as typical of the species. The northern side has been pruned (not to standard) due to the proximity of the power lines, and further pruning is imminent.									REMOVE See Section 7.1.5	
18	<i>Eucalyptus paniculata</i> Grey Ironbark	16	0.40	6 x 10	M	C	S	B <sup>c</sup>	A2/D2 <sup>c</sup>	HIGH <sup>c</sup>	4.8	2.6
<b>Assessment</b>		Limited assessment due to Lantana infestation. Tree presents as typical of the species. However the crown exhibits partial density. Deadwood presents mid-crown.									REMOVE See Section 7.1.5	
19	<i>Eucalyptus paniculata</i> Grey Ironbark	17	0.39	9 x 9	M	D	Sym.	A <sup>c</sup>	A1 <sup>c</sup>	HIGH <sup>c</sup>	4.7	2.3
<b>Assessment</b>		Limited assessment due to Lantana infestation. Tree presents as typical of the species.									REMOVE See Section 7.1.5	
20	<i>Eucalyptus paniculata</i> Grey Ironbark	10	0.21	5 x 7	M	S	E	A <sup>c</sup>	D2 <sup>c</sup>	HIGH <sup>c</sup>	2.5	1.7
<b>Assessment</b>		Limited assessment due to Lantana infestation. This tree is heavily suppressed, and as a result, the crown poses a strong eastern bias.									REMOVE See Section 7.1.5	
21	<i>Eucalyptus paniculata</i> Grey Ironbark	15	0.50	13 x 15	M	I	S	A <sup>c</sup>	A2/D2 <sup>c</sup>	HIGH <sup>c</sup>	6.0	2.5
<b>Assessment</b>		Limited assessment due to Lantana infestation. Tree presents as typical of the species. The northern side has been pruned due to the proximity of the power lines.									RETAIN See Section 7.1.4	
22	<i>Eucalyptus paniculata</i> Grey Ironbark	14	0.40	8 x 10	M	I	S	A	A1	HIGH	4.8	2.3

Tree No.	Botanical Name Common Name	Height (m)	DBH (m)	Crown Spread (m)	Age	Crown Class	Crown Aspect	Vitality	SULE Rating	STARS Rating	TPZ	SRZ
<b>Assessment</b>		Tree presents as typical of the species. The northern side has been pruned due to the proximity of the power lines.									RETAIN See Section 7.1.1	
23	<i>Eucalyptus paniculata</i> Grey Ironbark	14	0.39	10 x 10	M	C	S	A	A1	HIGH	4.7	2.3
<b>Assessment</b>		Tree presents as typical of the species.									RETAIN See Section 7.1.1	
24	<i>Acacia sp.</i> <sup>A</sup> Wattle	4	0.14	3 x 3	M	D	Sym.	A	A3	Medium	2.0	1.5
<b>Assessment</b>		Tree presents as typical of the species.									RETAIN See Section 7.1.1	
25	<i>Acacia sp.</i> <sup>A</sup> Wattle	4	0.08 (average)	2 x 2	M	C	Sym.	B	A3/A4	Low	2.1	1.6
<b>Assessment</b>		Group of three saplings, adjacent to one another. Decline evident.									REMOVE See Section 7.1.5	
26	<i>Eucalyptus deanei</i> <sup>A</sup> Eucalypt	9	0.33 0.12	7 x 8	M	D	Sym.	A	A2/ D2	MEDIUM	4.2	2.1
<b>Assessment</b>		Tree presents as a typical of the genus. Termites observed at base of tree.									REMOVE See Section 7.1.3	
27	<i>Eucalyptus deanei</i> <sup>A</sup> Eucalypt	4	0.08	1 x 2	Y	S	S	A <sup>C</sup>	E4 <sup>C</sup>	LOW <sup>C</sup>	2.0	1.5
<b>Assessment</b>		Limited assessment due to location. Located on the edge of the embankment, this tree is growing under and into tree no. 26.									REMOVE See Section 7.1.3	

Tree No.	Botanical Name Common Name	Height (m)	DBH (m)	Crown Spread (m)	Age	Crown Class	Crown Aspect	Vitality	SULE Rating	STARS Rating	TPZ	SRZ
28	<i>Acacia sp.</i> <sup>A</sup> Wattle	5	0.19	3 x 5	M	S	E	B	A3/A4	Low	2.3	1.7
<b>Assessment</b>		Tree presents as typical of the species. Partial crown density/ minor decline.									REMOVE See Section 7.1.3	
29	<i>Acacia sp.</i> <sup>A</sup> Wattle	4	0.17	2 x 2	M	C	E	B	A3/A4	Low	2.0	1.6
<b>Assessment</b>		This tree exhibits chlorotic foliage and partial crown density. Encroachment on the power line is imminent.									REMOVE See Section 7.1.3	
30	<i>Acacia sp.</i> <sup>A</sup> Wattle	4	0.12 0.09	1 x 2	M	C	E	B	A3/A4	Low	2.0	1.5
<b>Assessment</b>		This tree exhibits chlorotic foliage and partial crown density.									REMOVE See Section 7.1.3	
31	<i>Eucalyptus deanei</i> <sup>A</sup> Eucalypt	5	0.09	2 x 2	Y	S	N	B	C3	Low	2.0	1.5
<b>Assessment</b>		This juvenile tree is typical of the species. However it is growing under and into tree no. 26.									REMOVE See Section 7.1.5	
32	<i>Acacia sp.</i> <sup>A</sup> Wattle	4	0.08	1 x 1	Y	C	Sym.	B	A3/A4	Low	2.0	1.5
<b>Assessment</b>		This tree presents partial crown density and twiggy decline.									REMOVE See Section 7.1.3	
33	<i>Eucalyptus deanei</i> <sup>A</sup> Eucalypt	5	0.07	1 x 1	Y	S	Sym.	B	A2/A4	Low	2.0	1.5
<b>Assessment</b>		The crown size is limited and exhibits partial density.									REMOVE See Section 7.1.5	

Tree No.	Botanical Name Common Name	Height (m)	DBH (m)	Crown Spread (m)	Age	Crown Class	Crown Aspect	Vitality	SULE Rating	STARS Rating	TPZ	SRZ
34	<i>Acacia sp.</i> <sup>A</sup> Wattle	5	0.08	1 x 2	Y	C	Sym.	C	A3/A4	Low	2.0	1.5
	<b>Assessment</b>	This tree presents partial crown density and twiggy decline.									REMOVE See Section 7.1.5	
35	<i>Acacia sp.</i> <sup>A</sup> Wattle	4	0.06	1 x 1	Y	C	Sym.	C	A4	Low	2.0	1.5
	<b>Assessment</b>	This tree presents excessive decline.									REMOVE See Section 7.1.5	
36	<i>Acacia sp.</i> <sup>A</sup> Wattle	4	0.09	4 x 4	M	C	NE	B-C	A4	Low	2.0	1.5
	<b>Assessment</b>	This tree presents significant decline.									REMOVE See Section 7.1.3	
37	<i>Eucalyptus deanei</i> <sup>A</sup> Eucalypt	4	0.09	1 x 2	Y	S	Sym.	B	B3	Low	2.0	1.5
	<b>Assessment</b>	Stump sprouts on the edge of the embankment.									REMOVE See Section 7.1.5	
38	<i>Eucalyptus deanei</i> <sup>A</sup> Eucalypt	5	0.10	1 x 1	Y	C	Sym.	B	B3	Low	2.0	1.5
	<b>Assessment</b>	This tree has been completely 'lopped' at 4m, all foliage present is epicormic.									REMOVE See Section 7.1.3	
39	<i>Acacia sp.</i> <sup>A</sup> Wattle	5	0.10	1 x 1	M	C	N	C	A4	Low	2.0	1.5



Tree No.	Botanical Name Common Name	Height (m)	DBH (m)	Crown Spread (m)	Age	Crown Class	Crown Aspect	Vitality	SULE Rating	STARS Rating	TPZ	SRZ
<b>Assessment</b>		This tree has been completely 'lopped.' It exhibits severe decline and delaminating bark on the stem.									REMOVE See Section 7.1.3	
40	<i>Acacia sp.</i> <sup>A</sup> Wattle	4	0.08	1 x 3	M	C	N	C	A3/A4	Low	2.0	1.5
<b>Assessment</b>		This tree presents significant decline.									REMOVE See Section 7.1.3	
41	<i>Eucalyptus deanei</i> <sup>A</sup> Eucalypt	8	0.27	5 x 6	M	D	S	A-B	A3/A4	Medium	3.2	1.9
<b>Assessment</b>		This tree presents a basal wound, north side. The apical leader has previously failed and the tree has established new, co-dominant apical leaders. The wound has not occluded. The stem of the tree exhibits evidence of borer infestation (south side) and delaminating bark.									REMOVE See Section 7.1.5	
42	<i>Eucalyptus deanei</i> <sup>A</sup> Eucalypt	8	0.35 0.10 0.10	6 x 7	M	D	Sym.	A-B	A2/ D2	Medium	4.6	2.2
<b>Assessment</b>		This tree exhibits three small leaders emerging from the root crown on the northern side. Another leader has been lopped at 1m in the past and has completely died. This contains a termite colony. Partial crown density is exhibited on the north side, as are multiple pruning wounds from power line clearance.									RETAIN See Section 7.1.1	

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 consists of a portion of the northern side for the Glenbrook station. An entrance to the station extends through the area of assessment. The site is divided into two separate areas by the concrete entrance pathway for discussion. The pathway is contained by a steel fence approximately 1.3 metres high on both sides. The western portion of the site contains a very slight gradient with an easterly aspect. The eastern portion has variable gradients, and the aspect varies between east, south, and south-west. The entirety of the eastern portion is graded to divert surface water into the concrete drainage culvert located in the southeastern corner of the site. A swale has been created on the western side of the eastern portion to facilitate this.

Burfitt Parade is located to the north and provides pedestrian access to the station via the footpath on the southern side. Multiple spans of electrical infrastructure (differing voltages) are present immediately to the north of the trees, and along the verge of Burfitt Parade. Numerous trees are displaying evidence pruning for line clearance. A chain-wire security fence separates the site from the footpath. Glenbrook station encompasses the entirety of the southern portion of the site, and the southern side of the area of assessment descends steeply to the rail. Private housing is located to the north-west, and a commuter car park is located to the north-east.

The trees appear to be naturally occurring, that is remnant specimens. The assessment is divided between two genera, *Eucalyptus* and *Acacia*, and the distribution is composed of twenty-four *Eucalyptus*, and the remaining eighteen trees are *Acacia* species. The tree age is divided between the mature remnant trees, twelve trees in total and all *Eucalyptus*. These are trees no. 14, 16, 17, 18, 19, 20, 21, 22, 23, 26, 41 and 42 (based on the Dbh), and the remaining thirty trees are young regrowth. These mature trees are considered the most significant specimens within the area of assessment. The consistent age of the young trees suggests that these have either been planted as part of regeneration exercise or regrowth from partial clearing. This could be attributed to a bushfire event. The tree age of the young growth is also representative of pioneering growth, especially based on the presence of the *Pittosporum* and *Acacia*, both recognised pioneering plantings and potentially representative of the seed store. Due to the limited age of many *Acacia* species, numerous dead and senescing *Acacia* occur throughout the site. Also, numerous stumps that appear to be the result of tree removals, some of these stumps present regenerated growth. Some weed growth exists, and *Lantana* is well represented.

A large proportion of the trees contained in the assessment were saplings of the genus *Eucalyptus*. These trees were of insufficient age to provide fruit or flower required for a confident assessment. Therefore, specific epithet has been estimated based on the species assembly referenced in the Flora and fauna Report, see Section 4.4.3.

## 7.1 Proposed development

The proposed development consists of the demolishing of the existing pedestrian ramp and construction of a new pedestrian ramp (referred to on the drawing set as 'new walkway') and stairwell (referred to on the drawing set as 'new stair') servicing the rail station from Burfitt Parade and a pad mounted transformer and related subsurface electrical utility.

The stairwell extends from the existing footbridge and meets the footpath on Burfitt Parade as a direct desire line. The pedestrian ramp initiates from the existing footbridge and extends east and near parallel with Burfitt Parade from where it exists adjacent to the existing pedestrian crossing. This ramp will require excavation and a retaining wall to allow for the gradient and path level. The transformer is pad-mounted and based on communication with RPS is proposed to be located on the western side of the proposed stairway and 2000mm away and near flush with the footpath. Based on the gradients, this area will be retained via a retaining wall and will consume an area measuring 5500mm long and 2050mm deep.

Assumption 1: the grades (RL) within the area of assessment have not been included in the drawing set, and limitations of the construction of the pedestrian ramp are restricted to the sections (4 and 5) contained in drawing TAP-150068-GB-AR-1400. This does not indicate the extent of excavation required, however, does indicate that it appears to offer sufficient excavation where any root system within this area will be impacted upon. Based on this premise, the route of the pedestrian ramp has been considered to provide a significant loss of root system for any part of the zones of protection (SRZ, TPZ) that extends into this route.

Assumption 2; Transformer; The transformer resides in an easement measuring 5500mm long and 2050mm deep (see drawing SK-1700; Draft<sup>7</sup>). Based on the *Ausgrid Standards*, NS117 and NS141, the area of the easement must have no vegetation and have a ground cover of either mulch or blue metal aggregate. The transformer is a precast concrete pad supported by piers and measures 3190mm by 1370mm. This pad is located on the natural ground. Therefore the impact or encroachment provided by this structure consists of the excavation for the four piers, however, is superseded by the retaining wall surrounding the easement. Also, the installation is via a crane that lifts the pad into place, therefore overhanging dripline will require clearance. Based on the standards (*Ausgrid Standards*, NS117, and NS141), no part of a tree can extend over this transformer. Other works required for the transformer consists of the excavation for the high voltage wires (labeled 'HV') extending back towards the proposed stairwell. Therefore any tree that extends over this easement will require pruning and the area of the easement is considered to remove any root system that extends into the area. The tree location relative to this easement has been illustrated in Figure 1.

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<sup>7</sup> See Section 4.4.1

Assumption 3: the work required to construct the pedestrian ramp and stairwell will require room outside of the footprint for each of these structures as part of the work methodology. Therefore, an area of at least 1000mm outside of each structure has been considered also to be included as a zone of encroachment for each tree.

This report discusses the impact of the proposed design on the trees. Forty-two (42) trees have been listed within this report based upon the vicinity of the work. This has included trees located within and adjacent to the proposed works where any part of the zones of protection (TPZ, SRZ) could encroach into the area proposed for work. Recommendations based on the tree significance and condition, together with the impact on these trees regarding the development for this lot follow.

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

Trees no. 1, 9, 12, 13, 22, 23, 24 and 42

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.

#### **7.1.2 Trees providing a limited useful life expectancy**

Trees no. 1, 2, 5, 6, 7, 8, 9, 11, 13, 15, 25, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40 and 41

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. Based on the limited target zone these trees can be retained unless they conflict with the proposed works. Based on the introduction of a new target zone, that is the proposed design, further assessment of these trees after completion of works is required to determine the risk they could provide relative to the introduced target zones.

#### **7.1.3 Trees directly conflicting with the design**

Trees no. 6, 8, 10, 11, 26, 27, 28, 29, 30, 32, 36, 38, 39 and 40

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. 6, 8, 10 and 11; within the footprint of the proposed new pedestrian ramp.

Trees no. 26, 27, 28, 29 and 30; within the footprint of the proposed new stairway.

Tree no. 32; within the footprint of the proposed excavation required for the utilities servicing the transformer.

Tree no. 36, 38, 39 and 40; within the footprint of the proposed transformer.

#### **7.1.4 Trees subject to a minor encroachment**

Trees no. 7, 14 and 21

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.

Tree no. 14: Encroachment: 7%; based on drawing TAP-150068-GB-AR-1130, the encroachment consists of the construction of the proposed walkway.

Tree no. 21: Encroachment: 9%; based on drawing TAP-150068-GB-AR-1130, the encroachment consists of the construction of the proposed walkway.

#### **7.1.5 Trees subject to a major encroachment**

Trees no. 2, 3, 4, 5, 15, 16, 17, 18, 19, 20, 25, 31, 33, 34, 35, 37 and 41

These trees are not directly located in the footprint of the proposed design, however, are located close and adjacent to the dwelling footprint and subject to a *major encroachment*, that is, in excess of 10% of the TPZ. These encroachments have been based on the drawing no. TAP-150068-GB-AR-1130. The extent and type of encroachment for each tree are discussed and the relative implications.

Tree no. 2: Encroachment: 30%, the encroachment consists of the construction of the proposed pedestrian ramp.

Tree no. 3: Encroachment: 20%; the encroachment consists of the construction of the proposed pedestrian ramp.

Tree no. 4: Encroachment: 28%; the encroachment consists of the construction of the proposed pedestrian ramp.

Tree no. 5: Encroachment: 40%; the encroachment consists of the construction of the proposed pedestrian ramp.

Tree no. 15: Encroachment: 20%; the encroachment consists of the construction of the proposed pedestrian ramp.

Tree no. 16: Encroachment: 17%; the encroachment consists of the construction of the proposed pedestrian ramp.

Tree no. 17: Encroachment: 35%; the encroachment consists of the construction of the proposed pedestrian ramp.

Tree no. 18: Encroachment: 30%; the encroachment consists of the construction of the proposed pedestrian ramp.

Tree no. 19: Encroachment: 24%; the encroachment consists of the construction of the proposed pedestrian ramp.

Tree no. 20: Encroachment: 30%; the encroachment consists of the construction of the proposed pedestrian ramp.

Tree no. 25: Encroachment: 34%; the encroachment consists of the construction of the proposed pedestrian ramp.

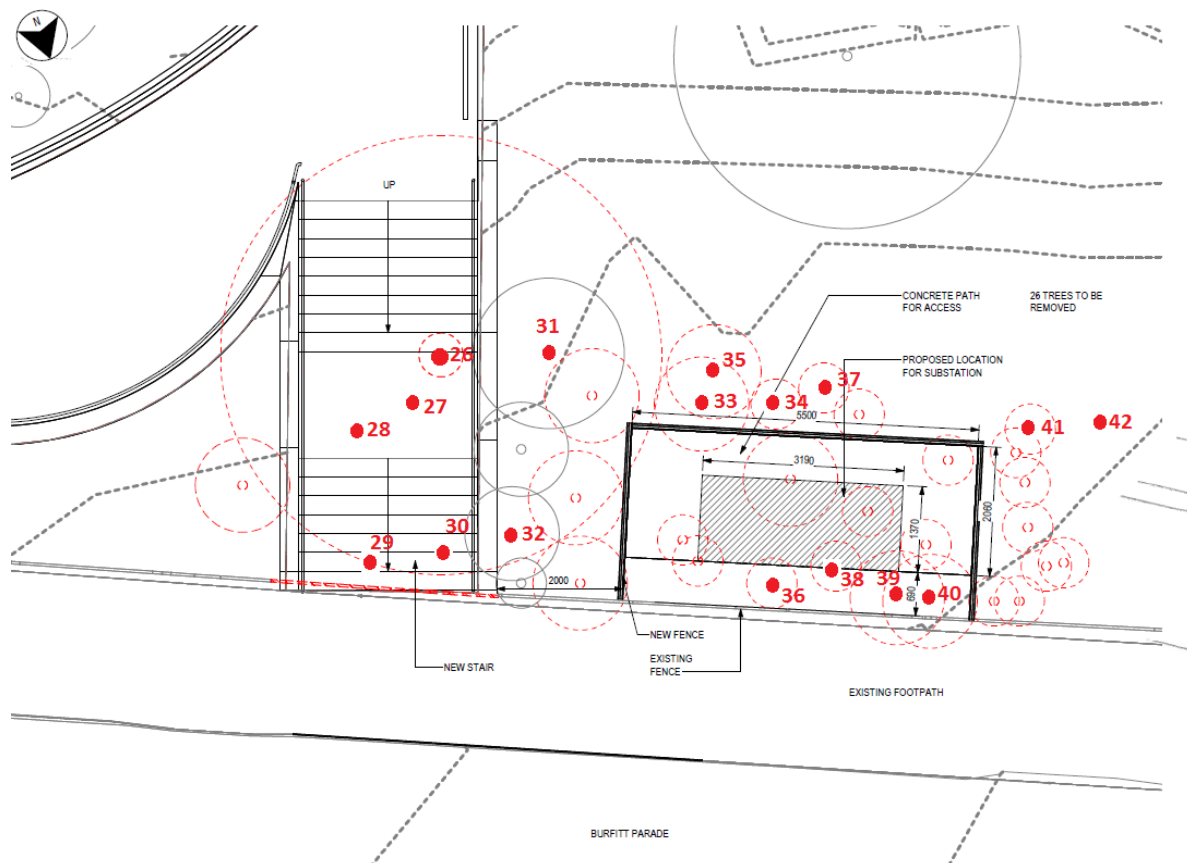
Tree no. 31: Encroachment: 24%; the encroachment consists of the construction of the proposed stairway.

Tree no. 41: Encroachment: 17%; based on drawing TAP-150068-GB-AR-1130, the encroachment consists of the construction of the proposed transformer easement.

Tree no. 33, 34, 35 and 37: Encroachment: 30%; with the transformer easement and pruning required to accommodate this structure.

## 7.2 Sub-surface utilities

No drawings have been provided for the proposed route of sub-surface utilities. 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 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.



**Figure 1; tree location relative to the transformer easement.**

Source: DesignInc P/L, SK-1700(Draft), see Section 4.4.1

## 7.3 Protection measures

The following protection measures are required to be implemented for the following trees before initiation of site works (including demolition/excavation) and retained until the landscaping works are required unless otherwise specified.

Trees no. 1, 7, 9, 12, 13, 14, 21, 22, 23, 24 and 42

A protective fence is required to be installed to protect the TPZ from all site-related work and are recommended to be located in accordance with the requirements of the AS 4970, listed in Appendix C. The fence is required to be secured to the ground with pegs to avoid movement during construction. This must be installed prior to the commencement of any demolition, excavation or construction works and shall be maintained throughout the entire construction phase of the development, and until landscaping works and installation of the drive/cross-overs is required.

The location of the protective fence has been illustrated in Plan 2, 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.

#### 7.4 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 Transport NSW.

##### 7.4.1 Table 2; Assessment/Certification stages

Stage	Work type	Document required
Pre- works	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.

**\*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. Foundation/footing types should not be strip type, 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. Subsurface utilities 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.

3. 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.
4. Soil levels within the TPZ must remain the same. Any excavation within the TPZ must have been previously specified and allowed for by the project arborist:
  - a) So it does not to 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.
5. No form of material or structure, solid or liquid, is to be stored or disposed of within the TPZ.
6. No lighting of fires is permitted within the TPZ.
7. 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.
8. 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 root zone.
9. 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.
10. 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.
11. 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)<sup>8</sup>.

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<sup>8</sup> 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 Summary of tree impact**

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

### **9.1 Trees no. 1, 7, 9, 12, 13, 14, 21, 22, 23, 24 and 42**

These trees can be retained relative to the nominated zones of protection (TPZ, SRZ) and based on the requirements of the Protection Specification, Section 8.0. The proposed design does not adversely affect these trees.

### **9.2 Trees no. 2, 3, 4, 5, 6, 8, 10, 11, 15, 16, 17, 18, 19, 20, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40 and 41**

The proposed design will require removal of these trees.

### **9.3 Sub-surface utilities**

No drawings have been provided for the proposed route of sub-surface utilities. 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 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.

### **9.4 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.

## 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 metres, 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).

### Vitality Rating

Is a rating of the trees health, 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

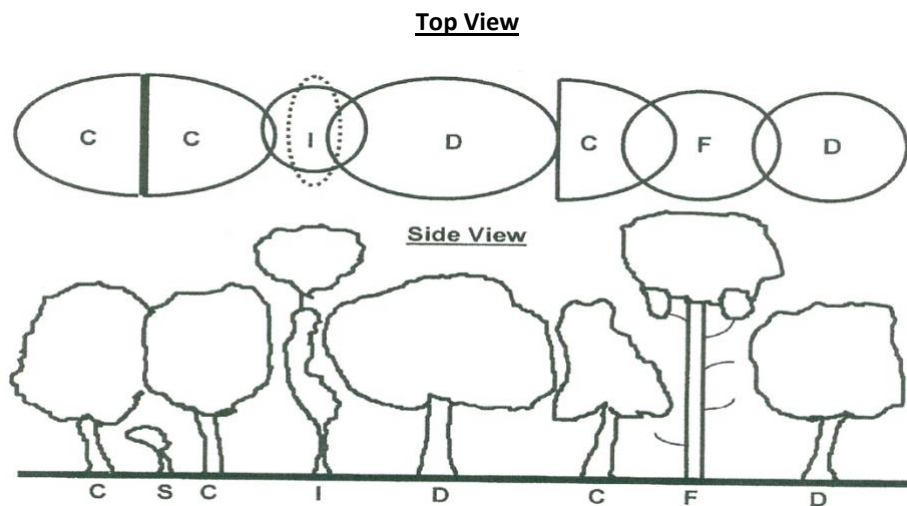
**B:** Below average vitality, possibly temporary loss of health, partial symptoms.

**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:

- |          |                       |  |
|----------|-----------------------|--|
| <b>D</b> | – <i>Dominant</i>     | Crown is receiving uninterrupted light from above and sides, also known as emergent.   |
| <b>C</b> | – <i>Codominant</i>   | Crown is receiving light from above and one side of the crown.   |
| <b>I</b> | – <i>Intermediate</i> | Crown is receiving light from above but not the sides of the crown.  |
| <b>S</b> | – <i>Suppressed</i>   | Crown has been shadowed by the surrounding elements and receives no light from above or sides.   |
| <b>F</b> | – <i>Forest</i>       | 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 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<sup>9</sup>**

**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,

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<sup>9</sup> IACA, 2010, IACA Significance of a Tree, Assessment Rating System (STARS), Institute of Australian Consulting Arboriculturists, Australia, [www.iaca.org.au](http://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.**

		Significance				
		1. High	2. Medium	3. Low		
		Significance in Landscape	Significance in Landscape	Significance in Landscape	Environmental Pest / Noxious Weed Species	Hazardous / Irreversible Decline
Estimated Life Expectancy	1. Long >40 years					
	2. Medium 15-40 Years					
	3. Short <1-15 Years					
	Dead					
Legend for Matrix Assessment						
		<b>Priority for Retention (High)</b> - These trees are considered important for retention and should be retained and protected. Design modification or re-location of building/s should be considered to accommodate the setbacks as prescribed by the Australian Standard AS4970 <i>Protection of trees on development sites</i> . Tree sensitive construction measures must be implemented e.g. pier and beam etc if works are to proceed within the Tree Protection Zone.				
		<b>Consider for Retention (Medium)</b> - These trees may be retained and protected. These are considered less critical; however their retention should remain priority with removal considered only if adversely affecting the proposed building/works and all other alternatives have been considered and exhausted.				
		<b>Consider for Removal (Low)</b> - These trees are not considered important for retention, nor require special works or design modification to be implemented for their retention.				
		<b>Priority for Removal</b> - These trees are considered hazardous, or in irreversible decline, or weeds and should be removed irrespective of development.				

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

	<b>1. Long</b>	<b>2. Medium</b>	<b>3. Short</b>	<b>4. Removal</b>	<b>5. Moved or Replaced</b>
	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.
<b>A</b>	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>B</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
<b>C</b>	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.
<b>D</b>		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.	
<b>E</b>				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.	
<b>F</b>				Trees that are damaging or may cause damage to existing structures within 5 years.	
<b>G</b>				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 metres 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 metres 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 C.

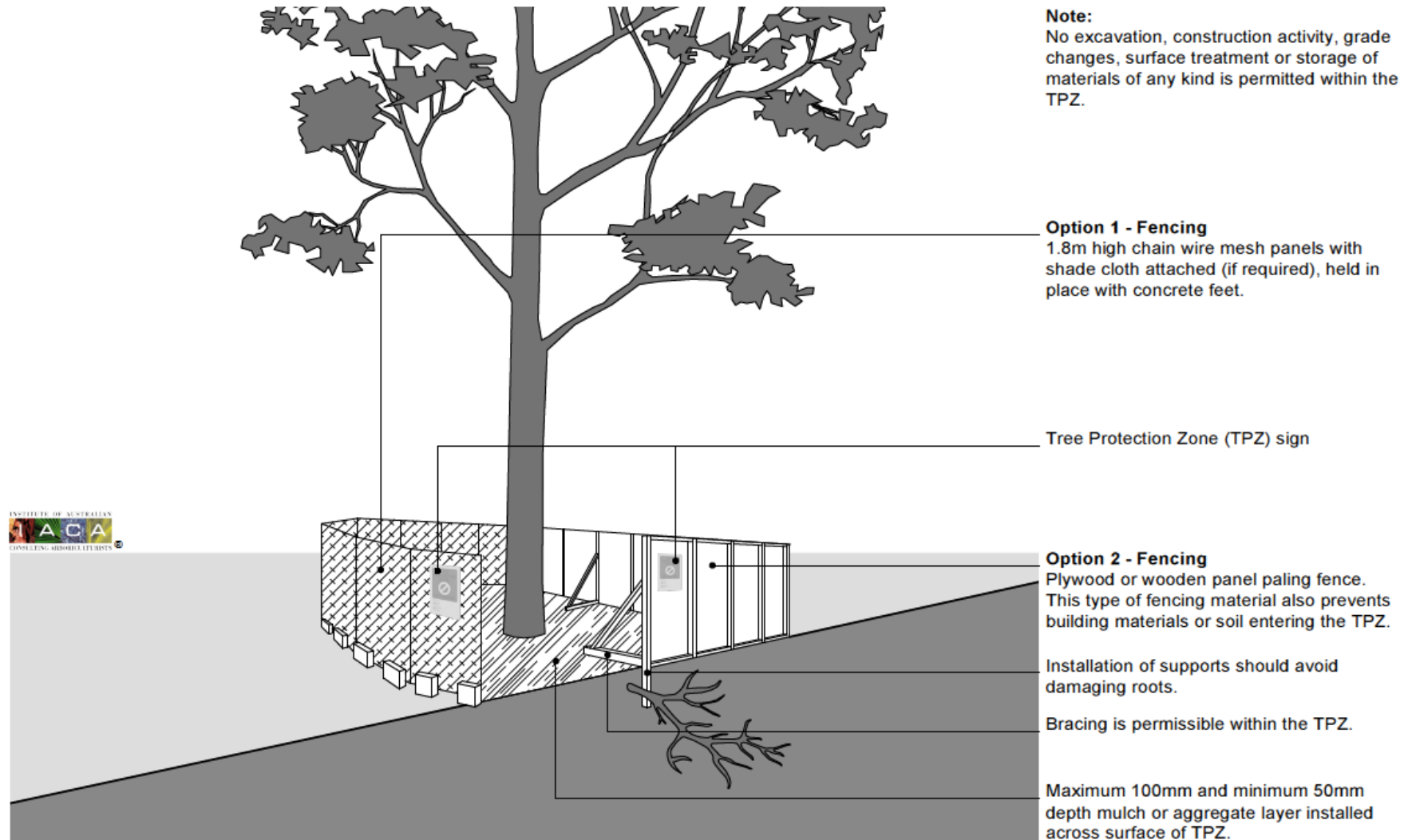


## **Appendix B- Plan 2; Zones and measures of protection**

Not to scale

Source: Adapted from , See Section 4.4.2

## Appendix C- Protection measures; Protective fence



## Stem and Ground protection

