



## **Arboricultural Impact Assessment Report**

### **For the project/site address**

Safe Accessible Transport program  
Chester Hill Station  
CHESTER HILL, NSW

### **Prepared for**

Aurecon P/L  
C/- Transport for NSW

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## 1.0 Introduction

**1.1** Allied Tree Consultancy (ATC) has been commissioned by Aurecon on behalf of Transport for NSW (Transport) to prepare an Arboricultural Impact Assessment for the Chester Hill station upgrade which is being delivered under the Safe Accessible Transport program. This proposal includes work related to upgrading the Station infrastructure to meet the requirements of the *Commonwealth Disability Discrimination Act 1992*. This report includes seventeen (17) trees located on and adjacent to the site and discusses the viability of these trees based on the proposed work.

**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 Chester Hill; for this reason, the City of Canterbury Bankstown Council is typically the consenting authority for any tree works recommended in this report. However, this project is subject to part 5, Division 5.1 assessment, where Transport is the Determining Authority.

## 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 by 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, where a target zone for any proposed work, must have removed all deadwood, hangers, and branch stubs pruned to the branch collar. This work must comply with Australian Standard 4970-2009, Transport's Tree and Hollow Replacement Guideline, 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 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 issued 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.

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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

**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.

**4.2.3** Discussion relating to the existing site assessment conditions within the site area, a description of the proposed works and encroachments to the TPZ of the identified trees, see Section 7.0.

**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 11th of June 2024 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** No survey drawings have been issued to ATC as part of the document set, although the drawing set referenced in Section 4.4.1 caters for a demolition plan that represents the existing landscape including trees. Therefore, this drawing set has been utilised in Section 5.0 of this report for identifying the site trees. This drawing set has also been utilised for illustrating the extent of works required.

**4.3.3** Trees included in this report are those that conform to the description of a prescribed tree by Australian Standard 4970-2009 and Transport's Tree and Hollow Replacement Guideline. That is, plants less than 3m in height are not a defined tree, nor are tree species, irrespective of size that are listed as exempt included in Table 1<sup>7</sup>.

**4.3.4** All measurements, unless specified otherwise are taken from the centre of the root crown.

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<sup>3</sup> Australian Standard, 4970; 2009 – 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)

<sup>7</sup> Canterbury Bankstown Council, June 2023, Development Control Plan, Chapter 2.3; Tree Management

**4.3.5** Raw data from the preliminary assessment, including the specimen's dimensions, were compiled using 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 Aurecon Design Inc. P/L

Date: 14 April 2023

Reference: not referenced

Drawing No: TAP4CDP2-AURC-CHH-AT-DRG-000110, revision B,  
SHEETS 5, 7 and 9 of 44

Note 2: See Section 4.5.1.

##### **4.4.2 Landscape**

Drawn by Aurecon Design Inc. P/L

Date: 14 April 2023

Reference: not referenced

SHEETS 1-9, revision B

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

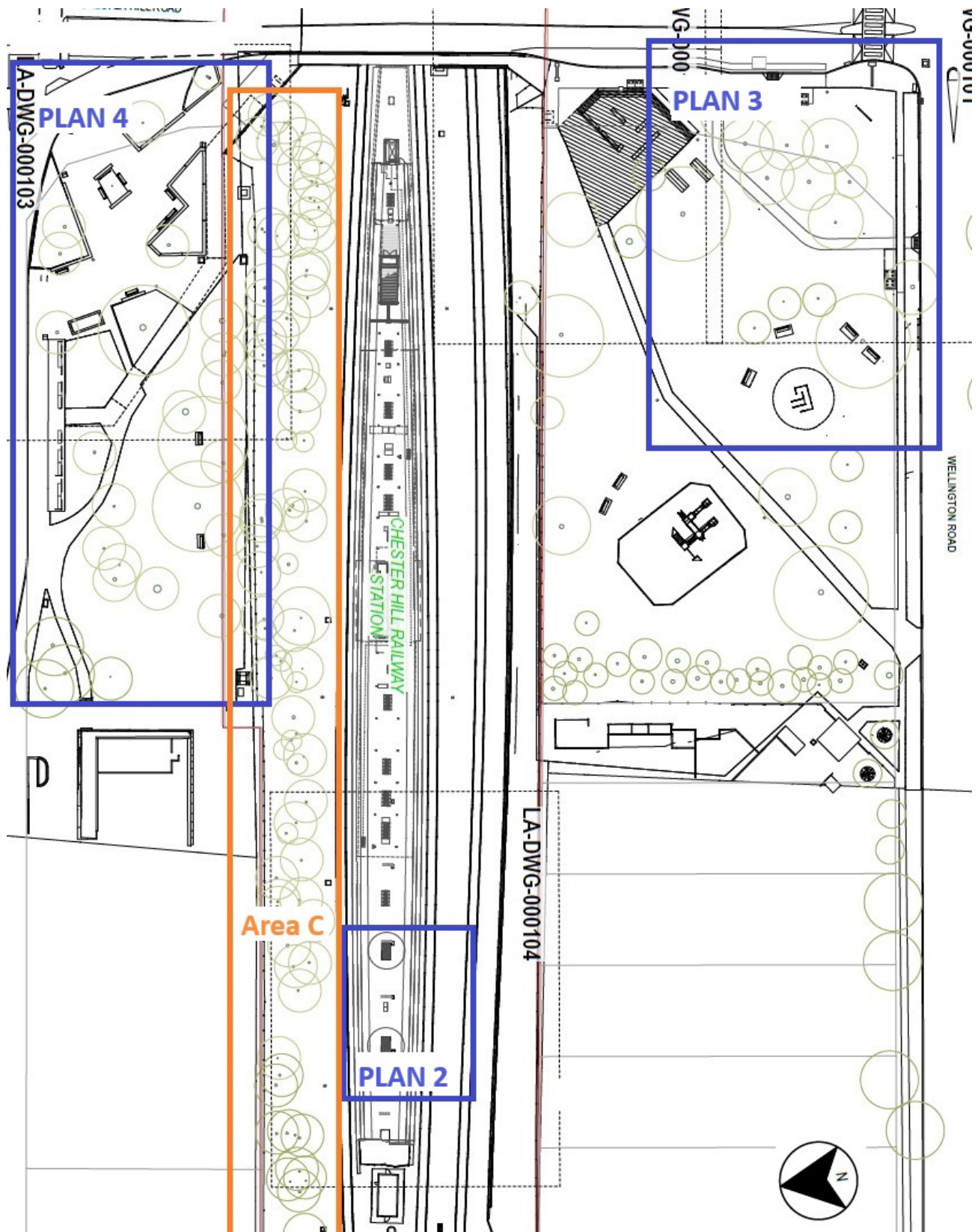
**4.5.1** Tree No. 14 has been omitted from the plans provided, however, is required for inclusion because it conforms to the definition of a prescribed tree by Australian Standard 4970-2009. The tree location has been plotted onto the Plan 1 by Allied Tree Consultancy. The tree location was established by measuring from known points and scaling onto the drawing. Allied Tree Consultancy is not a registered surveyor and, the true position of this tree may marginally deviate. Any such deviation provides the potential for changing the actual impact (encroachment) provided to a tree.

**4.5.2** The trees in Nugent Park and the road reserve are assumed to be the property of the City of Canterbury Bankstown Council. The lack of survey detail removes the opportunity for identifying ownership. The specific trees are identified in Table 1, Section 5.0.

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

- 4.5.4** Any tree regardless of apparent defects would fail if the forces applied to exceed the strength of the tree or its parts, for example, extreme storm conditions.
- 4.5.5** The assessment has been limited to that part of the tree, which is visible, existing from the ground level to the crown. Root decay can exist and, in some circumstances, provide no symptoms of its 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.
- 4.5.6** Construction methodology for vehicle access to the proposed site compound for the Proposal was not known at the time of finalising this Arboricultural Impact Assessment. As such, trees within the compound and access footprint are to be retained and protected from any encroachment of greater than 10% of the TPZ. Any further tree removal required as a result of these works would require additional assessment by a project arborist and approval from Transport.

## 5.0 Plan 1; Area of assessment



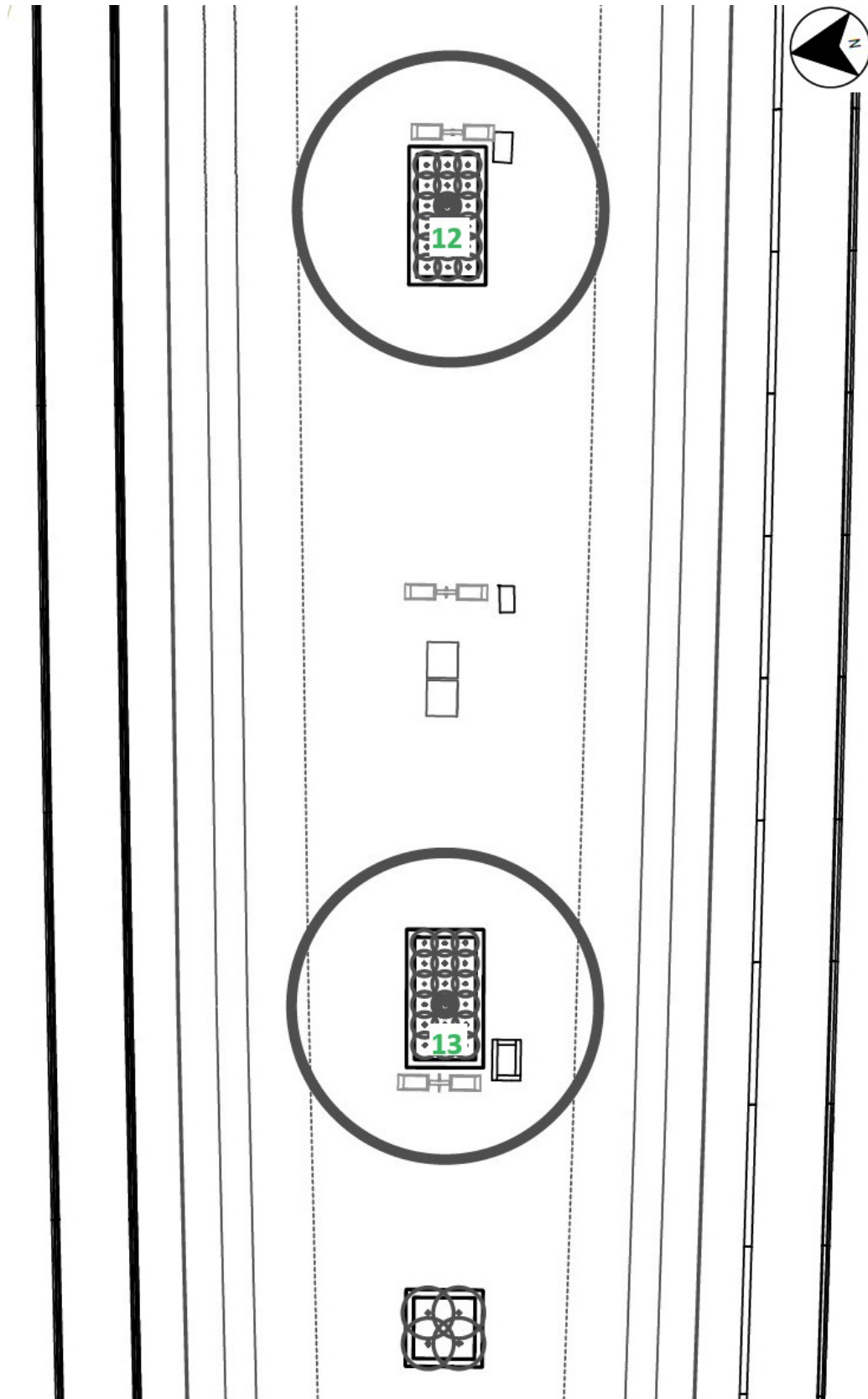
Not to scale

Area C, See Section 7.0

Source: Adapted from Aurecon Design Inc., see Section 4.4.2.

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

Indicative only, subject to detailed design

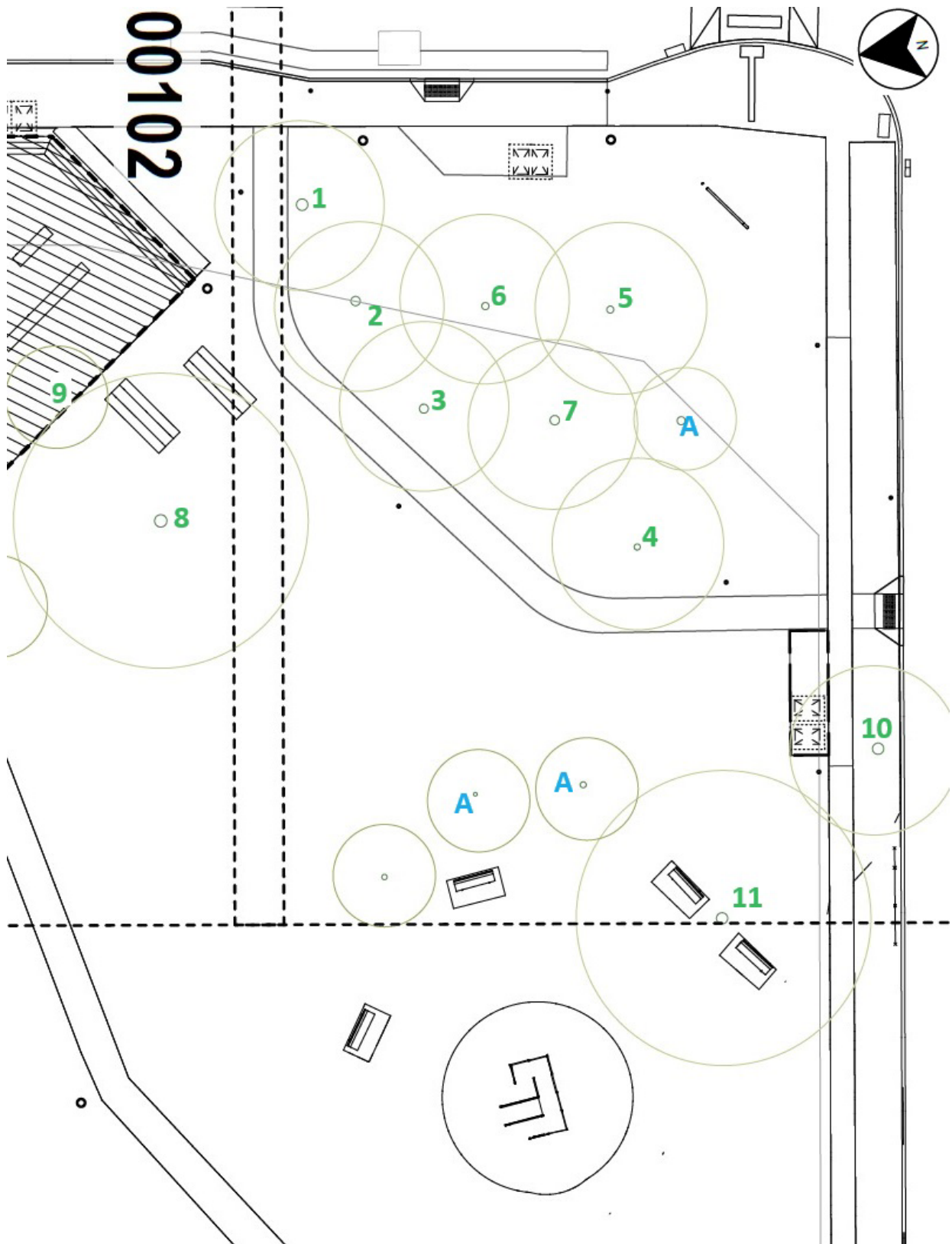


Not to scale

Source: Adapted from *Aurecon Design Inc.*, see Section 4.4.2.

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

Indicative only, subject to detailed design



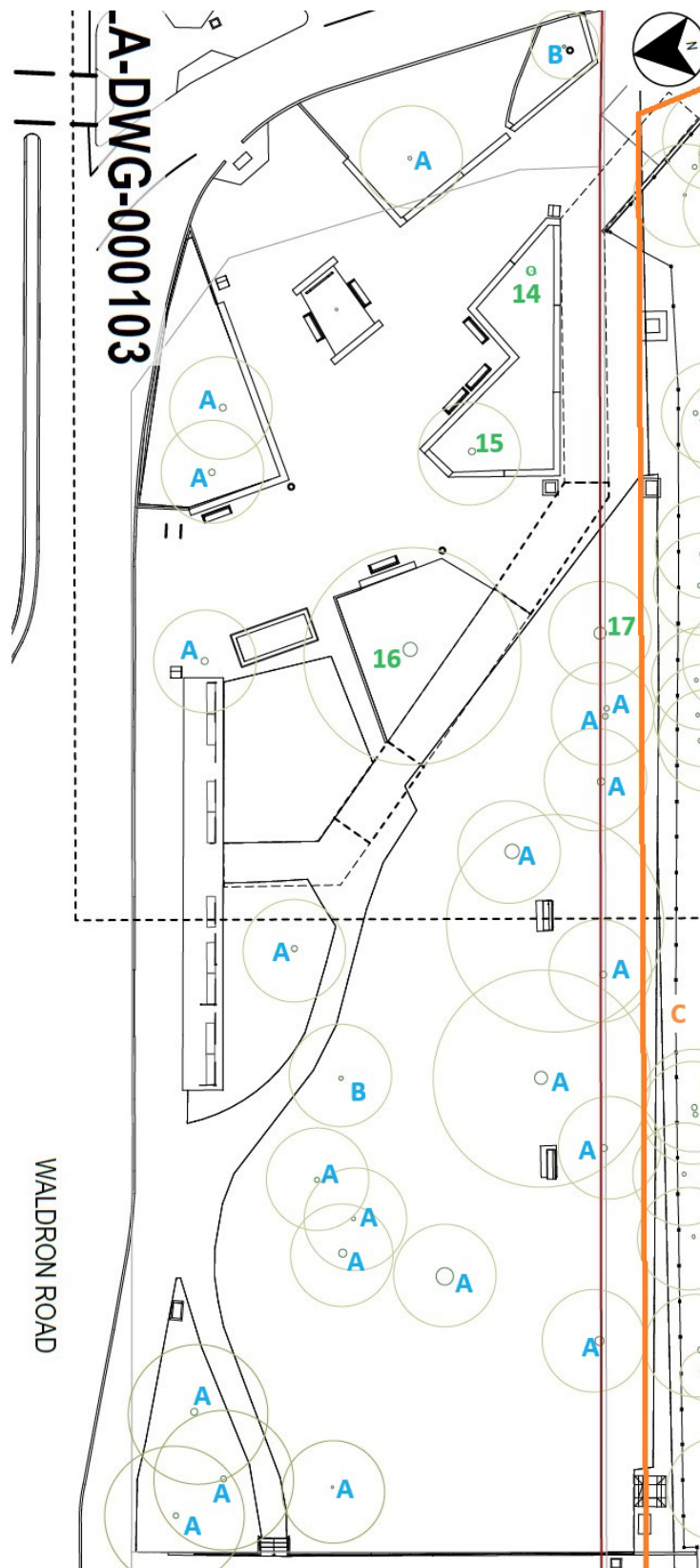
Not to scale

Trees labelled A, see Section 7.0.

Source: Adapted from *Aurecon Design Inc.*, see Section 4.4.2.

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

Indicative only, subject to detailed design



Not to scale

Trees labelled A and B, and comments for Area C, see Section 7.0.

Source: Adapted from *Aurecon Design Inc.*, see Section 4.4.2.

## 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
1	<i>Fraxinus angustifolia</i> 'Raywood' Claret Ash	8	0.26 0.36	6 x 6	M	D	Sym	- <sup>D</sup>	2A/2D <sup>C, D</sup>	Medium	5.33	2.35
<b>Assessment</b> This tree is typical of the species. Void of foliage at the time of assessment, nullifying comments on vitality. Excessive crown lift pruning has been undertaken, and multiple open wounds remain; no occlusion is evident.											<b>Development Impact</b> See Section 7.1.4 RETAIN TREE	
2	<i>Fraxinus angustifolia</i> 'Raywood' Claret Ash	7	0.17 0.22 0.08	5 x 6	M	D	W	- <sup>D</sup>	2A <sup>C, D</sup>	Medium	3.47	1.97
<b>Assessment</b> This tree is typical of the species. Void of foliage at the time of assessment, nullifying comments on vitality. Excessive crown lift pruning has been undertaken, and multiple open wounds remain; no occlusion is evident. The pruning event/s have included stub cut branches and bark tears below the pruning wounds.											<b>Development Impact</b> See Section 7.1.4 RETAIN TREE	
3	<i>Fraxinus angustifolia</i> 'Raywood' Claret Ash	6	0.26	2 x 3	O	D	Sym	- <sup>C, D</sup>	3D	Low	3.12	1.88
<b>Assessment</b> This tree is typical of the species. Void of foliage at the time of assessment, nullifying comments on vitality. Very excessive crown lift pruning has been undertaken, and the lower- mid stem reveals large areas of delaminating bark, large, open, degraded wounds, frass, decay and fruiting bodies on the wound faces, however these may be saprobes. A Large, aged pruning wound at the base (northern side), presents a crack that depends into the base. This tree is beyond remedial care.											<b>Development Impact</b> See Section 7.1.2 RETAIN TREE	
4	<i>Fraxinus angustifolia</i> 'Raywood' Claret Ash	8	0.33	8 x 8	M	D	Sym	- <sup>C, D</sup>	2A	Medium <sup>C, D</sup>	3.96	2.08
<b>Assessment</b> This tree is typical of the species. Void of foliage at the time of assessment, nullifying comments on vitality.											<b>Development Impact</b> 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
											RETAIN TREE	
5	<i>Fraxinus angustifolia</i> 'Raywood' Claret Ash	5	0.37 <sup>B</sup>	6 x 5	M	C	Sym	-C, D	2A <sup>C, D</sup>	Medium	4.44	2.18
<b>Assessment</b> This tree is typical of the species. Void of foliage at the time of assessment, nullifying comments on vitality.											Development Impact See Section 7.1.1 RETAIN TREE	
6	<i>Tristanopsis laurina</i> Water Gum	6	0.20 0.21	4 x 6	M	D	Sym	A	2A <sup>C, E</sup>	Medium	3.48	1.97
<b>Assessment</b> This tree presents as typical of the species. Composed of two stems at 1.4m, the union appears sound, however an aged deadwood stub descends into the union, providing a possible pathway to future infection and/ or infestation.											Development Impact See Section 7.1.1 RETAIN TREE	
7	<i>Fraxinus angustifolia</i> 'Raywood' Claret Ash	7	0.43 <sup>B</sup>	8 x 8	M	C	Sym	-C, D	2A <sup>C, D</sup>	Medium	5.16	2.32
<b>Assessment</b> This tree is typical of the species. Void of foliage at the time of assessment, nullifying comments on vitality.											Development Impact See Section 7.1.1 RETAIN TREE	
8	<i>Corymbia citriodora</i> Lemon Scented Gum	16	0.49	12 x 10	M	C	Sym	A	1B	High	5.88	2.45
<b>Assessment</b> This tree is typical of the species.											Development Impact See Section 7.1.1 RETAIN TREE	
9	<i>Fraxinus angustifolia</i> 'Raywood' Claret Ash	8	0.42	8 x 8	M	I	Sym	-C, D	2A <sup>C, D</sup>	Low	5.04	2.30
<b>Assessment</b> This tree is typical of the species. Void of foliage at the time of assessment, nullifying comments on vitality.											Development Impact See Section 7.1.1 RETAIN TREE	
10	<i>Eucalyptus cladocalyx</i> Sugar Gum <sup>A</sup>	8	0.50	10 x 10	M	C	Sym	A	2D <sup>C, E</sup>	Medium <sup>C, E</sup>	6.00	2.47

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
<b>Assessment</b> This tree presents multiple open pruning wounds, and conflict with the adjacent power pole and power lines. Swelling is evident in a 2nd order branch at 4m, northern side, and multiple open wounds and dead wood stubs are located within the branch structure.											<b>Development Impact</b> See Section 7.1.4 RETAIN TREE	
11	<i>Eucalyptus crebra</i> Narrow Leafed Ironbark	9	0.50	1 x 10	M	C	Sym	A	2A <sup>C, E</sup>	Medium <sup>E</sup>	6.00	2.47
<b>Assessment</b> This tree is typical of the species. An aged tear out wound at 2.8m (northern side), presents some associated swelling.											<b>Development Impact</b> See Section 7.1.1 RETAIN TREE	
12	<i>Lophostemon confertus</i> Brush Box	6	0.33 <sup>B</sup>	4 x 4	M	D	Sym	A	2D	Medium	3.96	2.08
<b>Assessment</b> Excessive crown lift pruning and lopping has been undertaken in the past; the entirety of the crown is maturing epicormic growths.											<b>Development Impact</b> See Section 7.1.3 REMOVE TREE	
13	<i>Lophostemon confertus</i> Brush Box	6	0.36	6 x 5	M	D	Sym	A	2D	Medium	4.32	2.15
<b>Assessment</b> Excessive crown lift pruning and lopping has been undertaken in the past; the entirety of the crown is maturing epicormic growths.											<b>Development Impact</b> See Section 7.1.3 REMOVE TREE	
14	<i>Brachychiton populneus</i> Kurrajong	5	0.36 <sup>C</sup>	2 x 2	Y	D	Sym	A	2A	Medium	4.32	2.15
<b>Assessment</b> Typical of the species, this tree has been installed inside a large planter/ garden bed with brick walls, indicating a barrier to root extension. This tree would be assumed to have an asymmetrical root mass. Not located on the drawing supplied.											<b>Development Impact</b> See Section 7.1.1 RETAIN TREE	
15	<i>Casuarina cunninghamiana</i> River Oak	15	0.36	8 x 8	M	D	Sym	A	1B	High	4.32	2.15
<b>Assessment</b> Typical of the species, this tree is located within a large planter/ garden bed with brick walls, indicating a barrier to root extension. This tree would be assumed to have an asymmetrical root mass, however, is of a size that it may have generated root mass under the footings/ walls or may have been in situ when the garden bed/ planter was installed.											<b>Development Impact</b> See Section 7.1.1 RETAIN TREE	

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
16	<i>Eucalyptus cladocalyx</i> Sugar Gum <sup>A</sup>	17	0.75	14 x 14	M	D	Sym	B	2D <sup>C</sup>	Medium <sup>C</sup>	9.00	2.93
<b>Assessment</b> This tree presents some decline. Mistletoe is present, lower crown. The assessment is limited by surrounding site structures.											<b>Development Impact</b> See Section 7.1.1 RETAIN TREE	
17	<i>Casuarina cunninghamiana</i> River Oak	18	0.53	10 x 11	M	C	Sym	B	2D	Medium	6.36	2.53
<b>Assessment</b> This tree presents decline, upper crown. An occluding wound is present on the stem at 1.6m, northeastern side.											<b>Development Impact</b> See Section 7.1.1 RETAIN TREE	

- 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

The area of assessment comprises the nominated trees within the station platform area, the embankment to the north of the platform, and also within the land to the north and south, including relevant areas in Nugent Park. These are vastly different areas, and each is discussed separately.

### Trees No. 1-11, South of the station (Nugent Park South); Intersection of Chester Hill and Wellington Roads

This area presents a consistent slight gradient, westerly aspect. The area is heavily modified and contains intentional plantings, pedestrian access, seating areas, and an amphitheatre/courtyard-type area. Multiple trees located within the greater area have been removed from the proposal and, therefore, have not been included in this report. Several small trees located on the drawings supplied are also of sufficient distance from the proposed works and, therefore, have not been included- these are labeled 'A' within Plan 3, Section 5.2. The aforementioned courtyard area has trees less than 3m, and it is also not indicated on the drawings supplied; these have not been included. An invasive and undesirable species (*Cotoneaster spp.*) is located in the northeastern corner of this area of assessment and immediately adjacent to the southwestern corner of the pedestrian access/footpath that provides access to the station. This tree is less than 5m in height and has not been included in this report, nor is it illustrated on the drawings supplied.

Trees No. 12 and 13, Chester Hill Station platform (see Appendix B); this is a highly modified area, where these two planted trees located within the platform, are planted within large planters, and coupled with lack of irrigation and scant maintenance, the growing conditions are expected to be significantly harsh.

### Trees No. 14-17; Area located north of the station (Nugent Park North); Intersection of Chester Hill and Waldron Roads

This area is highly modified and consists of pedestrian access (some of which are covered), bathroom facilities, large garden beds, and seating. The area has a consistent slight gradient, southerly aspect. Multiple trees within the greater area are of sufficient distance from the proposed works to not be included in Table 1 (Section 5.0) and have been labeled as 'A' within Plan 4, Section 5.3. Trees labeled as 'B' within Plan 4 are less than 3m in height and, therefore, do not constitute the definition of a prescribed tree. The raised garden beds in Nugent Park appear to be rendered brick or block construction and suggest an obstruction to root extension, supporting an asymmetrical root system (trees No., 14-16). The drawings supplied indicate the proposed works to the covered footpath is a replacement of nominated portions of the existing roof only, indicating greatly reduced impacts to trees compared to possible ground disturbance by new

pathways, etc. The consideration of trees removed from the works (and labeled A) has been based on these proposed work comments.

Area C (see Plan 2, Section 5.1); this is the embankment located on the northern side of the rail line adjacent the northern edge of the station platform. No access is available due to security fencing, and limited to pre-arranged access with permits. This area contains dense vegetation, primarily containing hundreds of *Casuarina cunninghamiana* (River Sheoak), that have established almost exclusively as forest class<sup>8</sup>. They have an approximate stem diameter range between 0.05m – 0.30m and an approximate height range from 5m-15m. All trees located within this area appear to be well removed from any proposed works. In addition, there are several *Eucalyptus* (*E. crebra* and *E. tereticornis*) and also *Corymbia citriodora* (Lemon Scented Gum). The *Eucalyptus* has an approximate stem diameter range from 0.10m to 0.35m and an approximate height range from 10m-15m. The *Corymbia* have an approximate stem diameter range from 0.20m – 0.38 and an approximate height range from 11m-15m. Throughout these native plantings are mature weed stock of varying species and size. Based on the consistent size, all these plantings are estimated to be planted although a combination of indigenous and native.

### 7.1 Proposed development

The proposed development consists of upgrading the station infrastructure to meet the requirements of the Accessible Public Transport Disability Standards issued under the *Commonwealth Disability Discrimination Act 1992*. Key features of the Proposal would include the following.

- Construction of an elevated walkway at the existing station entrance from the Chester Hill Road overbridge to provide access to the platform via a new lift and new stairs
- Changes to canopies at the station including:
  - replacement of the existing platform canopies
  - provision of a new canopy west of the platform building
  - replacement of existing street-level canopies along Chester Hill Road at the overbridge, the approach to the station entrance, and bus stops
- Provision of one new accessible parking space and a new accessible kiss and ride space with seating on Chester Hill Road (west)
- Relocation of the taxi rank to Wellington Road with new footpaths, shelter and seating
- Upgrades to bus stops on Chester Hill Road including shelter and seating

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<sup>8</sup> See Terminology Defined, Appendix A.

- Provision of additional bicycle parking in Nugent Park
- Regrading and resurfacing of localised areas on the platform and installation of tactile ground surface indicators (tactiles/TGSIs)
- Modifications to the existing station building, including the provision of a new unisex ambulant and a family accessible toilet and a new storage room.
- Ancillary work, including station power supply upgrade, protection and relocation of services and utilities, handrails and fencing, new ticketing facilities including additional Opal card readers, improvement to station communication systems (including CCTV cameras, help points and a public phone), landscaping and wayfinding signage.

### Public trees

Trees No. 1-17 are located in the adjacent areas outside of the Chester Hill Station lot, therefore constitute ownership by a second party, being the City of Canterbury Bankstown Council. Ordinarily, any proposed work within the zones of protection for these trees should not adversely impact these zones, and the trees shall be retained and protected from any site work unless permission for removal is granted by the City of Canterbury Bankstown Council. However, this project is subject to Part 5, Division 5.1 assessment, where Transport is the Determining Authority. That is, an avenue exists for the removal of these trees via the preparation of this Review of Environmental Factors (REF) and any subsequent Determination Report.

However it is noted that removal of these trees is not proposed as part of the proposal.

The calculations included in the following discussion have not 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 level of encroachment and tree impact and, therefore, may reduce the opportunity for tree retention.

### **Assumption 1: Existing encroachments**

Some of the proposed works include amending/upgrading existing infrastructure, in particular the existing footpaths. The replacement/amendment is assumed to utilise a similar footprint and depth, that would maintain (and not exceed) the encroachment of existing structures within the TPZ. That is, the actual impact for

some areas is assumed as less than the design implies, because the new design is replacing 'like for like'.

This report discusses the impact of the proposed design on the trees. Seventeen (17) trees have been listed within this report based upon the proposed work to these trees. This has included trees where any part of the zones of protection; Tree Protection Zone (TPZ), and Structural Root Zone (SRZ) to encroach into the area proposed for work and areas nominated for inclusion. Recommendations based on the tree significance and condition, together with the impact on these trees, from the proposed development, follow.

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

##### Trees No. 5-9, 11 and 14-17.

Based on the drawing set, none of the proposed work 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**

##### Tree No. 3

This tree provides poor form and does not provide sufficient significance to retain and design around. This tree could be removed irrespective of work although is not identified for removal.

#### **7.1.3 Trees located within the design footprint**

##### Trees No. 12 and 13

These trees are located within the existing platform and the drawings supplied (sheet 9 of 44) advise the "entire platform regraded". The landscape drawing indicates these trees are to be removed and replaced with new plantings (*Tristanopsis laurina*). Neither Tree No. 12 or 13<sup>9</sup> presents sufficient significance for retention in the long term based on the size related to maturity.

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

##### Trees No. 1, 2, 4, and 10

Based on Assumption 1, 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.

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<sup>9</sup> See Photos 1 and 2, Appendix B

### 7.1.5 Additional assessment- Nugent Park south

Construction methodology for vehicle access to the proposed site compound for the proposal was not known at the time of finalising this Arboricultural Impact Assessment. As such, trees within the compound and access footprint are to be retained and protected from any encroachment of greater than 10% of the TPZ. Any further tree removal or works within the TPZ of any tree (including traffic) as a result of these works would require additional assessment by a project arborist and approval from Transport.

## 7.2 Sub-surface utilities

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

## 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. The protection measures are contained in Appendix C.

### 7.3.1 Protective fence: Trees No. 1-11 and 14-17

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.

### 7.3.2 Conditions of demolition

The following conditions are required during the demolition stages for the zones of protection.

1. The demolition process must remove all other site structures before removal of the concrete surfaces. These will be the final structures removed from the site.
2. Machinery can be used for part of this removal, however, must always be retained to a hard surface (drive or slab). No machine should on any occasion work on a soil/lawn based surface within the area of the TPZ.

3. That part of the concrete surface that falls within the area of 4m radius from the girth of the tree must be removed via hand tools, e.g., Jackhammers, etc. removal of the remaining concrete must disturb as little area beneath the drive surface as possible. That is, the removal of this area should not carry any soil with it.
4. If machinery is required to enter the TPZ where no hard surface exists, then ground protection methods are required to be employed. Any machinery used within this process must provide for a minimum height of 2500mm, and that sufficient clearance is offered beneath the branch structure and machine to avoid injury. No pruning can occur for access to machinery.
5. After removal of the concrete surface, a soil conditioner is required to be applied immediately over the TPZ previously covered by the slab.  
Soil Conditioner: A non synthetic type is recommended such as 'Seasol,' 'Tri-Kelp' and applied as a diluted root drench via a hose applicator, appropriate to the manufacturer's recommendations. In addition to the soil drench, a surfactant (wetting agent) and carbohydrate treatment, will aid with the wetting and movement of water in the ground. The carbohydrate treatment includes the addition of 25-50 gms of caster sugar per litre of water. These three ingredients can be combined and applied via a single application.

### 7.3.3 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, which is to be submitted for approval by Transport's Environmental Representative.

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

Hold Points	Work type	Statement of compliance
Pre- Construction	Installation of the protection measures, Section 7.3	YES
During construction	Pruning, Project arborist required on-site before pruning proceeds.	YES
Post Construction	Final assessment of trees.	YES
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.	YES
During construction	Any crown modification including pruning or root disturbance.	YES

**Construction** refers to the time between the initiation of demolition and until occupation occurs.

**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>10</sup>.

## 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. 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

<sup>10</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.

proposed route within the TPZ. No trenching is permitted within the area of the TPZ unless stipulated by the project arborist.

3. 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 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.
4. No form of material or structure, solid or liquid, is to be stored or disposed of within the TPZ.
5. No lighting of fires is permitted within the TPZ.
6. 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.
7. 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.
8. 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.
9. 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.
10. 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.

11. (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**

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

### **9.1 Trees No. 1-11 and 14-17**

The design does not adversely impact these trees; 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.

#### **Tree No. 3**

This tree provides poor form and does not provide sufficient significance to retain and design around. This tree could be removed irrespective of work, however, the proposal does not identify this tree for removal.

### **9.2 Trees No. 12 and 13**

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

### **9.3 Additional assessment- Nugent Park south**

Construction methodology for vehicle access to the proposed site compound for the proposal was not known at the time of finalising this Arboricultural Impact Assessment. As such, trees within the compound and access footprint are to be retained and protected from any encroachment of greater than 10% of the TPZ. Any further tree removal or works within the TPZ of any tree (including traffic) as a result of these works would require additional assessment by a project arborist and approval from Transport.

### **9.4 Sub-surface utilities**

No drawings have been provided for the proposed route of sub-surface utilities, other than stormwater and electricity. 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. Underboring 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 at the nominated hold points.

**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.**

Assessed and Prepared by Geoff Beisler

Consulting Arborist

Level 5 Arborist

ISA Tree Risk Assessment Qualification

Prepared and checked by Warwick Varley

Consulting Arborist; Principal

Level 5 and 8; Arborist

ISA Tree Risk Assessment Qualification

IACA and ISA Member



## 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

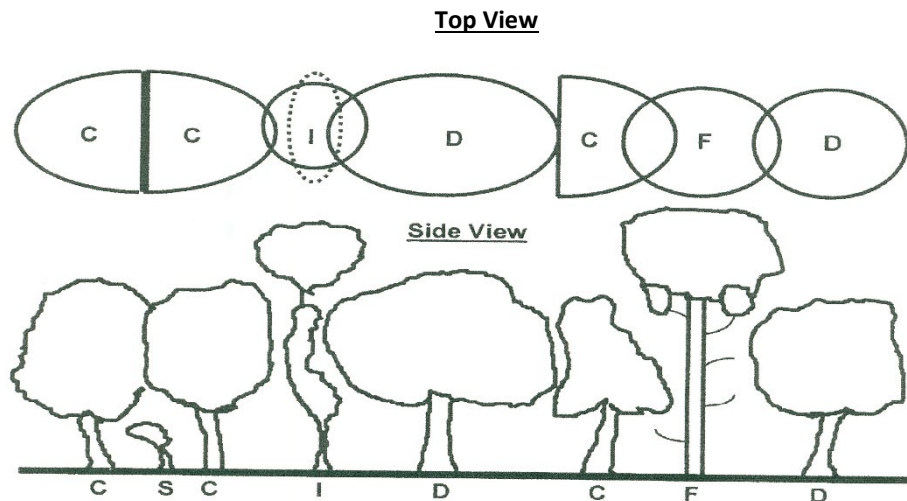
**B:** Below average vitality, possibly temporary loss of health, partial symptoms.

**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:

<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 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 C.

#### **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>11</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>11</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)

	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.
<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).	

## Appendix B- Photos

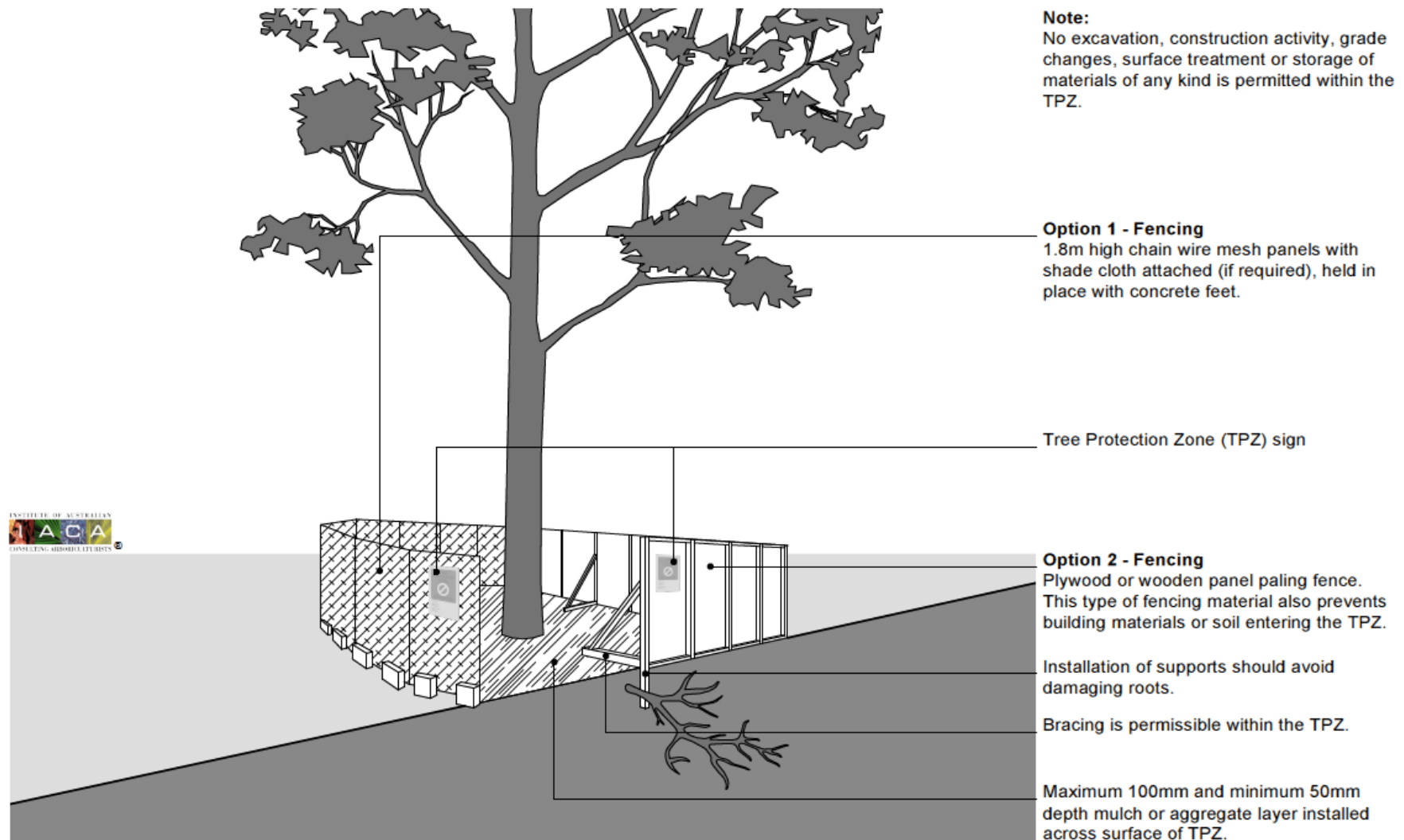


Photo 1; Tree No 12



Photo 2; Tree No 13

## Appendix C- Protection measures; Protective fence



## Stem and Ground protection

