

PDP FOR EASING SYDNEY CONGESTION  
WAKEHURST PARKWAY IMPROVEMENTS - FRENCHS  
FOREST TO NARRABEEN - CONCEPT DESIGN  
ARBORICULTURAL ASSESSMENT REPORT – WAKEHURST  
PARKWAY

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# 1 INTRODUCTION

## 1.1 Background

Transport for NSW (Transport) has engaged SustainJV to complete an Arboricultural Assessment Report for the proposed road upgrades and widening along portions of the Wakehurst Parkway (hereafter referred to as 'the proposal'), as part of the Easing Sydney's Congestion Program (ESC).

This report has been prepared with reference to TfNSW *Arboricultural assessment considerations – Version 1.0* (2021) and contains an arboricultural assessment of trees in the proposal footprint to assess the degree of potential impact, and provide advice on the viability of trees, that may be directly or indirectly impacted by the proposal. This report will also aim to inform the future design of the proposal during detailed design with an aim to retain trees, where possible.

A Biodiversity Development Assessment Report (BDAR) has also been prepared for the proposal to assess the impact on biodiversity values. This report makes no comment on impacts to biodiversity values resulting from the proposed works. The BDAR was prepared in accordance with the Biodiversity Assessment Method (BAM) to assess required mitigation and offset requirements. The trees assessed in this Arboricultural Assessment Report comprise native and exotic vegetation that have been assessed as part of the BDAR (see Section 3.3) however do not trigger BAM offsets as the Vegetation Integrity (VI) score for patches of vegetation was below the offsetting threshold set by the BAM. As such, the removal of vegetation with a VI score below the offsetting threshold would require no compensation for the loss of this vegetation, under the BAM.

In order to achieve a no net loss of biodiversity as a result of development activities, compensation for the loss of vegetation that is not to be offset under the BAM is therefore required in order to remain consistent with Transport's *Biodiversity Policy* (Policy No.CP22004 – the 'Biodiversity Policy') (2022). The following guidelines have been developed to assist Transport in implementing the Biodiversity Policy:

- TfNSW biodiversity offset thresholds – No net loss guidelines (2022)
- Tree and hollow replacement – Tree and hollow replacement guidelines (2022).

This report presents the results of the assessment of trees outside of the BAM offset areas and has been prepared to support and inform the Review of Environmental Factors (REF) being prepared for the proposal. This report also provides calculations for any tree replacement requirements, as per the Tree and hollow replacement guidelines (2022).

## 1.2 Scope and limitations

This report has been prepared by SustainJV for Transport for NSW and may only be used and relied on by Transport for NSW for the purpose agreed between SustainJV and Transport for NSW.

SustainJV otherwise disclaims responsibility to any person other than Transport for NSW arising in connection with this report. SustainJV also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by SustainJV in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. SustainJV has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by SustainJV described in this report. SustainJV disclaims liability arising from any of the assumptions being incorrect.

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The opinions, conclusions and any recommendations in this report are based on information obtained from, and testing undertaken at or in connection with, specific sample points. Conditions at other parts of the proposed footprint may be different from the site conditions found at the specific sample points.

Investigations undertaken in respect of this report are constrained by the particular site conditions, such as the location of buildings, services and vegetation. As a result, not all relevant site features and conditions may have been identified in this report.

### 1.3 Key terms used in this report

The following terms have been used throughout this report:

- The proposal is the works involving the upgrade and widening of the Wakehurst Parkway
- The construction footprint is the footprint of the road upgrade and widening
- The project boundary is the area of land that may be impacted by the proposed works (e.g. including potential temporary compound and laydown areas)
- Subject trees are the individual trees and groups of trees surveyed for this report.

### 1.4 Site location

As shown on Figure 1, the project boundary occurs along Wakehurst Parkway between Frenchs Forest Road, Frenchs Forest and Pittwater Road, North Narrabeen. The REF describes the proposal in two sections – Wakehurst Parkway South -from Trefoil Creek to Oxford Falls Road Intersection, and Wakehurst Parkway North - from Elanora Road to Mirrool Street, as follows:

- Wakehurst Parkway South - An approximate 1800 m section from 200 m north of Oxford Falls Road to 900 m south of Dreadnought Road (incorporating Trefoil Creek to Dreadnought Road and Dreadnought Rd Intersections)
- Wakehurst Parkway North - An approximate 400 m section between the intersections Elanora Road and Mirrool Street, Elanora Heights.

### 1.5 Glossary and Terms

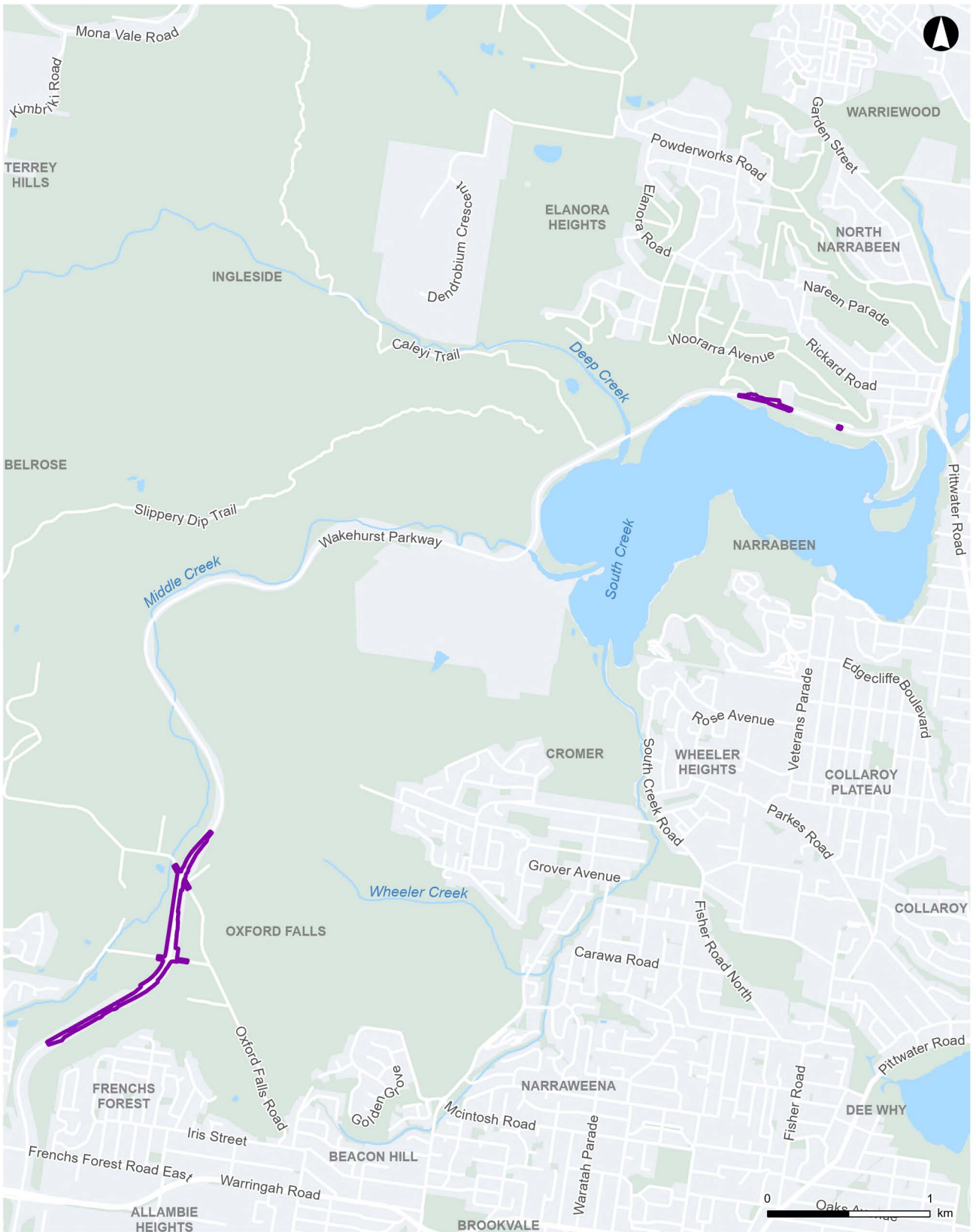
Table 1: Glossary and Terms

Acronym	Name
AHD	Australian Height Datum
DBH	Diameter at Breast Height
DCP	Development Control Plan
GIS	Geographic information system
km	Kilometre
LEP	Local Environmental Plan
m	Metre
REF	Review of Environmental Factors
SRZ	Structural Root Zone

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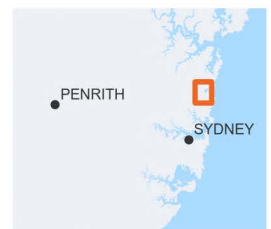
Acronym	Name
SULE	Safe Useful Life Expectancy
TfNSW	Transport for NSW
TPZ	Theoretical Tree Protection Zone





Legend

 Proposal area



1:35,000 at A4  
 Coordinate System: GDA2020 MGA Zone 56  
 Date issued: August 3, 2023



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## 2 METHODS

### 2.1 Desktop review

The following literature and online databases were reviewed as a part of this assessment:

- Australian Standard *Protection of trees on development sites, AS 4970 – 2009* (Standards Australia, 2009)
- Transport for NSW *Tree and hollow replacement guide – EMF-BD-GD-0129* (TfNSW, 2022)
- Transport for NSW *Arboricultural assessment considerations – Version 1.0* (TfNSW, 2021)
- Significant Tree Register (National Trust, 2022)
- Soils Landscapes Reports and mapping (DPE, 2023) eSpade online database – accessed 1 August 2023
- Warringah vegetation mapping (Smith and Smith 2005)
- *Pittwater Native Vegetation Classification, pre-1750 Vegetation Mapping and Vegetation Profiles* (Bangalay (Ecological and Bushfire) and Eastcoast Flora Survey, 2011)
- Draft Northern Beaches Council Biodiversity Planning Review (SMEC 2021).
- Studies which are specific to the project site include:
- Biodiversity Constraints Assessment; Potential flood mitigation works near Middle Creek, Wakehurst Parkway (GHD 2015); and
- Species Impact Statement for proposed multi-use trail between Deep Creek and Middle Creek beside Narrabeen Lagoon (P&J Smith Ecological Consultants 2009).
- Relevant Council documents include:
- Bushland and Biodiversity Policy, Northern Beaches Council (2021)
- Draft Northern Beaches Tree Canopy Policy (Northern Beaches Council 2023).

### 2.2 Field survey

The field survey assessed all trees located in the construction footprint and a number of trees in and adjacent to the project boundary on 14, 19, 20, 21 and 22 June, and 18 and 19 July 2023. The field survey was carried out a GHD Senior Botanist and Senior Arborist assisted by two GHD Ecologists.

The trees surveyed for this report are the individual trees and tree groups which are identified and shown on Figures A1 to A8 (Appendix A). The location of each tree or tree group was recorded in the field with the use of a Trimble R12 GNSS receiver with sub-metre accuracy.

#### 2.2.1 Definition of a tree

With an aim to keep definitions and reports consistent across ESC projects, and at the request of Transport, the definition of a tree stipulated in the Transport for NSW *Tree and hollow replacement guidelines* (2021a), which is derived from AS 4970-2009, and adopted, as follows:

*“A long-lived woody perennial plant greater than (or usually greater than) 3 m in height with one or relatively few main stems or trunks...”*

Additionally, Transport has requested that all shrubs that have the potential to meet the above definition within five years (commencing from REF approval) are included in this assessment.

A ‘tree group’ is defined as a number of trees in the same location which are the same species and age class with the same Safe Useful Life Expectancy (SULE) rating (see Section 2.2.3). Therefore, all



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trees and shrubs according to the above criteria have been assessed in this report. For the purposes of this report, all trees and shrubs assessed are herein defined as a 'tree'.

A search of The National Trust's *Significant Tree Register* (2022) for significant or heritage trees did not reveal any records relevant to the proposal. A Significant Tree Register was not identified for Northern Beaches Council.

## 2.2.2 Visual tree assessment

The assessment involved a visual tree assessment to identify trees and tree groups to species level. The following details were recorded:

- Tree number
- Botanical name of tree species
- Common name of tree species
- Height of tree in metres (m)
- Spread (radius m)
- Diameter at Breast Height (DBH) (m) and diameter of leader above root crown (DRC) (m)
- Age and health
- Safe Useful Life Expectancy (SULE)
- Theoretical Tree Protection Zone (TPZ) (m) and theoretical Structural Root Zone (SRZ) (m).

No diagnostic equipment was used. No aerial inspection (climbing) or tree root mapping was undertaken.

Trees or tree groups were numbered on a tree map for identification purposes (see Figures A1 to A8 (Appendix A)). The details of individual trees and tree groups were documented in a tree schedule with reference to the unique numerical identifier indicated on the tree map (see Appendix C). The information provided in this report reflects the condition of the trees at the time of inspection and only relates to the trees surveyed. Trees were not tagged. In the case of tree groups, averages for height, canopy spread and diameter at breast height (DBH) were calculated.

Trees were identified to species level according to current taxa outlined in PlantNet (2023) or in Spencer (1995 to 2002).

To inform compliance with non-statutory offsets provided in the *Biodiversity Policy*, TfNSW (2022), the presence of tree hollows was also recorded in the field.

## 2.2.3 Tree structure and health

For each tree, the Safe Useful Life Expectancy (SULE) was determined based on the health and structure of the subject tree (after Barrell, 2001). The SULE code is provided in Appendix B. The health and structural integrity of each tree were evaluated according to the criteria outlined in *Table 2*.

The estimate of each tree's age was based on the definitions outlined by Draper and Richards (2009). Trees were classed as follows:

- Young (Early Mature): age <20% of their life expectancy in situ;
- Mature: aged between 20 to 80% of their life expectancy in situ; and
- Over-mature: aged >80% of their life expectancy in situ.

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Table 2: Tree structure and health

Tree structure and health	
Structural Considerations *	
Presence/absence of cankers (abnormal growth caused by fungi or bacteria)	Evidence of 'end weight' (accumulation of mass at the end of a branch)
Presence/absence of cavities (open wound with evidence of decay)	Presence/absence of epicormic shoots (shoots arising from latent or adventitious buds)
Presence/absence of co-dominant stems (Stems or branches of equal diameter, often weakly attached)	Presence/absence of previous branch or trunk failure
Presence/absence of conks (fruiting body of decay fungi e.g. Bracket Fungus)	Evidence of girdling roots (roots that encircle the base [above ground] of the stem)
Presence/absence of decay (degradation of wood by fungi / bacteria)	Leaning trunk (bias)
Evidence of decline (loss of vigour)	Low canopy (branches that are close to ground may require heavy pruning for construction clearance)
Evidence of dieback (death of twigs and branches)	Presence/absence of wounds (injuries on the surface of a stem or branch)
Health Considerations	
Presence/absence of pest and diseases	Proportion of necrotic material in platform
Amount of extension growth	Absence/presence of epicormic growth
Density of canopy	Foliage size and colour

\* Adapted from Matheny & Clark (1998).

### 2.2.4 Tree protection zones

The Tree Protection Zone (TPZ) has been calculated for all trees assessed during the field survey. The calculations of the TPZs for assessed trees were based on the DBH as outlined in Australian Standard AS 4970 – 2009 *Protection of Trees on Development Sites* (Standards Australia, 2009) (see Appendix C).

TPZ radius = DBH x 12 where: DBH = Diameter at Breast height (in metres).

Where the trees have co-dominant leaders, the following formula was applied, in order to calculate DBH:

$$DBH = (dbh1^2+dbh2^2+...+dbhn^2)^{0.5}$$

The TPZ calculation according to AS 4970 – 2009 (Standards Australia, 2009) is stated for each tree in the tree table included in Appendix C. It should be stressed that the TPZ is a theoretical area and is based on trees growing in natural conditions. It is apparent that most of the subject trees have atypical root zones, based on location, unnatural air and water percolation levels, surface and underground disturbances as well as ongoing above-ground disturbances.

The Structural Root Zone is determined by the following formula:

$$SRZ = (DRC \times 50) \times 0.42 \times 0.64,$$

where DRC is the diameter of the leader above the root crown (DRC).

According to AS 4970 – 2009 (Standards Australia, 2009), encroachment of up to 10% of the TPZ is acceptable, but any encroachment into the SRZ may inhibit the tree's stability.

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## 3 PROJECT SITE AND ENVIRONMENTAL SETTING

### 3.1 Overview

The project site consists of mostly intact and continuous patches of vegetation extending along sections of both sides of Wakehurst Parkway.

The Wakehurst Parkway North section occurs between Elanora Road and Mirrool Street. Residential development occurs along the northern side of Wakehurst Parkway and a narrow band of open-forest within Billarong Reserve and the shoreline of Narrabeen Lakes follows the southern side.

The Wakehurst Parkway South section extends along both sides of Wakehurst Parkway north from Trefoil Creek, to north of the intersection of Oxford Falls Road. Developed areas include Oxford Falls Grammar School to the east of the Parkway with the C3 church and Christian City Training College to the west; Oxford Falls Peace Park and St Pius X College playing fields are located to the south of the Dreadnought Road intersection.

Sections of excavated cliff lines follow portions of the road reserve. The cliff lines are mostly formed from Hawkesbury sandstone and, in a few instances strata of the Narrabeen series. Topography ranges from gently to moderately inclined. Altitude ranges from 100 m Australian Height Datum (AHD) upslope of the Dreadnought Road intersection to 10 m AHD along the shoreline of Narrabeen lakes.

### 3.2 Soils

With reference to the 1:100,000 Sydney Soils Landscape Sheet (DPE, 2023), the Wakehurst Parkway North section is underlain with fluvial soils of the Deep Creek soils landscape. These soils are associated with Hawkesbury Sandstone and are found along lower, non-tidal floodplains that drain the Hawkesbury valleys, are typically loams or sands and are characterised by flooding events, high erosion and sedimentation hazards with very low fertility and high, permanent water tables (DPE, 2023).

Soils along the Wakehurst Parkway South section are mapped as fluvial soils of the Oxford Falls soils landscape, erosional soils of the Lambert soils landscape and colluvial soils of the Hawkesbury soils landscape. As with the Deep Creek soils, soils in the Wakehurst Parkway South section comprise sands and/or loams, are associated with Hawkesbury Sandstone and each have limitations of being highly permeable with low soil fertility, of having a high erosion and hazard, with high or perched water tables (DPE, 2023).

It is likely that the existing topsoil and potentially underlying soils have been modified after initial clearing and subsequent suburban/road development. It is also possible that sections of remnant soils remain intact within the project boundary.

### 3.3 The subject trees

The trees surveyed for Arboricultural Assessment Report have been identified as a 'tree' or 'tree group', and given an identification number between 1 to 1248.

While field survey covered the whole proposal area, trees and tree groups that trigger BAM offset requirements were removed from this assessment as they are considered under the BDAR. A total of 747 trees were assessed for this report, with all other trees assessed under the BDAR. Of the 747 trees assessed, 127 were native and 620 were exotic (refer to Figures A1 to A8 (Appendix A). Detailed survey results are provided in the Tree Table (Appendix C).

Although some patches of native vegetation are recovering from fire, the native trees growing in the project site generally have a SULE rating of A2, indicating that they "*appear to be retainable at the time of assessment for 15 to 40 years with an acceptable degree of risk, assuming reasonable maintenance*" (see Barrell, 2001).

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There are very few over-mature Eucalypts and trees with large hollows are uncommon, indicating that most of the canopy trees have established within the last 80 years (see Gibbons and Lindenmayer, 2002). A large proportion of mature Eucalypts in the project site have co-dominant leaders. Factors which may have contributed to this tendency are described by James (2010) and James et al. (1999) and include increased exposure to winds and vortex effects because of their proximity to edges of busy roads.

Patches of invasive exotic species occur at several locations in the project site, although the most extensive patches occur on both sides of the Parkway adjacent to Oxford Falls Grammar, especially within the alignment of a tributary of Middle Creek which flows beneath the Parkway. On the eastern side, there is an extensive thicket of Indian Coral (*Erythrina x sykesii*) and English Ash (*Fraxinus excelsior*) growing along the creek bank. On the western side there are extensive thickets of Privet (*Ligustrum lucidum and Ligustrum sinense*) and Lantana (*Lantana camara*). Large patches of Privet and Lantana thicket also occur to the north of the Oxford Falls Road intersection, downslope of recent development on Meatworks Avenue.

It is apparent that large numbers of trees and shrubs are proposed for clearing; moreover excavation of existing cliffs and slopes are proposed, with the likely result of disturbance to root systems of trees proposed for retention.

No hollows are present in the trees subject to Arboricultural Assessment Report.

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## 4 IMPACTS OF THE PROPOSED WORKS

### 4.1 Impacts on the subject trees

The determination on whether a tree is likely to be removed or whether it was likely to remain viable during construction was based on the location of the tree’s TPZ, and how much of that TPZ falls within the construction footprint.

Refer to Figures A1 to A8 (Appendix A) for the tree/tree group location and to the Tree Table in Appendix C for the tree species name and particulars (e.g. health, SULE, age, additional comments etc).

As a general rule, and with reference to AS 4970 – 2009:

- A 10% encroachment into the TPZ is considered as a minor encroachment, one that the tree is likely to remain viable during and following construction
- Anything greater than 10% into the TPZ is considered a major encroachment, and likely to adversely affect the tree to such a degree that it may not remain viable
- Any impact into the SRZ is considered unacceptable as it impacts on the tree’s structural stability, i.e. the root growth required to keep the tree upright. The SRZ does not relate to the tree’s long-term viability; this will comprise a larger area.

Based on the above criteria, of the 747 trees assessed, a total of 735 trees (comprising 118 native and 617 exotic trees) are unlikely to remain viable and are likely to be removed as a part of the proposed works, as the proposal is considered to majorly encroach into their TPZs. The remaining 12 trees are likely to have a minor encroachment into their TPZ’s and as such, are likely to remain viable and may require protection. These trees/tree groups are presented in **Table 3**.

Table 3: Impacts on subject trees

Major encroachment	Minor encroachment
7, 8, 9, 10, 160 to 172 (inclusive), 280, 283, 285, 304, 305, 306, 370 to 402 (inclusive), 690, 693 to 705 (inclusive), 708, 929, 1138, 1139, 1207, 1238, 1240, 1241 and 1242	15, 159, 1202 to 1206 (inclusive), 1239, 1243 to 1245 (inclusive), 1247 and 1248

An example of appropriate temporary fencing is indicated in Appendix D. It is, however recognised that the use of temporary fences may be inconvenient, in the context of machinery access, materials storage and parking, therefore the recommendation for fencing over such a short time period may not be practicable.

It is noted that the C2 Construction Compound is partially located in the St Pius X College Playing Fields. Although no trees are proposed for removal and given that they are outside of the project boundary they were not assessed. Notwithstanding, trees along the boundary of the compound may be subject to damage from the storage and movement of materials/plant. As such trees along the boundary, as shown on Figures A1 to A8 should be buffered with a protection zone around each tree. As a general rule of thumb, the drip line is to serve as an approximate TPZ for each tree. So too is the case for private trees located along the boundary of the C3 church, where private trees along the C3 Construction Compound boundary may be susceptible to damage during construction, and as such, may require protection. See Section 5.3 for additional tree protection measures that should be implemented during works.



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## 5 MITIGATION MEASURES

### 5.1 Avoidance of impacts

The proposal would result in impacts on planted and self-recruited native and exotic trees and areas of intact native vegetation. The constraints of the proposal footprint and lack of available alternative space means that avoidance of all impacts is not feasible. It is noted that the final design footprint is yet to be confirmed, and therefore, the range of impacts to individual trees are likely to vary and may result in the removal of less, or more, trees than expected.

### 5.2 Construction Environmental Management Plan

A Construction Environmental Management Plan (CEMP) would be required for the construction phase of the proposal. The CEMP would include, as a minimum, industry-standard measures for the management of soil, surface water and pollutants, as well as site-specific measures including the procedures outlined below. The CEMP should be prepared and implemented by the contractor.

### 5.3 Tree protection measures

With an aim to minimise impacts, mitigation measures are provided below with respect to tree removal, and the protection and management of trees at the project site:

- Native vegetation removal will be minimised through detailed design. All workers would be provided with an environmental induction prior to commencing work onsite. This induction would include information on the protection measures to be implemented to protect vegetation, penalties for breaches and locations of areas of sensitivity.
- Pre-clearing surveys will be undertaken in accordance with *Guide 1: Pre-clearing process of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects* (RTA 2011).
- Disturbance of vegetation should be limited to the minimum amount necessary. Trees nominated to be removed would be clearly demarcated onsite prior to construction, to avoid unnecessary vegetation removal. Trees to be retained would be protected through temporary protection measures discussed below.
- Vegetation removal will be undertaken by a qualified arborist and in accordance with Guide 4: Clearing of vegetation and removal of bushrock of the *Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects* (RTA, 2011).
- If appropriate, the felled trees should be mulched and spread over the Tree Protection Zones of retained trees or regeneration areas.
- Vegetation to be retained is to be protected in accordance with *AS 4970-2009 Protection of Trees on Development Sites* (Standards Australia, 2009), and may require exclusion fencing of the Tree Protection Zones.
- Those trees proposed for retention should be protected by temporary fencing. An example of suitable protective fencing is indicated in Appendix D. Fencing should be installed prior to demolition and should be kept in place during excavation and construction.
- Protection of trees adjacent to construction areas should be undertaken in accordance with *AS 4970-2009 Protection of Trees on Development Sites* (Standards Australia, 2009) and may require exclusion fencing of the Tree Protection Zones (TPZs).

The following actions should not be permitted within TPZs of trees to be retained:

- Storage of materials, plants or equipment
- Installation of site sheds or portable toilets

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- Excavations, trenching, ripping or cultivation of soils
- Modification of existing soil level or addition of fill materials
- Disposal of waste materials and chemicals (both solid or liquid)
- Mechanical removal of vegetation
- Pedestrian or vehicular movement
- Any root pruning required within the TPZ should be approved by the Project Arborist and any digging and pruning of roots (only roots < 5cm may be pruned) within the TPZ should be conducted by hand for a clean cut
- To protect soil within the TPZ, a layer of organic mulch may be applied (no more than 75 mm thick). Any mulch used should comply with the *AS 4454-2012 Composts, soil conditioners and mulches* (Standards Australia, 2012).

A Project Arborist should supervise works and inspect excavated areas adjacent to retained trees, in order to assess the amount of fine roots affected, the loss of which may affect tree health as well as the amount of supporting roots affected, the loss of which may affect tree stability. The project arborist would then determine appropriate ameliorative measures for retained trees (e.g. canopy reduction, irrigation, fertiliser applications) or provide recommendations for tree removal if required.

## 5.4 Vegetation and fauna

The CEMP would be required to address the following as a minimum to minimise the impacts of construction on native flora and fauna:

- Fauna management measures, including (but not limited to) the following:
  - An ecologist or suitably qualified wildlife handler to be present case of any unexpected finds (eg. nestlings)
  - Any unexpected finds should be removed by the wildlife handler and released into the care of WIRES, Sydney Wildlife or other appropriate wildlife rescue organisation as necessary.

## 5.5 Erosion and sedimentation

Erosion and sediment control plans and measures would be established prior to the commencement of construction in accordance with the principles and guidelines included in *Managing Urban Stormwater: Soils and Construction - Volume 1* (Landcom, 2004) and *Volume 2D of Managing Urban Stormwater: Soils and Construction* (DECC 2008). Any controls would be managed and maintained in accordance with the CEMP to ensure their ongoing functionality. Erosion and sediment control controls would be regularly inspected, particularly following rainfall events, to ensure their ongoing functionality. All stockpiled material should be stored in bunded areas and kept away from waterways to avoid sediment or contaminants entering waterways.

## 5.6 Biodiversity Policy

As noted in Section 1, as most of the trees considered in this Arboricultural Assessment Report comprise native vegetation, they have been assessed in accordance with the BAM during the preparation of the BDAR for the project, and as such, will be offset in line with the Biodiversity Offset Scheme (BOS). Some patches of native vegetation fall below the offsetting threshold under the BAM and therefore would not require biodiversity offsets. The removal of trees in these locations will therefore be offset under the *Tree and Hollow replacement guidelines* (TfNSW, 2022), as shown on Figures A1 to A8 (Appendix A). TfNSW (2022) identifies the non-statutory offset requirements for proposals that result in tree loss in areas not offset under the BOS. Broadly, the draft offset requirements are shown in *Table 4* below.

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Of the 735 trees likely requiring removal, 118 trees are native and are to be replaced under the TfNSW *Biodiversity Policy* (2022), as shown in Table 4. All remaining 617 trees are exotic and none are considered an amenity tree, as such, these trees do not require offsetting under the *Biodiversity Policy*. It is understood that the proposal’s landscaping and revegetation will partially meet the replacement requirements, with the balance being met via contribution into the TfNSW Conservation Fund.

Table 4: TfNSW (2022) tree and hollow replacement requirements

Tree size (DBH) (m)	Native trees requiring removal under TfNSW (2022)	Replacement ratio per tree removed	Contribution required if project not able to replace trees and hollows on or in neighbouring land
Very large tree (DBH greater than 100cm)	2	Plant a minimum of 16 trees and provide 3 artificial hollows for every occupied hollow removed (assuming a 20% occupancy rate)	\$2500 per tree and \$500 for each hollow required
Large tree (DBH between 50cm and 100cm)	5	Plant a minimum of 8 trees and provide 3 artificial hollows for every occupied hollow removed (assuming a 20% occupancy rate)	\$1000 per tree and \$500 for each hollow required
Medium tree (DBH greater than 20 cm, but less than 50cm)	86	Plant a minimum of 4 trees and provide 3 artificial hollows for every occupied hollow removed (assuming a 20% occupancy rate)	\$500 per tree and \$500 for each hollow required
Small tree (DBH greater than 5cm, but less than 20cm)	25	Plant a minimum of 2 trees.	\$125 per tree

Based on the requirements of TfNSW (2022), 466 new trees will need to be planted within the proposal footprint or in neighbouring properties to offset the impact of the proposal. If this cannot be achieved, the proposal must make a payment of \$56,125 to Transport’s Conservation Fund. Additionally, as per TfNSW (2022), exotic invasive species have not been included in the count of tree replacement or offsetting.

The offsetting requirements are likely to change if the construction footprint or construction methodology changes, or during the detailed design phase of the project which would vary the nature and scale of impacts to existing trees.

Status: Approved for use

## 6 CONCLUSION

Trees to be affected by the proposal comprise mostly native vegetation in good condition, with smaller areas of a mixture of self-recruited and planted exotic and native species.

This assessment has identified the potential removal of up to 735 trees and shrubs (comprising 118 native and 617 exotic invasive trees), not already considered under the BDAR prepared for the proposal. As the BDAR assesses the impact of the proposal on biodiversity values, this Arboricultural Assessment Report makes no comment on impacts to biodiversity values resulting from the proposed works.

Of the 735 trees identified for removal 118 are to be offset via non-statutory means as per TfNSW (2022) by either the planting of 466 new trees, or payment of \$56,125 into TfNSW's Conservation Fund.

Several environmental safeguards and management measures will be implemented by the construction contractor as part of the Construction Environmental Management Plan for the proposal to further minimise the potential for any adverse impacts on retained trees and native fauna species that may be present during construction.

Mitigation measures are provided to support tree removal, and the protection and management of trees as part of the proposal. Protection of trees adjacent to the proposal footprint should be undertaken in accordance with *AS 4970-2009 Protection of Trees on Development Sites* (Standards Australia, 2009) and may require exclusion fencing of the TPZ.

Any alterations to the proposal footprint may result in changes to the viability of some trees. As such, a qualified arborist should review any changes during detailed design and provide further advice as required. Similarly, changes to the proposal footprint may require recalculation of non-statutory offset obligations associated with the project, in line with the requirements of TfNSW (2022).

Status: Approved for use

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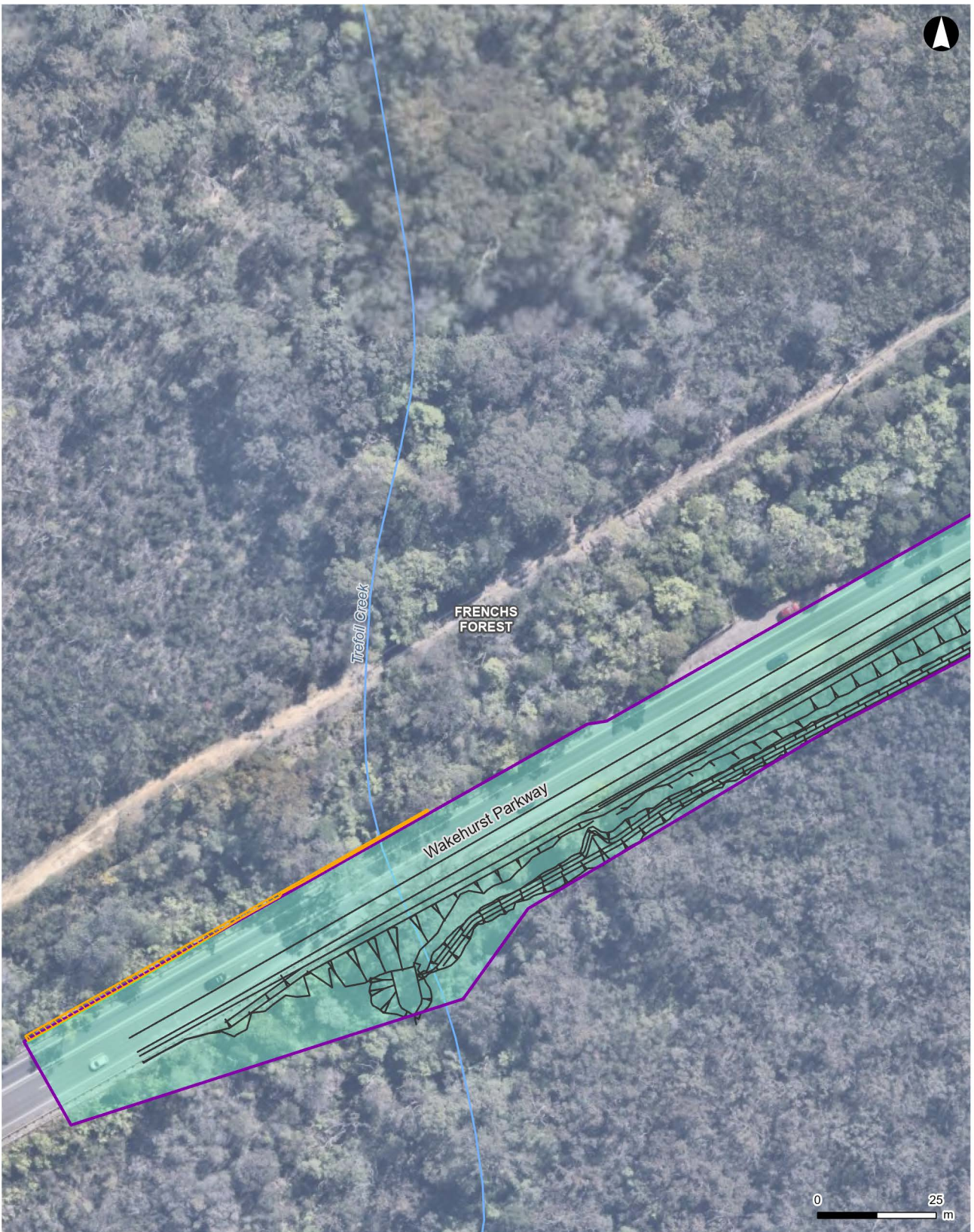
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## **APPENDIX A – TREE SURVEY FIGURES**



Legend

- Proposal area
- Compound site
- Tree and hollow replacement area
- BDAR assessment area

Proposal

- Road design

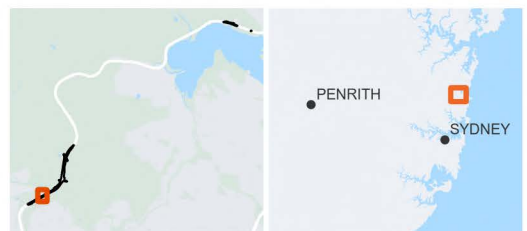




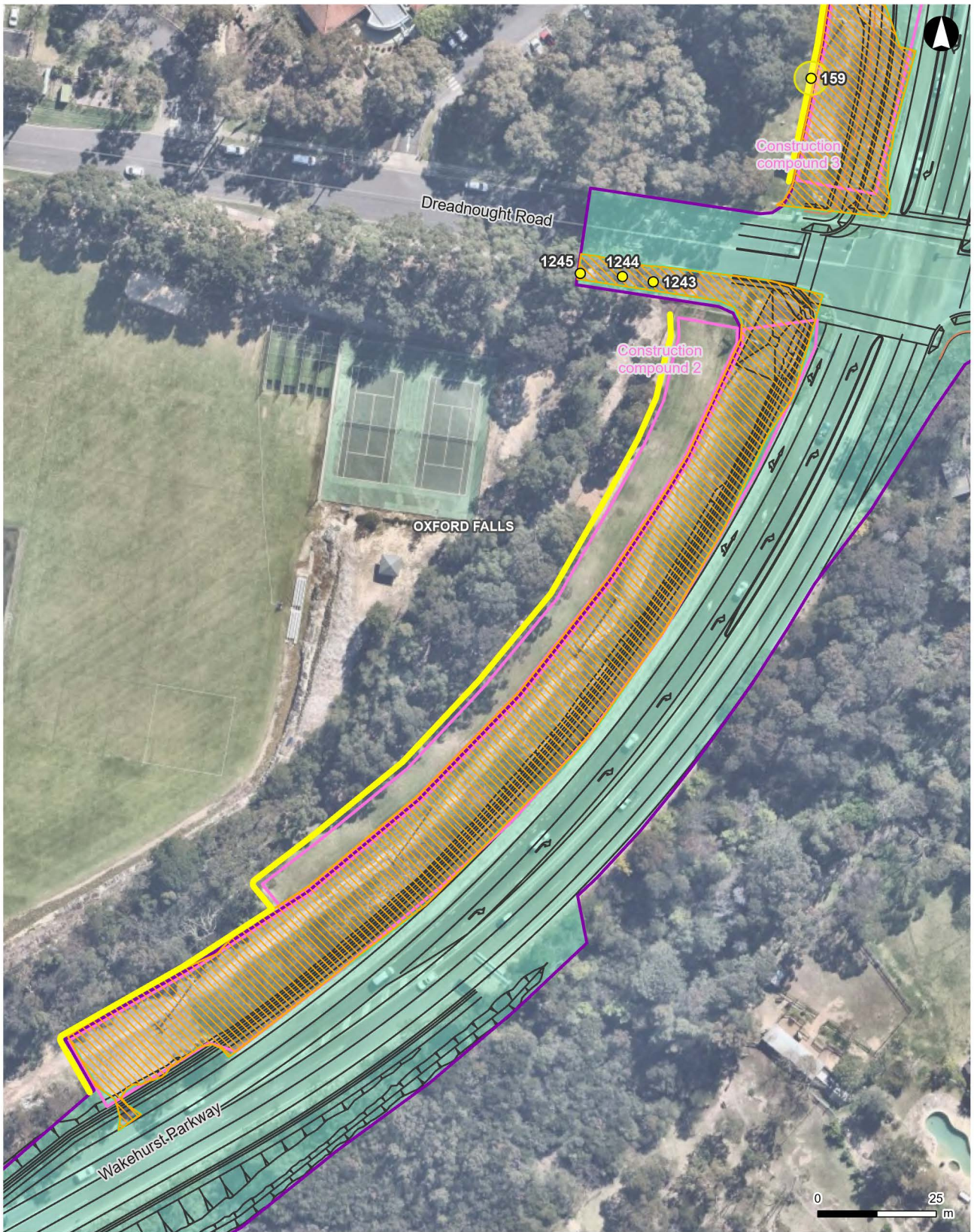


Legend

- Proposal area
- Compound site
- Tree and hollow replacement area
- BDAR assessment area
- Proposal
- Road design
- Tree protection zone
- Likely to require removal







Legend

- Proposal area
- Compound site
- Tree and hollow replacement area
- BDAR assessment area
- Approximate tree protection zone
- Tree protection zone
- Likely to require protection

Proposal

- Road design
- Footpath



1:1,200 at A4  
 Coordinate System: GDA2020 MGA Zone 56  
 Date issued: September 22, 2023  
 Imagery: Nearmap 2023



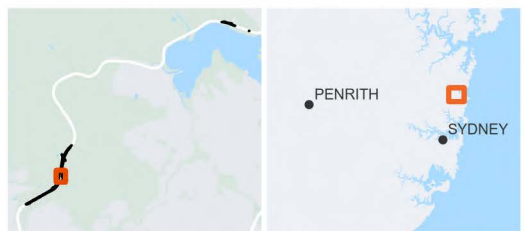




Legend

- |                                  |                                  |  |
|----------------------------------|----------------------------------|--|
| Proposal area                    | Proposed bus stop                | Tree protection zone                   |
| Compound site                    | Approximate tree protection zone | Likely to require removal              |
| Tree and hollow replacement area |                                  | Likely to require protection           |
| BDAR assessment area             |                                  | Tree group (Likely to require removal) |

- Proposal
- Road design
  - Footpath







Legend

- Proposal area
- Compound site
- Tree and hollow replacement area
- BDAR assessment area
- Tree protection zone
- Likely to require removal
- Tree group (Likely to require removal)

Proposal









- Road design
- Footpath

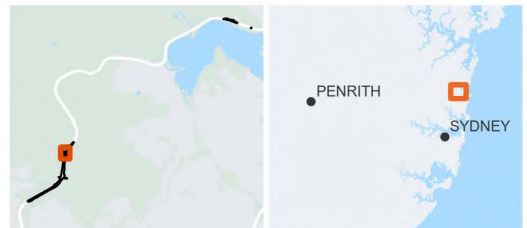






Legend

- |  |  |
|--|--|
|  Proposal area                    |  Tree protection zone         |
|  Compound site                    |  Likely to require removal    |
|  Tree and hollow replacement area |  Likely to require protection |
|  BDAR assessment area             |  |
| <b>Proposal</b>  |  |
|  Road design                      |  |

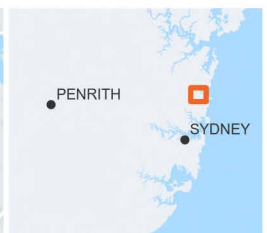
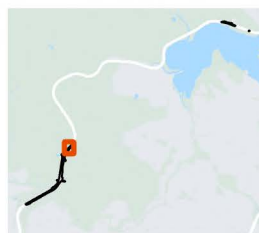






Legend

- Proposal area
- Compound site
- Tree and hollow replacement area
- BDAR assessment area
- Proposal
- Road design
- Tree protection zone
- Likely to require removal





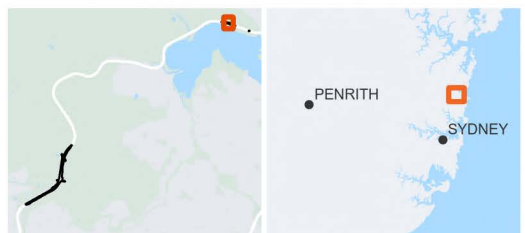


**Legend**

- Proposal area
- Compound site
- Tree and hollow replacement area
- BDAR assessment area
- Tree protection zone
- Likely to require removal

**Proposal**

- Road design
- Footpath





Status: Approved for use

## APPENDIX B – SAFE USEFUL LIFE EXPECTANCY (SULE) MATRIX

The SULE value generated by the below (Table B1) matrix gives an indication of the time a tree is expected to be usefully retained. Adapted from Barrell (2001).

Table B1 SULE Value

	1 Long SULE	2 Medium SULE	3 Short SULE	4 Removal	5 Move or Replace
A	Tree that appear to be retainable at the time of assessment for >40 years with an acceptable degree of risk, assuming reasonable maintenance.	Tree that appear to be retainable at the time of assessment for 15 to 40 years with an acceptable degree of risk, assuming reasonable maintenance.	Tree that appear to be retainable at the time of assessment for 5 to 15 years with an acceptable degree of risk, assuming reasonable maintenance.	Trees which should be removed within the next 5 years.	Trees which can be readily moved or replaced.
B	Structurally sound trees located in positions that can accommodate for future growth.	Trees that may only live for 15-40 years.	Trees that may only live for another 5-15 years.	Dead, dying, suppressed or declining trees.	Small trees <5 (m) in height.
C	Trees that could be made suitable for retention in the long term by remedial tree care.	Trees that could live for more than 40 years but may be removed for safety or nuisance reasons.	Trees that could live for more than 15 years but may be removed for safety or nuisance reasons.	Dangerous trees because of instability or loss of adjacent trees.	Young trees less than 15 years old but over 5m in height.
D	Trees of special significance that would warrant extraordinary efforts to secure their long term retention.	Trees that could live for more than 40 years but may be removed to prevent interference with more suitable individuals or to provide for new planting.	Trees that could live for more than 15 years but may be removed to prevent interference with more suitable individuals or to provide for a new planting.	Dangerous trees because of structural defects.	
E		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 not safe to retain.	
F				Trees that could live for more than 5 years but may be removed to prevent interference with more suitable individuals or to provide for a new planting.	

Status: Approved for use

## APPENDIX C – TREE TABLE SUBJECT TO TREE AND HOLLOW REPLACEMENT GUIDELINES

ID	Latitude	Longitude	Botanical name	Common name	Height (m)	Canopy Radius (m)	Age	Health	Form	DBH	TPZ	SRZ (radius)	SULE	Expected impact	Additional comments
7	341083.249	6268789.472	<i>Callistemon citrinus</i>	Crimson Bottlebrush	5	1.5	M	G	G	0.2	2.2	1.8	A2	Major encroachment - may require removal	Nil
8	341087.352	6268785.549	<i>Callistemon viminalis</i>	Weeping Bottlebrush	6	2.5	M	G	G	0.2	2.4	1.9	A3	Major encroachment - may require removal	Dense cover of Balloon Vine
9	341090.995	6268785.713	<i>Casuarina glauca</i>	Swamp Oak Guman	12	3	M	G	G	0.33	4	2.2	A2	Major encroachment - may require removal	* <i>Ficus benjamina</i> adjacent with low laterals
10	341092.692	6268781.54	<i>Casuarina glauca</i>	Swamp Oak Guman	9	3	M	G	G	0.27	3.2	2	A2	Major encroachment - may require removal	Nil
159	337363.816	6265390.05	<i>Corymbia maculata</i>	Spotted Gum	8	3	M	M	F	0.28	3.5	2.1	A3	Minor encroachment - protection may be required	Terminal leader has been lopped; adjacent to overhead wires
160	337402.836	6265560.608	<i>Pittosporum undulatum</i>	Brush Daphne	6	2	M	M	M	0.12	2	1.5	A3	Major encroachment - may require removal	Nil
161	337410.284	6265566.863	<i>Pittosporum undulatum</i>	Brush Daphne	8	3	M	M	M	0.42	4.8	2.5	A3	Major encroachment - may require removal	Co-dominant leaders

Status: Approved for use

ID	Latitude	Longitude	Botanical name	Common name	Height (m)	Canopy Radius (m)	Age	Health	Form	DBH	TPZ	SRZ (radius)	SULE	Expected impact	Additional comments
162	337413.749	6265572.34	<i>Pittosporum undulatum</i>	Brush Daphne	6	3	M	M	M	0.21	2.5	1.9	A3	Major encroachment - may require removal	Growing with * <i>Ligustrum sinense</i>
163	337417.305	6265590.006	* <i>Erythrina crista-gallii</i>	Cockspur Coral-thorn	6	4	M	NA	NA	NA	NA	NA	A5	Major encroachment - may require removal	Invasive weed
164	337418.834	6265595.195	* <i>Erythrina crista-gallii</i>	Cockspur Coral-thorn	7	2	M	NA	NA	NA	NA	NA	A5	Major encroachment - may require removal	Invasive weed
165	337419.085	6265596.674	* <i>Erythrina crista-gallii</i>	Cockspur Coral-thorn	6	4	M	NA	NA	NA	NA	NA	A5	Major encroachment - may require removal	Invasive weed
166	337418.696	6265608.731	<i>Acacia floribunda</i>	White Sally-wattle	6	3	OM	F	F	0.31	3.7	2.1	A3	Major encroachment - may require removal	Canopy covered with Balloon Vine
167	337421.921	6265622.114	* <i>Ligustrum sinense</i>	Small-leaved Privet	7	4	M	NA	NA	NA	NA	NA	A5	Major encroachment - may require removal	Invasive weed
168	337422.217	6265623.486	* <i>Ligustrum sinense</i>	Small-leaved Privet	6	3	M	NA	NA	NA	NA	NA	A5	Major encroachment - may require removal	Invasive weed
169	337422.843	6265631.219	* <i>Ligustrum sinense</i>	Small-leaved Privet	6	3	M	NA	NA	NA	NA	NA	A5	Major encroachment - may require removal	Invasive weed

Status: Approved for use

ID	Latitude	Longitude	Botanical name	Common name	Height (m)	Canopy Radius (m)	Age	Health	Form	DBH	TPZ	SRZ (radius)	SULE	Expected impact	Additional comments
170	337424.643	6265642.514	<i>Pittosporum undulatum</i>	Brush Daphne	7	4	M	G	G	0.39	4.7	2.3	A3	Major encroachment - may require removal	Nil
171	337424.463	6265644.545	<i>Eucalyptus punctata</i>	Grey Gum	10	6	M	G	M	0.37	4.6	2.1	A2	Major encroachment - may require removal	Nil
172	337413.794	6265660.869	* <i>Platanus x hispanica 'Acerifolia'</i>	London Plane	8	7	M	M	F	1.04	12	3.6	A4	Major encroachment - may require removal	Seedlings present
280	337437.734	6265745.432	* <i>Cinnamomum camphora</i>	Camphor Laurel	12	6	M	NA	NA	NA	NA	NA	A5	Major encroachment - may require removal	Invasive species
283	337439.613	6265741.61	* <i>Cinnamomum camphora</i>	Camphor Laurel	10	4	M	NA	NA	NA	NA	NA	A5	Major encroachment - may require removal	Invasive species
285	337439.112	6265737.758	* <i>Cinnamomum camphora</i>	Camphor Laurel	5	2	M	NA	NA	NA	NA	NA	A5	Major encroachment - may require removal	Invasive species. Three leaders
304	337468.93	6265823.318	<i>Melaleuca quinquenervia</i>	Broad-leaved Paperbark	7	5	M	G	G	0.34	4	2.2	A2	Major encroachment - may require removal	Nil
305	337468.495	6265822.342	<i>Casuarina glauca</i>	Swamp Oak	8	3	M	G	G	0.18	2.2	1.8	A3	Major encroachment - may require removal	Nil

Status: Approved for use

ID	Latitude	Longitude	Botanical name	Common name	Height (m)	Canopy Radius (m)	Age	Health	Form	DBH	TPZ	SRZ (radius)	SULE	Expected impact	Additional comments
306	337467.852	6265819.496	*Pinus elliottii	Slash Pine	8	3	M	NA	NA	NA	NA	NA	A5	Major encroachment - may require removal	Invasive species with high fuel load
370 start	337443.343	6265647.123	*Erythrina x sykesii	Indian Coral	9	5	M	NA	NA	NA	NA	NA	A5	Major encroachment - may require removal	Invasive species. 135 clumps
370 end	337429.765	6265556.696													
371 start	337428.445	6265553.721	*Fraxinus excelsior	English Ash thicket	16	8	M	NA	NA	NA	NA	NA	A5	Major encroachment - may require removal	Invasive species. Thicket x 42
371 end	337424.85	6265534.224													
372	337422.419	6265513.856	^Acacia saligna	Golden Wreath Wattle	8	3	M	NA	NA	0.2	NA	NA	A5	Major encroachment - may require removal	Invasive species
373	337421.235	6265505.001	*Ligustrum sinense	Privet Thicket	6	2	M	NA	NA	multi	NA	NA	A5	Major encroachment - may require removal	Invasive weed. 18 clumps
374	337420.18	6265488.352	Eucalyptus sieberi	Silvertop Ash	14	8	M	G	M	0.87	11	3.7	A2	Major encroachment - may require removal	Two leaders from base
375	337425.352	6265488.824	^Acacia saligna	Golden Wreath Wattle	7	2	M	NA	NA	NA	NA	NA	A5	Major encroachment - may require removal	Invasive species
376	337425.657	6265482.24	Eucalyptus sieberi	Silvertop Ash	14	7	M	G	M	0.38	4.7	2.3	A2	Major encroachment - may require removal	Co-dominant leaders

Status: Approved for use

ID	Latitude	Longitude	Botanical name	Common name	Height (m)	Canopy Radius (m)	Age	Health	Form	DBH	TPZ	SRZ (radius)	SULE	Expected impact	Additional comments
377	337421.15	6265482.151	Pittosporum undulatum	Brush Daphne	5	5	M	G	G	0.12	2	1.5	A3	Major encroachment - may require removal	Nil
378	337418.074	6265479.106	Acacia saligna	Golden Wreath Wattle	6	4	M	NA	NA	NA	NA	NA	A5	Major encroachment - may require removal	Invasive species
379	337419.099	6265470.048	Eucalyptus sieberi	Silvertop Ash	11	3	M	P	P	1.02	12	3.4	B3	Major encroachment - may require removal	Three leaders from base. Emergent from Privet thicket. Mostly necrotic
380	337415.74	6265466.614	Pittosporum undulatum	Brush Daphne	6	3	M	G	G	multi	2	"1,5"	A3	Major encroachment - may require removal	Nil
381	337415.684	6265464.207	Eucalyptus sieberi	Silvertop Ash	7	5	M	G	M	0.22	2.5	1.9	A2	Major encroachment - may require removal	Bias
382	337415.078	6265459.726	Eucalyptus racemosa subsp. racemosa	Scribbly Gum	12	8	M	G	M	0.74	8.9	3	A2	Major encroachment - may require removal	Bias
383	337415.906	6265460.837	Eucalyptus sieberi	Silvertop Ash	10	5	M	G	M	0.43	5.4	2.5	A2	Major encroachment - may require removal	Co-dominant leaders
384	337414.321	6265457.098	Corymbia gummifera	Red Bloodwood	9	3	M	G	G	0.16	2	1.7	A2	Major encroachment - may require removal	Nil



Status: Approved for use

ID	Latitude	Longitude	Botanical name	Common name	Height (m)	Canopy Radius (m)	Age	Health	Form	DBH	TPZ	SRZ (radius)	SULE	Expected impact	Additional comments
385	337415.244	6265453.797	*Cinnamomum camphora	Camphor Laurel	10	3	M	NA	NA	NA	NA	NA	A5	Major encroachment - may require removal	Invasive species
386	337415.289	6265452.672	Pittosporum undulatum	Brush Daphne	8	3	M	G	M	0.21	2.5	1.9	A3	Major encroachment - may require removal	Co-dominant leaders
387	337415.649	6265451.943	Pittosporum undulatum	Brush Daphne	9	2	M	G	M	0.29	3.4	2.1	A3	Major encroachment - may require removal	Co-dominant leaders
388	337414.736	6265450.353	Pittosporum undulatum	Brush Daphne	10	5	M	G	G	0.27	3.4	2.1	A3	Major encroachment - may require removal	Nil
389	337414.109	6265448.262	Eucalyptus racemosa subsp. racemosa	Scribbly Gum	14	7	M	G	G	0.42	5	2.4	A2	Major encroachment - may require removal	Three leaders from base
390	337414.099	6265443.281	Eucalyptus sieberi	Silvertop Ash	16	8	M	G	G	0.59	6.8	2.8	A2	Major encroachment - may require removal	Nil
391	337413.06	6265437.439	Eucalyptus sieberi	Silvertop Ash	12	7	M	G	G	0.43	5.2	2.4	A2	Major encroachment - may require removal	Nil
392	337412.972	6265434.718	Pittosporum undulatum	Brush Daphne	6	4	M	G	G	0.28	3.4	2.1	A3	Major encroachment - may require removal	Nil

Status: Approved for use

ID	Latitude	Longitude	Botanical name	Common name	Height (m)	Canopy Radius (m)	Age	Health	Form	DBH	TPZ	SRZ (radius)	SULE	Expected impact	Additional comments
393	337415.029	6265428.204	Banksia integrifolia subsp. integrifolia	Coast Banksia	14	2	M	G	M	0.62	7.3	3.1	A3	Major encroachment - may require removal	Co-dominant leaders
394	337414.169	6265429.307	Eucalyptus racemosa subsp. racemosa	Scribbly Gum	12	7	M	G	M	0.47	5.6	2.6	A2	Major encroachment - may require removal	Co-dominant leaders. Emergent from privet thicket
395	337410.041	6265423.079	Acacia saligna	Golden Wreath Wattle	10	4	M	NA	NA	NA	NA	NA	A5	Major encroachment - may require removal	Invasive species
396	337410.805	6265418.616	Banksia integrifolia subsp. integrifolia	Coast Banksia	11	3	M	G	G	0.2	2.4	1.8	A3	Major encroachment - may require removal	Nil
397	337410.536	6265417.721	Banksia integrifolia subsp. integrifolia	Coast Banksia	11	3	M	G	G	0.19	2.3	1.8	A3	Major encroachment - may require removal	Nil
398	337409.604	6265416.549	Banksia integrifolia subsp. integrifolia	Coast Banksia	11	3	M	G	G	0.11	2	1.5	A3	Major encroachment - may require removal	Nil
399	337410.156	6265412.488	Banksia integrifolia subsp. integrifolia	Coast Banksia	10	3	M	G	G	0.3	3.5	2.2	A3	Major encroachment - may require removal	Nil
400	337409.499	6265410.268	Banksia integrifolia subsp. integrifolia	Coast Banksia	9	3	M	G	M	0.27	3.5	2.1	A3	Major encroachment - may require removal	3 leaders from base

Status: Approved for use

ID	Latitude	Longitude	Botanical name	Common name	Height (m)	Canopy Radius (m)	Age	Health	Form	DBH	TPZ	SRZ (radius)	SULE	Expected impact	Additional comments
401	337408.432	6265408.226	<i>Banksia integrifolia</i> subsp. <i>integrifolia</i>	Coast Banksia	7	3	M	G	G	0.14	2	1.5	A3	Major encroachment - may require removal	Nil
402	337415.605	6265400.349	<i>Eucalyptus sieberi</i>	Silvertop Ash	12	8	M	G	M	0.48	5.9	2.5	A2	Major encroachment - may require removal	Co-dominant leaders
690	336972.783	6265009.698	<i>Pittosporum undulatum</i>	Brush Daphne	6	4	M	G	G	0.1	2	1.5	A3	Major encroachment - may require removal	Thicket x 8
693	336974.98	6265003.381	<i>Pittosporum undulatum</i>	Brush Daphne	6	4	M	G	G	multi	2	1.5	A3	Major encroachment - may require removal	Thicket x 7
694	336966.13	6265008.709	<i>Pittosporum undulatum</i>	Brush Daphne	6	3	M	G	G	multi	2	1.5	A3	Major encroachment - may require removal	Nil
695	336963.925	6265000.072	<i>Corymbia gummifera</i>	Red Bloodwood	16	7	M	G	M	0.33	3.5	2.1	A3	Major encroachment - may require removal	Glider incisions
696	336968.384	6264997.341	<i>Acacia decurrens</i>	Black Wattle Boo'kerriken	5	5	M	G	G	0.29	3.5	2.1	A3	Major encroachment - may require removal	Nil
697	336968.201	6264996.25	<i>Eucalyptus punctata</i>	Grey Gum	15	6	M	G	G	0.31	3.5	2.1	A2	Major encroachment - may require removal	Nil

Status: Approved for use

ID	Latitude	Longitude	Botanical name	Common name	Height (m)	Canopy Radius (m)	Age	Health	Form	DBH	TPZ	SRZ (radius)	SULE	Expected impact	Additional comments
698	336970.784	6264998.939	<i>Acacia longifolia subsp. longifolia</i>	Sydney Golden Wattle	5	4	EM	G	G	multi	2	1.5	A3	Major encroachment - may require removal	Nil
699	336966.421	6265003.147	<i>Acacia saligna</i>	Golden Wreath wattle	5	2	M	NA	NA	0.07	1	NA	A5	Major encroachment - may require removal	Invasive species
700	336956.839	6265004.292	<i>Acacia saligna</i>	Golden Wreath wattle	5	2	M	NA	NA	0.24	1	NA	A5	Major encroachment - may require removal	Invasive species
701	336952.763	6265000.96	<i>Eucalyptus oblonga</i>	Narrow-leaved Stringybark	15	6	M	G	G	0.38	4.7	2.3	A2	Major encroachment - may require removal	Nil
702	336956.844	6264999.325	<i>Callicoma serratifolia</i>	Black Wattle	6	4	M	G	G	multi	2	1.5	A3	Major encroachment - may require removal	Nil
703	336954.896	6264999.791	<i>Ligustrum sinense</i>	Small-leaved privet	6	3	M	NA	NA	multi	NA	NA	A5	Major encroachment - may require removal	Invasive weed
704	336959.411	6264996.839	<i>Acacia decurrens</i>	Black Wattle - Boo'kerriken	8	3	M	G	G	0.19	2.3	1.8	A3	Major encroachment - may require removal	Nil
705	336948.22	6265000.253	<i>Allocasuarina torulosa</i>	Forest Oak	9	4	M	G	G	0.23	2.8	2	A3	Major encroachment - may require removal	Nil

Status: Approved for use

ID	Latitude	Longitude	Botanical name	Common name	Height (m)	Canopy Radius (m)	Age	Health	Form	DBH	TPZ	SRZ (radius)	SULE	Expected impact	Additional comments
1138	337572.603	6266035.326	<i>Kunzea ambigua</i>	Tick Bush	6	2	M	G	G	Multi	2	1.6	A3	Major encroachment - may require removal	Thicket x 45
1139	337619.674	6266093.758	" <i>Eucalyptus haemastoma</i> , ^ <i>Acacia saligna</i> , * <i>Ligustrum sinense</i> "	"Scribbly Gum, Golden Wreath wattle, Small-leaved Privet"	14 4 6	6 2 2	M M M	G NA NA NA	G NA NA NA	0.42 Multi Multi Multi	5.2 NA NA NA	2.5 NA NA NA	A2 A5 A5 A5	Major encroachment - may require removal	Nil
1202	337426.331	6265903.732	<i>Allocasuarina littoralis</i>	Black Oak	6	5	M	G	G	Multi	2	1.6	A3	Minor encroachment - protection may be required	Bias towards road
1203	337420.994	6265913.597	<i>Eucalyptus pilularis</i>	Blackbutt	14	7	M	G	G	0.27	3.1	2	A2	Minor encroachment - protection may be required	Nil
1204	337422.381	6265911.711	<i>Pittosporum undulatum</i>	Brush Daphne	6	5	M	G	M	multi	2	1.6	A3	Minor encroachment - protection may be required	Nil
1205	337419.67	6265919.73	<i>Eucalyptus pilularis</i>	Blackbutt	12	8	M	G	M	0.37	4.7	2.3	A2	Minor encroachment - protection may be required	Bias
1206	337419.342	6265916.63	<i>Callitris rhomboidea</i>	Port Jackson Pine	6	4	M	G	M	multi	2	1.6	A3	Minor encroachment - protection may be required	Nil
1207	337486.073	6265820.129	* <i>Ligustrum lucidum</i>	Broad-leaved Privet	6	3	M	G	G	Multi	NA	NA	A5	Major encroachment - may require removal	Invasive species

Status: Approved for use

ID	Latitude	Longitude	Botanical name	Common name	Height (m)	Canopy Radius (m)	Age	Health	Form	DBH	TPZ	SRZ (radius)	SULE	Expected impact	Additional comments
1238	337426.943	6265335.415	<i>Eucalyptus racemosa subsp. racemosa</i>	Narrow-leaved Scribbly Gum	14	7	M	G	G	0.51	6.2	2.6	A2	Major encroachment - may require removal	Nil
1239	337429.522	6265332.355	<i>Eucalyptus racemosa subsp. racemosa</i>	Narrow-leaved Scribbly Gum	10	4	M	M	M	0.33	3.5	2.1	A3	Minor encroachment - protection may be required	Longicorns
1240	337427.169	6265401.1	* <i>Ligustrum sinense</i>	Small-leaved Privet	5	1.5	M	G	G	multi	NA	NA	A5	Major encroachment - may require removal	Thicket of 45 - mixed in with thicket of <i>Lantana camara</i>
1241	337422.505	6265409.958	<i>Eucalyptus racemosa subsp. racemosa</i>	Narrow-leaved Scribbly Gum	10	7	M	G	G	0.29	3.48	2.18	A2	Major encroachment - may require removal	Within thicket of <i>Lantana camara</i>
1242	337431.965	6265409.523	<i>Eucalyptus racemosa subsp. racemosa</i>	Narrow-leaved Scribbly Gum	12	7	M	G	G	0.33	3.84	2.08	A2	Major encroachment - may require removal	Within thicket of <i>Lantana camara</i>
1243	337329.746	6265345.332	<i>Eucalyptus microcorys</i>	Tallowwood	10	6	M	G	G	0.35	3.5	2.1	A2	Minor encroachment - protection may be required	Co-dormant leaders
1244	337324.6	6265347.108	<i>Eucalyptus microcorys</i>	Tallowwood	10	6	M	G	G	0.3	3	2	A2	Minor encroachment - protection may be required	Co-dormant leaders
1245	337314.195	6265347.008	<i>Eucalyptus microcorys</i>	Tallowwood	9	6	M	G	G	0.35	3.5	2.1	A2	Minor encroachment - protection may be required	NIL



Status: Approved for use

ID	Latitude	Longitude	Botanical name	Common name	Height (m)	Canopy Radius (m)	Age	Health	Form	DBH	TPZ	SRZ (radius)	SULE	Expected impact	Additional comments
1247	340995.698	6268816.004	<i>Ficus elastica</i>	Rubber Fig	3	2.5	EM	G	G	0.09	1.5	1.1	A2	Minor encroachment - protection may be required	NIL
1248	340992.597	6268819.069	<i>Ficus elastica</i>	Rubber Fig	3	2.5	EM	G	G	0.11	1.5	1.1	A2	Minor encroachment - protection may be required	NIL

**Notes:**

Structure: G = good; M = moderate; F = fair

SULE: Safe Useful Life Expectancy (see SULE matrix - Appendix B)

Health: G = good; M = moderate; F = fair

Age: EM = early mature; M = Mature; OM = over-mature

TPZ = Tree Protection Zone

\*exotic

^not endemic to the Northern Beaches LGA

Status: Approved for use

## APPENDIX D – TREE PROTECTION ZONE FENCING EXAMPLE

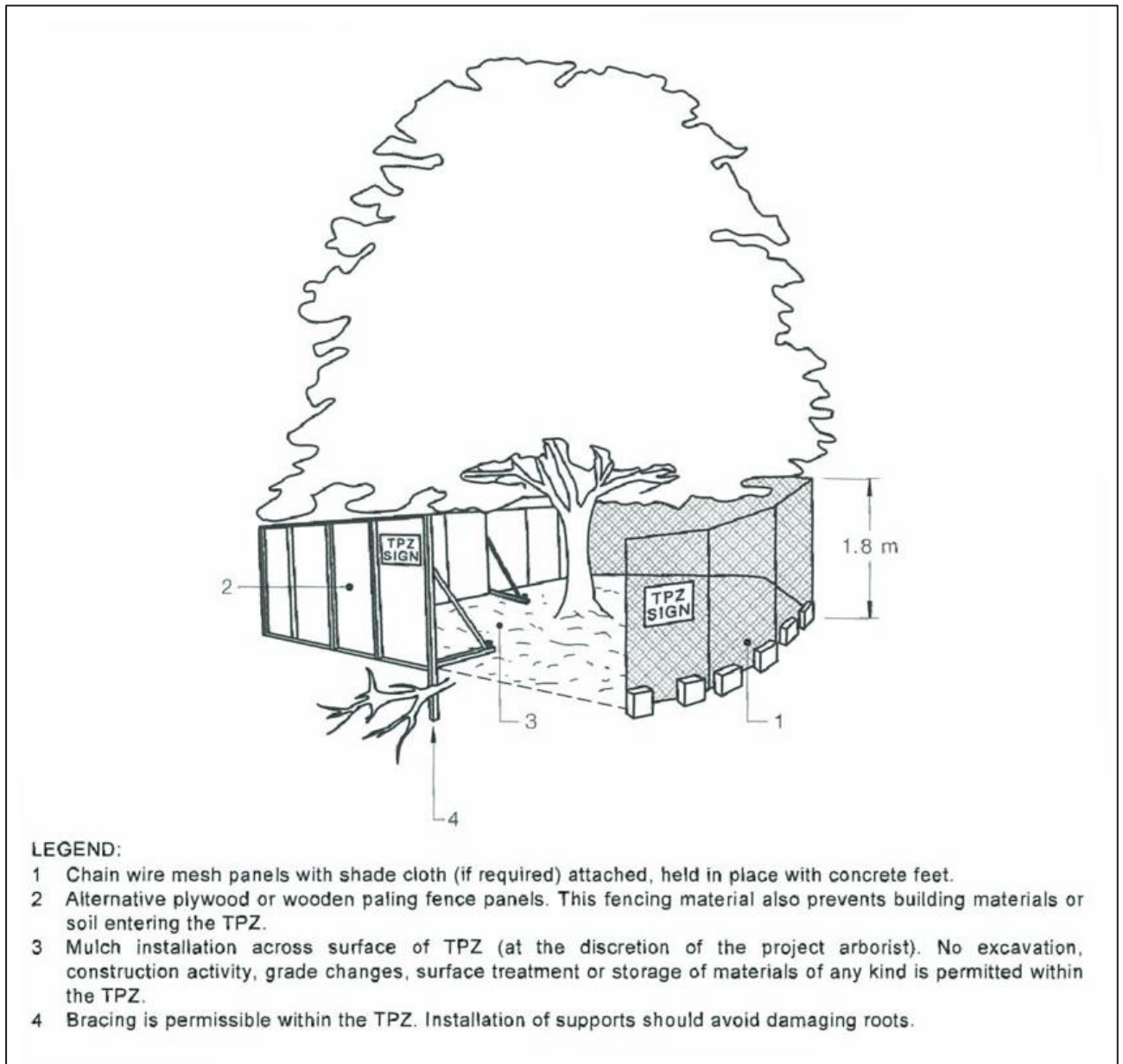


Figure D.2 AS 4970-2009 Tree protection zone fencing example

