EARTHSCAPE HORTICULTURAL SERVICES
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ARBORICULTURAL IMPACT ASSESSMENT REPORT

WARRIEWOOD VALLEY COMMUNITY CENTRE
2-4 JACKSONS ROAD, WARRIEWOOD

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1 INTRODUCTION

1.1.1 This report was commissioned by Terroir on behalf of Northern Beaches Council to assess the health and condition of eighty-four (84) trees located in the vicinity of the Warriewood Valley Community Centre, 2-4 Jacksons Road, Warriewood. The report has been prepared to aid in the assessment of a Development Application (DA) for the demolition of the existing community centre building and construction of a new community centre and associated infrastructure (internal roads and car parking) together with landscape works within the property.

1.1.2 The purpose of this report is to assess the potential impact of the proposed development on the subject trees, together with recommendations for amendments to the design or construction methodology where necessary to minimise any adverse impact. The report also provides recommended tree protection measures to ensure the long-term preservation of the trees to be retained where appropriate.

1.1.3 This report has been prepared in accordance with the Northern Beaches Council's *Guidelines for Arborists Reports* as outlined on Council's website, Section 2.4.1 & 2.4.2 of Appendix 9 of the *Pittwater 21 Development Control Plan 2015* (PDCP) and Sections 2.3.2 -2.3.3 of the *Australian Standard for Protection of Trees on Development Sites* (AS 4970:2009).

2 THE SITE

2.1.1 The subject property is comprised of several allotments, being Lots 1-3 in DP 8561 (1575-1579 Pittwater Road), Lot 4 in DP 654321 & Lot 15 in DP 26902 (2-4 Jacksons Road) and Part of Lot B in DP 402309 (part of Boondah Reserve), collectively known as the 'Nelson Heather Senior Citizens Centre', Jacksons Road, Warriewood. The site is located on the corner of Pittwater Road and Jacksons Road, Warriewood, within part of the Boondah Reserve. For the purposes of this report, the subject allotments will be referred to as "the Site". The eastern portion of the site (adjacent Pittwater Road) site is zoned Public Recreation [RE1] under the *Pittwater Local Environmental Plan 2014* (PLEP) and the western portion of the site is zoned Special Activities [SP2] under the PLEP. The site contains several buildings together with on grade car parking areas and associated landscape works comprising the Community Centre. The site is relatively level with some raised landscape mounds in the eastern portion of the site alongside Pittwater Road. The site contains numerous semi-mature and mature trees. These include a variety of locally-indigenous, non-local native and exotic (introduced) species.

2.1.2 Soils of this area are typical of the Warriewood Soil Landscape Group (as classified in the *Soil Landscapes of the Sydney 1:100,000 Sheet*), consisting of "deep (greater than 1500mm) well sorted, sandy *Humus Podzols* and dark, mottled *Siliceous Sands*, overlying buried *Acid Peats* in depressions; deep (greater than 2000mm *Podzols* and pale *Siliceous Sands* on rises*"*. The landscape of the area generally consists of level to gently undulating swales, depressions and infilled lagoons on Quaternary sands with slopes of less than 3%. [1]

2.1.3 The original vegetation of this area consisted of sclerophyll scrub and woodland most of which has been cleared for residential development. [2] The dominant locally-indigenous tree species formerly found in this area included *Eucalyptus robusta* (Swamp Mahogany), *Eucalyptus botryoides* (Bangalay), *Banksia integrifolia* (Coast Banksia), *Melaleuca quinquenervia* (Broad-leaved Paperbark) and *Casuarina glauca* (Swamp Oak). Other species occurring in this association may include *Livistona australis* (Cabbage Tree Palm) and *Glochidion ferdinandi* (Cheese Tree).

3 SUBJECT TREES

3.1.1 The subject trees were inspected by Earthscape Horticultural Services (EHS) on the 22nd March 2019. Each tree has been provided with an identification number for reference purposes denoted

on the attached Tree Location Plan (**Appendix 5**), based on the survey prepared by Lockley Land Title Solutions, Dwg. Ref No. 50601 001DT [C] dated 29/01/2019. The numbers used on this plan correlate with the Tree Assessment Schedule (**Appendix 3**). Tree No.s T3, T54-T60, T79 & T81, were not shown on the original survey and have been plotted on the drawing in their approximate positions.

4 HEALTH AND CONDITION ASSESSMENT

4.1 Methodology

4.1.1 An assessment of each tree was made using the Visual Tree Assessment (VTA) procedure.[3] All of the trees were assessed in view from the ground. No aerial inspection or diagnostic testing has been undertaken as part of this assessment.

4.1.2 The following information was collected for each tree:-

- Tree Species (Botanical & Common Name);
- Approximate height;
- Canopy spread; measured using a metric tape and an average taken.
- Trunk diameter (measured at 1.4 metres from ground level);
- Live Crown Size; (measured by subtracting the total height of the tree from the lowest point of the crown and multiplying by the average crown spread to give a value in square metres).
- Health & vigour; using foliage size, colour, extension growth, presence of disease or pest infestation, canopy density, presence of deadwood, dieback and epicormic growth as indicators,
- Condition; using visible evidence of structural defects, instability, evidence of previous pruning and physical damage as indicators.
- Suitability of the tree to the site and its existing location; in consideration of damage or potential damage to services or structures, available space for future development and nuisance issues.

4.1.3 This information is presented in a tabulated form in **Appendix 3**.

4.2 Safe Useful Life Expectancy (SULE)

4.2.1 The remaining Safe Useful Life Expectancy[4] of the tree is an estimate of the sustainability of the tree in the landscape, calculated based on an estimate of the average age of the species in an urban area, less its estimated current age. The life expectancy of the tree has been further modified where necessary in consideration of its current health and vigour, condition and suitability to the site. The estimated SULE of each tree is shown in **Appendix 3.**

4.2.2 The following ranges have been allocated to each tree:-

- Greater than 40 years (Long)
- Between 15 and 40 years (Medium)
- Between 5 and 15 years (Short)
- Less than 5 years (Transient)
- Dead or immediately hazardous (defective or unstable)

4.2.3 SULE ratings are intended to provide a general overview of the long-term sustainability of the trees within the site in consideration of these factors. The allocated ranges are not intended to be absolute. This information is useful in guiding future planning by highlighting the probable lifespan of individual trees, for which a clear pattern may emerge. This information may be helpful in forecasting likely tree senescence and planning for replacement planting to ensure continuity in tree canopy across the site. It should be noted that SULEs *may* be extended or reduced depending

on the way trees are managed. Intervention and remedial works may extend the SULE of some trees.

5 LANDSCAPE SIGNIFICANCE

5.1 Methodology for Determining Landscape Significance

5.1.1 The significance of a tree in the landscape is a combination of its environmental, heritage and amenity values. Whilst these values may be fairly subjective and difficult to assess consistently, some measure is necessary to assist in determining the retention value of each tree. To ensure a consistent approach, the assessment criteria shown in **Appendix 1** have been used in this assessment.

5.1.2 A rating has been applied to each tree to give an understanding of the relative significance of each tree in the landscape and to assist in determining priorities for retention, in accordance with the following categories:-

1. **Significant**
2. **Very High**
3. **High**
4. **Moderate**
5. **Low**
6. **Very Low**
7. **Insignificant**

5.2 Environmental Significance

5.2.1 Tree Management Controls

Prescribed Trees within the Northern Beaches (former Pittwater) Local Government Area (LGA) are protected under the provisions under Volume 2, Section B4.22 (Preservation of Trees and Bushland Vegetation) of the *Pittwater 21 Development Control Plan 2014* (PDCP) (as amended 25/11/2015), made pursuant to Clause 9 of the *State Environmental Planning Policy (Vegetation in Non-rural Areas) 2017* (SEPP VNRA). The PDCP generally protects all trees with a height of five (5) metres or greater and all Bushland Vegetation. Some exemptions apply. The following trees are exempt (not protected) under the provisions of the PDCP 2014:-

Tree No.	Species	Exemption
T9	*Brachychiton acerifolius* (Illawarra Flame Tree)	Exempt species
T10	*Cinnamomum camphora* (Camphor Laurel)	Noxious Weed
T46	*Harpephyllum caffrum* (Kaffir Plum)	Exempt species
T48	*Eucalyptus scoparia* (Willow Gum)	Exempt species
T49	*Cupressus sempervirens* (Italian Cypress)	Exempt species
T21	*Oreocallis wickhamii* (Tree Waratah)	Less than the prescribed dimensions
T66	*Cupaniopsis anarcardioides* (Tuckeroo)	Less than the prescribed dimensions

T65	*Acacia floribunda* (Sally Wattle)	Less than the prescribed dimensions
T47	*Casuarina glauca* (Swamp Oak)	Located within 2 metres of an approved building

The remainder of the trees are protected under the PDCP 2014.

5.2.2 Wildlife Habitat

Banksia integrifolia (Coast Banksia) [T83] *Casuarina glauca* (Swamp Oak) [T47, T52, T53, T54, T56, T57, T58, T59, T60, T61, T62, T63, T64, T67, T68, T69, T70, T72, T73, T74, T76, T77, T78, T79 & T80], *Eucalyptus botryoides* (Bangalay) [T32, T37, T38 & T39] and *Eucalyptus robusta* (Swamp Mahogany) [T55, T71, T75 & T82] are all locally-indigenous species, representative of the original vegetation of the area and would be of benefit to native wildlife. However, none of the trees contain cavities that would be suitable as nesting hollows for arboreal mammals or birds. A stick nest (possibly Magpie or Sea Eagle) was observed in the crown of T37 (Bangalay) at approximately 18 metres from ground level. There were no or other visible signs of wildlife habitation.

5.2.3 Noxious Plants & Environmental Weeds

Cinnamomum camphora (Camphor Laurel) [T10] is scheduled as a potential 'Biosecurity Risk' ('Priority Weed' – formerly 'Noxious Weed') within NSW under the provisions of the *Biosecurity Act 2015*. The growth of this plant species must be managed in a manner that continuously inhibits the ability of the plant to spread (so far as is reasonably practicable) and the plant must not be sold, propagated or knowingly distributed.

5.2.4 Threatened Species & Ecological Communities

Eucalyptus scoparia (Willow Gum) [T48] is listed as an Endangered Species under the *Biodiversity Conservation Act 2016* (NSW) and listed as a Vulnerable Species under the *Environmental Protection and Biodiversity Conservation Act* 1999. Whilst this species is listed as endangered & vulnerable, it is a commonly planted ornamental tree in parks, gardens and streetscapes. The species is *not* endemic to this area and therefore does *not* have any ecological significance in this context of this site.

None of the other trees are listed as Threatened or Vulnerable Species or form part of Endangered Ecological Communities (EECs) under the provisions of the *Biodiversity Conservation Act 2016* (NSW) or the *Environmental Protection and Biodiversity Conservation Act* 1999.

5.2.5 Biodiversity

The eastern portion of the site (excluding Lots 1, 2 & 3 in DP 8561) is indicated as containing an area of Biodiversity Significance as indicated on Council's Biodiversity Map forming part of the PDCP 2014. The reason for this is not clear.

5.3 Heritage Significance

5.3.1 Heritage Items

The subject property is *not* listed as a Heritage Item under Schedule 5, Part 1 of the *Pittwater Local Environmental Plan 2014* (PLEP).

5.3.2 Heritage Conservation Area

The site is *not* located within a Heritage Conservation Area under Schedule 5, Part 2 of the PLEP 2014.

5.3.3 Significant Tree Register

Pittwater Council does *not* currently maintain a Register of Significant Trees.

5.3.4 General

T46, a *Eucalyptus microcorys* (Tallowwood) is a commemorative planting. A plaque adjacent the tree bares the following inscription "*This tree was planted by the Honourable N. K. Wran, O.C., M.P. Premier of New South Wales to commemorate Senior Citizens Week 1981*."

None of the other trees have any known or suspected heritage significance.

5.4 Amenity Value

5.4.1 Criteria for the assessment of amenity values are incorporated into **Appendix 1**. The amenity value of a tree is a measure of its live crown size, visual appearance (form, habit, crown density), visibility and position in the landscape and contribution to the visual character of an area. Generally the larger and more prominently located the tree, and the better its form and habit, the higher its amenity value.

6 TREE RETENTION VALUES

6.1.1 The Retention Values shown in **Appendix 3** and **Appendix 5** have been determined on the basis of the estimated longevity of the trees and their landscape significance rating, in accordance with **Table One**. Together with guidelines contained in **Section 7** (Tree Protection Zones) this information should be used to determine the most appropriate position of building footprints and other infrastructure within the site, with due consideration to other site constraints, to minimise the impact on trees considered worthy of preservation.

TABLE 1 – TREE RETENTION VALUES – ASSESSMENT METHODOLOGY

	Landscape Significance Rating						
Estimated Life Expectancy	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Long - Greater than 40 Years	High Retention Value						
Medium- 15 to 40 Years			Moderate Retention Value				
Short - 5 to 15 years				Low Ret. Value			
Transient - Less than 5 Years				Very Low Retention Value			
Dead or Potentially Hazardous							

6.1.2 The following table describes the implications of the retention values on site layout and design.

TABLE 2 – TREE RETENTION PRIORITES.

RETENTION VALUE	RECOMMENDED ACTION
"High"	These trees considered worthy of preservation; as such careful consideration should be given to their retention as a priority. Proposed site design and placement of buildings and infrastructure should consider the recommended setbacks as discussed in the following section (refer also **Appendix 2**) to avoid any adverse impact on these trees. In addition to Tree Protection Zones, the extent of the canopy (canopy drip-line) should also be considered, particularly in relation to high rise developments. Significant pruning of the trees to accommodate the building envelope or temporary scaffolding is generally not acceptable.
"Moderate"	The retention of these trees is desirable, but not essential. These trees should be retained as part of any proposed development if possible. However, these trees are considered less critical for retention. If these trees must be removed, replacement planting should be considered in accordance with Council's Tree Replenishment Policy to compensate for loss of amenity (refer also **Section 9**).
"Low"	These trees are not considered to worthy of any special measures to ensure their preservation, due to current health, condition or suitability. They do not have any special ecological, heritage or amenity value, or these values are substantially diminished due to their SULE. These trees should not be considered as a constraint to the future development of the site.
"Very Low"	These trees are considered potentially hazardous or very poor specimens, or may be environmental or noxious weeds. The removal of these trees is therefore recommended regardless of the implications of any proposed development.

7 TREE PROTECTION ZONES

7.1.1 The Tree Protection Zone (TPZ) is a radial distance measured from the centre of the trunk of the tree as specified in **Appendix 4**. These have been calculated in accordance with AS 4970-2009 (Protection of Trees on Development Sites).[5]

7.1.2 The intention of the TPZ is to ensure protection of the root system and canopy from the potential damage from construction works and ensure the long-term health and stability of each tree to be retained. Incursions to the root zone may occur due to excavations, changes in ground levels, (either lowering or raising the grade), trenching or other forms or soil disturbance such as ripping, grading or inverting the soil profile. Such works may cause damage or loss of part of the root system, leading to an adverse impact on the tree.

7.2 Structural Root Zone (SRZ)

7.2.1 The Structural Root Zone (SRZ) provides the bulk of mechanical support and anchorage for a tree. This is also a radial distance measured from the centre of the trunk as specified in **Appendix 4**. The SRZ has been calculated in accordance with AS 4970-2009 (Protection of Trees on Development Sites).

7.2.2 Incursions within the SRZ are not recommended as they are likely to result in the severance of woody roots which may compromise the stability of the tree or lead to its decline and demise.

7.3 Acceptable Encroachments to the Tree Protection Zone.

7.3.1 Where encroachment to the TPZ is unavoidable, an incursion to the TPZ of not exceeding 10% of the area of the TPZ and outside the SRZ may be acceptable. Examples of acceptable incursions are shown in **Appendix 2**. Greater incursions to the TPZ may result in an adverse impact on the tree.

7.3.2 Where incursions greater than 10% of the TPZ are unavoidable, exploratory excavation using non-destructive methods may be required to evaluate the extent of the root system affected and determine whether or not the tree can remain viable

7.4 Acceptable Encroachments to the Canopy

7.4.1 The removal of a small portion of the crown (foliage and branches) is generally tolerable provided that the extent of pruning required is less than 10% of the total foliage volume of the tree and the removal of branches does not create large wounds or disfigure the natural form and habit of the tree. All pruning cuts must be undertaken in accordance with AS 4373:2007. This generally involves reduction of the affected branches back to the nearest branch collar at the junction with the parent branch, rather than at an intermediate point. The latter is referred to as "lopping" and is no longer an acceptable arboricultural practice. Generally speaking, the minimum pruning as required to accommodate any proposed works is desirable. Extensive pruning can result in a detrimental impact on tree health and may lead to exposure of remaining branches to wind forces that they were previously sheltered from, leading to a greater risk of branch failure.

7.4.2 Clearance to between the building line and canopy should take into account any projecting structures, such as balconies, awnings and the roofline and any requirement for temporary scaffolding to be erected during construction (typically 1-1.5 metres wide). High structures should preferably be located outside the canopy dripline (as shown indicatively on the attached plans) in order to avoid or minimise canopy pruning

7.4.3 Legal Protection

7.4.4 Notwithstanding the above recommendations, Council may require a greater setback from certain types of structures to ensure the on-going legal protection of the tree (i.e. its legal status under Council's Tree Management Controls). In the Northern Beaches LGA, a tree located within two (2) metres of the wall of an approved building is not protected under the PDCP. As such, if a tree is considered worthy of preservation, Council is unlikely to approve the construction of a building within two (2) metres of the tree (regardless of whether this can be undertaken without having an adverse impact on its health or longevity). It should be noted that this does not necessarily apply to ancillary structures (decks, pergolas, sheds, patios etc).

8 PROPOSED DEVELOPMENT

8.1.1 The proposed development includes the demolition of the existing community centre building and construction of a new community centre and associated infrastructure (internal roads and car parking) together with landscape works within the property.

9 IMPACT ASSESSMENT

9.1.1 The intention of this assessment is to determine the incursions to the root zones and canopies created by the proposed development and evaluate the likely impact of the proposed works on the subject trees. Details shown on the following plans were used in this assessment:-

Title	Author	Dwg No.	Date
Site Plan	Terroir	19319 DA-001-01 [01]	18/12/2020
Demolition Plan	Terroir	19319 DA-004-04 [01]	18/12/2020
Floor Plan Proposed	Terroir	19319 DA-005-10 [01]	18/12/2020
Elevations North and East	Terroir	19319 DA-006-50 [01]	18/12/2020
Elevations South and West	Terroir	19319 DA-006-51 [01]	18/12/2020
Elevations Main Hall	Terroir	19319 DA-006-52 [01]	18/12/2020
Elevations Players Hall	Terroir	19319 DA-006-53 [01]	18/12/2020
Elevations Activity Hall & Amenities	Terroir	19319 DA-006-54 [01]	18/12/2020
Sections A & B	Terroir	19319 DA-007-40 [01]	18/12/2020
Sections C & D	Terroir	19319 DA-006-41 [01]	18/12/2020
Stormwater Layout Plan	Warren Smith & Partners	71010000 C6.01 [1]	16/12/2020
Siteworks Plan	Warren Smith & Partners	71010000 C4.01 [1]	16/12/2020
Landscape DA Report	Aspect Studios	20201216 [D]	16/12/2020

9.1.2 A summary of the impact of the proposed development on each tree within the site is shown in **Appendix 5**. The following criteria have been examined as part of this assessment:-

- Existing Relative Levels (R.L.);
- Tree Protection Zone (TPZ);
- Structural Root Zone (SRZ);
- Footprint and envelope of the proposed development and temporary structures (scaffolding, hoardings etc);
- Incursions to the TPZ & SRZ, including estimated cut & fill beyond the building footprint;
- Incursions to the tree canopy from the building envelope and temporary structures; and
- Assessment of the likely impact of the works on existing trees.

9.1.3 The proposed development will necessitate the removal of twenty (20) trees of low and very low retention value. These include Tree No.s T14 & T34 (Old Man Banksia), T15 (Lillypilly), T21 (Tree Waratah), T22 & T23 (Sally Wattle), T25 (Black Tea-tree), T27 & T30 (Sydney Blue Gum), T29 (Gum), T46 (Wild Plum), T47, T56, T57, T58 & T59 (Swamp Oak), T48 (Willow Gum), T49 (Italian Cypress), T50 (Water Gum) and T55 (Swamp Mahogany). None of these trees are considered significant or worthy of special measures to ensure their preservation. The removal of these trees to accommodate the proposed development is therefore considered warranted in this instance. It should be noted that T21, T46, T47, T48 & T49 are exempt from Council's Tree Management Controls.

9.1.4 The removal of a further seven (7) trees of low and very low retention value, not adversely affected by the proposed development, is also recommended. These include Tree No.s T7, T8, T11 & T12 (Blueberry Ash), T10 (Camphor Laurel), T13 (Water Gum) and T65 (Sally Wattle). All of these trees are in poor health and condition and are not considered to be worthy of preservation. It should be noted that T65 is exempt from Council's Tree Management Controls.

9.1.5 The proposed development will also necessitate the removal of fifteen (15) trees of moderate retention value. These include Tree No.s T16, T20 & T26 (Turpentine), T17 (Water Gum), T18 (Blueberry Ash), T19 (Willow Bottlebrush), T28 & T33 (Old Man Banksia), T31 (Tallowwood), T35, T36 & T51 (Lillypilly) and T52, T53 & T54 (Swamp Oak). These trees are not considered significant, but are in good health and condition and make a fair contribution to the amenity of the site and surrounding properties. In order to compensate for loss of amenity resulting from the removal of these trees to accommodate the proposed development, consideration should be given to replacement planting within the site in accordance with **Section 11**.

9.1.6 The existing car park in the western portion of the site is proposed to be part demolished, reconfigured and resurfaced within the TPZs of Trees T1 (Sydney Blue Gum), T2 (Turpentine), T4 & T6 (Blueberry Ash), T9 (Illawarra Flame) and Trees T37 & T38 (Bangalay). As the new carpark is within the same or smaller footprint as the existing carpark at a similar grade, the proposed works will not result in any increase in the present encroachment to the TPZs of these trees and in some instances the encroachments will be less than the present situation. These works will not result in any adverse impact on these trees, provided the existing asphalt surface and associated kerbs are demolished (where required) in accordance with **Section 10.8**, and any required excavations for the new pavement sub-grade within the TPZs of these trees is undertaken in accordance with **Section 10.9.**

9.1.7 A proposed new pergola structure is located within the TPZs of Trees T23 (Turpentine) and T32 (Bangalay). It is understood the pergola will be a single level timber or steel frame structure supported by isolated post or pad footings, with a permeable pavement ground surface treatment beneath (yet to be determined, but may include a loose gravel or decomposed granite type pavement surface). This work will not result in any adverse impact on these trees provided that all excavations for the pergola post footings are excavated in accordance with **Section 10.9**. The post footings should be located outside the SRZ wherever possible. A minimum of 1 metre clearance should be provided between any part of the structure and the trunk and primary limbs of these trees. Demolition of the existing buildings and pavements within the TPZs should be undertaken in accordance with **Section 10.8.** Any new pavement installed beneath the pergola should be a constructed using a permeable type surface and sub-base material, installed slightly above existing grade (to minimise excavation for the pavement sub-grade) in accordance with **Section 10.12 & 10.13.**

9.1.8 The proposed building is located within the TPZs of Trees T32 (Bangalay) and T45 (Tallowwood). In both instances the majority of the encroachment is within the footprint of existing buildings and pavements and will be less than the present situation. This work will not result in any adverse impact on these trees, provided that demolition of the existing buildings and pavements within the TPZs are undertaken in accordance with **Section 10.8** and all excavations for the new building foundations within the TPZ are undertaken in accordance with **Section 10.9**.

9.1.9 New pedestrian pathways are also proposed within the TPZ of T45 (Tallowwood). It is understood that the path arrangement shown on the landscape drawings supersedes that shown on the civil drawings. The landscape plan indicates a new crushed sandstone pavement to the south-east and new timber sleeper path to the north-west of the tree, within the TPZ. The cumulative encroachment from both the building works and pathway is approximately 42%, which exceeds acceptable limits under AS4970:2009. Excavations for the new pavement sub-grade have the potential to result in severance and damage to woody roots, which may lead to an adverse impact

on this tree. However, provided that the pathways are installed slightly above grade (to avoid excavations for any pavement sub-grade) and the pathways are constructed using permeable materials (to allow on-going moisture penetration to the root zone) any adverse impact can be avoided. The finished level of the walkways should be at least 150mm above existing ground levels to avoid bulk excavation within the TPZ (refer **Section 10.10**). In order to avoid any adverse impact on T45, all excavations for the pathway/elevated walkway foundations shall be undertaken in accordance with **Section 10.9** and the pavement should be installed in accordance with **Sections 10.12 & 10.13**. As an alternative solution, consideration could be given to installing the pathway elevated permeable walkway supported by post footings. This could be achieved using Fibre Reinforced Plastic (FRB) decking over a galvanised steel subframe supported by isolated post/pad footings (refer to **Plates 1 & 2**). The finished level of the walkway should be at least 250mm above existing ground levels to avoid bulk excavation within the TPZ.

9.1.10 The existing internal roadway and footpath on the southern side of the site is part demolished, reconfigured (widened and realigned slightly) and resurfaced within the TPZs of Trees T39 (Bangalay), T40 & T41 (Spotted Gum) and T42 (Flooded Gum). As the new pavement surface will not result in any increase to the present encroachment, this work will not result in any adverse impact on these trees provided that demolition of the existing pavements within the TPZs are undertaken in accordance with **Section 10.8** and all excavations for the new pavement sub-grade and kerb foundations within the TPZ are undertaken in accordance with **Section 10.9**. In order to avoid any adverse impact on these trees, the new road pavement should be installed slightly above existing grade in accordance with **Section 10.12**. Any required kerb or edge restraint on the northern side of the pavement should be a flush type edging (rather than a typical upstand kerb) to minimise excavations for the kerb footings within the TPZs.

9.1.11 A proposed new carpark is located within the TPZs of T61, T62 & T63 (Swamp Oaks). Any batter to facilitate construction of the carpark may require excavations extending into the TPZs of these trees, which may result in any adverse impact. Further details of the proposed car park levels and extent of any batter are required before the potential impacts can be properly verified. In order to minimise any adverse impact on these trees, all excavations associated with the carpark and any construction batter within the TPZs should be undertaken in accordance with **Section 10.9**.

9.1.12 A proposed new 300mm diameter stormwater pipeline is located within the TPZs of Trees T4 & T6 (Blueberry Ash), T5 (Sydney Blue Gum) and T9 (Illawarra Flame tree). Open trenching for the proposed pipeline has the potential to result in severance and damage to woody roots of these trees. However, as the new pipeline is located within the footprint of the existing kerb and gutter, the proposed works should not result in any actual incursion to the root zone and therefore this work will not result in any adverse impact on these trees. In order to avoid any adverse impact, all excavations for the proposed stormwater pipeline within the TPZs should be undertaken in accordance with **Section 10.11**.

9.1.13 No other trees will be adversely affected by the proposed development.

Plate 1 – Typical elevated FRP walkway (St. Leonards Park, North Sydney)

Plate 2 – Typical elevated FRP walkway interface with asphalt path (St. Leonards Park, North Sydney)

10 RECOMMENDED TREE PROTECTION MEASURES

10.1 Tree Protection Plan

10.1.1 The following Tree Protection Measures should be read in accordance with the Tree Protection Plan (**Appendix 6**). The Tree Protection Plan (TPP) indicates the position of tree protection devices and other recommended measures to ensure the protection of trees within the site to be retained as part of the proposed development.

10.2 Prohibited Activities

10.2.1 The following activities should be avoided within specified Tree Protection Zones (refer **Appendix 4 & 6** for extent of the TPZ for each tree):-

- Excavations and trenching (with exception of the approved remediation works, underground services, building foundations or pavement sub-grade);
- Soil disturbance, surface grading, compaction, tyning, ripping or cultivation of soil;
- Mechanical removal of vegetation, including extraction of tree stumps;
- Soil level changes including the placement of fill material (excluding imported validated fill for remediation works or placement of fill for approved works)
- Movement and storage of plant, equipment & vehicles (except within defined temporary haul roads, where ground protection has been installed, or within the footprint of existing floor slabs or paved areas);
- Erection of site sheds (except where approved by the site arborist);
- Affixing of signage, barricades or hoardings to trees;
- Storage of building materials, waste and waste receptacles;
- Stockpiling of spoil or fill;
- Stockpiling of bulk materials, such as soil, sand, gravel, roadbase or the like;
- Stockpiling of demolition waste;
- Disposal of waste materials and chemicals including paint, solvents, cement slurry, fuel, oil and other toxic liquids;
- Other physical damage to the trunk or root system; and
- Any other activity likely to cause damage to the tree.

10.3 Tree Damage

10.3.1 Care shall be taken when operating cranes, drilling rigs and similar equipment near trees to avoid damage to tree canopies (foliage and branches). Under no circumstances shall branches be torn-off by construction equipment. Where there is potential conflict between tree canopy and construction activities, the advice of the Site Arborist must be sought.

10.3.2 In the event of any tree becoming damaged for any reason during the construction period a consulting arborist [Australian Qualification Framework Level 5] shall be engaged to inspect and provide advice on any remedial action to minimise any adverse impact. Such remedial action shall be implemented as soon as practicable and certified by the arborist.

10.4 Tree Removal

10.4.1 The removal of Trees [**T14, T15, T16, T17, T18, T19, T20, T21, T22, T24, T25, T26, T27, T28, T29, T30, T31, T33, T34, T35, T36, T46, T47, T48, T49, T50, T51, T52, T53, T54, T55, T56, T57, T58 & T59**] shall be carried out by an experienced tree surgeon in accordance with the NSW WorkCover Code of Practice for the Amenity Tree Industry (1998). Care shall be taken to avoid damage to other trees during the felling operation.

10.4.2 Stumps located within the TPZs of trees to be retained shall be grubbed-out where required using a mechanical stump grinder (or by hand where less than 150mm in diameter) without damage to the root system of other trees. Where trees to be removed are within the SRZ of any trees to be retained, consideration should be given to cutting the stump close to ground level and retaining the root crown intact. Stumps within the Tree Protection Zone of other trees to be retained shall **not** be pulled out using excavation equipment or similar.

10.5 Tree Protection Fencing

10.5.1 Trees [**T1-T6, T9, T23, T32, T37-T42, T45, T60-T83 & T84**] shall be protected prior to and during construction from all activities that may result in detrimental impact by erecting a suitable protective fence in the positions as indicated on the Tree Protection Plan (**Appendix 6**). As a minimum, the fence shall consist of temporary chain wire panels of 1.8 metres in height, supported by steel stakes as required and fastened together and supported to prevent sideways movement using corner braces where required. The fence shall be erected prior to the commencement of any work on-site and shall be maintained in good condition for the duration of construction. Where tree protection zones merge together a single fence encompassing the area is deemed to be adequate. Existing site boundary fences may form part of the enclosure.

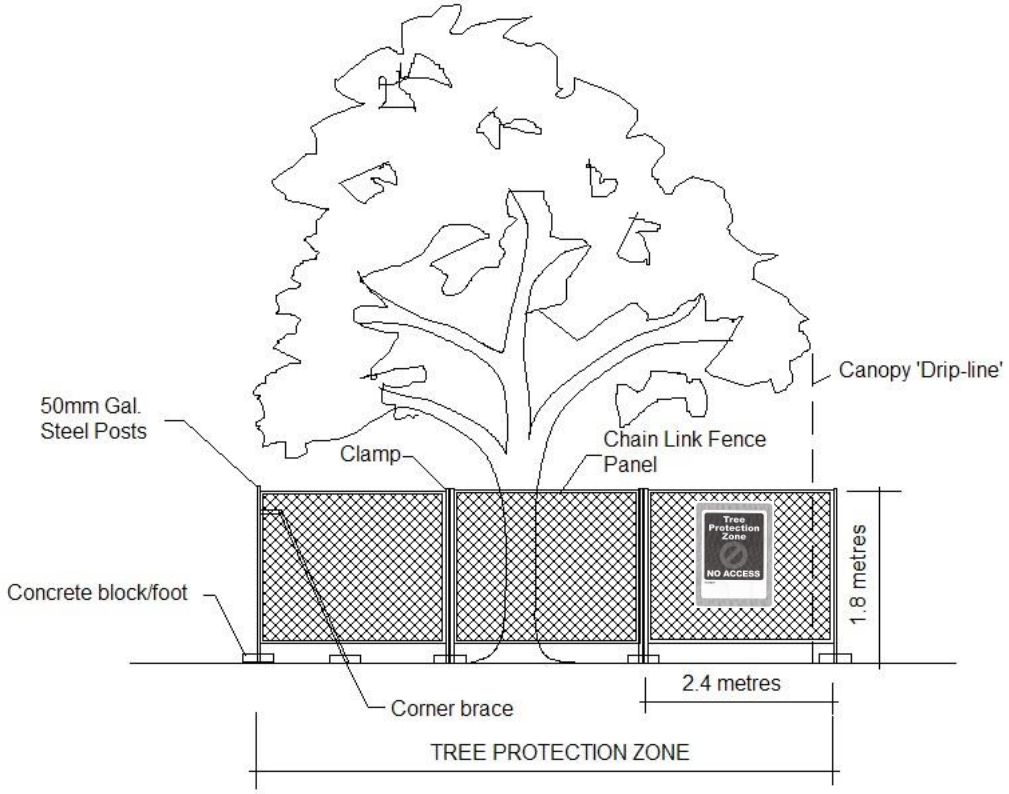
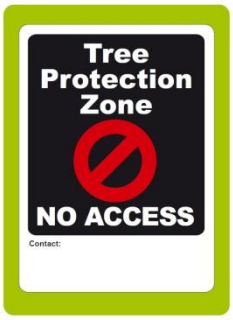


Figure 1 – Detail of Tree Protection Fence



10.5.2 Signs shall be installed on the Tree Protection Fence to prevent unauthorised movement of plant and equipment or entry to the Tree Protection Zone. The signs shall be securely attached to the fence using cable ties or equivalent. Signs shall be placed at minimum 10 metre intervals. The wording and layout of the sign shall comply with AS 4970-2009 as shown in **Figure 2**.

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Figure 2 – Detail of Tree Protection Sign

10.6 Trunk Protection

10.6.1 Trunk protection boarding shall be erected around Trees [**T23, T32, T37-T42 & T45**] to avoid accidental damage, as indicated on the Tree Protection Plan (**Appendix 6**). The trunk protection shall consist of a layer of carpet underfelt (or similar) wrapped around the trunk, followed by 1.8 metre lengths of softwood timbers (90 x 45mm in section) aligned vertically and spaced evenly around the trunk at 150mm centres (i.e. with a 50mm gap) and secured together with 2mm galvanised wire or galvanised hoop strap as shown in **Figure 3**. Recycled timber (such as demolition waste) may be suitable for this purpose, subject to the approval of the Project Arborist. The timbers shall be wrapped around the trunk (over the carpet underfelt), but not fixed to the tree to avoid mechanical injury or damage to the trunk. Trunk protection should be installed prior to any site works and maintained in good condition for the duration of the construction period. Carpet underfelt (alone) is sufficient for trees with a trunk diameter of less than 200mm. This shall be wrapped around the trunk in a double layer and held in place with heavy-duty fibre reinforced adhesive tape (e.g. Gaffer Tape).

Figure 3 – Detail of Trunk Protection

10.7 Ground Protection

10.7.1 A 100mm layer of woodchip mulch shall be installed within designated areas of the TPZs [all fenced areas] as indicated on the Tree Protection Plan (**Appendix 6**) to minimise moisture stress during construction.

10.7.2 Construction haul routes shall be confined to existing paved areas wherever possible. Where this is not feasible and construction haul routes or access for plant and equipment must traverse soft landscape areas within TPZs of [**any tree nominated for retention**], 20mm thick marine ply

sheets or truck mats (such as Envirex Versadeck® access mats) (refer **Figure 4** shall be placed over the top of the ground surface to minimise compaction and disturbance of the underlying soil profile and root zone.

Figure 4 – Showing typical detail for truck mats.

10.7.3 Ground protection shall be installed prior to any site works and maintained in good condition for the duration of the construction period. On completion of the works, ground protection shall be removed without damage or disturbance to the underlying soil profile.

10.8 Demolition Works within Tree Protection Zones

10.8.1 Paved Areas

Demolition of paved areas within the Tree Protection Zones (TPZs) of trees [**T1-T6, T9, T23, T32, T37-T42 & T45**] shall be undertaken under the supervision of a qualified Arborist [Australian Qualification Framework (AQF) Level 5].

Concrete pavements shall be demolished by breaking the slab into manageable sections (using a rock hammer or similar) and asphalt pavements shall be removed by breaking the topcoat into manageable pieces. The broken sections shall be carefully lifted and folded over the remaining paved surface to minimise disturbance and compaction of the underlying soil profile (refer to **Figure 2**). Special care shall be taken where underlying woody roots have lifted or displaced the pavement. Any plant or equipment used in demolition work shall operate within the footprint of existing paved areas and avoid traversing soft landscape areas. Where this is unavoidable, suitable ground protection shall first be installed in accordance with **Section 10.7**.

Figure 2 – Showing method for removal of concrete pavement, by carefully lifting sections and folding over the remaining paved surface.

The pavement sub-base within the TPZ shall be gradually removed (where required) in layers of no greater than 50mm thick using a small rubber tracked excavator or alternative approved method to avoid excessive disturbance and compaction of the underlying soil profile and damage to underlying roots and minimise. The machine shall work within the footprint of the existing path footprint to avoid compaction of the underlying soil. The final layer of sub-base material shall be removed using hand tools were required to avoid compaction of the underlying soil profile and avoid damage to any underlying woody roots.

Following removal of the pavement surface and sub-base, clean, friable topsoil shall be used to fill in the excavated area and bring flush with surrounding levels within new landscape areas. Soil shall only be imported and spread when the underlying soil conditions are dry to avoid compaction of the soil profile. Where there is insufficient recovered site topsoil for this purpose, any imported material shall be free of rocks, vegetation, heavy clay or other extraneous matter and supplied and spread in accordance with **Section 10.14**. Any imported soil material should be similar in texture to the existing site topsoil.

10.8.2 Structures & Retaining Walls

Demolition of existing walls, buildings, kerbs and other structures within the TPZ of trees [**T1-T6, T9, T23, T32, T37-T42 & T45**] shall be undertaken under the supervision of a qualified Arborist [AQF level 5]. The structures shall be demolished using equipment on stationed outside the TPZ where possible or within the footprint of existing hardstand areas.

Care shall be taken to avoid the root systems, trunks and lower branches of trees in the vicinity of the structures during demolition works, with special attention required during demolition of the footings and other sub-surface members to avoid damage to woody roots. An observer ('spotter') shall be employed to assist the plant operator in order to detect and avoid damage to underlying woody roots during demolition. Trunk and/or branch protection shall be installed where there is a potential risk of damage to trees in proximity or overhead of the work.

10.9 Excavations within Tree Protection Zones

10.9.1 Prior to any mechanical excavations for building foundations or pavement sub-grade within the TPZs of Trees [**T1-T6, T9, T23, T32, T37-T42, T45, T61, T62 & T63**] exploratory excavation using non-destructive techniques shall be taken along the perimeter of the structure or pavement within the TPZ. Non-destructive excavation techniques may include the use of hand-held implements, air pressure (using an Air-spade® device) or water pressure (hydro-excavation in combination with a vacuum extraction unit). The exploratory excavation shall be undertaken along the perimeter of the foundation or pavement (within the TPZ) to the depth of the foundation or to a maximum of 800mm from surface levels, to locate and expose any woody roots prior to any mechanical excavation.

10.9.2 All care shall be undertaken to preserve woody roots intact and undamaged during exploratory excavation. Any roots encountered of less than 40mm in diameter may be cleanly severed with clean sharp pruning implements at the face of the excavation. The root zone in the vicinity of the excavation shall be kept moist following excavation for the duration of construction to minimise moisture stress on the tree. Where large woody roots (greater than 40mm diameter) are encountered during exploratory excavations, further advice from a qualified arborist shall be sought prior to severance.

10.10 Alternative Construction Methods

10.10.1 Where necessary, (to avoid severing large woody roots) consideration should be given to the installation of an elevated structure (e.g. pier and beam footing, suspended slab or floor supported on piers, cantilevered slab, up-turned edge beam etc) in preference to structures requiring a deep edge beam or continuous perimeter strip footing. The beam section of any pier and beam footing should be placed **above** grade to avoid excavation within the SRZ. Pier footings intersecting large woody roots should be slightly offset where necessary to avoid root severance.

10.10.2 For masonry walls or fences it may be acceptable to delete continuous concrete strip footings and replace with suspended in-fill panels (e.g. steel or timber pickets, lattice etc) fixed to pillars. For paved areas, consideration should be given to raising the proposed pavement level and using a porous fill material in preference to excavation where large woody roots are found within the sub-base.

10.11 Underground Services

10.11.1 All proposed stormwater lines and other underground services should be located outside TPZs of trees proposed to be retained wherever possible or installed by alternative measures. Alternative measures include suspending pipelines beneath the floor of a building or structure (to avoid excavation with the TPZ), non-destructive excavation methods or Horizontal Directional Drilling (HDD). Where the installation of service lines within TPZs is unavoidable, the pipelines or conduits should be installed as follows.

10.11.2 Trenching for underground services and stormwater pipes within the TPZs of Trees [**T2, T4, T5, T6 & T9**], shall be undertaken using non-destructive excavation in accordance with **Section 10.9**. Where large woody roots are encountered during excavation or trenching (root diameter greater than 40mm), these shall be retained intact wherever possible (e.g. by tunnelling beneath roots and inserting the pipeline or conduit beneath or re-routing the service etc). Where this is not practical and root pruning is the only alternative, proposed root pruning should be assessed by a qualified arborist [AQF 5] to evaluate the potential impact on the health and stability of the subject tree.

10.11.3 Installation of underground services and stormwater pipes within the SRZs of Trees [**any tree nominated for retention**], shall only be undertaken by Horizontal Directional Drilling (HDD)

(also referred to as sub-surface boring or Micro-tunnelling for large diameter pipes). The Invert Level of the pipe, plus the pipe diameter, must be lower than the estimated root zone depth as specified. At this site a minimum depth of 1 metre to the invert level of the pipe is specified.

10.12 Pavements

10.12.1 Proposed paved areas within the TPZs of Trees [**T23, T32, T37-T42 & T45**] shall be placed at or slightly above grade where possible to minimise excavations within the root zone and avoid severance and damage of woody roots. The pavement sub-base material should be supplied and installed in accordance with **Section 10.13**.

10.13 Pavement Sub-base

10.13.1 Pavement sub-base material within TPZs of trees [**T23 & T32**] shall be a coarse, gap-graded material such as 20 – 50mm crushed basalt (Blue Metal) or equivalent no-fines gravel material to provide some aeration and moisture permeation to the root zone. Note that road base or crushed sandstone or other similar material containing a high percentage of fines is unacceptable for this purpose. The fill material should be consolidated using a non-vibrating roller or similar to minimise compaction of the underlying soil. A permeable geotextile may be used beneath the sub-base to prevent migration of the stone into the sub-grade and provide greater load capacity.

10.14 Placement of Fill Material

10.14.1 Placement of fill material within the TPZs of Trees [**any tree nominated for retention**] should be avoided wherever possible. Where placement of fill is unavoidable, the material shall be a well-drained friable material, equivalent in texture to the existing site topsoil material. The fill should be free from rocks, vegetation and other extraneous material complying with AS 4419:2003 (*Soils for Landscaping and Garden Use*).

10.14.2 The fill may be lightly consolidated, but shall not be compacted to engineering standards. No fill material should be placed in direct contact with the trunk.

10.14.3 Plant and equipment used to place and spread fill material should be stationed outside the TPZ where possible. Where not possible, suitable ground protection should be installed in accordance with **Section 10.14** to avoid compaction of the underlying soil profile and root zone.

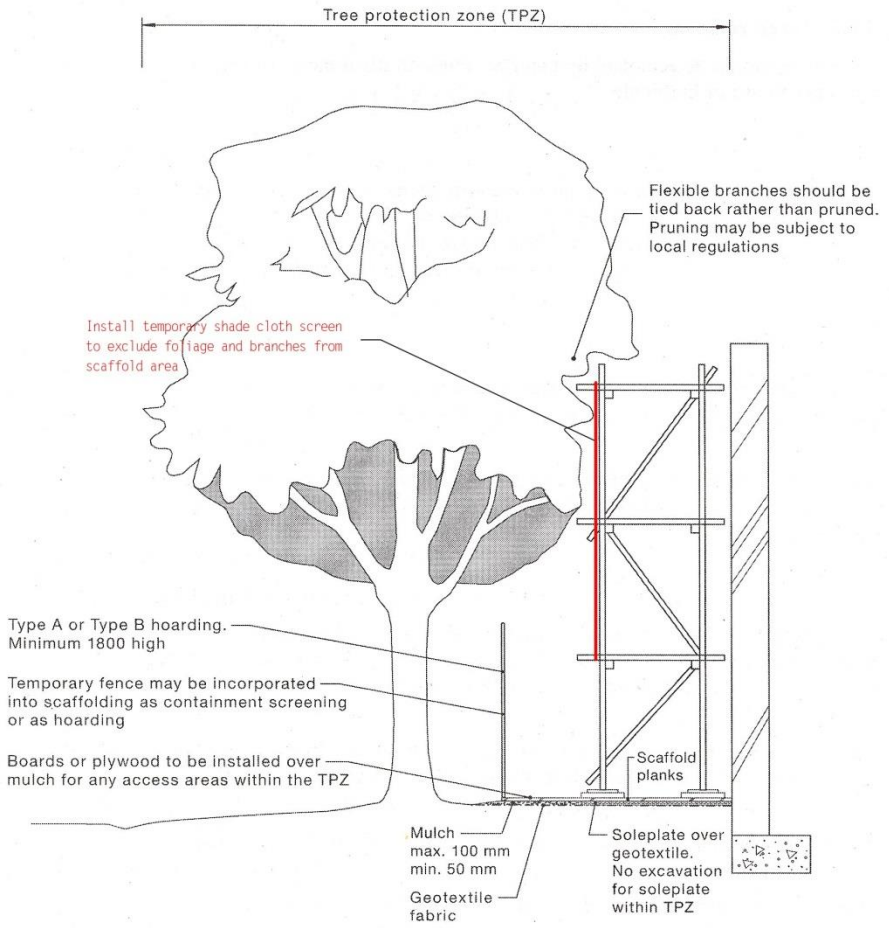
10.15 Root Pruning

10.15.1 Where root pruning of [**any tree nominated for retention**] is required to facilitate construction, roots shall be severed with clean, sharp pruning implements and retained in a moist condition during the construction phase using Hessian material or mulch where practical. Severed roots shall be treated with a suitable root growth hormone containing the active constituents Indol-3-yl-Butric Acid (IBA) and 1-Naphthylacetic Acid (NAA) to stimulate rapid regeneration of the root system.

10.15.2 Any required root pruning shall be carried out in accordance with Australian Standard 4373-2007 – *Pruning of Amenity Trees* by a qualified and experienced arborist or tree surgeon [Australian Qualification Framework Level 3] in accordance with the NSW WorkCover Code of Practice for the Amenity Tree Industry (1998). No roots of greater than 40mm in diameter should be removed or pruned without further advice from a Consulting Arborist [Australian Qualification Framework Level 5].

10.16 Temporary Scaffolding

10.16.1 Where temporary scaffolding must be erected within the TPZ of trees [**any tree nominated for retention**] (as indicated in **Appendix 6**), the scaffold shall be erected in accordance with **Figure 5**. Where foliage or branches project through the scaffold and create a safety hazard, this foliage and branches shall be temporarily excluded from the inner part of the scaffold by affixing a shade cloth screen on the outside of the scaffold **(**refer to **Figure 5)**, or alternatively temporarily tying back branches where required. The pruning or removal of branches to accommodate the scaffold should be avoided wherever possible. Suitable ground protection shall be installed beneath the scaffold as shown in **Figure 5** to prevent contamination, disturbance and compaction of the soil profile within the scaffold zone during construction.



NOTE: Excavation required for the insertion of support posts for tree protection fencing should not involve the severance of any roots greater than 20 mm in diameter, without the prior approval of the project arborist.

Figure 5 - Detail of Temporary scaffolding within a Tree Protection Zone

10.16.2 Where pruning or removal of branches to accommodate temporary scaffolding is unavoidable, all such pruning work shall be undertaken in accordance with **Section 10.12**.

11 REPLACEMENT PLANTING

11.1.1 Where trees are proposed to be removed to accommodate any future development, consideration should be given to planting new trees in appropriate locations to compensate for any loss of amenity.

11.1.2 Replacement trees should preferably include some locally indigenous species. These will be most appropriate to the site conditions and be most valuable in terms of preserving the landscape character and wildlife habitat of the area. The following species are appropriate to the site conditions and could be considered for replacement planting:-

- *Syzygium paniculatum* (Magenta Cherry)
- *Acmena smithii* (Lillypilly)
- *Eucalyptus robusta* (Swamp Mahogany)*
- *Glochidion ferdinandi* (Cheese Tree)*
- *Livistona australis* (Cabbage Tree Palm)*
- *Melaleuca leucadendra* (Cajuput, Weeping Paperbark)
- *Ficus rubiginosa* (Port Jackson Fig)*
- *Ficus coronata* (Sandpaper Fig)
- *Cupaniopsis anarcardioides* (Tuckeroo)
- *Hibiscus tiliaceus* 'Rubra' (Bronze Cottonwood)
- *Melaleuca stypheliodes* (Prickly Paperbark)*
- *Banksia integrifolia* (Coast Banksia)*
- *Syzygium leuhmannii* (Small-leaf Lillypilly)
- *Lophostemon confertus* (Brushbox)
- *Harpulia pendula* (Tulipwood)
- *Jacaranda mimosifolia* (Jacaranda)
- *Fraxinus griffithii* (Evergreen Ash)
- *Magnolia grandiflora* (Bullbay Magnolia)
- *Waterhousea floribunda* (Weeping Lillypilly).

* Denotes locally-indigenous species.

Andrew Morton
EARTHSCAPE HORTICULTURAL SERVICES
4th February 2021

REFERENCES:-

[1] GA Chapman & CL Murphy (1989)
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[2] Benson, Doug & Howell, Jocelyn (1990)
Taken for Granted: the Bushland of Sydney and its Suburbs.
Kangaroo Press & The Royal Botanic Gardens, Sydney, NSW

[3] Mattheck, Dr. Claus & Breloer, Helge (1994) – Sixth Edition (2001)
The Body Language of Trees – A Handbook for Failure Analysis
The Stationery Office, London, England

[4] Barrell, Jeremy (1996)
Pre-development Tree Assessment
Proceedings of the International Conference on Trees and Building Sites (Chicago)
International Society of arboriculture, Illinois, USA

[5] Council of Standards Australia (August 2009)
AS 4970 – 2009 – Protection of Trees on Development Sites
Standards Australia, Sydney

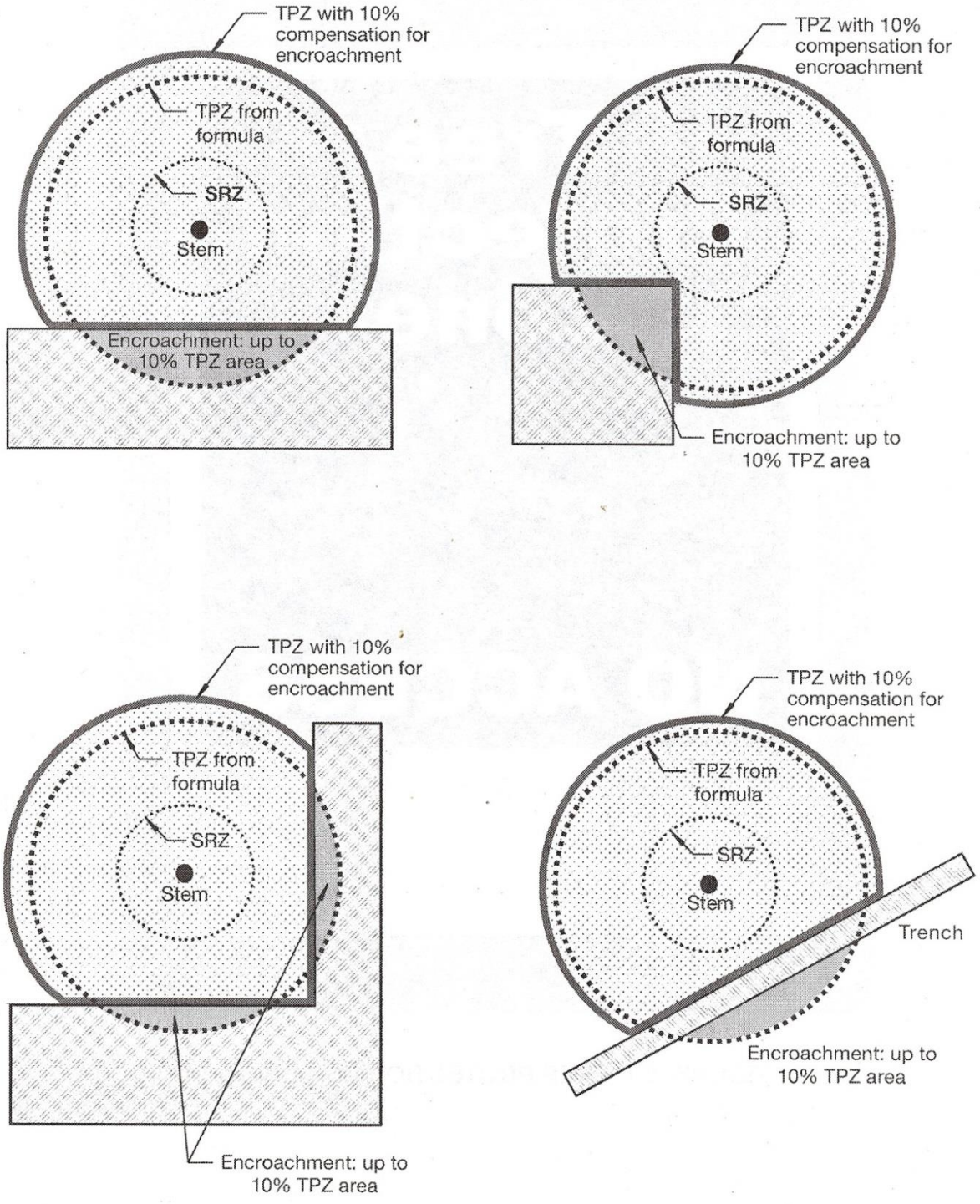
APPENDIX 1 - CRITERIA FOR ASSESSMENT OF LANDSCAPE SIGNIFICANCE

RATING	HERITAGE VALUE	ECOLOGICAL VALUE	AMENITY VALUE
1. SIGNIFICANT	The subject tree is listed as a Heritage Item under the Local Environment Plan (LEP) with a local, state or national level of significance or is listed on Council's Significant Tree Register	The subject tree is scheduled as a Threatened Species as defined under the Threatened Species Conservation Act 1995 (NSW) or the Environmental Protection and Biodiversity Conservation Act 1999	The subject tree has a very large live crown size exceeding 300m² with normal to dense foliage cover, is located in a visually prominent position in the landscape, exhibits very good form and habit typical of the species
	The subject tree forms part of the curtilage of a Heritage Item (building /structure /artefact as defined under the LEP) and has a known or documented association with that item	The tree is a locally indigenous species, representative of the original vegetation of the area and is known as an important food, shelter or nesting tree for endangered or threatened fauna species	The subject tree makes a significant contribution to the amenity and visual character of the area by creating a sense of place or creating a sense of identity
	The subject tree is a Commemorative Planting having been planted by an important historical person (s) or to commemorate an important historical event	The subject tree is a Remnant Tree, being a tree in existence prior to development of the area	The tree is visually prominent in view from surrounding areas, being a landmark or visible from a considerable distance.
2. VERY HIGH	The tree has a strong historical association with a heritage item (building/structure/artefact/garden etc) within or adjacent the property and/or exemplifies a particular era or style of landscape design associated with the original development of the site.	The tree is a locally-indigenous species, representative of the original vegetation of the area and is a dominant or associated canopy species of an Endangered Ecological Community (EEC) formerly occurring in the area occupied by the site.	The subject tree has a very large live crown size exceeding 200m²; a crown density exceeding 70% (normal-dense), is a very good representative of the species in terms of its form and branching habit or is aesthetically distinctive and makes a positive contribution to the visual character and the amenity of the area
3. HIGH	The tree has a suspected historical association with a heritage item or landscape supported by anecdotal or visual evidence	The tree is a locally-indigenous species and representative of the original vegetation of the area and the tree is located within a defined Vegetation Link / Wildlife Corridor or has known wildlife habitat value	The subject tree has a large live crown size exceeding 100m²; The tree is a good representative of the species in terms of its form and branching habit with minor deviations from normal (e.g. crown distortion/suppression) with a crown density of at least 70% (normal); The subject tree is visible from the street and surrounding properties and makes a positive contribution to the visual character and the amenity of the area
4. MODERATE	The tree has no known or suspected historical association, but does not detract or diminish the value of the item and is sympathetic to the original era of planting.	The subject tree is a non-local native or exotic species that is protected under the provisions of this DCP.	The subject tree has a medium live crown size exceeding 40m²;The tree is a fair representative of the species, exhibiting moderate deviations from typical form (distortion/suppression etc) with a crown density of more than 50% (thinning to normal); and
			The tree is visible from surrounding properties, but is not visually prominent – view may be partially obscured by other vegetation or built forms. The tree makes a fair contribution to the visual character and amenity of the area.
5. LOW	The subject tree detracts from heritage values or diminishes the value of a heritage item	The subject tree is scheduled as exempt (not protected) under the provisions of this DCP due to its species, nuisance or position relative to buildings or other structures.	The subject tree has a small live crown size of less than 40m² and can be replaced within the short term (5-10 years) with new tree planting
6. VERY LOW	The subject tree is causing significant damage to a heritage Item.	The subject tree is listed as an Environment Weed Species in the relevant Local Government Area, being invasive, or is a known nuisance species.	The subject tree is not visible from surrounding properties (visibility obscured) and makes a negligible contribution or has a negative impact on the amenity and visual character of the area. The tree is a poor representative of the species, showing significant deviations from the typical form and branching habit with a crown density of less than 50% (sparse).
7. INSIGNIFICANT	The tree is completely dead and has no visible habitat value	The tree is a declared Noxious Weed under the Noxious Weeds Act (NSW) 1993 within the relevant Local Government Area.	The tree is completely dead and represents a potential hazard.

Ref:- Morton, A (2006) **Determining the Retention Value of Trees on Development Sites**

TreeNet - Proceedings of the 7th National Street Tree Symposium 2006 Government of South Australia Department for Transport, Energy and Infrastructure

APPENDIX 2 – ACCEPTABLE INCURSIONS TO THE TREE PROTECTION ZONE (TPZ)



NOTE: Less than 10% TPZ area and outside SRZ. Any loss of TPZ compensated for elsewhere.

REF:- Council of Standards Australia (August 2009)
AS 4970 – 2009 – Protection of Trees on Development Sites
Standards Australia, Sydney

APPENDIX 3 - TREE HEALTH AND CONDITION ASSESSMENT SCHEDULE

Tree Identification No.	Species	Height (m)	Spread (m)	Trunk Diameter (mm)	Live Crown Size (m^2)	Maturity Class	Condition	Previous Pruning	Health		Remaining Safe Useful Life Expectancy (SULE)	Landscape Significance Rating	Retention Value	Location
									Vigour	Pest & Disease				
1	***Eucalyptus saligna*** (Sydney Blue Gum)	12	8	379	72	SM	Appears stable with fair branching structure. Exhibits a prominent lean to the north-east (self-corrected). Some dieback in upper crown due salt laden winds with 10% deadwood.	Deadwooded	Fair with slightly thinning crown	No Evidence	Medium 15-40 Years	4	**Moderate**	On-site
2	***Syncarpia glomulifera*** (Turpentine)	7	7	478	42	SM	Appears stable with fair branching structure. Exhibits a prominent lean to the north (self corrected). Muultiple high bark inclusions at 1-2 metres.	Crown lifted to 2 metres	Good	No Evidence	Long - more than 40 years	4	**Moderate**	On-site
3	***Elaeocarpus reticulatus*** (Blueberry Ash)	5	4	156	20	SM	Appears stable with sound branching structure.	No Evidence	Very Good	No Evidence	Long - more than 40 years	5	**Moderate**	On-site
4	***Elaeocarpus reticulatus*** (Blueberry Ash)	5	5	180 + 100	25	SM	Appears stable with fair branching structure. Exhibits a moderate bark inclusion at 2.5 metres at junction of co-dominant PLs. Some dieback in upper crown with 5% deadwood.	Crown lifted to 2 metres	Fair with slightly thinning crown	No Evidence	Long - more than 40 years	5	**Moderate**	On-site
5	***Eucalyptus saligna*** (Sydney Blue Gum)	10	6	271	48	I	Appears stable with fair branching structure. Exhibits a prominent lean to the north (self corrected).	Leader selectively pruned to clear HV overhead powerlines	Fair with slightly thinning crown	High borer infestation (longorn beetle) in lower trunk	Short 5-15 Years	4	**Low**	On-site
6	***Elaeocarpus reticulatus*** (Blueberry Ash)	5	3.5	137	17.5	I	Appears stable with sound branching structure. Some dieback in upper crown with 10% deadwood.	Crown lifted to 1 metre	Fair with slightly thinning crown	No Evidence	Short 5-15 Years	5	**Low**	On-site
7	***Elaeocarpus reticulatus*** (Blueberry Ash)	7	4	135x2	28	SM	Appears stable with sound branching structure. Exhibits moderate dieback in upper crowns with 30% deadwood.	Crown lifted to 1.5 metres	Fair with thinning crown	No Evidence	Transient (less than 5 years)	5	**Very Low**	On-site
8	***Elaeocarpus reticulatus*** (Blueberry Ash)	7	5	191	30	SM	Appears stable with sound branching structure. Exhibits a prominent lean to the north (self corrected). Exhibits moderate dieback in upper crown with 20% deadwood.	Crown lifted to 1 metre	Fair with thinning crown	No Evidence	Transient (less than 5 years)	5	**Very Low**	On-site
9	***Brachychiton acerifolius*** (Illawarra Flame Tree)	8	5	236	30	SM	Appears stable with sound branching structure.	No Evidence	Very Good	No Evidence	Long - more than 40 years	6	**Low**	On-site

PL = Primary Limb; SL = Secondary Limb; TL = Tertiary Limb. GL = Ground Level

APPENDIX 3 - TREE HEALTH AND CONDITION ASSESSMENT SCHEDULE

Tree Identification No.	Species	Height (m)	Spread (m)	Trunk Diameter (mm)	Live Crown Size (m^2)	Maturity Class	Condition	Previous Pruning	Health		Remaining Safe Useful Life Expectancy (SULE)	Landscape Significance Rating	Retention Value	Location
									Vigour	Pest & Disease				
10	***Cinnamomum camphora*** (Camphor Laurel)	6	6	120x4	36	I	Appears stable with poor branching structure. Exhibits multiple severe bark inclusions at GL metres at junctions of co-dominant PLs.	Previously cut to GL (crown restored).	Good	No Evidence	Short 5-15 Years	7	Very Low	On-site
11	***Elaeocarpus reticulatus*** (Blueberry Ash)	7	6	213	42	SM	Appears stable with sound branching structure. Exhibits moderate dieback in upper crowns with 15% deadwood.	Crown lifted to 1 metre	Fair with slightly thinning crown	No Evidence	Short 5-15 Years	5	Low	On-site
12	***Elaeocarpus reticulatus*** (Blueberry Ash)	7	5	140x2	30	SM	Appears stable with poor branching structure. Exhibits a severe bark inclusion at 0.3 metres. Some dieback in upper crown with 5% deadwood. Prominent lean to the north (self-corrected).	Crown lifted to 1.5 metres	Fair with slightly thinning crown	No Evidence	Short 5-15 Years	5	Low	On-site
13	***Tristaniopsis laurina*** (Water Gum)	5	5	100x8	25	SM	Appears stable with poor branching structure. Exhibits multiple high bark inclusions at GL at junctions of co-dominant PLs. Some dieback in upper crown with 5% deadwood	No Evidence	Good	No Evidence	Short 5-15 Years	5	Low	On-site
14	***Banksia serrata*** (Old Man Banksia)	6	4	200	24	I	Appears stable with fair branching structure. Crown suppressed on the south side due to crowding. Multiple small wounds on PLs due mechanical injuries.	No Evidence	Good	No Evidence	Medium 15-40 Years	5	Low	On-site
15	***Syzygium australe*** (Lillypilly)	5	3.5	150	17.5	I	Appears stable with sound branching structure. Crown suppressed on east side due to overshadowing.	No Evidence	Fair	No Evidence	Medium 15-40 Years	5	Low	On-site
16	***Syncarpia glomulifera*** (Turpentine)	11	6	350 + 270	54	SM	Appears stable with fair branching structure. Exhibits multiple high bark inclusions at GL + 2 metres.	Crown lifted to 2 metres	Very Good	No Evidence	Medium 15-40 Years	4	Moderate	On-site
17	***Tristaniopsis laurina*** (Water Gum)	7	6	242	42	SM	Appears stable with sound branching structure.	Lower TLs lopped to clear roadway north side	Very Good	No Evidence	Long - more than 40 years	4	Moderate	On-site
18	***Elaeocarpus reticulatus*** (Blueberry Ash)	5	5	130	25	I	Appears stable with sound branching structure.	Crown lifted to 1.5 metres	Very Good	No Evidence	Long - more than 40 years	5	Moderate	On-site

PL = Primary Limb; SL = Secondary Limb; TL = Tertiary Limb. GL = Ground Level

APPENDIX 3 - TREE HEALTH AND CONDITION ASSESSMENT SCHEDULE

Tree Identification No.	Species	Height (m)	Spread (m)	Trunk Diameter (mm)	Live Crown Size (m^2)	Maturity Class	Condition	Previous Pruning	Health		Remaining Safe Useful Life Expectancy (SULE)	Landscape Significance Rating	Retention Value	Location
									Vigour	Pest & Disease				
19	***Callistemon salignus*** (Willow Bottlebrush)	6	6	320	36	SM	Appears stable with fair branching structure. Exhibits a prominent lean to the south-west. Crown suppressed north side due previous crowding. Multiple high bark inclusions at 1-2 metres.	Crown lifted to 1.5 metres	Good	No Evidence	Medium 15-40 Years	4	**Moderate**	On-site
20	***Syncarpia glomulifera*** (Turpentine)	7	6.5	382	39	SM	Appears stable with fair branching structure. Prominent lean to the west. Contorted branching habit.	Crown lifted to 1.5 metres	Good	No Evidence	Medium 15-40 Years	4	**Moderate**	On-site
21	***Oreocallis wickhamii*** (Tree Waratah)	4	3	80	9	I	Appears stable with sound branching structure.	No Evidence	Very Good	No Evidence	Long - more than 40 years	6	**Low**	On-site
22	***Acacia floribunda*** (Sally Wattle)	5	7	100x3	35	SM	Appears stable with sound branching structure.	Crown lifted to 1.5 metres	Good	No Evidence	Short 5-15 Years	5	**Low**	On-site
23	***Syncarpia glomulifera*** (Turpentine)	11	6	245 + 350	60	SM	Appears stable with poor branching structure. Exhibits a severe bark inclusion at GL (junction of PL). Multiple high bark inclusions at 2 metres at junctions of co-dominant leaders.	Crown lifted to 1.5 metres	Good	No Evidence	Medium 15-40 Years	4	**Moderate**	On-site
24	***Acacia floribunda*** (Sally Wattle)	5	5	60x3	20	I	Appears stable with fair branching structure. Exhibits multiple co-dominant PLs at GL.	Crown lifted to 1 metre	Very Good	No Evidence	Short 5-15 Years	5	**Low**	On-site
25	***Melaleuca bracteata*** (Black Tea-tree)	5	4	60x3	16	I	Appears stable with fair branching structure.	Crown lifted to 1 metre	Very Good	No Evidence	Medium 15-40 Years	5	**Low**	On-site
26	***Syncarpia glomulifera*** (Turpentine)	10	7	400	70	SM	Appears stable with fair branching structure. Exhibits multple moderate bark inclusions at 1-2 metres. Some dieback in upper crown with 5% deadwood	No Evidence	Fair with slightly thinning crown	No Evidence	Medium 15-40 Years	4	**Moderate**	On-site
27	***Eucalyptus saligna*** (Sydney Blue Gum)	10	7	240	70	I	Appears stable with poor branching structure. Exhibits multple co-dominant leaders at 2 metres with included bark at junctions.	No Evidence	Very Good	No Evidence	Short 5-15 Years	4	**Low**	On-site

PL = Primary Limb; SL = Secondary Limb; TL = Tertiary Limb. GL = Ground Level

APPENDIX 3 - TREE HEALTH AND CONDITION ASSESSMENT SCHEDULE

Tree Identification No.	Species	Height (m)	Spread (m)	Trunk Diameter (mm)	Live Crown Size (m^2)	Maturity Class	Condition	Previous Pruning	Health		Remaining Safe Useful Life Expectancy (SULE)	Landscape Significance Rating	Retention Value	Location
									Vigour	Pest & Disease				
28	***Banksia serrata*** (Old Man Banksia)	5	4	80x4	20	I	Appears stable with sound branching structure.	No Evidence	Very Good	No Evidence	Long - more than 40 years	5	**Moderate**	On-site
29	***Eucalyptus sp.*** (Gum)	7	5	160	35	I	Appears stable with poor branching structure. Main leader broken out at 3.5 metres (crown restored).	No Evidence	Very Good	No Evidence	Short 5-15 Years	5	**Low**	On-site
30	***Eucalyptus saligna*** (Sydney Blue Gum)	7	5	146	30	I	Appears stable with poor branching structure. Main leader broken out at 6 metres (crown restored). Insufficient space available for future growth and development.	No Evidence	Very Good	No Evidence	Transient (less than 5 years)	5	**Very Low**	On-site
31	***Eucalyptus microcorys*** (Tallowwood)	18	12	682	156	M	Appears stable with sound branching structure. Exhibits a very prominent lean to the south-east (self corrected).	Selectively pruned & deadwooded	Fair with slightly thinning crown	No Evidence	Medium 15-40 Years	3	**Moderate**	On-site
32	***Eucalyptus botryoides*** (Bangalay)	13	12	430	132	SM	Appears stable with sound branching structure. Crown suppressed on east side due to overshadowing. 10% interior crown deadwood. Contorted branching habit	Selectively pruned & deadwooded	Good	No Evidence	Long - more than 40 years	3	**High**	On-site
33	***Banksia serrata*** (Old Man Banksia)	5	3	80	15	I	Appears stable with sound branching structure.	No Evidence	Good	No Evidence	Long - more than 40 years	5	**Moderate**	On-site
34	***Banksia serrata*** (Old Man Banksia)	5	4	120x2	16	SM	Appears stable with fair branching structure. Exhibits substantial dieback with 50% deadwood.	No Evidence	Poor with sparse crown	No Evidence	Transient (less than 5 years)	5	**Very Low**	On-site
35	***Acmena smithii*** (Lillypilly)	5	3	40x8	15	I	Appears stable with fair branching structure. Exhibits multiple PLs arising from GL.	No Evidence	Good	No Evidence	Long - more than 40 years	5	**Moderate**	On-site
36	***Syzygium australe*** (Lillypilly)	6	5	160 + 140	30	I	Appears stable with sound branching structure. Exhibits a low bark inclusion at GL.	No Evidence	Good	Low foliar insect infestation (Psyllids)	Long - more than 40 years	4	**Moderate**	On-site
37	***Eucalyptus botryoides*** (Bangalay)	20	20	1210	320	M	Appears stable with sound branching structure. Exhbits a moderate bark inclusion at 0.5 metres at junction of PL. Located close to the existing building.	Selectively crown thinned & deadwooded	Very Good	No Evidence	Long - more than 40 years	3	**High**	On-site

PL = Primary Limb; SL = Secondary Limb; TL = Tertiary Limb. GL = Ground Level

APPENDIX 3 - TREE HEALTH AND CONDITION ASSESSMENT SCHEDULE

Tree Identification No.	Species	Height (m)	Spread (m)	Trunk Diameter (mm)	Live Crown Size (m^2)	Maturity Class	Condition	Previous Pruning	Health		Remaining Safe Useful Life Expectancy (SULE)	Landscape Significance Rating	Retention Value	Location
									Vigour	Pest & Disease				
38	***Eucalyptus botryoides*** (Bangalay)	12	16	535	144	M	Appears stable with sound branching structure. Exhbits a very prominent lean to the west (self-corrected). Multiple extended lateral PLs.	Selectively crown thinned & deadwooded	Very Good	No Evidence	Long - more than 40 years	3	**High**	On-site
39	***Eucalyptus botryoides*** (Bangalay)	16	15	510	165	M	Appears stable with sound branching structure. Exhibits a prominent lean to the north (self-corrected). Crown suppressed on the south-east side due to overshadowing.	Selectively crown thinned & deadwooded	Very Good	No Evidence	Long - more than 40 years	3	**High**	On-site
40	***Corymbia maculata*** (Spotted Gum)	20	13	640	169	M	Appears stable with sound branching structure.	Deadwooded	Good	No Evidence	Long - more than 40 years	2	**High**	On-site
41	***Corymbia maculata*** (Spotted Gum)	16	16	618	224	M	Appears stable with sound branching structure. Exhibits a prominent lean to the north-west (self-corrected). Moderate wound at 3 metres due to mechanical injury (vehicle damage).	Deadwooded	Fair with thinning crown	Suspected foliar insect infestation (Thaumastocorids)	Medium 15-40 Years	3	**Moderate**	On-site
42	***Eucalyptus grandis*** (Flooded Gum)	22	16	455	288	SM	Appears stable with sound branching structure. Exhibits a moderate wound to the lower trunk due to borer damage.	No Evidence	Good	Low borer infestation (longorn beetle) in lower trunk	Medium 15-40 Years	3	**Moderate**	On-site
43	***Banksia serrata*** (Old Man Banksia)	5	3	70x4	15	I	Appears stable with sound branching structure.	No Evidence	Very Good	No Evidence	Long - more than 40 years	5	**Moderate**	On-site
44	***Banksia serrata*** (Old Man Banksia)	5	3	130	15	I	Appears stable with sound branching structure.	No Evidence	Very Good	No Evidence	Long - more than 40 years	5	**Moderate**	On-site
45	***Eucalyptus microcorys*** (Tallowwood)	23	11	592	231	M	Appears stable with fair branching structure. Exhibits a prominent lean to the north. Some dieback in upper crown due to salt laden winds with 10% deadwood. Multiple moderate bark inclusions at junctions of PLs.	Selectively crown thinned & deadwooded	Fair with slightly thinning crown	No Evidence	Medium 15-40 Years	1	**High**	On-site
46	***Harpephyllum caffrum*** (Wild Plum)	13	14	600	154	M	Appears stable with fair branching structure. Exhibits a prominent lean to the north (self coorected. Multiple moderate bark inclusions at 1-2 metres at junctions of PLs.	No Evidence	Very Good	No Evidence	Long - more than 40 years	6	**Low**	On-site

PL = Primary Limb; SL = Secondary Limb; TL = Tertiary Limb. GL = Ground Level

APPENDIX 3 - TREE HEALTH AND CONDITION ASSESSMENT SCHEDULE

Tree Identification No.	Species	Height (m)	Spread (m)	Trunk Diameter (mm)	Live Crown Size (m^2)	Maturity Class	Condition	Previous Pruning	Health		Remaining Safe Useful Life Expectancy (SULE)	Landscape Significance Rating	Retention Value	Location
									Vigour	Pest & Disease				
47	***Casuarina glauca*** (Swamp Oak)	14	7	300	84	SM	Appears stable with fair branching structure. Exhibits a prominent lean to west with an obtuse bend in trunk. Located close to existing building and path. Multiple axial wounds in bark and vascular tissue with some lesions.	Crown lifted to 3 metres	Fair	Suspected Canker infection.	Short 5-15 Years	6	**Very Low**	On-site
48	***Eucalyptus scoparia*** (Willow Gum)	12	13	400	130	M	Appears stable with fair branching structure. Exhibits a prominent lean to the north. Some interior crown dieback (probably due to pest infestation). Moderate wound at 5 metres due previous branch loss.	No Evidence	Fair with slightly thinning crown	Suspected foliar insect infestation (Thaumastocorids)	Short 5-15 Years	6	**Very Low**	On-site
49	***Cupressus sempervirens*** (Italian Cypress)	7	5	180	35	SM	Appears stable with sound branching structure. Exhibits a prominent lean to the east. Located close to existing building.	No Evidence	Good	No Evidence	Short 5-15 Years	6	**Very Low**	On-site
50	***Tristaniopsis laurina*** (Water Gum)	5	3	120	15	I	Appears stable with fair branching structure. Exhibits moderate dieback with 30% deadwood.	No Evidence	Fair with thinning crown	No Evidence	Transient (less than 5 years)	5	**Very Low**	On-site
51	***Syzygium australe*** (Lillypilly)	5	4	150	20	I	Appears stable with fair branching structure.	No Evidence	Very Good	Moderate foliar insect infestation (Psyllids)	Long - more than 40 years	5	**Moderate**	On-site
52	***Casuarina glauca*** (Swamp Oak)	15	9	417	117	M	Appears stable with fair branching structure. Exhibits a very prominent lean to the north-west. Crown suppressed on the east side due to overshadowing.	No Evidence	Good	No Evidence	Medium 15-40 Years	4	**Moderate**	On-site
53	***Casuarina glauca*** (Swamp Oak)	17	10	561	150	M	Appears stable with fair branching structure.	Deadwooded	Good	No Evidence	Medium 15-40 Years	4	**Moderate**	On-site
54	***Casuarina glauca*** (Swamp Oak)	13	7	220x2	77	SM	Appears stable with sound branching structure.	No Evidence	Good	No Evidence	Long - more than 40 years	4	**Moderate**	On-site
55	***Eucalyptus robusta*** (Swamp Mahogany)	8	8	180	40	I	Appears stable with poor branching structure. Main leader broken out at 4 metres. Poor form and habit.	No Evidence	Good	No Evidence	Short 5-15 Years	4	**Low**	On-site

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APPENDIX 3 - TREE HEALTH AND CONDITION ASSESSMENT SCHEDULE

Tree Identification No.	Species	Height (m)	Spread (m)	Trunk Diameter (mm)	Live Crown Size (m^2)	Maturity Class	Condition	Previous Pruning	Health		Remaining Safe Useful Life Expectancy (SULE)	Landscape Significance Rating	Retention Value	Location
									Vigour	Pest & Disease				
56	***Casuarina glauca*** (Swamp Oak)	8	4	180	24	I	Appears stable with sound branching structure.	No Evidence	Fair	No Evidence	Short 5-15 Years	5	**Low**	On-site
57	***Casuarina glauca*** (Swamp Oak)	12	4	150+ 120	36	I	Appears stable with fair branching structure.	No Evidence	Fair	No Evidence	Short 5-15 Years	5	**Low**	On-site
58	***Casuarina glauca*** (Swamp Oak)	12	4	130x2	40	I	Appears stable with poor branching structure.	No Evidence	Fair	No Evidence	Short 5-15 Years	5	**Low**	On-site
59	***Casuarina glauca*** (Swamp Oak)	10	3	130	18	I	Appears stable with sound branching structure.	No Evidence	Fair	No Evidence	Medium 15-40 Years	5	**Low**	On-site
60	***Casuarina glauca*** (Swamp Oak)	10	4	160	24	I	Appears stable with sound branching structure. Crown suppressed on west side due to crowding.	No Evidence	Fair	No Evidence	Medium 15-40 Years	5	**Low**	On-site
61	***Casuarina glauca*** (Swamp Oak)	12	4	160	40	SM	Appears stable with sound branching structure.	No Evidence	Good	No Evidence	Long - more than 40 years	4	**Moderate**	On-site
62	***Casuarina glauca*** (Swamp Oak)	12	4	170	40	SM	Appears stable with sound branching structure.	No Evidence	Good	No Evidence	Long - more than 40 years	4	**Moderate**	On-site
63	***Casuarina glauca*** (Swamp Oak)	13	5	250	65	SM	Appears stable with sound branching structure.	No Evidence	Good	No Evidence	Long - more than 40 years	4	**Moderate**	On-site
64	***Casuarina glauca*** (Swamp Oak)	10	4	220	32	SM	Appears stable with sound branching structure.	No Evidence	Good	No Evidence	Long - more than 40 years	4	**Moderate**	On-site
65	***Acacia floribunda*** (Sally Wattle)	4	6	60x4	18	M	Appears stable with poor branching structure. Exhibits substantial dieback with 80% deadwood.	No Evidence	Poor with sparse crown	No Evidence	Transient (less than 5 years)	6	**Very Low**	On-site
66	***Cupaniopsis anarcardioides*** (Tuckeroo)	4	5	160	20	I	Appears stable with sound branching structure. Exhibits a prominent lean to the east. Crown suppressed west side due to crowding.	No Evidence	Very Good	No Evidence	Long - more than 40 years	6	**Low**	On-site

APPENDIX 3 - TREE HEALTH AND CONDITION ASSESSMENT SCHEDULE

Tree Identification No.	Species	Height (m)	Spread (m)	Trunk Diameter (mm)	Live Crown Size (m^2)	Maturity Class	Condition	Previous Pruning	Health		Remaining Safe Useful Life Expectancy (SULE)	Landscape Significance Rating	Retention Value	Location
									Vigour	Pest & Disease				
67	***Casuarina glauca*** (Swamp Oak)	12	5	180x2	50	SM	Appears stable with fair branching structure. Exhibits a high bark inclusion at GL.	No Evidence	Good	No Evidence	Short 5-15 Years	4	**Low**	On-site
68	***Casuarina glauca*** (Swamp Oak)	14	6	300	72	SM	Appears stable with sound branching structure. Exhibits a prominent lean to the west.	No Evidence	Good	No Evidence	Long - more than 40 years	4	**Moderate**	On-site
69	***Casuarina glauca*** (Swamp Oak)	12	4	200	40	SM	Appears stable with sound branching structure.	No Evidence	Good	No Evidence	Long - more than 40 years	5	**Moderate**	On-site
70	***Casuarina glauca*** (Swamp Oak)	12	4	200	40	SM	Appears stable with poor branching structure. Main leader broken out at 7 metres with modertate wound (stub)	No Evidence	Good	No Evidence	Long - more than 40 years	5	**Moderate**	On-site
71	***Eucalyptus robusta*** (Swamp Mahogany)	13	4	200	20	I	Appears stable with sound branching structure.	No Evidence	Very Good	No Evidence	Long - more than 40 years	4	**Moderate**	On-site
72	***Casuarina glauca*** (Swamp Oak)	12	5	160x2	55	SM	Appears stable with fair branching structure.	No Evidence	Good	No Evidence	Medium 15-40 Years	4	**Moderate**	On-site
73	***Casuarina glauca*** (Swamp Oak)	14	7	330	84	M	Appears stable with sound branching structure.	No Evidence	Good	No Evidence	Long - more than 40 years	4	**Moderate**	On-site
74	***Casuarina glauca*** (Swamp Oak)	13	5	180x2	55	SM	Appears stable with sound branching structure.	No Evidence	Good	No Evidence	Medium 15-40 Years	4	**Moderate**	On-site
75	***Eucalyptus robusta*** (Swamp Mahogany)	10	4	170	28	I	Appears stable with sound branching structure. Crown suppressed on west side due to overshadowing.	No Evidence	Good	No Evidence	Long - more than 40 years	5	**Moderate**	On-site
76	***Casuarina glauca*** (Swamp Oak)	12	4	180	40	SM	Appears stable with sound branching structure.	No Evidence	Good	No Evidence	Long - more than 40 years	5	**Moderate**	On-site
77	***Casuarina glauca*** (Swamp Oak)	14	5	280	60	SM	Appears stable with sound branching structure.	No Evidence	Good	No Evidence	Long - more than 40 years	4	**Moderate**	On-site

PL = Primary Limb; SL = Secondary Limb; TL = Tertiary Limb. GL = Ground Level

APPENDIX 3 - TREE HEALTH AND CONDITION ASSESSMENT SCHEDULE

Tree Identification No.	Species	Height (m)	Spread (m)	Trunk Diameter (mm)	Live Crown Size (m^2)	Maturity Class	Condition	Previous Pruning	Health		Remaining Safe Useful Life Expectancy (SULE)	Landscape Significance Rating	Retention Value	Location
									Vigour	Pest & Disease				
78	***Casuarina glauca*** (Swamp Oak)	15	5	280	65	SM	Appears stable with sound branching structure.	No Evidence	Good	No Evidence	Medium 15-40 Years	4	**Moderate**	On-site
79	***Casuarina glauca*** (Swamp Oak)	12	7	300	70	SM	Appears stable with sound branching structure. Prominent lean to the north-west. Crown suppressed on the east side due crowding. Poor form and habit.	No Evidence	Good	No Evidence	Medium 15-40 Years	4	**Moderate**	On-site
80	***Casuarina glauca*** (Swamp Oak)	12	7	320	70	SM	Appears stable with sound branching structure. Prominent lean to the west. Crown suppressed on the east side due crowding.	No Evidence	Good	No Evidence	Medium 15-40 Years	4	**Moderate**	On-site
81	***Eucalyptus grandis*** (Flooded Gum)	18	9	350	90	SM	Appears stable with fair branching structure. Prominent lean to the north. Moderate wound at 5 metres due storm damage (main leader broken out) - crown restored. Poor form and habit.	No Evidence	Good	No Evidence	Short 5-15 Years	4	**Low**	On-site
82	***Eucalyptus robusta*** (Swamp Mahogany)	12	14	650	126	M	Stability suspect with poor branching structure. Exhibits a large basal wound with substantial dieback in vascular tissue and decay evident.	No Evidence	Poor with sparse crown	Suspected root rot and/or butt rot disease	Transient (less than 5 years)	3	**Very Low**	On-site
83	***Banksia integrifolia*** (Coast Banksia)	10	8	360	64	M	Appears stable with fair branching structure. Exhibits a prominent lean to the west with an obtuse bend in trunk. Crown suppressed east side due to overshadowing.	No Evidence	Good	No Evidence	Long - more than 40 years	4	**Moderate**	On-site
84	***Eucalyptus haemastoma*** (Scribbly Gum)	9	9	300	54	SM	Appears stable with sound branching structure.	No Evidence	Good	No Evidence	Long - more than 40 years	4	**Moderate**	On-site

PL = Primary Limb; SL = Secondary Limb; TL = Tertiary Limb. GL = Ground Level

APPENDIX 4 - IMPACT ASSESSMENT SCHEDULE

Tree Identification No.	Species	Construction Tolerance	Tree Protection Zone (m R)	Structural Root Zone (m R)	TPZ (m^2)	Encroachments to root zone and/or incursions to canopy	Likely impact	Implications of the proposed works & Recommendations for Tree Protection
1	***Eucalyptus saligna*** (Sydney Blue Gum)	P	5.0	2.2	78.5	Existing asphalt car park & conc. kerb offset 1.3 metres north-east to be demolished within TPZ/SRZ. Proposed new car park and associated kerb offset 1.5 metres north-east at RL3.60 (close to existing grade, beyond existing kerb). Excavations for pavement sub-grade within TPZ. No increase in present encroachment.	No adverse impact, provided that all proposed works are undertaken as recommended.	Retain in accordance with recommended Tree Protection Measures (Section 10). Install temporary Tree Protection Fence in accordance with Section 10.5. Demolish existing asphalt pavement and kerb within TPZ in accordance with Section 10.8. Undertake all excavations for new pavement sub-grade and kerb footings within TPZ in accordance with Section 10.9.
2	***Syncarpia glomulifera*** (Turpentine)	M	5.7	2.4	103.2	Existing asphalt car park & conc. kerb offset 1.3 metres north-east to be demolished within TPZ/SRZ.. Existing steps offset 1.2 metres north to be demolished within TPZ/SRZ. Proposed new car park and associated kerb offset 1.6 metres north-east at RL3.60 (close to existing grade, beyond existing kerb). Excavations for pavement sub-grade within TPZ. No increase in present encroachment.	No adverse impact, provided that all proposed works are undertaken as recommended.	Retain in accordance with recommended Tree Protection Measures (Section 10). Install temporary Tree Protection Fence in accordance with Section 10.5. Demolish existing asphalt pavement, kerb & stairs within TPZ in accordance with Section 10.8. Undertake all excavations for new pavement sub-grade and kerb footings within TPZ in accordance with Section 10.9.
3	***Elaeocarpus reticulatus*** (Blueberry Ash)	M	2.5	1.5	19.6	No proposed works within TPZ.	No adverse impact.	Retain in accordance with recommended Tree Protection Measures (Section 10). Install temporary Tree Protection Fence in accordance with Section 10.5. Maintain existing ground levels within TPZ.

APPENDIX 4 - IMPACT ASSESSMENT SCHEDULE

Tree Identification No.	Species	Construction Tolerance	Tree Protection Zone (m R)	Structural Root Zone (m R)	TPZ (m^2)	Encroachments to root zone and/or incursions to canopy	Likely impact	Implications of the proposed works & Recommendations for Tree Protection
4	***Elaeocarpus reticulatus*** (Blueberry Ash)	M	2.8	1.8	23.9	Existing asphalt car park & conc. kerb offset 1.5 metres east to be demolished within TPZ/SRZ. Proposed new car park and associated kerb offset 1.5 metres east at RL3.50) (close to existing grade, within footprint of existing kerb). Excavations for pavement sub-grade & kerb footings within TPZ. Proposed 300mm diameter stormwater pipeline offset 1.8 metres east at IL2.47 (1 metre below grade). Open trenching for pipeline within TPZ/SRZ (within alignment of existing kerb & gutter). No increase in present encroachment.	No adverse impact, provided that all proposed works are undertaken as recommended.	Retain in accordance with recommended Tree Protection Measures (Section 10). Install temporary Tree Protection Fence in accordance with Section 10.5. Demolish existing asphalt pavement & kerb within TPZ in accordance with Section 10.8. Undertake all excavations for new pavement sub-grade and kerb footings within TPZ in accordance with Section 10.9. Undertake all open trenching for proposed stormwater pipeline within TPZ in accordance with Section 10.11.
5	***Eucalyptus saligna*** (Sydney Blue Gum)	P	4.5	1.9	63.6	Existing asphalt car park & conc. kerb offset 1.3 metres east to be demolished within TPZ/SRZ. Proposed new car park and associated kerb offset 1.3 metres east at RL? (TBC) (assumed close to existing grade, within footprint of existing kerb). Excavations for pavement sub-grade & kerb footings within TPZ. Proposed 300mm diameter stormwater pipeline offset 1.6 metres east at IL2.47 (1 metre below grade). Open trenching for pipeline within TPZ/SRZ (within alignment of existing kerb & gutter). No increase in present encroachment.	No adverse impact, provided that all proposed works are undertaken as recommended.	Retain in accordance with recommended Tree Protection Measures (Section 10). Install temporary Tree Protection Fence in accordance with Section 10.5. Demolish existing asphalt pavement & kerb within TPZ in accordance with Section 10.8. Undertake all excavations for new pavement sub-grade and kerb footings within TPZ in accordance with Section 10.9. Undertake all open trenching for proposed stormwater pipeline within TPZ in accordance with Section 10.11.

APPENDIX 4 - IMPACT ASSESSMENT SCHEDULE

Tree Identification No.	Species	Construction Tolerance	Tree Protection Zone (m R)	Structural Root Zone (m R)	TPZ (m^2)	Encroachments to root zone and/or incursions to canopy	Likely impact	Implications of the proposed works & Recommendations for Tree Protection
6	***Elaeocarpus reticulatus*** (Blueberry Ash)	M	2.0	1.4	12.6	Existing asphalt car park & conc. kerb offset 1.5 metres east to be demolished within TPZ/SRZ. Proposed new car park and associated kerb offset 1.5 metres east at RL? (TBC) (assumed close to existing grade, within footprint of existing kerb). Excavations for pavement sub-grade & kerb footings within TPZ. Proposed 300mm diameter stormwater pipeline offset 1.8 metres east at IL2.47 (1 metre below grade). Open trenching for pipeline within TPZ/SRZ (within alignment of existing kerb & gutter). No increase in present encroachment.	No adverse impact, provided that all proposed works are undertaken as recommended.	Retain in accordance with recommended Tree Protection Measures (Section 10). Install temporary Tree Protection Fence in accordance with Section 10.5. Demolish existing asphalt pavement & kerb within TPZ in accordance with Section 10.8. Undertake all excavations for new pavement sub-grade and kerb footings within TPZ in accordance with Section 10.9. Undertake all open trenching for proposed stormwater pipeline within TPZ in accordance with Section 10.11.
7	***Elaeocarpus reticulatus*** (Blueberry Ash)	M	3.0	1.7	28.3	Existing asphalt car park & conc. kerb offset 0.8 metres east to be demolished within TPZ/SRZ. Proposed new car park and associated kerb offset 0.8 metres east at RL? (TBC) (assumed close to existing grade, within footprint of existing kerb). Excavations for pavement sub-grade & kerb footings within TPZ. No increase in present encroachment.	No adverse impact, provided that all proposed works are undertaken as recommended.	Consider removal - poor specimen.
8	***Elaeocarpus reticulatus*** (Blueberry Ash)	M	3.0	1.7	28.3	Existing asphalt car park & conc. kerb offset 1.6 metres east to be demolished within TPZ/SRZ. Proposed new car park and associated kerb offset 1.6 metres east at RL? (TBC) (assumed close to existing grade, within footprint of existing kerb). Excavations for pavement sub-grade & kerb footings within TPZ. No increase in present encroachment.	No adverse impact, provided that all proposed works are undertaken as recommended.	Consider removal - poor specimen.

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Tree Identification No.	Species	Construction Tolerance	Tree Protection Zone (m R)	Structural Root Zone (m R)	TPZ (m^2)	Encroachments to root zone and/or incursions to canopy	Likely impact	Implications of the proposed works & Recommendations for Tree Protection
9	***Brachychiton acerifolius*** (Illawarra Flame Tree)	M	3.0	1.8	28.3	Existing asphalt car park & conc. kerb offset 0.7 metres east to be demolished within TPZ/SRZ. Proposed new car park and associated kerb offset 0.7 metres east at RL? (TBC) (assumed close to existing grade, within footprint of existing kerb). Excavations for pavement sub-grade & kerb footings within TPZ. Proposed 300mm diameter stormwater pipeline offset 1.8 metres east at IL2.47 (1 metre below grade). Open trenching for pipeline within TPZ/SRZ (within alignment of existing kerb & gutter). No increase in present encroachment.	No adverse impact, provided that all proposed works are undertaken as recommended.	Retain in accordance with recommended Tree Protection Measures (Section 10). Install temporary Tree Protection Fence in accordance with Section 10.5. Demolish existing asphalt pavement & kerb within TPZ in accordance with Section 10.8. Undertake all excavations for new pavement sub-grade and kerb footings within TPZ in accordance with Section 10.9. Undertake all open trenching for proposed stormwater pipeline within TPZ in accordance with Section 10.11.
10	***Cinnamomum camphora*** (Camphor Laurel)	M	2.9	1.8	26.0	Existing asphalt car park & conc. kerb offset 0.7 metres east to be demolished within TPZ/SRZ. Proposed new car park and associated kerb offset 0.7 metres east at RL? (TBC) (assumed close to existing grade, within footprint of existing kerb). Excavations for pavement sub-grade & kerb footings within TPZ. No increase in present encroachment.	No adverse impact, provided that all proposed works are undertaken as recommended.	Consider removal - poor specimen + Environmental Weed Species.
11	***Elaeocarpus reticulatus*** (Blueberry Ash)	M	2.6	1.7	20.6	Existing asphalt car park & conc. kerb offset 1.8 metres east to be demolished within TPZ/SRZ. Proposed new car park and associated kerb offset 1.7 metres east at RL? (TBC) (assumed close to existing grade, within footprint of existing kerb). Excavations for pavement sub-grade & kerb footings within TPZ. No increase in present encroachment.	No adverse impact, provided that all proposed works are undertaken as recommended.	Consider removal - poor specimen.

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Tree Identification No.	Species	Construction Tolerance	Tree Protection Zone (m R)	Structural Root Zone (m R)	TPZ (m^2)	Encroachments to root zone and/or incursions to canopy	Likely impact	Implications of the proposed works & Recommendations for Tree Protection
12	***Elaeocarpus reticulatus*** (Blueberry Ash)	M	2.5	1.7	19.9	Existing asphalt car park & conc. kerb offset 1.2 metres east to be demolished within TPZ/SRZ. Proposed new car park and associated kerb offset 1.1 metres east at RL? (TBC) (assumed close to existing grade, within footprint of existing kerb). Excavations for pavement sub-grade & kerb footings within TPZ. No increase in present encroachment.	No adverse impact, provided that all proposed works are undertaken as recommended.	Consider removal - poor specimen.
13	***Tristaniopsis laurina*** (Water Gum)	M	4.2	2.1	55.4	Existing asphalt car park & conc. kerb offset 2 metres east to be demolished within TPZ/SRZ. Proposed new car park and associated kerb offset 1.9 metres east at RL? (TBC) (assumed close to existing grade, within footprint of existing kerb). Excavations for pavement sub-grade & kerb footings within TPZ. No increase in present encroachment.	No adverse impact, provided that all proposed works are undertaken as recommended.	Consider removal - poor specimen.
14	***Banksia serrata*** (Old Man Banksia)	P	2.4	1.7	18.1	Existing asphalt car park & conc. kerb offset 0.7 metres east to be demolished within TPZ/SRZ. Proposed new car park and associated kerb offset 0.5 metres east at RL? (TBC) (assumed close to existing grade, 200mm closer than existing kerb). Excavations for pavement sub-grade & kerb footings within TPZ/SRZ.	Proposed works are likely to result in severance of woody roots, leading to a significant adverse impact.	Remove tree.
15	***Syzygium australe*** (Lillypilly)	M	2.0	1.5	12.6	Located within footprint of proposed new car park.	Proposed works will necessitate removal.	Remove tree.
16	***Syncarpia glomulifera*** (Turpentine)	M	5.4	2.4	91.6	Located within footprint of proposed new car park.	Proposed works will necessitate removal.	Undertake replacement planting with a new tree elsewhere within the site to compensate for loss of amenity in accordance with Section 11.

APPENDIX 4 - IMPACT ASSESSMENT SCHEDULE

Tree Identification No.	Species	Construction Tolerance	Tree Protection Zone (m R)	Structural Root Zone (m R)	TPZ (m^2)	Encroachments to root zone and/or incursions to canopy	Likely impact	Implications of the proposed works & Recommendations for Tree Protection
17	***Tristaniopsis laurina*** (Water Gum)	M	3.0	1.8	28.3	Located within footprint of proposed new car park.	Proposed works will necessitate removal.	Undertake replacement planting with a new tree elsewhere within the site to compensate for loss of amenity in accordance with Section 11.
18	***Elaeocarpus reticulatus*** (Blueberry Ash)	M	2.5	1.4	19.6	Located within footprint of proposed new car park.	Proposed works will necessitate removal.	Undertake replacement planting with a new tree elsewhere within the site to compensate for loss of amenity in accordance with Section 11.
19	***Callistemon salignus*** (Willow Bottlebrush)	M	3.8	2.1	46.3	Located within footprint of proposed new car park.	Proposed works will necessitate removal.	Undertake replacement planting with a new tree elsewhere within the site to compensate for loss of amenity in accordance with Section 11.
20	***Syncarpia glomulifera*** (Turpentine)	M	4.6	2.2	66.0	Located within footprint of proposed new car park.	Proposed works will necessitate removal.	Undertake replacement planting with a new tree elsewhere within the site to compensate for loss of amenity in accordance with Section 11.
21	***Oreocallis wickhamii*** (Tree Waratah)	M	2.0	1.1	12.6	Located within footprint of proposed new car park.	Proposed works will necessitate removal.	Remove tree.
22	***Acacia floribunda*** (Sally Wattle)	M	4.0	1.6	50.2	Located within footprint of proposed new car park.	Proposed works will necessitate removal.	Remove tree.
23	***Syncarpia glomulifera*** (Turpentine)	M	5.4	2.4	91.6	Existing roadway and associated kerb offset 0.6 metres south to be demolished within TPZ/SRZ. Propsed new pergola structure (single level) offset 2.3 metres south-east. Excavations for post footings within TPZ (within footprint of existing road). Pavement surface treatment TBC (permeable treatment proposed). Potential encroachment to TPZ = 17% (less than present situation).	No adverse impact, provided that all proposed works within TPZ are undertaken as recommended.	Retain in accordance with recommended Tree Protection Measures (Section 10). Install temporary Tree Protection Fence in accordance with Section 10.5. Demolish existing asphalt pavement & kerb within TPZ in accordance with Section 10.8. Undertake all excavations for new pavement sub-grade and pergola footings within TPZ in accordance with Section 10.9. Install pergola pavement surface in accordance with Section 10.12 & 10.13.

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Tree Identification No.	Species	Construction Tolerance	Tree Protection Zone (m R)	Structural Root Zone (m R)	TPZ (m^2)	Encroachments to root zone and/or incursions to canopy	Likely impact	Implications of the proposed works & Recommendations for Tree Protection
24	***Acacia floribunda*** (Sally Wattle)	M	2.5	1.4	19.6	Proposed new building offset 1.8 metres east and south at RL? Excavations for building foundations within TPZ.	Proposed works will necessitate removal.	Remove tree.
25	***Melaleuca bracteata*** (Black Tea-tree)	M	2.0	1.4	12.6	Located within footprint of proposed new building.	Proposed works will necessitate removal.	Remove tree.
26	***Syncarpia glomulifera*** (Turpentine)	M	4.8	2.3	72.3	Located within footprint of proposed new building.	Proposed works will necessitate removal.	Undertake replacement planting with a new tree elsewhere within the site to compensate for loss of amenity in accordance with Section 11.
27	***Eucalyptus saligna*** (Sydney Blue Gum)	P	4.0	1.8	50.2	Located within footprint of proposed new building.	Proposed works will necessitate removal.	Remove tree.
28	***Banksia serrata*** (Old Man Banksia)	P	2.5	1.5	19.6	Located within footprint of proposed new building.	Proposed works will necessitate removal.	Undertake replacement planting with a new tree elsewhere within the site to compensate for loss of amenity in accordance with Section 11.
29	***Eucalyptus sp.*** (Gum)	P	3.0	1.5	28.3	Located within footprint of proposed new building.	Proposed works will necessitate removal.	Remove tree.
30	***Eucalyptus saligna*** (Sydney Blue Gum)	P	3.0	1.5	28.3	Located within footprint of proposed new building.	Proposed works will necessitate removal.	Remove tree.
31	***Eucalyptus microcorys*** (Tallowwood)	P	8.2	2.8	210.0	Located within footprint of proposed new building.	Proposed works will necessitate removal.	Undertake replacement planting with a new tree elsewhere within the site to compensate for loss of amenity in accordance with Section 11.

PL = Primary Limb; SL = Secondary Limb; TL = Tertiary Limb. GL = Ground Level

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Tree Identification No.	Species	Construction Tolerance	Tree Protection Zone (m R)	Structural Root Zone (m R)	TPZ (m^2)	Encroachments to root zone and/or incursions to canopy	Likely impact	Implications of the proposed works & Recommendations for Tree Protection
32	***Eucalyptus botryoides*** (Bangalay)	P	7.0	2.3	153.9	Existing building offset 3.2 metres south and existing pathway & carpark offset 0.6 metres north to be demolished within TPZ/SRZ. Proposed new building offset 3.6 metres east at RL? Excavations for building foundations within TPZ (partially within footprint of existing car park. Encroachment to TPZ = 18% (less than present situation. Located within footprint of proposed pergola structure (to be be constructed around the tree). Excavations for post footings within TPZ. Pavement surface treatment TBC (permeable treatment proposed).	No adverse impact, provided that all proposed works within TPZ are undertaken as recommended.	Retain in accordance with recommended Tree Protection Measures (Section 10). Install temporary Tree Protection Fence in accordance with Section 10.5. Demolish existing building, asphalt pavement & kerb within TPZ in accordance with Section 10.8. Undertake all excavations for new pavement sub-grade and pergola footings within TPZ in accordance with Section 10.9. Install pergola pavement surface in accordance with Section 10.12 & 10.13.
33	***Banksia serrata*** (Old Man Banksia)	P	2.0	1.1	12.6	Located within footprint of proposed new car park.	Proposed works will necessitate removal.	Undertake replacement planting with a new tree elsewhere within the site to compensate for loss of amenity in accordance with Section 11.
34	***Banksia serrata*** (Old Man Banksia)	P	2.9	1.8	26.0	Located within footprint of proposed new car park.	Proposed works will necessitate removal.	Remove tree.
35	***Acmena smithii*** (Lillypilly)	M	2.0	1.5	12.6	Located within footprint of proposed new car park.	Proposed works will necessitate removal.	Undertake replacement planting with a new tree elsewhere within the site to compensate for loss of amenity in accordance with Section 11.
36	***Syzygium australe*** (Lillypilly)	M	2.8	1.8	23.9	Located within footprint of proposed new car park.	Proposed works will necessitate removal.	Undertake replacement planting with a new tree elsewhere within the site to compensate for loss of amenity in accordance with Section 11.

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Tree Identification No.	Species	Construction Tolerance	Tree Protection Zone (m R)	Structural Root Zone (m R)	TPZ (m^2)	Encroachments to root zone and/or incursions to canopy	Likely impact	Implications of the proposed works & Recommendations for Tree Protection
37	***Eucalyptus botryoides*** (Bangalay)	P	14.5	3.6	662.2	Existing building offset 2.9 metres south and 3.3 metres east and existing car park offset 1.7 metres west to be demolished within TPZ. Proposed new car park and associated kerb offset 3.1 metres west at RL? (TBC) (within footprint of existing asphalt pavement). Excavations for pavement sub-grade and kerb footings within TPZ/SRZ. No increase in present encroachment (substantial decrease).	No adverse impact, provided that all proposed works are undertaken as recommended.	Retain in accordance with recommended Tree Protection Measures (Section 10). Install temporary Tree Protection Fence in accordance with Section 10.5. Demolish existing asphalt pavement & kerb within TPZ in accordance with Section 10.8. Undertake all excavations for new pavement sub-grade and kerb footings within TPZ in accordance with Section 10.9.
38	***Eucalyptus botryoides*** (Bangalay)	P	9.0	2.5	254.3	Existing building offset 3.6 metres north and 2.8 metres east and existing car park offset 2.1 metres west to be demolished within TPZ. Proposed new car park and associated kerb offset 3.2 metres west at RL? (TBC) (within footprint of existing asphalt pavement). Excavations for pavement sub-grade and kerb footings within TPZ/SRZ. No increase in present encroachment (substantial decrease).	No adverse impact, provided that all proposed works are undertaken as recommended.	Retain in accordance with recommended Tree Protection Measures (Section 10). Install temporary Tree Protection Fence in accordance with Section 10.5. Demolish existing asphalt pavement & kerb within TPZ in accordance with Section 10.8. Undertake all excavations for new pavement sub-grade and kerb footings within TPZ in accordance with Section 10.9.
39	***Eucalyptus botryoides*** (Bangalay)	P	9.0	2.5	254.3	Proposed new roadway and associated kerb offset 3.1 metres west and 1.3 metres south at RL? (TBC) (assumed close to existing grade, within footprint of existing roadway and footpath to be demolished/re-surfaced). Excavations for pavement sub-grade and kerb footings within SRZ. No increase in present encroachment.	No adverse impact, provided that all proposed works are undertaken as recommended.	Retain in accordance with recommended Tree Protection Measures (Section 10). Install temporary Trunk Protection Boarding in accordance with Section 10.6. Demolish existing asphalt pavement & path within TPZ (where required) in accordance with Section 10.8. Undertake all excavations for new pavement sub-grade and kerb footings within TPZ in accordance with Section 10.9. Install pavement in accordance with Section 10.12. Install flush kerb at edge of road pavement in preference to upstand kerb to minimise excavations for kerb footings within SRZ.

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Tree Identification No.	Species	Construction Tolerance	Tree Protection Zone (m R)	Structural Root Zone (m R)	TPZ (m^2)	Encroachments to root zone and/or incursions to canopy	Likely impact	Implications of the proposed works & Recommendations for Tree Protection
40	***Corymbia maculata*** (Spotted Gum)	P	7.7	2.7	185.3	Proposed new roadway and associated kerb offset 0.8 metres south at RL? (TBC) (assumed close to existing grade within footprint of existing roadway and footpath to be demolished/re-surfaced). Excavations for pavement sub-grade and kerb footings within SRZ. No increase in present encroachment.	No adverse impact, provided that all proposed works are undertaken as recommended.	Retain in accordance with recommended Tree Protection Measures (Section 10). Install temporary Trunk Protection Boarding in accordance with Section 10.6. Demolish existing asphalt pavement & path within TPZ (where required) in accordance with Section 10.8. Undertake all excavations for new pavement sub-grade and kerb footings within TPZ in accordance with Section 10.9. Install pavement in accordance with Section 10.12. Install flush kerb at edge of road pavement in preference to upstand kerb to minimise excavations for kerb footings within SRZ.
41	***Corymbia maculata*** (Spotted Gum)	P	9.0	2.7	254.3	Proposed new roadway and associated kerb offset 0.5 metres south at RL? (TBC) (assumed close to existing grade within footprint of existing roadway and footpath to be demolished/re-surfaced). Excavations for pavement sub-grade and kerb footings within SRZ. No increase in present encroachment.	No adverse impact, provided that all proposed works are undertaken as recommended.	Retain in accordance with recommended Tree Protection Measures (Section 10). Install temporary Trunk Protection Boarding in accordance with Section 10.6. Demolish existing asphalt pavement & path within TPZ (where required) in accordance with Section 10.8. Undertake all excavations for new pavement sub-grade and kerb footings within TPZ in accordance with Section 10.9. Install pavement in accordance with Section 10.12. Install flush kerb at edge of road pavement in preference to upstand kerb to minimise excavations for kerb footings within SRZ.

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Tree Identification No.	Species	Construction Tolerance	Tree Protection Zone (m R)	Structural Root Zone (m R)	TPZ (m^2)	Encroachments to root zone and/or incursions to canopy	Likely impact	Implications of the proposed works & Recommendations for Tree Protection
42	***Eucalyptus grandis*** (Flooded Gum)	P	9.0	2.4	254.3	Proposed new roadway and associated kerb offset 2.2 metres south at RL? (TBC) (assumed close to existing grade within footprint of existing roadway and footpath to be demolished/re-surfaced). Excavations for pavement sub-grade and kerb footings within SRZ. No increase in present encroachment.	No adverse impact, provided that all proposed works are undertaken as recommended.	Retain in accordance with recommended Tree Protection Measures (Section 10). Install temporary Trunk Protection Boarding in accordance with Section 10.6. Demolish existing asphalt pavement & path within TPZ (where required) in accordance with Section 10.8. Undertake all excavations for new pavement sub-grade and kerb footings within TPZ in accordance with Section 10.9. Install pavement in accordance with Section 10.12. Install flush kerb at edge of road pavement in preference to upstand kerb to minimise excavations for kerb footings within SRZ.
43	***Banksia serrata*** (Old Man Banksia)	P	2.0	1.4	12.6	Existing asphalt roadway offset 0.5 metres north to be demolished within TPZ/SRZ. Proposed new roadway and associated kerb offset 1.8 metres north at RL? (TBC) (assumed close to existing grade, beyond existing kerb). Excavations for pavement sub-grade within TPZ. No increase in present encroachment.	No adverse impact, provided that all proposed works are undertaken as recommended.	Retain in accordance with recommended Tree Protection Measures (Section 10). Install temporary Tree Protection Fence in accordance with Section 10.5. Demolish existing asphalt pavement and kerb within TPZ in accordance with Section 10.8. Undertake all excavations for new pavement sub-grade and kerb footings within TPZ in accordance with Section 10.9.
44	***Banksia serrata*** (Old Man Banksia)	P	2.0	1.4	12.6	Existing asphalt roadway offset 0.8 metres north to be demolished within TPZ/SRZ. Proposed new roadway and associated kerb offset 2.2 metres north at RL? (TBC) (assumed close to existing grade, beyond existing kerb). Excavations for pavement sub-grade within TPZ. No increase in present encroachment.	No adverse impact, provided that all proposed works are undertaken as recommended.	Retain in accordance with recommended Tree Protection Measures (Section 10). Install temporary Tree Protection Fence in accordance with Section 10.5. Demolish existing asphalt pavement and kerb within TPZ in accordance with Section 10.8. Undertake all excavations for new pavement sub-grade and kerb footings within TPZ in accordance with Section 10.9.

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Tree Identification No.	Species	Construction Tolerance	Tree Protection Zone (m R)	Structural Root Zone (m R)	TPZ (m^2)	Encroachments to root zone and/or incursions to canopy	Likely impact	Implications of the proposed works & Recommendations for Tree Protection
45	***Eucalyptus microcorys*** (Tallowwood)	P	7.1	2.7	158.7	Existing asphalt pavement offset 2.6 metres south and 3.1 metres west and existing pathway offset 1.4 metres north to be demolished within TPZ. Proposed new building offset 4.2 metres south-west and 6.0 metres south-east at RL? Excavations for building foundations within TPZ (mostly within footprint of existing asphalt pavement). Encroachment to TPZ = 21% (less than present situation). Proposed pathway (crushed sandstone) offset 3.3 metres south-east and timber decking (timber sleepers) offset 1.7 metres north-east at RL4.00 (150mm above grade). Cut and fill for pavement sub-grade within TPZ. Cumulative encroachment = 42%	Extent of encroachment to TPZ from building exceeds acceptable limits under AS 4970:2009. However, this tree will tolerate the extent of the encroachment proposed given the existing encroachments. The cumulative encroachment including the new pathways have the potential to result in severance and damage to woody roots, which may result in an adverse impact on this tree. However, provided that thesese works are implemented as recommended, any adverse impact can be avoided.	Retain in accordance with recommended Tree Protection Measures (Section 10). Install temporary Tree Protection Fence in accordance with Section 10.5. Demolish existing asphalt pavement and kerb within TPZ in accordance with Section 10.8. Undertake all excavations for new building foundations within TPZ in accordance with Section 10.9. Install pathway within TPZ in accordance with Section 10.12. Consider constructing the pathway to the north-west as an elevated walkway using permeable Fibre Reinforced Plastic (FRP) decking supported by steel subframe on isolated post/pad footings or similar construction (timber deck or timber sleepers placed above existing grade) within TPZ to avoid encroachment.
46	***Harpephyllum caffrum*** (Wild Plum)	M	7.2	2.7	162.8	Located within footprint of proposed new roadway/kerb	Proposed works will necessitate removal.	Remove tree.
47	***Casuarina glauca*** (Swamp Oak)	M	4.0	2.0	50.2	Located within footprint of proposed new building.	Proposed works will necessitate removal.	Remove tree.
48	***Eucalyptus scoparia*** (Willow Gum)	P	7.0	2.3	153.9	Located within footprint of proposed new building.	Proposed works will necessitate removal.	Remove tree.

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Tree Identification No.	Species	Construction Tolerance	Tree Protection Zone (m R)	Structural Root Zone (m R)	TPZ (m^2)	Encroachments to root zone and/or incursions to canopy	Likely impact	Implications of the proposed works & Recommendations for Tree Protection
49	***Cupressus sempervirens*** (Italian Cypress)	M	3.0	1.6	28.3	Located within footprint of proposed new building & car park.	Proposed works will necessitate removal.	Remove tree.
50	***Tristaniopsis laurina*** (Water Gum)	M	2.0	1.4	12.6	Located within footprint of proposed new car park.	Proposed works will necessitate removal.	Remove tree.
51	***Syzygium australe*** (Lillypilly)	M	2.2	1.5	15.2	Located within footprint of proposed new car park.	Proposed works will necessitate removal.	Undertake replacement planting with a new tree elsewhere within the site to compensate for loss of amenity in accordance with Section 11.
52	***Casuarina glauca*** (Swamp Oak)	M	5.0	2.3	78.7	Located within footprint of proposed new car park.	Proposed works will necessitate removal.	Undertake replacement planting with a new tree elsewhere within the site to compensate for loss of amenity in accordance with Section 11.
53	***Casuarina glauca*** (Swamp Oak)	M	6.7	2.6	142.1	Located within footprint of proposed new car park.	Proposed works will necessitate removal.	Undertake replacement planting with a new tree elsewhere within the site to compensate for loss of amenity in accordance with Section 11.
54	***Casuarina glauca*** (Swamp Oak)	M	4.0	2.1	49.2	Located within footprint of proposed new car park.	Proposed works will necessitate removal.	Undertake replacement planting with a new tree elsewhere within the site to compensate for loss of amenity in accordance with Section 11.
55	***Eucalyptus robusta*** (Swamp Mahogany)	P	5.0	1.6	78.5	Located within footprint of proposed new car park.	Proposed works will necessitate removal.	Remove tree.
56	***Casuarina glauca*** (Swamp Oak)	M	2.2	1.6	14.6	Located within footprint of proposed new car park.	Proposed works will necessitate removal.	Remove tree.
57	***Casuarina glauca*** (Swamp Oak)	M	2.4	1.7	18.1	Located within footprint of proposed new car park.	Proposed works will necessitate removal.	Remove tree.
58	***Casuarina glauca*** (Swamp Oak)	M	2.4	1.7	18.1	Located within footprint of proposed new car park.	Proposed works will necessitate removal.	Remove tree.

PL = Primary Limb; SL = Secondary Limb; TL = Tertiary Limb. GL = Ground Level

APPENDIX 4 - IMPACT ASSESSMENT SCHEDULE

Tree Identification No.	Species	Construction Tolerance	Tree Protection Zone (m R)	Structural Root Zone (m R)	TPZ (m^2)	Encroachments to root zone and/or incursions to canopy	Likely impact	Implications of the proposed works & Recommendations for Tree Protection
59	***Casuarina glauca*** (Swamp Oak)	M	2.0	1.4	12.6	Located within footprint of proposed new car park.	Proposed works will necessitate removal.	Remove tree.
60	***Casuarina glauca*** (Swamp Oak)	M	2.0	1.5	12.6	No proposed works within TPZ.	No adverse impact.	Retain in accordance with recommended Tree Protection Measures (Section 10). Install temporary Tree Protection Fence in accordance with Section 10.5.
61	***Casuarina glauca*** (Swamp Oak)	M	2.5	1.5	19.6	No proposed works within TPZ. Extent of temporary/permanent construction batter to be verified.	No adverse impact.	Retain in accordance with recommended Tree Protection Measures (Section 10). Install temporary Tree Protection Fence in accordance with Section 10.5.
62	***Casuarina glauca*** (Swamp Oak)	M	3.0	1.6	28.3	No proposed works within TPZ. Extent of temporary/permanent construction batter to be verified.	No adverse impact.	Retain in accordance with recommended Tree Protection Measures (Section 10). Install temporary Tree Protection Fence in accordance with Section 10.5.
63	***Casuarina glauca*** (Swamp Oak)	M	3.0	1.8	28.3	Proposed new car park offset 2.1 metres north-west at RL? (assumed 500 to 800mm below grade). Excavations for pavement sub-grade and constructed batter within SRZ. Encroachment to TPZ = 10% (excluding batter).	Extent of temporary/permanent construction batter to be verified.	Retain in accordance with recommended Tree Protection Measures (Section 10). Install temporary Tree Protection Fence in accordance with Section 10.5.
64	***Casuarina glauca*** (Swamp Oak)	M	2.6	1.8	21.9	No proposed works within TPZ.	No adverse impact.	Retain in accordance with recommended Tree Protection Measures (Section 10). Install temporary Tree Protection Fence in accordance with Section 10.5.
65	***Acacia floribunda*** (Sally Wattle)	M	3.5	1.4	38.5	No proposed works within TPZ.	No adverse impact.	Consider removal - poor specimen.
66	***Cupaniopsis anarcardioides*** (Tuckeroo)	M	3.0	1.5	28.3	No proposed works within TPZ.	No adverse impact.	Retain in accordance with recommended Tree Protection Measures (Section 10). Install temporary Tree Protection Fence in accordance with Section 10.5.

APPENDIX 4 - IMPACT ASSESSMENT SCHEDULE

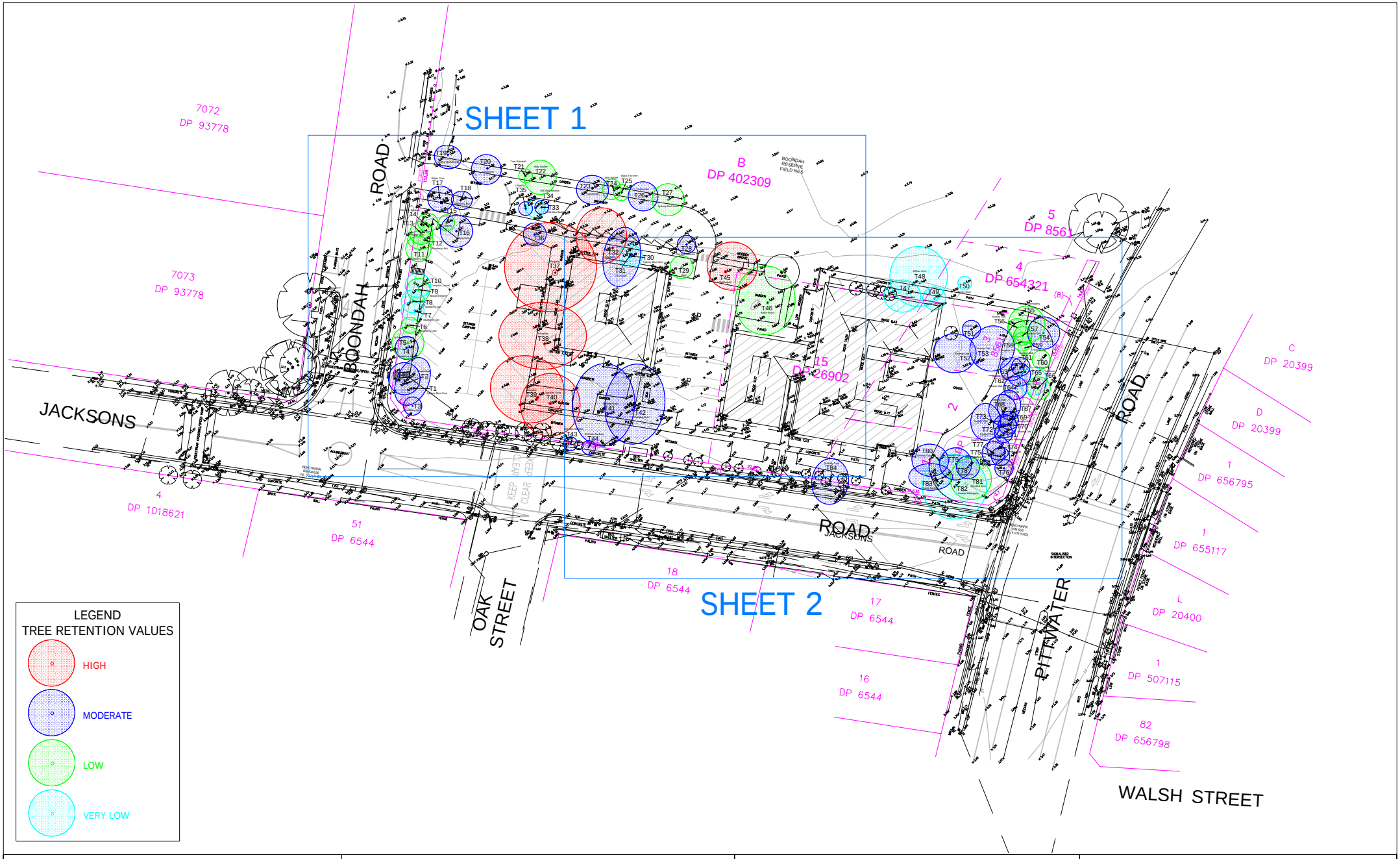
Tree Identification No.	Species	Construction Tolerance	Tree Protection Zone (m R)	Structural Root Zone (m R)	TPZ (m^2)	Encroachments to root zone and/or incursions to canopy	Likely impact	Implications of the proposed works & Recommendations for Tree Protection
67	***Casuarina glauca*** (Swamp Oak)	M	3.2	1.9	33.0	No proposed works within TPZ.	No adverse impact.	Retain in accordance with recommended Tree Protection Measures (Section 10). Install temporary Tree Protection Fence in accordance with Section 10.5.
68	***Casuarina glauca*** (Swamp Oak)	M	3.6	2.0	40.7	No proposed works within TPZ.	No adverse impact.	Retain in accordance with recommended Tree Protection Measures (Section 10). Install temporary Tree Protection Fence in accordance with Section 10.5.
69	***Casuarina glauca*** (Swamp Oak)	M	2.4	1.7	18.1	No proposed works within TPZ.	No adverse impact.	Retain in accordance with recommended Tree Protection Measures (Section 10). Install temporary Tree Protection Fence in accordance with Section 10.5.
70	***Casuarina glauca*** (Swamp Oak)	M	2.4	1.7	18.1	No proposed works within TPZ.	No adverse impact.	Retain in accordance with recommended Tree Protection Measures (Section 10). Install temporary Tree Protection Fence in accordance with Section 10.5.
71	***Eucalyptus robusta*** (Swamp Mahogany)	P	2.4	1.7	18.1	No proposed works within TPZ.	No adverse impact.	Retain in accordance with recommended Tree Protection Measures (Section 10). Install temporary Tree Protection Fence in accordance with Section 10.5.
72	***Casuarina glauca*** (Swamp Oak)	M	2.9	1.8	26.0	No proposed works within TPZ.	No adverse impact.	Retain in accordance with recommended Tree Protection Measures (Section 10). Install temporary Tree Protection Fence in accordance with Section 10.5.
73	***Casuarina glauca*** (Swamp Oak)	M	4.0	2.1	49.2	No proposed works within TPZ.	No adverse impact.	Retain in accordance with recommended Tree Protection Measures (Section 10). Install temporary Tree Protection Fence in accordance with Section 10.5.
74	***Casuarina glauca*** (Swamp Oak)	M	3.2	1.9	33.0	Proposed future roadway (slip lane) offset 1.6 metres south at RL? (assumed 500 to 900mm below grade). Excavations for pavement sub-grade and constructed batter within SRZ. Encroachment to TPZ >20% (excluding batter).	Extent of encroachment to TPZ exceeds acceptable limits under AS 4970:2009. Likely to result in severance and damage to woody roots, leading to a significant adverse impact. No adverse impact from proposed Community Centre works.	To be retained at this stage. Retain in accordance with recommended Tree Protection Measures (Section 10). Install temporary Tree Protection Fence in accordance with Section 10.5.

APPENDIX 4 - IMPACT ASSESSMENT SCHEDULE

Tree Identification No.	Species	Construction Tolerance	Tree Protection Zone (m R)	Structural Root Zone (m R)	TPZ (m^2)	Encroachments to root zone and/or incursions to canopy	Likely impact	Implications of the proposed works & Recommendations for Tree Protection
75	***Eucalyptus robusta*** (Swamp Mahogany)	P	2.0	1.6	13.1	Located within footprint of future roadway (slip lane).	Proposed future road works will necessitate removal. No adverse impact from proposed Community Centre works.	To be retained at this stage. Retain in accordance with recommended Tree Protection Measures (Section 10). Install temporary Tree Protection Fence in accordance with Section 10.5.
76	***Casuarina glauca*** (Swamp Oak)	MM	2.2	1.6	14.6	Located within footprint of future roadway (slip lane).	Proposed future road works will necessitate removal. No adverse impact from proposed Community Centre works.	To be retained at this stage. Retain in accordance with recommended Tree Protection Measures (Section 10). Install temporary Tree Protection Fence in accordance with Section 10.5.
77	***Casuarina glauca*** (Swamp Oak)	M	3.4	1.9	35.4	Proposed future roadway (slip lane) offset 0.9 metres south at RL? (assumed 500 to 900mm below grade). Excavations for pavement sub-grade and constructed batter within SRZ. Encroachment to TPZ >30% (excluding batter).	Extent of encroachment to TPZ exceeds acceptable limits under AS 4970:2009. Likely to result in severance and damage to woody roots, leading to a significant adverse impact. No adverse impact from proposed Community Centre works.	To be retained at this stage. Retain in accordance with recommended Tree Protection Measures (Section 10). Install temporary Tree Protection Fence in accordance with Section 10.5.
78	***Casuarina glauca*** (Swamp Oak)	M	3.4	1.9	35.4	Located within footprint of future roadway (slip lane).	Proposed future road works will necessitate removal. No adverse impact from proposed Community Centre works.	To be retained at this stage. Retain in accordance with recommended Tree Protection Measures (Section 10). Install temporary Tree Protection Fence in accordance with Section 10.5.
79	***Casuarina glauca*** (Swamp Oak)	M	3.6	2.0	40.7	Located within footprint of future roadway (slip lane).	Proposed future road works will necessitate removal. No adverse impact from proposed Community Centre works.	To be retained at this stage. Retain in accordance with recommended Tree Protection Measures (Section 10). Install temporary Tree Protection Fence in accordance with Section 10.5.
80	***Casuarina glauca*** (Swamp Oak)	M	3.8	2.1	46.3	Proposed future roadway (slip lane) offset 1.6 metres south at RL? (assumed 400-500mm below grade). Excavations for pavement sub-grade and constructed batter within SRZ. Encroachment to TPZ >30% (excluding batter).	Extent of encroachment to TPZ exceeds acceptable limits under AS 4970:2009. Likely to result in severance and damage to woody roots, leading to a significant adverse impact. No adverse impact from proposed Community Centre works.	To be retained at this stage. Retain in accordance with recommended Tree Protection Measures (Section 10). Install temporary Tree Protection Fence in accordance with Section 10.5.

APPENDIX 4 - IMPACT ASSESSMENT SCHEDULE

Tree Identification No.	Species	Construction Tolerance	Tree Protection Zone (m R)	Structural Root Zone (m R)	TPZ (m^2)	Encroachments to root zone and/or incursions to canopy	Likely impact	Implications of the proposed works & Recommendations for Tree Protection
81	***Eucalyptus grandis*** (Flooded Gum)	P	4.2	2.1	55.4	Located within footprint of future roadway (slip lane).	Proposed future road works will necessitate removal. No adverse impact from proposed Community Centre works.	To be retained at this stage. Retain in accordance with recommended Tree Protection Measures (Section 10). Install temporary Tree Protection Fence in accordance with Section 10.5.
82	***Eucalyptus robusta*** (Swamp Mahogany)	P	7.8	2.8	191.0	Located within footprint of future roadway (slip lane).	Proposed future road works will necessitate removal. No adverse impact from proposed Community Centre works.	To be retained at this stage. Retain in accordance with recommended Tree Protection Measures (Section 10). Install temporary Tree Protection Fence in accordance with Section 10.5.
83	***Banksia integrifolia*** (Coast Banksia)	P	5.0	2.2	78.5	Located within footprint of future roadway (slip lane).	Proposed future road works will necessitate removal. No adverse impact from proposed Community Centre works.	To be retained at this stage. Retain in accordance with recommended Tree Protection Measures (Section 10). Install temporary Tree Protection Fence in accordance with Section 10.5.
84	***Eucalyptus haemastoma*** (Scribbly Gum)	P	5.0	2.0	78.5	Located within footprint of future roadway (slip lane).	Proposed future road works will necessitate removal. No adverse impact from proposed Community Centre works.	To be retained at this stage. Retain in accordance with recommended Tree Protection Measures (Section 10). Install temporary Tree Protection Fence in accordance with Section 10.5.



APPENDIX 5
TREE LOCATION PLAN SHOWING
TREE RETENTION VALUES
Warriewood Valley Community Centre

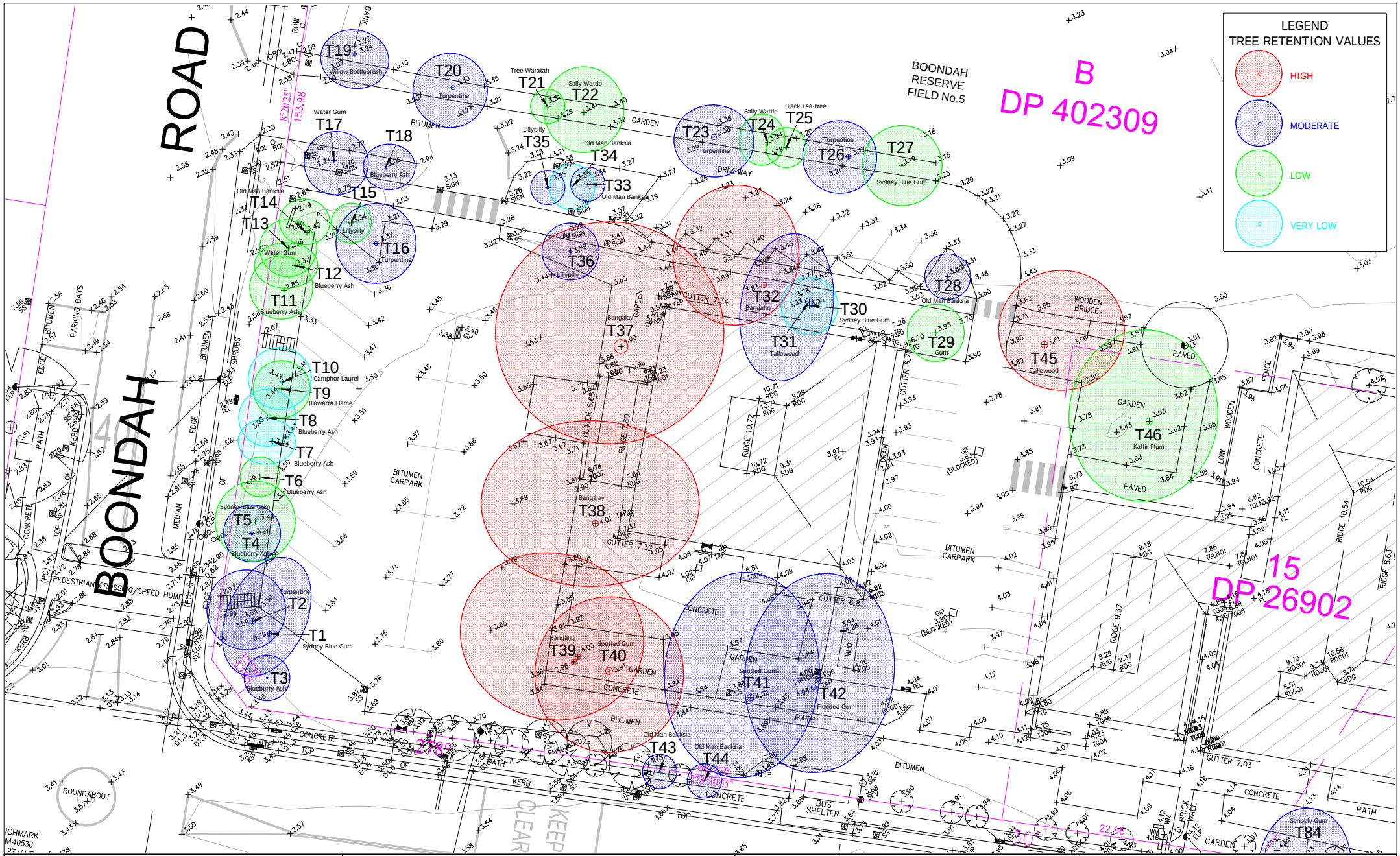
Earthscape Horticultural Services
Arboricultural and Horticultural Consultants
PO Box 364
BEROWRA NSW 2081
Ph: 02 9456 4787
Fax: 02 9456 5757 e: earthscape@iinet.net.au

Based on the Survey Drawing
prepared by Lockley Land Title Solutions
Dwg Ref No. 50601 001DT
Dated 29/01/2019

DWG No. T19-032701 [A]

KEY PLAN

DATE: 27/03/2019



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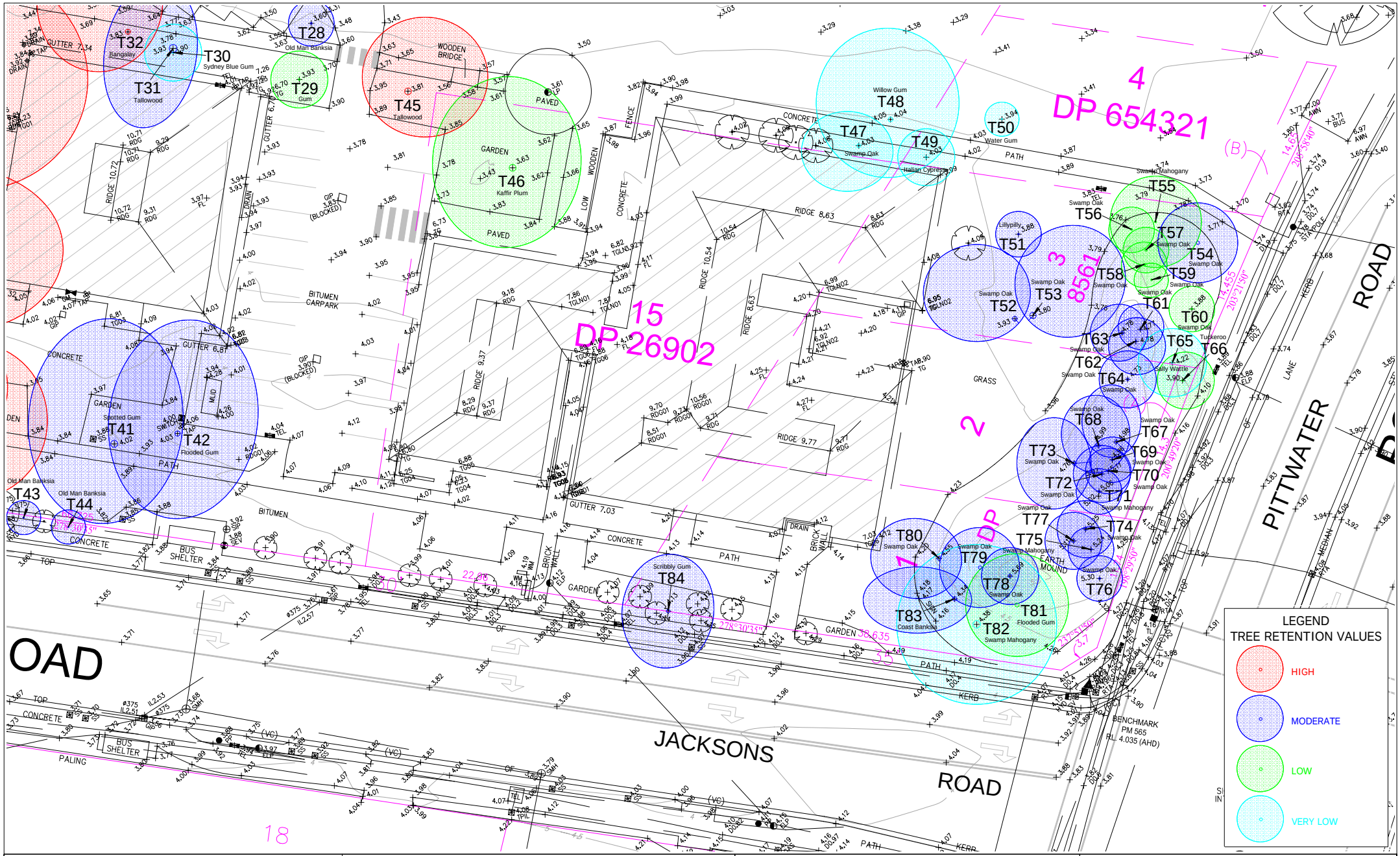

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SHEET 2

DATE: 27/03/2019

APPENDIX 6

TREE PROTECTION PLAN

Warriewood Valley Community Centre
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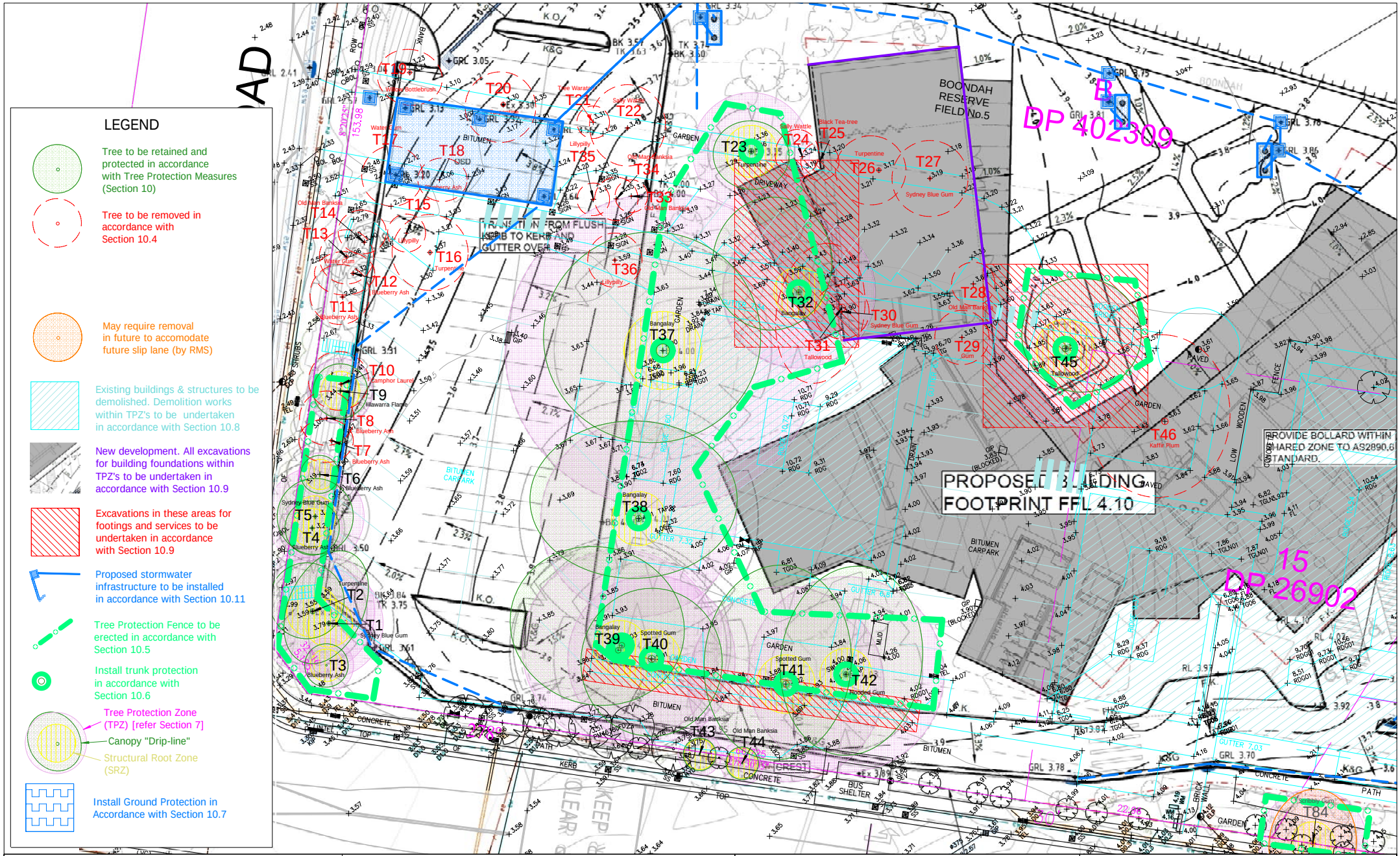
Dated 29/01/2019

DWG No. T19-032702 [E]

KEY PLAN

DATE: 04/02/2021



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SHEET 1

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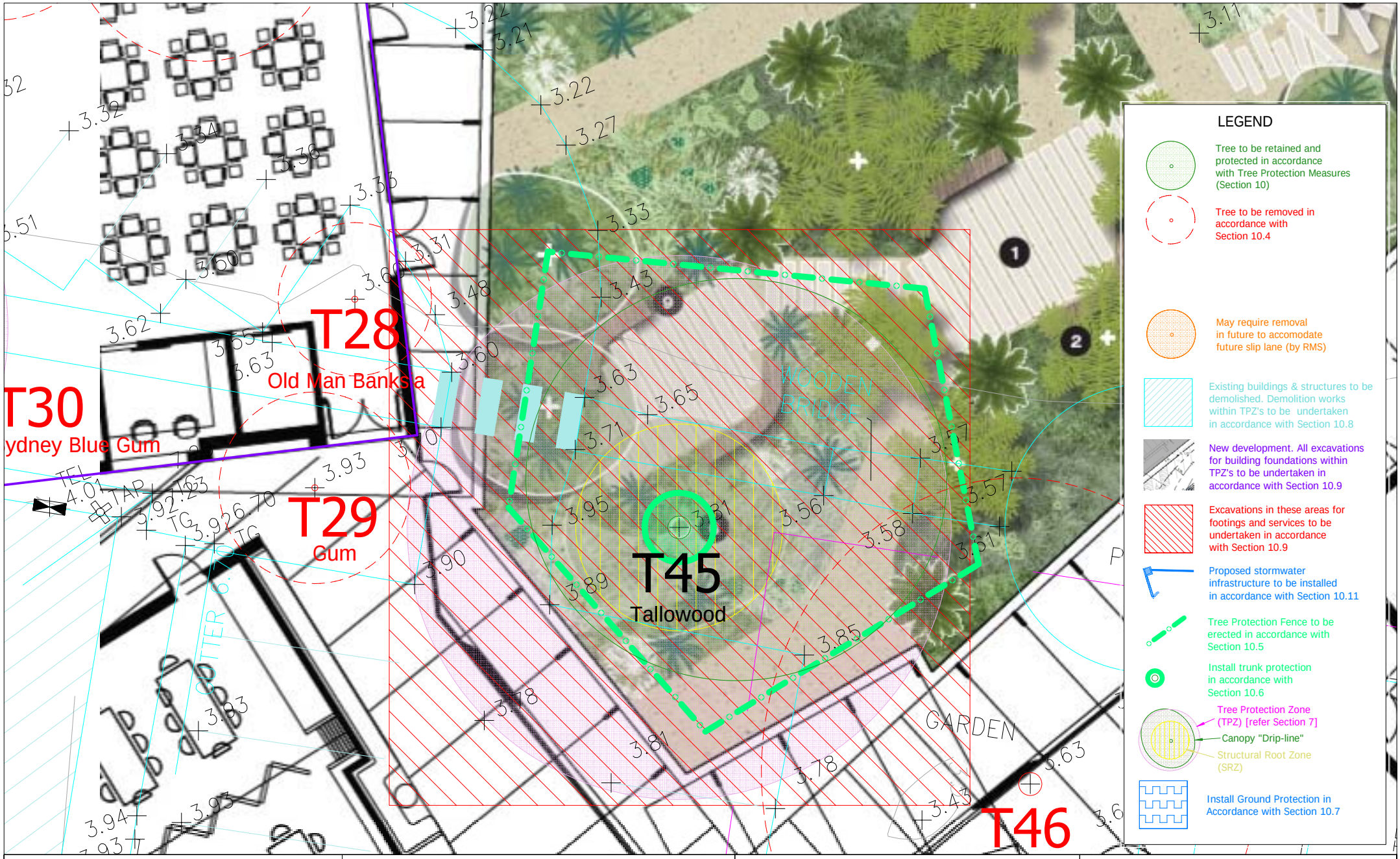

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SHEET 3 - DETAIL T45

DATE: 04/02/2021